

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

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If this book is a soft cover it is in black and white print a digital colour copy can be found on padreaustralia.com¹ website free of charge. Email:

padregraham8@gmail.com

[Dr Barry Gumm Email: cornerstonetargeting@gmail.com](mailto:cornerstonetargeting@gmail.com)

Youtube: Padre Rev'd Dr Graham J Whelan OAM

https://www.youtube.com/channel/UC2HCizMdbxH7_2lmXkyhnqg

If there are any errors, please note I have very low vision and my team have done their best to correct.

Some of the videos that this book has reference have already been deleted from you tube. Go to padreaustralia.com Where possible we have uploaded the videos in the appropriate chapter and reference area of this book and may still be available.

Any perceived wisdom or understanding this book is from the Lord.

¹ <http://padreaustralia.com/7-trumpets-a-overview/> Change this when finishing BARRY

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“For, All men are like grass, and all their glory is like the flowers of the field; the grass withers and the flowers fall, but the word of the Lord stands forever. And this is the word that was preached to you.” (1 Peter 1:24-25).

Mark recorded Jesus said: “What good is it for a man to gain the whole world, yet forfeit his soul?” (Mark 8:36).

**The King of kings
and
Lord of lords
reigns for ever and ever.**

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Blessings

Trumpet Number One

A Detailed Analysis

By

Reverend Dr Graham J Whelan OAM

&

Reverend Dr Barry D G Gumm

**A detailed analysis of Trumpet Number One
in the Series - 7 Trumpets Sounding God's Warnings**

THANK YOU AND ACKNOWLEDGMENTS

I thank Our Lord Jesus every day for the Ministry of my colleague Dr. Barry Gumm, for our Godly discussions resulting in several books:

- 1) Savage Kings – Defeated
- 2) ANTICHRIST REVEALED
- 3) COVID WAR – Revelation 6 – 7 Seals
- 4) Seven Trumpets Sounding God’s Warning
- 5) Trumpet Number One – A Detailed Analysis in the 7 Trumpet Sounding God’s Warnings series
- 6) Book of Revelation – Now and Not yet
- 7) Among many others

Which have faithfully commented on Holy Scripture, in particular The Book of Revelation which the Lord Jesus through the Apostle John gave to us.

Thank you to Dr Barry D G Gumm for his contributions, his previous works the “Woman in Heaven who gives Birth” and “Mystery Babylon the Great-er London” books.

SPECIAL THANKS - For

The Holy Bible, New International Version
The Zondervan Corporation
Grand Rapids, Michigan, 49530

A note: This book was written on the 27th August 2024 with the expectation that President Trump elect would win the vote for president of the USA in line with Bible Prophecy of the Red Horse Republican Party Rider of USA.

Note: Amazon AI may occasionally overlap a picture on to some text. We have tried our many times and our best to stop this from happening. We apologise in advance if AI did not set type setting correctly. There may be a blank page due to this type setting failure(s) of Amazon AI.

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FORWARD

This book 7 Trumpets Sounding God's Warning's is a general overview of the 7 Trumpets that are in the Holy Bible in the Book of Revelation chapters eight through ten including the little scroll or book.

A separate Book for detailed analysis and theology for each Trumpet is entrain.

Proverbs 9.10

The fear of the LORD is the beginning of wisdom, and knowledge of the Holy One is understanding.

The elite when they reach the top of their POWER need to repent of their evil delusion and rebellion to Almighty God – to repent (see Book of Common Prayer 1662 Morning Prayer and prayer of the people).

PREFACE

The book “COVID WAR – Revelation 6 – 7 Seals”² was completed with the beginning of Revelation chapter eight where the angel (messenger/demonstrator) throws fire and hail mixed with blood (blood of Animals, Humans, Birds) to the Earth.

Revelation 8.1-5

1 When he opened the seventh seal, there was silence in Heaven for about half an hour.

2 And I saw the seven angels who stand before God, and to them were given seven trumpets.

3 Another angel, who had a golden censer, came and stood at the altar. He was given much incense to offer, with the prayers of all the saints*, on the golden altar before the throne.

² <http://padreaustralia.com/4-horses-of-revelation/> Book by Rev'd Dr Graham J Whelan OAM COVID WAR – Revelation 6 – 7 Seals ISBN: 9798437529577

We explain in the chapter “Almighty God’s Approval why the saints are praying and why the angels are demonstrating the evil destructions the globalists bankers are deploying on the Earth

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4 The smoke of the incense, together with the prayers of the saints, went up before God from the angel's hand.

5 Then the angel took the censer, filled it with fire from the altar, and hurled it on the Earth; and there came peals of thunder, rumblings, flashes of lightning and an Earthquake.

I have revealed some of the technologies that create these disasters in my book "Savage Kings" and on my youtube channel. Daniel Alexander Cannon³ along with others on social media have proven the lightning comes from underground from the use of technologies like HAARP and DARPA just to name only two. It is alleged that the United Nations have revealed that they will have 100% control of Earth's weather by 2025. The patents for these technologies are numerous and can be easily found. If that is the case then climate change is a lie, because if it were true they could control the weather.

³ <https://www.youtube.com/c/LogicBeforeAuthorityOFFICIAL>

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The USA air force in the 1950's⁴ authorised documentaries on how they were spraying USA towns with various chemicals. Could this be classed as biological weapons on its own populace?

The USA navy have tested biological weapons dispersal in the 1950s. Link to youtube video.⁵ “Naval Concepts of Chemical and Biological Warfare” (1952).⁶

<https://www.youtube.com/watch?v=RyUCSy9dzQU&t=39s>

You will see that not only have they used chemical weapons like Agent Orange in the Vietnam war and the research has been extensive. This is very important because in some of the Trumpets the Lord reveals that these technologies are going to be used for evil purposes and probably more than once and with devastating consequences.

The Lord is against those that destroy the Earth*.

Revelation 11.8

“The time has come for judging the dead,.....and for destroying those who destroy the Earth.”

⁴ https://en.wikipedia.org/wiki/Operation_LAC

⁵ <https://www.youtube.com/watch?v=RyUCSy9dzQU&t=39s>

⁶ <https://youtu.be/RyUCSy9dzQU>

*We explain in the chapter “Almighty God’s Approval” we explain why the angels are demonstrating the evil the destructions globalists bankers are deploying on the Earth

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Holy Scripture indicates that climate change is a lie, and it is the Devil and sons of the devil, those who work evil that are destroying the Earth and not, the normal day to day living of humans. It seems an evil plan has been devised a very long time ago to blame the destruction of the Earth on normal human living.

In this book, the aim is to continue the theme in the Book of Revelation as to the glorious way in which Our Lord will overcome the devil's evil before He returns.

The seven trumpets God's warning revised editions both overlays in time and events within the sounding of the warnings can show specific dates. The specific dates like the one in Trumpet Number Two are not yet known. However, using updated information and simple cycle analysis may it be possible to estimate the timing of the Trumpet Number One disaster.

In relation to Trumpet Number Two we have only been told that it is currently in January 2031 with the addition of a SpaceX "tug" that NASA has paid \$843 Million USD⁷ to help

⁷ <https://www.reuters.com/technology/space/musks-spacex-gets-843-million-discard-international-space-station-around-2030-2024-06-26/>

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blaze the ISS into the sea at point NEMO just as the Holy Bible says.

However, the build-up of the Trumpet disasters is being sounded each day and has been since the mid 1990's. It is also visible; the warning is loud and clear for those who have eyes to see and ears to hear.

If, dear reader, you have not read these previous books listed in the acknowledgements above, I need to overview again several important truths. I have commented and written some concerns about God's world and His political leaders. The Apostle Paul was guided by Jesus and the Holy Spirit to record:

2 Thessalonians 2.9-12

9 The coming of the lawless one will be in accordance with the work of Satan displayed in all kinds of counterfeit miracles, signs and wonders,

10 and in every sort of evil that deceives those who are perishing. They perish because they refused to love the truth and so be saved.

11 For this reason God sends them a powerful delusion so that they will believe the lie

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Note: God allows a powerful delusion

12 and so that all will be condemned who have not believed the truth but have delighted in wickedness.

Paul recorded this because Jesus said:

Matthew 7.13-14

13 “Enter through the narrow gate. For wide is the gate and broad is the road that leads to destruction, and many enter through it.

14 But small is the gate and narrow the road that leads to life, and only a few find it.

There is salvation for all who will believe Jesus’ truth.

John 3.16, 36

16 “For God so loved the world that he gave his one and only Son, that whoever believes in him shall not perish but have eternal life.

36 Whoever believes in the Son has eternal life, but whoever rejects the Son will not see life, for God’s wrath remains on him.”

SALVATION FOR YOU TODAY

Let not your Heart be troubled – there is a way out

This book reveals last days scriptures pertaining to the end times and therefore can be distressing. The “NOW” i.e 20th and 21 Century end days up until mid-2022 and hopefully a little beyond but, also explaining what happened thousands of years ago and verse two and three of Genesis chapter 1 which has remained unexplained and generally unknown until recently.

The “Not Yet” we can not foresee and therefore some of the technology/information and events may change or be revealed in more detail than it has been leading up to mid-2022, which will only confirm the greater truth of the Bible and that is that it was and is inspired by the Holy Spirit for the “Past, Present (today year of our Lord Jesus – mid-2022) and Future (the not yet)”.

Due to the last days material and facts, thoughts and opinions expressed in this book are to **give you hope**. The hope has been stated at the beginning of the book, in order for you to know that there is **ONE** who saves and is **able to SAVE** and His

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name is Jesus and He died and rose again so that you may have Life Eternal and abundantly.

Matthew 24.3-8

3 As Jesus was sitting on the Mount of Olives, the disciples came to him privately. "Tell us, "they said, "when will this happen, and what will be the sign of your coming and of the end of the age?"

4 Jesus answered: "Watch out that no one deceives you.

5 For many will come in my name, claiming, 'I am the Christ,' and will deceive many.

6 You will hear of wars and rumours of wars, (*like the Ukraine-Russia situation in early 2022*) but see to it that you are not alarmed. Such things must happen, but the end is still to come.

Here we may have a link to Ezekiel 38 example

Ezekiel 38.3

3..... This is what the Sovereign LORD says: I am against you, O Gog, chief prince of Meshech and Tubal (*NATO, UK,EU USA and many others*).

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4 I will turn you around, put hooks in your jaws and bring you out with your whole army....

Putting various hooks in multiple nations jaws takes a long time and may involved some very unique situations.

7 Nation will rise against nation, and kingdom against kingdom. There will be famines and Earthquakes in various places. *(These are manmade famines – food shortages and Earthquakes).*

8 All these are the beginning of birth pains”.

John 3 – Jesus says how to get saved.

John 3.3-8

1 Now there was a man of the Pharisees named Nicodemus, a member of the Jewish ruling council.

2 He came to Jesus at night and said, "Rabbi, we know you are a teacher who has come from God. For no one could perform the miraculous signs you are doing if God were not with him."

3 In reply Jesus declared, "I tell you the truth, no one can see the kingdom of God unless he is born again. "

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4 "How can a man be born when he is old?" Nicodemus asked. "Surely he cannot enter a second time into his mother's womb to be born!"

5 Jesus answered, "I tell you the truth, no one can enter the kingdom of God unless he is born of water and the Spirit.

6 Flesh gives birth to flesh, but the Spirit gives birth to spirit.

7 You should not be surprised at my saying, 'You must be born again.'

8 The wind blows wherever it pleases. You hear its sound, but you cannot tell where it comes from or where it is going. So it is with everyone born of the Spirit."

Let me explain. Everyone who received the Holy Ghost in the past (since the day of Pentecost and until Jesus returns), that person of The Holy Spirit is by The Holy Spirit enabled to speak in tongues. That is where the wind blows you to hear the sound as the scripture says, where the Holy Spirit is accepted by a person into that person's life, they are evidence of that acceptance, and are enabled with the sign and gift of the Holy Spirit, to speak in the Holy Spirit – Speaking in Tongues. No

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speaking in Tongues means you have not received the Holy Spirit or Holy Faith as Jude 20 records.

Again:

Jude 17-21

17 But, dear friends, remember what the apostles of our Lord Jesus Christ foretold.

18 They said to you, “In the last times there will be scoffers who will follow their own ungodly desires.”

19 These are the men who divide you, who follow mere natural instincts and do not have the Spirit.

20 But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit.

21 Keep yourselves in God’s love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.

John 4.23-24 – Jesus states how God wants to be worshipped:

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23 Yet a time is coming and has now come when the true worshipers will worship the Father in spirit and truth, for they are the kind of worshipers the Father seeks.

24 God is spirit, and his worshipers must worship in spirit and in truth."

Let me explain further – God the Father actively wants you and everyone to worship Him in God the Holy Spirit – speaking in tongues which He gives you when you accept Jesus the Son and God the Holy Spirit into your life, **for these are the kind of worshipers the Father seeks.**

Acts 1.4-8

Jesus says wait to be baptised or immersed in the Holy Spirit

4 On one occasion, while he was eating with them, he gave them this command: "Do not leave Jerusalem, but wait for the gift my Father promised, which you have heard me speak about.

5 For John baptized with water, but in a few days you will be baptized with the Holy Spirit."

6 So when they met together, they asked him, "Lord, are you at this time going to restore the kingdom to Israel?"

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7 He said to them: "It is not for you to know the times or dates the Father has set by his own authority.

8 But you will receive power when the Holy Spirit comes on you; and you will be my witnesses in Jerusalem, and in all Judea and Samaria, and to the ends of the Earth."

Then we see the very first pouring out of the Holy Spirit on the day of Pentecost, just as Jesus had prophesied and promised in John 3.

Acts 2.1-4

120 people initially then 3000 on this day speak in tongues as they are enabled by the Holy Spirit.

1 When the day of Pentecost came, they were all together in one place.

2 Suddenly a sound like the blowing of a violent wind came from Heaven and filled the whole house where they were sitting.

3 They saw what seemed to be tongues of fire that separated and came to rest on each of them.

4 All of them were filled with the Holy Spirit and began to speak in other tongues as the Spirit enabled them.

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Then we see that the Holy Spirit was poured out on non-Jewish people, the Gentiles – you and me.

Acts 10.44-48 - Holy Spirit poured out on the Gentiles

44 While Peter was still speaking these words, the Holy Spirit came on all who heard the message.

45 The circumcised believers who had come with Peter were astonished that the gift of the Holy Spirit had been poured out even on the Gentiles.

46 For they heard them speaking in tongues and praising God.

47 Then Peter said, "Can anyone keep these people from being baptized with water? They have received the Holy Spirit just as we have."

48 So he ordered that they be baptized in the name of Jesus Christ. Then they asked Peter to stay with them for a few days.

How do we know they received the Holy Spirit back then and today? Verse 46 **“For they heard them speaking in tongues and praising God.”** There is NO other way to receive the Holy Spirit and NO other evidence of receiving The Holy Spirit except to hear someone speak in tongues.

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Acts 11.16 – Immersed in the Holy Spirit

16 Then I remembered what the Lord had said: 'John baptized with water, but you will be baptized with the Holy Spirit.'

Jude 20-21

Praying – building or immersing yourself in the Holy Spirit

20 But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit.

21 Keep yourselves in God's love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.

To be clear, to be saved the way Jesus said it is best to be saved if you will, John 3, you must repent of your separation from God, be Baptized by being fully immersed in water and be Baptised fully immersed in the Holy Spirit. You will hear the Holy Spirit when you speak in tongues in prayer to God and as John 4:24 says – this is the way God the Father desires and wants you to worship Him.

Why? Why does God seek such worshippers?

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John 4.24

24 God is spirit, and his worshipers must worship in spirit and in truth.”

To speak to someone in a language or read or translate language, **primers of that language** are needed to enable the process.

The Miriam Learners dictionary explains a “primer” as following:⁸

1 chiefly US : something (such as a book) that provides basic information on a particular subject

The article is an excellent primer on foreign policy.

2 : a small book that helps teach children how to read

So to communicate efficiently, effectively with The Father a **primer is needed**.

God gives us His Primer – God the Holy Spirit.

Jesus died so that God could give us The Holy Spirit.

⁸ <https://www.learnersdictionary.com/definition/primer>

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Acts 1.5

5 For John baptized with a water, but in a few days you will be baptized with the Holy Spirit.”

Acts 1.8

8 But you will receive power when the Holy Spirit comes on you;

Part of the power one receives when the Holy Spirit comes upon you is that you speak in tongues.

Acts 2.4

4 All of them were filled with the Holy Spirit and began to speak in other tongues as the Spirit enabled them.

When you receive the Holy Spirit it is He who enables you to communicate in effectual Holy Faith prayer to The Father.

The Holy Spirit provides you with the primer to speak with The Father who is a Spirit. No primer and you do not know how to pray to The Father **as you ought to pray** or speak with Him.

Romans 8.26

26 In the same way, the Spirit helps us in our weakness. We do not know what we ought to pray for, but the Spirit himself intercedes for us with groans that words cannot express.

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Without the primer, The person, The Holy Spirit you do **not** know how to express the right communication in the spirit.

What a wonderful gift and sign that God has given us, He enables us to speak with Him by God the Holy Spirit person who intercedes for us.

Jesus died so that we could have this wonderful gift from God the Father.

First God gave us Jesus the Son of God made flesh. Next He gives us the Holy Spirit to enable us to speak with Him as we know not how to pray in the spirit where God the Father dwells.

How kind, thoughtful and loving is our God!

JESUS BREATHED ON THEM

In Revelation 19 we read:

15 Out of his mouth comes a sharp sword with which to strike down the nations. “He will rule them with an iron scepter.” He treads the winepress of the fury of the wrath of God Almighty

The timing of this is not known – Timing is of the Lord.

In Isaiah 11.4 we read:

4 but with righteousness he will judge the needy, with justice he will give decisions for the poor of the Earth. He will strike the Earth with the rod of his mouth; with the breath of his lips he will slay the wicked.

We see the power is in His breath in John 20.21-22.

21 Again Jesus said, “Peace be with you! As the Father has sent me, I am sending you.”

22 And with that he breathed on them and said, “Receive the Holy Spirit.

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In Acts 1.7 Jesus said:

8 But you will receive power when the Holy Spirit comes on you; and you will be my witnesses in Jerusalem, and in all Judea and Samaria, and to the ends of the Earth.”

Acts 2.2-4 we read:

2 Suddenly a sound like the blowing of a violent wind came from Heaven and filled the whole house where they were sitting.

3 They saw what seemed to be tongues of fire that separated and came to rest on each of them.

4 All of them were filled with the Holy Spirit and began to speak in other tongues as the Spirit enabled them.

John 1.12 we read:

12 Yet to all who did receive him, to those who believed in his name, he gave the right to become children of God

When you are “breathed on” and when given the Holy Spirit you are given the right and the power to become children of GOD and greater things shall you do in His name.

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John 14.12

12 Very truly I tell you, whoever believes in me will do the works I have been doing, and they will do even greater things than these, because I am going to the Father.

How important it is that we do when Jesus did so often and pray to the Father in Spirit and in Truth.

John 4.23-24

23 Yet a time is coming and has now come when the true worshipers will worship the Father in spirit and truth, for they are the kind of worshipers the Father seeks.

24 God is spirit, and his worshipers must worship in spirit and in truth.”

Worship in its root word from the Strong's Concordance means:

Prep in direction of; The place; time; occasion; or respect which the destination of the relation.

God wants you to breathe and speak to and with Him in The Holy Spirit – Speaking in tongues.

THE NEED FOR PRAYER

We remember that in the beginning the Lord God created everything in Heaven and in Earth and He said all He created 'was good'. The devil enters and all becomes evil and bad.

Hence the constant need for prayer.

Matthew 6.7-15

“And when you pray, do not keep on babbling like pagans, for they think they will be heard because of their many words. Do not be like them, for your Father knows what you need before you ask him. "This, then, is how you should pray: "Our Father in Heaven, hallowed be your name, your kingdom come, your will be done on Earth as it is in Heaven. Give us today our daily bread. Forgive us our debts, as we also have forgiven our debtors. And lead us not into temptation, but deliver us from the evil one. For if you forgive men when they sin against you, your Heavenly Father will also forgive you. But if you do not forgive men their sins, your Father will not forgive your sins.”

Romans 8.26

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“In the same way, the Spirit helps us in our weakness. We do not know what we ought to pray for, but the Spirit himself intercedes for us with groans that words cannot express.”

Jude 17-21

“But, dear friends, remember what the apostles of our Lord Jesus Christ foretold. They said to you, "In the last times there will be scoffers who will follow their own ungodly desires." These are the men who divide you, who follow mere natural instincts and do not have the Spirit. But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit. Keep yourselves in God's love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.”

THE DEVIL'S TOTAL EVIL AND DESTRUCTION

The devil has been effective in trying to destroy God's awesome creation since the beginning – from Genesis 3 as previously mentioned. Throughout all Old Testament history, the devil has hated God's creation and tempted and led astray almost all people with whom he had contact. From the time of Samuel, we see Samuel's sons destroyed by the devil, along with the evil reigns of 19 evil kings before Israel and Judah went into their relative captivities. All this history in the Old Covenant was the time of ante-Christ, before Jesus came into His world. Remember:

Malachi 2.16 – 3.5

"...guard yourself in your spirit, and do not break faith. You have wearied the Lord with your words. "How have we wearied him?" you ask. By saying, "All who do evil are good in the eyes of the Lord , and he is pleased with them" or "Where is the God of justice?" "See, I will send my messenger, who will prepare the way before me. Then suddenly the Lord you are seeking will come to his temple; the messenger of the covenant, whom you desire, will come," says the Lord Almighty. But who can endure the day of his coming? Who can stand when he

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appears? For he will be like a refiner's fire or a launderer's soap. He will sit as a refiner and purifier of silver; he will purify the Levites and refine them like gold and silver. Then the Lord will have men who will bring offerings in righteousness, and the offerings of Judah and Jerusalem will be acceptable to the Lord , as in days gone by, as in former years. "So I will come near to you for judgment. I will be quick to testify against sorcerers, adulterers and perjurers..."

Malachi 4.5

"See, I will send you the prophet Elijah before that great and dreadful day of the Lord comes.

In the above truth, the Messenger who prepared the way is John the Baptist, the new Elijah, and the Messenger of the New Covenant is the Anointed One, the Messiah, the Christ Jesus.

And the new Elijah, John the Baptist and Jesus came:

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Mark 1.1-5, 7-13

“The beginning of the gospel about Jesus Christ, the Son of God. It is written in Isaiah the prophet: "I will send my messenger ahead of you, who will prepare your way" - "a voice of one calling in the desert, 'Prepare the way for the Lord, make straight paths for him.' " And so John came, baptizing in the desert region and preaching a baptism of repentance for the forgiveness of sins. The whole Judean countryside and all the people of Jerusalem went out to him. Confessing their sins, they were baptized by him in the Jordan River. And this was his message: "After me will come one more powerful than I, the thongs of whose sandals I am not worthy to stoop down and untie. I baptize you with water, but he will baptize you with the Holy Spirit." At that time Jesus came from Nazareth in Galilee and was baptized by John in the Jordan. As Jesus was coming up out of the water, he saw Heaven being torn open and the Spirit descending on him like a dove. And a voice came from Heaven: "You are my Son, whom I love; with you I am well pleased." At once the Spirit sent him out into the desert, and he was in the desert forty days, being tempted by Satan...”

It is so important to read and study Holy Scripture. From the above truth we see Jesus being led to be tempted by the devil.

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Jesus is the Eternal Second Person of the Trinity in His Second Nature His Humanity. In the next Scripture we see Him being tested by the devil:

Matthew 4.1-11

“Then Jesus was led by the Spirit into the desert to be tempted by the devil. After fasting forty days and forty nights, he was hungry. The tempter came to him and said, "If you are the Son of God, tell these stones to become bread." Jesus answered, "It is written: 'Man does not live on bread alone, but on every word that comes from the mouth of God.' " Then the devil took him to the holy city and had him stand on the highest point of the temple. "If you are the Son of God," he said, "throw yourself down. For it is written: " 'He will command his angels concerning you, and they will lift you up in their hands, so that you will not strike your foot against a stone.' " Jesus answered him, "It is also written: 'Do not put the Lord your God to the test.'

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"Again, the devil took him to a very high mountain and showed him all the kingdoms of the world and their splendour. "All this I will give you," he said, "if you will bow down and worship me." Jesus said to him, "Away from me, Satan! For it is written: 'Worship the Lord your God, and serve him only.' " Then the devil left him, and angels came and attended him."

PRAYER FROM A WAR POINT OF VIEW

If a country is at war with another, do they want their plans to be known to the enemy?

Of course, not – Therefore secure encrypted communication is essential.

We are in a spiritual war, therefore when you pray do you want the devil to know what you are praying about?

Of course, not.

Therefore, when you pray in the Spirit – Speaking in Tongues, only the Holy Trinity knows what you are praying as the Holy Spirit makes these prayers for you with groanings that only the Holy Trinity understands.

Your prayer is encrypted. **Only God the Father, God the Son and God the Holy Spirit knows what is being said.**

What a wonderful blessing this is!

God planned all this so that your communication with Him is pure and untainted in any way whatsoever!

ALMIGHTY GOD'S APPROVAL

Genesis 1.26-31

And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the Earth, and over every creeping thing that creepeth upon the Earth.

So God created man in his own image, in the image of God created he him; male and female created he them.

And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the Earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the Earth.

And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the Earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.

And to every beast of the Earth, and to every fowl of the air, and to every thing that creepeth upon the Earth,

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wherein there is life, I have given every green herb for meat: and it was so.

And God saw everything that he had made, and, behold, it was very good. And the evening and the morning were the sixth day.

We see above that God gave mankind dominion or meaning sovereignty or control. That sovereignty or control is still in force. However, it was sold if you will to the devil when they ate of the fruit that was forbidden in the midst of the garden.

Genesis 3.13-14

13 And the Lord God said unto the woman, What is this that thou hast done? And the woman said, The serpent beguiled me, and I did eat.

14 And the Lord God said unto the serpent, Because thou hast done this, thou art cursed above all cattle, and above every beast of the field; upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life:

When Eve and then Adam were deceived by the serpent they sold out their life to the devil and were by default no long The Almighty God's.

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Since then the devil has been the prince of the power of the air on Earth.

Mankind is in chains to the devil and his workers be they fallen angels and evil spirits.

The only way to have these chains broken is to be Born Again in Jesus.

Fast forward to these end days mankind's knowledge has grown to the height of the starry host we read in Daniel and to the depths of the ocean as we see with deep sea mining starting on the 01/01/2025.

Therefore, the dominion sovereignty and control is still in the hands of the devil and his workers of disobedience.

Mankind's greed being ever present has set him on the path to total destruction.

Almighty God who wants His recreation to repent and love Him with a free will and heart continues to allow mankind exercise his/her free will.

Regarding the events in the book Revelation Almighty is allowing mankind to do these evils to the rest of mankind and planet Earth and some of the starry host until He has had

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enough of the disobedience and sends Jesus back to Earth in great triumph and glory.

Until that time God allows the events past present and future in order that mankind sees the error of his ways and repents and returns to the Fathers will.

Therefore, it is NOT God making these disasters but mankind.

God is showing us through the Angels sounding the Warnings that if we do not stop then the events will continue until the bowl / vials are fulfilled and the Earth is destroyed save Jesus returning unless no flesh should be saved.

Matthew 24.21-22

For then shall be great tribulation, such as was not since the beginning of the world to this time, no, nor ever shall be.

And except those days should be shortened, there should no flesh be saved: but for the elect's sake those days shall be shortened.

Therefore God is not the destroyer the devil is and mankind follows him unless they become Born Again and live in Jesus a new creation.

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The angels blowing the seven trumpets are sounding warnings and the seven angels pouring the seven bowls or vials are showing that mankind has not taken the warnings and continue to the complete and utter destruction.

To the point in Bowl/Vial number one “Mark of the Beast” mankind removes God’s right to save that person from eternal death.

Many People do not study the book of revelation – the prophecy defined. Many say it simple is symbolic or mythological. We believe it is truth literal. Our analysis tries to establish ways that the Father is allowing evil to happen. The heart of the evil globalists are hardening – This is allowed b our Father so we proceed.

Jesus said the following word once before he taught the 41 parables. That word was:

THE WATCHMAN

Ezekiel 33.1-12 kjv

Son of man, speak to the children of thy people, and say unto them, When I bring the sword upon a land

(God allows Globalist Bankers free will which they will use and thus they intend to destroy you for there gain),

if the people of the land take a man of their coasts, and set him for their watchman:

3 If when he seeth the sword (Famine & Tsunamis (T#1 & T#2) come upon the land, he blow the trumpet (this website), and warn the people;

4 Then whosoever heareth the sound of the trumpet, and taketh not warning; if the sword come, and take him away, his blood shall be upon his own head.

5 He heard the sound of the trumpet, and took not warning; his blood shall be upon him. But he that taketh warning shall deliver his soul.

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6 But if the watchman see the sword come, and blow not the trumpet, and the people be not warned; if the sword come, and take any person from among them, he is taken away in his iniquity; but his blood will I require at the watchman's hand.

7 So thou, O son of man, I have set thee a watchman unto the house of Israel (and the gentiles – YOU); therefore thou shalt hear the word at my mouth, and warn them from me.

8 When I say unto the wicked, O wicked man, thou shalt surely die; if thou dost not speak to warn the wicked from his way, that wicked man shall die in his iniquity; but his blood will I require at thine hand.

9 Nevertheless, if thou warn the wicked of his way to turn from it; if he do not turn from his way, he shall die in his iniquity; but thou hast delivered thy soul.

10 Therefore, O thou son of man, speak unto the house of Israel (and the gentiles – YOU); Thus ye speak, saying, If our transgressions and our sins be upon us, and we pine away in them, how should we then live?

11 Say unto them, As I live, saith the Lord God, I have no pleasure in the death of the wicked; but that the wicked turn

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from his way and live: turn ye, turn ye from your evil ways; for why will ye die, O house of Israel (and the gentiles – YOU) ?

12 Therefore, thou son of man, say unto the children of thy people (YOU), The righteousness of the righteous shall not deliver him in the day of his transgression: as for the wickedness of the wicked, he shall not fall thereby in the day that he turneth from his wickedness; neither shall the righteous be able to live for his righteousness in the day that he sinneth.

There are terrible things coming – this book and the websites padreaustralia.com⁹ and trumpetdisasters.net¹⁰ are declaring them to you. Get ready your soul for you know not the hour you will die or when calamity comes and you need to call on the Lord. Also prepare so that you may help others and your family.

⁹ <https://padreaustralia.com/>

¹⁰ <https://trumpetdisasters.net/>

LISTEN

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Listen

Got the point?

This is very important the event you are going to read about Trumpet Number One specifically will happen in the third quarter of 2029.

GOLGOTHA

The place of the skull is the whole Earth without Jesus' death, resurrection and saving grace the earth would be destroyed and dead. Satan would have destroyed all that God had made.

Ancient texts like the Book of Thomas quote Jesus saying that the whole Earth is a carcass. What does this mean?

A person only needs to look on google Earth at the shape of the land masses. NASA has done this and proved it a couple of decades ago that the land masses look like dead animals.

To highlight this one such land mass is pictured further below.

Isabela Island in Ecuador. Isabela Island is the largest of the Galápagos Islands, with an area of 4,586 km² and a length of 100 km. By itself, it is larger than all the other islands in the chain combined, and it has a little under 2,000 permanent inhabitants. The island straddles the equator.

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Isabela Island



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This one picture quite clearly shows it was a sea horse. 120km tall! A person may ask if a giant sea horse can grow to 120km how big were some of the other giants that were born from the fallen angels.

Therefore, we see that the sea horse is just one of many we can quote proving the Earth is a carcass of the dead be they animals, mammals, fish, birds and dinosaurs which means big lizards.

The place of the skull is the whole Earth without Jesus' death and resurrection.

Revelation 14.13

And I heard a voice from heaven saying unto me, Write, Blessed are the dead which die in the Lord from henceforth:

Yea, saith the Spirit, that they may rest from their labours; and their works do follow them.

When in this time and time to come of the Tribulation most likely to start around the 7th-8th August 2029, and you wish to become a follower of Jesus, just call on Him to fill you with the Holy Spirit and be a rock of obedience until Jesus returns and thereafter.

Our regeneration – Remember Jesus first words.

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Mark 1.15 kjv

And saying, The time is fulfilled, and the kingdom of God is at hand: repent ye, and believe the gospel.

Mark 15.16-22 Akjv

16 And the soldiers led him away into the hall, called Prætorium; and they call together the whole band.

17 And they clothed him with purple, and platted a crown of thorns, and put it about his head,

18 and began to salute him, Hail, King of the Jews!

19 And they smote him on the head with a reed, and did spit upon him, and bowing their knees worshipped him.

20 And when they had mocked him, they took off the purple from him, and put his own clothes on him, and led him out to crucify him.

21 And they compel one Simon a Cyrenian, who passed by, coming out of the country, the father of Alexander and Rufus, to bear his cross.

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22 And they bring him unto the place Golgotha, which is, being interpreted, The place of a skull.

Two key words here.

Prætorium

Golgotha – which is being interpreted, The place of a skull

Hebrews 13.8

Jesus Christ the same yesterday, and to day, and for ever.

Jesus did not have this scripture Mark 16-22 written in the Holy Bible just for a history lesson!

NO!

Judgement was passed on Jesus in the room that was a magistrate / war room of the Romans.

What was happening was that while they were passing judgement on Jesus along with the people and High priest

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outside of the room. Video about this room is below¹¹. Jesus was in the Spirit allowing it to happen!



He was allowing it to happen to show us in this time of the Trumpets and Bowls what He was going to save us from and all of those who ever walked on the Earth that He chose.

No! Fast forward today and we see the pending total Annihilation of ALL flesh on the Earth. Jesus at that very time standing in front of Pilate was saving the elect, from total annihilation and all flesh on Earth!

¹¹ <https://youtu.be/nKJ6GPvNUgc?si=Oz3mvujVOZ1hNmC5> Is this where Jesus was tried by Pontius Pilate?
Exhibition Bible You Tube Channel

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Ephesians 1.4

According as he hath chosen us in him before the foundation of the world, that we should be holy and without blame before him in love:

Pilate marvelled why Jesus was quiet facing death, Jesus was quiet because the Truth was Jesus and Jesus was saving His people in His world and knowing He was going to return early so that all flesh would not be annihilated!

Matthew 24.22

And except those days should be shortened, there should no flesh be saved: but for the elect's sake those days shall be shortened.

Therefore, in the Prætorium judgement was happening in both directions and the mercy of God was on display. He could have said “no” not going through this and left and we would all be dead. But Jesus didn't.

When the destruction of the Earth is in play. Everyday really the Earth is being destroyed in the name of science and observation.

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When for example the globalist bankers have their destruction machines as seen on this book trumpetdisasters.net, padreaustralia.com websites, and YT @padreaustralia like Hurricane Helene when the water bomber dropped millions of tons of water in seconds and washed many away to their deaths. Destroyed housing and infrastructure, Jesus was already there! He was there back when Pilate was being marvelled! Another fact is Jesus is Alpha Omega meaning He was there at the beginning and at the end and every second of time in between.

That was in the Prætorium moving to Golgotha

Golgotha

Golgotha – The Hill that looks like a skull. When you look at hills or cliff faces quite often this can be seen. After all the whole Earth is made of carcasses. See Roger Spurr's research
YT @@mudfossiluniversity

Jesus is led to His fleshly death which He allowed. At Golgotha – The place of the Skull, is a type shadow of what was happening the whole Earth over from before Noah and until Jesus returns.

In that instant of time Jesus was allowing for it to happen. He was allowing us to see what He was saving the elect from and

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more specifically The Trumpets and Bowl / Vials of mankind's disobedience leading to total annihilation.

2,000 years later we are in the time of the Trumpets and Bowls when the Angels are preparing to sound as of 01/01/2025. We can look forward and see that Jesus saved us, the repentant, faithful, obedient elect and the old testament remnant and on that day when He allowed Himself to be crucified.

John 10:18

No man taketh it from me, but I lay it down of myself. I have power to lay it down, and I have power to take it again. This commandment have I received of my Father.

We should also consider the following.

Genesis 22.7-8

And Isaac spake unto Abraham his father, and said, My father: and he said, Here am I, my son. And he said, Behold the fire and the wood: but where is the lamb for a burnt offering?

And Abraham said, My son, God will provide himself a lamb for a burnt offering: so they went both of them together.

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The place that Abraham was to offer his son as a sacrifice was approximately just 200 yards from Golgotha. A lamb was to be offered to pay the price of disobedience. That lamb was innocent. That lamb was Jesus.

John 1.29-34 KJV

29 The next day John seeth Jesus coming unto him, and saith, Behold the Lamb of God, which taketh away the sin of the world.

30 This is he of whom I said, After me cometh a man which is preferred before me: for he was before me.

31 And I knew him not: but that he should be made manifest to Israel, therefore am I come baptizing with water.

32 And John bare record, saying, I saw the Spirit descending from heaven like a dove, and it abode upon him.

33 And I knew him not: but he that sent me to baptize with water, the same said unto me, Upon whom thou shalt see the Spirit descending, and remaining on him, the same is he which baptizeth with the Holy Ghost.

34 And I saw, and bare record that this is the Son of God.

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1 John 3.8

He that committeth sin is of the devil; for the devil sinneth from the beginning. For this purpose the Son of God was manifested, that he might destroy the works of the devil.

The following scripture is repeated for context.

John 10.17-21

17 Therefore doth my Father love me, because I lay down my life, that I might take it again.

18 No man taketh it from me, but I lay it down of myself. I have power to lay it down, and I have power to take it again. This commandment have I received of my Father.

19 There was a division therefore again among the Jews for these sayings.

20 And many of them said, He hath a devil, and is mad; why hear ye him?

21 Others said, These are not the words of him that hath a devil. Can a devil open the eyes of the blind?

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The place of the skull was where Jesus laid down His life.

The place of the skull was where we were saved.

The place of the skull being the whole Earth is where Jesus saved.

The place of the skull is the whole Earth.

The place of the skull is the whole Earth without Jesus' death, resurrection and saving grace.

FIELD OF BLOOD

Acts 1.15-19

15 And in those days Peter stood up in the midst of the disciples, and said, (the number of names together were about an hundred and twenty,)

16 Men and brethren, this scripture must needs have been fulfilled, which the Holy Ghost by the mouth of David spake before concerning Judas, which was guide to them that took Jesus.

17 For he was numbered with us, and had obtained part of this ministry.

18 Now this man purchased a field with the reward of iniquity; and falling headlong, he burst asunder in the midst, and all his bowels gushed out.

19 And it was known unto all the dwellers at Jerusalem; insomuch as that field is called in their proper tongue, Aceldama, that is to say, The field of blood.

20 For it is written in the book of Psalms, Let his habitation be desolate, and let no man dwell therein: and his bishoprick let another take.

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When Trumpet Number One is executed upon the earth by the globalist bankers the result and damage will make the whole world – THE FIELD OF BLOOD.

Blood use as an interface to make the grass and trees burn, and animals die. More information about this in a later chapter.

1 John 2.1-2

My little children, these things write I unto you, that ye sin not. And if any man sin, we have an advocate with the Father, Jesus Christ the righteous:

2 and he is the propitiation for our sins: and not for ours only, but also for the sins of the whole world.

Let not your blood – your life be left in the field of blood (this world) when Jesus returns but rather believe on Him now and be raised up on the last day when the earthly body becomes a Spiritual body.

Ephesians 1.4

According as he hath chosen us in him before the foundation of the world, that we should be holy and without blame before him in love:

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If you are one of the Elect that Jesus came to save you were chosen before the foundation of the world was put in place. Therefore, be holy and without blame before in Him in righteousness. This is possible because Jesus is the Alpha Omega. Beginning End at the same time!

Be not like Judas left in the field / world of blood but rather be like the other disciples and be counted among the living being raised from the dead on the last day...

THE SEVENTH SEAL IS OPENED

Truth is always strange; Stranger than fiction¹²

Revelation 8.1-6

1 When He had opened the seventh seal, there was silence in Heaven for about half an hour.

2 And I saw the seven angels who stand before God, and seven trumpets were given to them.

3 Another angel, who had a golden censer, came and stood at the altar. He was given much incense to offer, with the prayers of all God's people, on the golden altar in front of the throne.

4 The smoke of the incense, together with the prayers of God's people, went up before God from the angel's hand.

5 Then the angel took the censer, filled it with fire from the altar, and hurled it on the Earth; and there came peals of thunder, rumblings, flashes of lightning and an Earthquake.

¹² Truth is stranger than fiction quote by Lord Bryon's Don Juan (1823)

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6 Then the seven angels who had the seven trumpets prepared to sound them.

Due to the complexity of the processes mentioned in Revelation 8.1 - 6 we have decided to make new chapters for specific mentioning like the work “lightnings” for example.

Key words

Angels	Trumpets	Incense	smoke
Fire	Altar	Hurled	Peals
Thunder	Rumblings	Lightning	Earthquake

Strong's Concordance

Word in kjv	Ref-No- for Greek word	Definition(s)	Possible Technology
Angels	G32	a messenger, envoy, one who is sent, an angel, a messenger from God	God's Creation

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Trumpets	G4536 & G4535	through the idea of quavering or reverberation	Musical Technology
Incense	G2368 & G2370	an aroma, he burning itself:— incense, odour.	Prayers of the Saints
Smoke	G2586	Uncertain affinity	Smoke – Stage Smoke
Fire	G4442	Fire & Fiery	Lasers, Microwaves, Fire, Bombs, wildfires
Altar	G2379	Slaying of victims	Golgotha the place of the skull being the Earth
Hurled – Cast	G906	to throw or let go of a thing without caring where it falls	Beamed down via, lasers, microwaves, sun simulator, hail
Peals – voices	G5456	Noised abroad	Starlink, phones linked to starlink as of 2025, Starlink sound system for the deceptions of fake aliens and for the image of the beast
Thunderings	G1027	Thunder	NEXRAD and Phased arrays

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Rumblings	-	-	NEXRAD and Phased arrays, Sonic Sound
Lightnings	G796	Lightning, of the gleam of a lamp	Starlink, Chinese megaconstellations, IceCube Observatory, Neutrino tracking and projection of energy, electromagnetic craft fake lightning. Hyper Kamiokande - Neutrino lab(s) in the mountains of Japan
earthquake	G4578	A shaking, a commotion, a tempest, an earthquake	IceCube Observatory sending energy through the earth to create an earthquake that appears in diverse places. Created in one spot dispersed to many spots. CERN Hadron collider and other technologies

UNPACKING OF REVELATION 8.1-6

Revelation 8.1-6

Revelation 8.1 - Unpacking

1 When He had opened the seventh seal, there was silence in Heaven for about half an hour.

When he (the Lamb of God - Jesus the Son of God) opened the seventh seal, there was silence in Heaven for about half an hour.

Is this about half an hour of Earth's time or half an hour in Heaven's time frame. If it is about half an hour of Earth's time it is about 29.6 minutes, according to YT channel the lamb and the dragon @LambAndTheDragon.

If we are talking about Heaven's time frame we know Heaven doesn't have time as we know it. - consider -

2 Peter 3.8

But, beloved, be not ignorant of this one thing, that one day is with the Lord as a thousand years, and a thousand years as one day.

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1000 years is for a day and a day is a thousand. When apply that to Earth's time frame we come to around 20 years approximately.

Where does this fit? Not fully understood yet. However, if we used the 9/11/2001 attack on the trade centre New York City as a guide we come to around 2020-2021 when the nanotechnology jobs were given at warp speed as President Trump signed these into deployment, to take peace from the Earth, when he signed the Abraham Accord 2020. This is just one example.

Abraham Accord Medallion featuring the great sword of the red horse (Republican Party USA) its rider / President at the time being President Donald J Trump:

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Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

- President Donald J Trump signed Abraham Accord
- Put enough needles together and you get a great sword
- Have nanotechnology in the injection and you have a different kind of great sword

However, the great sword may be great as in the evil works it does in the human body, animal bodies, fish, birds and vegetation (food). See book The COVID WAR.¹³

Thank you to Daniel Alexander Cannon¹⁴ for his research re this medallion.

The following is from Karin Kingston substack. Karin Kingston is Karen Kingston is a med-legal advisor and biotech analyst with 25 years experience. She's internationally recognized as an expert on the harmful biological effects caused by mRNA and other nanobiotechnologies.

Light-Based Bioelectronics in Vaccines are Changing What it Means to 'Be Human'¹⁵

Scientists found highly-toxic, rare Earth minerals (lanthanides) in the COVID-19 vaccines. Lanthanide nanoparticles can

¹³ Book, COVID WAR – 7 Seals – ISBN:9798422326792 free pdf download <https://padreaustralia.com/7-seals/>

¹⁴ Daniel Alexander Cannon – You tube channel – Logic before authority - @LogicBeforeAuthorityOFFICIAL

¹⁵ https://karenkingston.substack.com/p/light-based-bioelectronics-in-vaccines?r=tk0tr&utm_campaign=post&utm_medium=web&triedRedirect=true

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wirelessly control gene expression and nerve cell functioning of the brain.

October 17, 2024: Using high-powered scanning electron microscope technologies, a team of research scientists from Argentina affirmed the presence of '*at least 55 undeclared chemical elements found in six brands of the COVID-19 vaccines*' including toxic metals, radioactive elements, and **rare Earth metals (lanthanides)**.

At Least 55 Undeclared Chemical Elements Found in COVID-19 Vaccines from AstraZeneca, Cansino, Moderna, Pfizer, Sinopharm and Sputnik V, with Precise ICP-MS

Lorena Dhlbas Biotechnologist, Universidad Nacional de Tucumán, Argentina, **Martin Monteverde** Physician, Colegio Médico de Santa Fe, Argentina, **David Noms** Biologist, California, USA, **Marcela Sangorin** Biologist, CONICET-INCO, Neuquén, Argentina

Abstract

The experimental vaccines supposedly invented to combat COVID-19 were coercively forced upon the global population beginning late in 2020. They have precipitated innumerable and varied disease conditions ranging from mild to lethal. This increase in health disorders and sudden deaths began to manifest concomitantly with the number of people inoculated and doses administered per person. By the end of 2023, 24 undeclared chemical elements had been detected by Scanning Electron Microscopy Coupled with Energy-Dispersive X-Ray Spectroscopy (SEM-EDX), in the COVID-19 vaccines of the different brands, by various research groups from different countries around the world. In this paper, we report laboratory results from high precision Inductively Coupled Plasma Mass Spectrometry (ICP-MS) that confirm and expand previous results by SEM-EDX. To this end, the contents of vials from different lots of the brands AstraZeneca/Oxford Cansino Biologics, Pfizer/BioNTech, Sinopharm, Moderna and Sputnik V were analyzed. **Among the undeclared chemical elements were detected 11 of the 15 cytotoxic lanthanides used in electronic devices and optogenetics**. In addition, among the undeclared elements were all 11 of the heavy metals: chromium was found in 100% of the samples; arsenic 82%, nickel 59%, cobalt and copper 47%, tin 35%, cadmium, lead and manganese in 18%, and mercury in 6%. A total of 55 undeclared chemical elements were found and quantified with ICP-MS. Combining these findings with results from SEM-EDX, altogether 62 undeclared chemical elements have been found in the various products. In all brands, we found boron, calcium, titanium, aluminum, arsenic, nickel, chromium, copper, gallium, strontium, niobium, molybdenum, barium and hafnium. With ICP-MS, we found that the content of the samples is heterogeneous, the elemental composition varies in different aliquots extracted from the same vial.

2.1 Samples

Thirteen vials from different lots of the so-called COVID-19 vaccines were analyzed. The brands, batch numbers and expiration dates are shown in Table 1. The samples were analyzed in duplicate.

Table 1
Samples Analyzed by ICP-MS

Manufacturing Laboratory	Brand	Lot	Expiration date
Astrazeneca/Oxford	Covishield	ABZ2413	Nov-21
Astrazeneca/Oxford	Covishield	210581	Mar-22
Cansino Biologics	Convidecta	NGOV202106034V	Jun-21
Cansino Biologics	Sputnik V	II-840621	Dec-21
Cansino Biologics	Sputnik V	II-640821	Feb-22
Cansino Biologics	Sputnik V	IYN18	Dec-22
Moderna	Spikvax	045Z22A	Jan-23
Moderna	Spikvax	940915	Jun-22
Pfizer/BioNTech	Comirnaty	SELY6	Nov-22
Pfizer/BioNTech	Comirnaty	FJ1966	Jan-22
Pfizer/BioNTech	Comirnaty	FK8892	Mar-22
Sinopharm	COVIL0	202108B2715	Mar-23
Sinopharm	COVIL0	202108B2087	Jul-23

* (RDI)* Russian Direct Investment Fund (2024) paid for just the three marked items.

Among the undeclared chemical elements were detected 11 of the 15 cytotoxic lanthanides used in electronic devices and optogenetics.

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Nine (9) rare earth lanthanides were found in the Pfizer COVID-19 mRNA injections.

Rare Earth Metals

Atomic Number	Element	Symbol
21	Scandium**	Sc
39	Yttrium	Y
57	Lanthanum	La
58	Cerium	Ce
59	Praseodymium	Pr
60	Neodymium	Nd
61	Promethium*	Pm
62	Samarium	Sm
63	Europium	Eu
64	Gadolinium	Gd
65	Terbium	Tb
66	Dysprosium	Dy
67	Holmium	Ho
68	Erbium	Er
69	Thulium	Tm
70	Ytterbium	Yb
71	Lutetium	Lu

<https://www.themofster.com/blog/mining/can-you-name-all-17-rare-earth-elements/>

Table 5
Chemical Elements Found by ICP-MS in Pfizer (Continued) Lots: † Declared

Chemical Elements	Isotopes	Pfizer/BioNTech EJ1966 (ug/L)	Pfizer/BioNTech FJ8892 (ug/L)	Pfizer/BioNTech SELV6 (ug/L)	Pfizer/BioNTech SELV6 (ug/L)
Li	Lithium	7			62.80
B	Boron	11	140	170	220
Na	Sodium	23	2700000	5800000	4900000
Mg	Magnesium	24	5400		470000
Al	Aluminum	27	94000	23000	61
P	Phosphorus	31	670000	6400000	39000
K	Potassium	39	700000	630	11000
Ti	Titanium	48	100		6600
V	Vanadium	51			9.2
Cr	Chromium	52			30
Mn	Manganese	55			21
Ni	Nickel	58			72
Co	Cobalt	59			
Cu	Copper	63			
Zn	Zinc	65			
Ga	Gallium	71			
As	Arsenic	75			
Se	Selenium	78			
Rb	Rubidium	85			
Sr	Strontium	87			
Nb	Niobium	93			
Mo	Molybdenum	96			
Ru	Ruthenium	101			
Rh	Rhodium	103			
Pd	Palladium	105			
Ba	Barium	137			
La	Lanthanum	139			
Ce	Cerium	140			
Pr	Praseodymium	141			
Sm	Samarium	150			
Eu	Europium	153			
Tb	Terbium	159			
Gd	Gadolinium	157			
Dy	Dysprosium	162			
Er	Erbium	167			
Hf	Hafnium	178			
W	Wolfram	183			
Ir	Iridium	193			
Pt	Platinum	195			
Pb	Lead	208			
U	Uranium	238			
Total Elements Detected		22	19	23	26
Sample Analysis Date		27/12/2023	27/12/2023	3/11/2023	3/1/2024

International Journal of Toxicology, Practice, and Research 3(2)
<https://doi.org/10.56089/mtjhp32>

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Lanthanides, also known as ‘rare Earth metals’ have unique electromagnetic properties that have established them as the cornerstone elements found in the internet-of-things’ technologies including; smart phones, fiber optics, lasers, and electronic vehicles (EVs).

Rare Earth lanthanides are also key components of quantum dots and gene-editing nanoparticle technologies that are foundational elements of **optogenetics** and the internet-of-bodies (IOB).

Optogenetics is Changing What it Means to ‘Be Human’

Optogenetics is the field of synthetic biology that uses light and bioelectronic nanoparticle devices to **manipulate and control cellular functions *inside* the human body**, including;

- gene expression inside the cells of organs and tissues, and
- nerve cell expression and activity inside the human brain

via a wireless and traceless manner.



**Centre
for Neural
Circuits
and
Behaviour**

Optogenetics

Optogenetics combines genetic targeting of specific cells or proteins with either optical imaging or optical control of these targets. Optogenetic techniques allow neuroscientists to read or write patterns of neuronal activity in the living brain with cellular and molecular specificity.

The key reagents in optogenetics are genetically engineered, light-responsive proteins. These proteins are encoded in DNA, introduced into tissues or whole animals by genetic manipulation, and expressed selectively in defined cell types. Two kinds of proteins perform complementary functions: Optogenetic sensors emit light in response to neuronal signals, such as synaptic impulses or action potentials. These sensor proteins make activity visible. Optogenetic actuators absorb light and cause changes in neuronal signals, such as ionic currents. These actuator proteins make activity controllable.

“Optogenetic techniques allow neuroscientists to read or write patterns of neuronal activity in the living brain with cellular and molecular specificity.”



“Optogenetic control is a form of wireless communication in which the receiver of the wireless signal - the actuator-is fabricated from materials encoded with DNA... The activity of the cell can be controlled simply by turning on an external light source.”

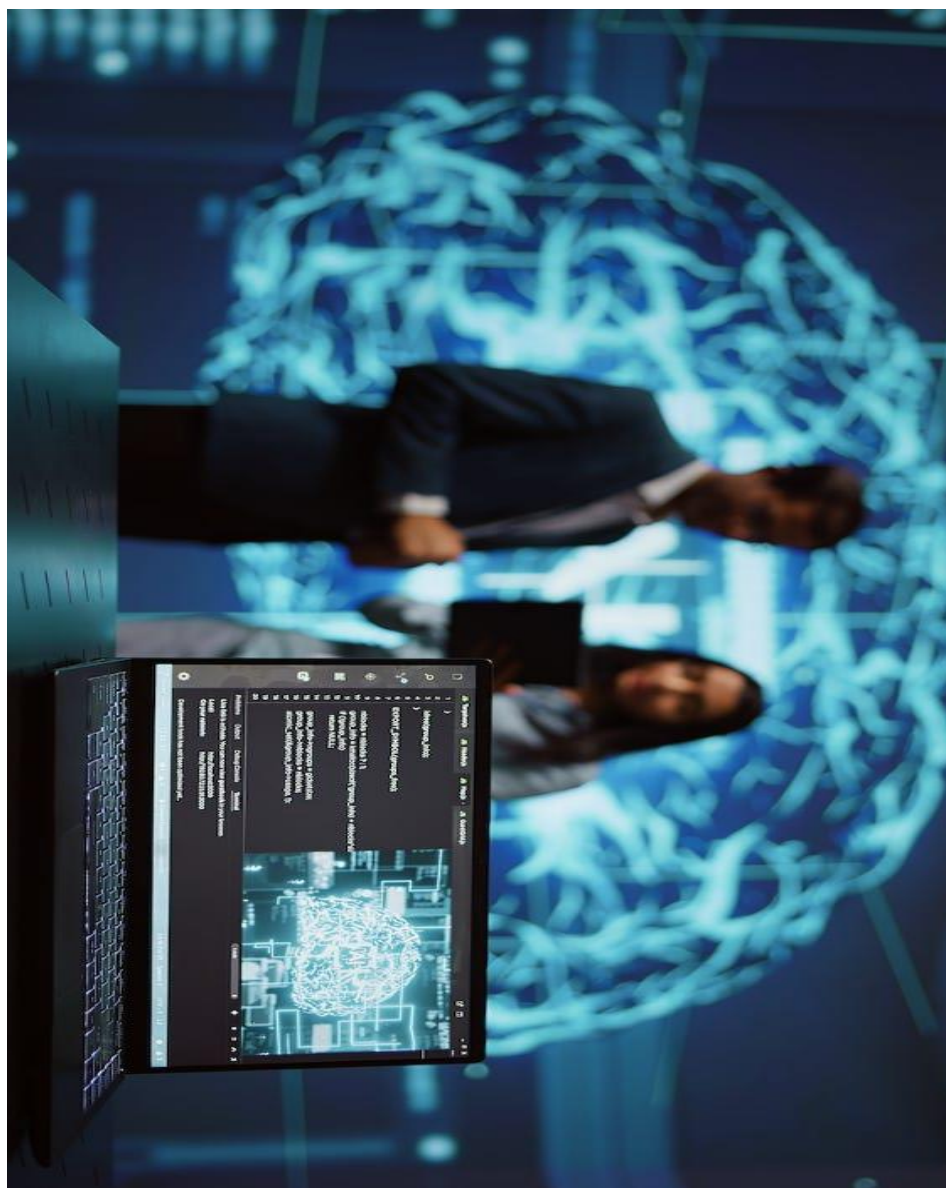
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“Imagine a world where we can treat diseases simply with a beam of light... This might not be as far from reality as you think. **Technological development and applications of light-based bioelectronics, in the form of electronic devices that interface with optogenetics and biological systems, are already experiencing rapid growth.**”

“Indeed, the parallel growth of optogenetics and synthetic biology is generating great enthusiasm for innovative technology platforms with the potential to achieve precise spatiotemporal control and manipulation of cellular behaviors through light stimulation, both in vitro and in vivo (in the body).” -

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Haifeng Ye and Martin Fussenegger, 2019



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While the above statements are from the introduction of the 2019 article *Optogenetic Medicine: Synthetic Therapeutic Solutions Precision-guided by Light*, today is October 17, 2024, and scientists from around the world are affirming that the COVID-19 mRNA injections are part of a global transhumanism experiment on humanity Kingstan says.

The Use of Light-Based Bioelectronics is Transforming Humanity

The scientific researchers that discovered the ubiquitous presence of the extremely cytotoxic lanthanides in all six brands of the 'COVID-19 vaccines' opined that their presence could not be due to manufacturing contamination but indicate a global nanotechnology experiment on humanity while referencing Kyrie and Broudy's 2022 article "Cyborgs R Us."

COVID-19 Vaccines: A Global Transhumanism Experiment

“Whereas the appearance of the daunting diversity of undeclared chemical elements remains strange, the clues seem to be pointing to some kind of worldwide technological experimentation. Because the lanthanides, as we have noted above, are known to be extremely cytotoxic, their being discovered in significant quantity and across the whole array of vaccines we have studied here, is suggestive of some kind of nanotechnological experimentation along the lines discussed by Kourie & Broudy 2022.”

International Journal of Vaccine Theory, Practice, and Research

IJVTPR

Cyborgs R Us: The Bio-Nano Panopticon of Injected Bodies?

Valerie Kyrle¹ and Daniel Broudy²

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“Cyborgs R Us,” highlights the many speeches given by Yuval Noah Harari on leveraging the COVID-19 crisis to inoculate humans with Ai gene-editing and surveillance technologies in order to control the human population and create a new ‘hackable’ hybrid-human species.

Lanthanides Nanoparticles Use Light (Optics) to Read and Write Activity of Nerve Cells in the Brain

In 2021, a team of scientists from China published a scientific summary on lanthanide up conversion nanoparticles asserting that, “The integration of lanthanide up-conversion nanoparticles with cellular optogenetics has showed great promise in biomedical applications in regulating neural/brain activity, cancer therapy and cardiac optogenetics in vivo.”

These Chinese scientists explain that “This field (optogenetics) has recently attracted great attention because of the unmatched properties of light as a traceless, remotely controllable trigger signal that enables quantitative, spatiotemporally, well-defined modulation of cellular activities.”

Permanently Damaging the Human Genome and Our Humanity

By reprogramming our genetic expression and controlling nerve cell functioning, the ‘COVID-19 mRNA vaccine

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experiment’ is not only intended to permanently damage the human genome, but to also change what it actually means to ‘be a human.’

End of Karin Kingston’s article.

We thank Karin Kingston for her great work on revealing the evil that the globalist deployed in the COVID WAR¹⁶

The rider of the red horse -Republican Party of the book of Revelation chapter six whose sword was great certainly has been fulfilled. Donald Trump will be re-elected on the 4-5th November 2024 and will leave office in January 2029. It is alleged that before he leaves office, he will authorise Trumpet Number One to be executed approximately around 7-8th August 2029. The sword if you will, will be drawn back in to place as it were, (having been used for the covid war) and the disaster of “burn grass” a statement he said he liked in his book¹⁷ “The Art of the Deal” on page 88¹⁸ - Trumpet Number One will be fulfilled.

Whether Donald J Trump issues another type of virus war is yet to be seen.

¹⁶ <https://padreaustralia.com/4-horses-of-revelation/> COVID WAR book Free pdf download

¹⁷ Trump: The Art of the Deal Paperback – by Donald J. Trump (Author), Tony Schwartz (Author) ISBN 10 : 9780399594496 page 88

¹⁸ <https://trumpetdisasters.net/trumpet/t1/t1-d-j-trump/>

REVELATION 8.2 – SEVEN TRUMPETS

2 And I saw the seven angels who stand before God, and seven trumpets were given to them.

The word Angel here in the Strong's Concordance means

"a messenger, envoy, one who is sent, an angel, a messenger from God"

Trumpet here means

Perhaps from σάλος (G4535) (through the idea of quavering or reverberation)

G4535 σάλος sálos, sal'-os; probably from the base of G4525; a vibration, i.e. (specially), billow:—wave.

A billowing sound wave!

One may only assume this is after the silence in Heaven. It may also be for many decades or centuries during the time of mankind learning, developing, deploying destroying technologies. Then replacing, increasing the power, enlarging facilities and silently deploying the technologies while all the time making contractors sign secrecy agreements.

Secrecy agreements stop the person from telling the truth of what they seen or worked on. Some whistle blowers have

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revealed what private companies like the military Raytheon and Lockheed Martin have worked on and hold the government contracts for. However, most of the whistle blowers are quickly silence it would seem.

REVELATION 8.3 – INCENSE - SMOKE

3 Another angel, who had a golden censer, came and stood at the altar. He was given much incense to offer, with the prayers of all God's people, on the golden altar in front of the throne.

This is interesting. We know that the angels are demonstrating mankind's technology used in evil ways. There were prayers all over the world from God's people praying about concerns of the implications of the sword injections.

This however is talking about smoke. This smoke is defined further in the next verse.

In context, we also remember that Almighty God is allowing evil to happen – mankind's evil technologies. As like in the time Pharaoh of Egypt would not allow the Israelites to be free but with evil did put them to work as slaves.

When the Israelites were slaves, many prayed to Almighty God for freedom.

When attacks come in the form of smoke (wildfires) weaponized hail (manmade hail) Hurricanes, floods and Earthquakes just to name a few, people pray.

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Fulfilling the above-mentioned verse.

As in the times of Israelites and God hardening Pharaoh's heart

Almighty God hardened their evil hearts of the kings that fight against the Lord today.

Psalm 2.1-2

Why do the heathen rage, and the people imagine a vain thing?

2 The kings of the Earth set themselves, and the rulers take counsel together, against the Lord, and against his anointed

Matthew 13.13-15

Therefore, speak I to them in parables: because they seeing see not; and hearing they hear not, neither do they understand.

14 And in them is fulfilled the prophecy of Esaias, which saith, By hearing ye shall hear, and shall not understand; and seeing ye shall see, and shall not perceive:

15 For this people's heart is waxed gross, and their ears are dull of hearing, and their eyes they have closed; lest at any time they should see with their eyes and hear with their ears,

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and should understand with their heart, and should be converted, and I should heal them.

Pharaoh could neither understand nor perceive. In these last days the globalists can neither understand nor perceive.

What should they understand, perceive and receive?

John 14.6

Jesus is the way the truth and the life!

Incense – manmade clouds and storms, hailstorms and prayers of the saints.

REVELATION 8.3.1 NEXRAD

NEXRAD or Nexrad (Next-Generation Radar) is a network of 159 high-resolution S-band Doppler weather radars operated by the National Weather Service (NWS), an agency of the National Oceanic and Atmospheric Administration (NOAA) within the United States Department of Commerce, the Federal Aviation Administration (FAA) within the Department of Transportation, and the U.S. Air Force within the Department of Defense. Its technical name is WSR-88D (Weather Surveillance Radar, 1988, Doppler).

NEXRAD detects precipitation and atmospheric movement or wind. It returns data which when processed can be displayed in a mosaic map which shows patterns of precipitation and its movement. The radar system operates in two basic modes, selectable by the operator – a slow-scanning clear-air mode for analysing air movements when there is little or no activity in the area, and a precipitation mode, with a faster scan for tracking active weather. NEXRAD has an increased emphasis on automation, including the use of algorithms and automated volume scans.

Deployment

Testbed of the WSR-88D on display at the National Severe Storms Laboratory.

In the 1970s, the U.S. Departments of Commerce, Defense, and Transportation, agreed that to better serve their operational needs, the existing national radar network needed to be replaced. The radar network consisted of WSR-57 developed in 1957, and WSR-74 developed in 1974. Neither system employed Doppler technology, which provides wind speed and direction information.

Such systems are now world wide.

More of this information can be found in the appendix.

Another link to go to for further research is NOAA

<https://www.ncei.noaa.gov/>

Revelation 8.3 fulfilled

REVELATION 8.4 - SMOKE

4 The smoke of the incense, together with the prayers of God's people, went up before God from the angel's hand.

The word smoke in this verse is of uncertain affinity according to the Strong's Concordance. It could be the smoke from the man-made created wildfires.

Stage Smoke.

Could the smoke of the incense together with the prayers of God's people be that His people are seeing something in the sky that most have not seen before?

Could this be referenced to Starlink and the Stratospheric Aerosol Injection¹⁹ (spraying) of the sky?

Yes!

We believe it is a type of **stage smoke** to improve the visual effects of the hologram from the Starlink fake alien invasion. **Stage smoke!**

Reverend Dr Barry was sitting waiting for a church meeting to start once being early and of to the side of the stage, before

¹⁹ https://en.wikipedia.org/wiki/Stratospheric_aerosol_injection

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the start of one meeting. The stage smoke was so thick and extended far beyond the front of the stage walkway and into the first front rows of chairs that you could not see who was on stage! Along comes Reverend Dr Graham out of the smoke and said, “cannot have incense but stage smoke is ok – have that in overabundance”! Reverend Dr Barry just laughed.

In addition to Starlink China is building its own.²⁰

China to begin constructing its own megaconstellation later this year by Andrew Jones March 28, 2023.

HELSINKI — China is preparing to launch its first satellites for a national low Earth orbit broadband megaconstellation to challenge SpaceX’s Starlink.

China is developing its plans to deploy a 13,000-satellite low Earth orbit (LEO) broadband megaconstellation, sometimes referred to as “Guowang,” or national network, to rival Starlink and other Western ventures.

The project will have ramifications for international competition to secure customers for satellite communications, international infrastructure, space debris and for the use of,

²⁰ <https://spacenews.com/china-to-begin-constructing-its-own-megaconstellation-later-this-year/>

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and coordination in, LEO. It may also have implications for commercial space development in China.

The China Academy of Space Technology (CAST), a major subsidiary of CASC, and the Innovation Academy for Microsatellites (IAMCAS) under the Chinese Academy of Sciences, are understood to be two entities contracted to manufacture satellites for Guowang.

IAMCAS is expected to deliver its first 30 satellites for the project by the end of the year. Other and potentially commercial setups could also be involved in the project.

China has greatly increased its small satellite manufacturing capacity in recent years, with a number of entities each now capable of producing hundreds of satellites per year. Other actors include GalaxySpace and the state-owned China Aerospace Science and Industry Corporation (CASIC). The former launched six LEO communications test satellites last year....

End of Article

It seems some companies are preparing to launch Starlink type of satellites. However, these would be limited compared to the government backed projects like Starlink and the Chinese megaconstellations.

REVELATION 8.4.1 – STRATOSPHERIC AEROSOL INJECTION

The subject of stratospheric aerosol injection²¹ which started after WWII is a very large subject. We have put more details of this treasonous but slow destruction in the appendix.

From Wikipedia, the free encyclopedia

Solar radiation reduction due to volcanic eruptions, considered the best analogue for stratospheric aerosol injection.

Stratospheric aerosol injection (SAI) is a proposed method of solar geoengineering (or solar radiation modification) to reduce global warming. This would introduce aerosols into the stratosphere to create a cooling effect via global dimming and increased albedo, which occurs naturally from volcanic winter.

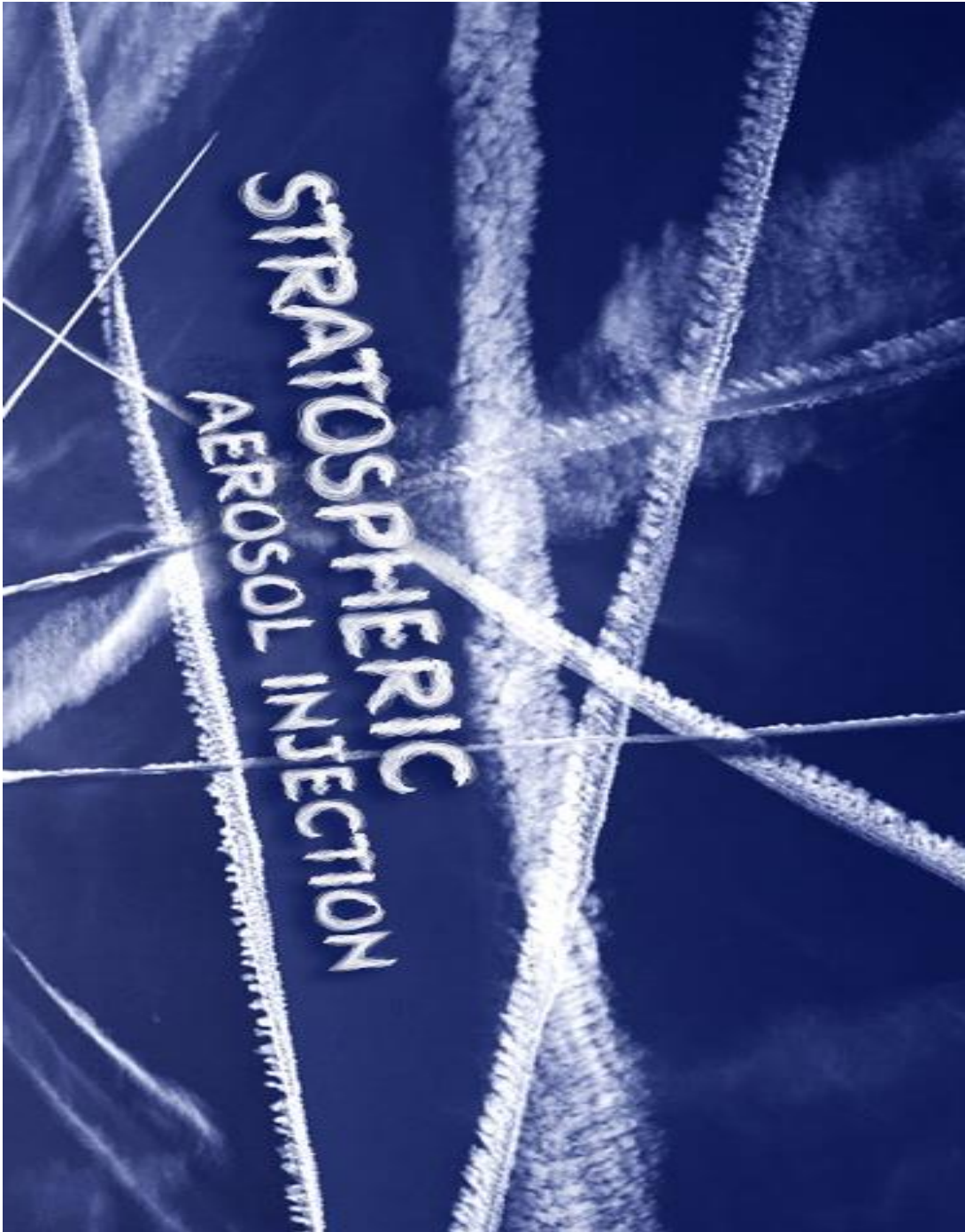
Further information in the appendix.

What does that really look like when only a little is spread across the sky.

Stratospheric aerosol injection on a blue sky

²¹ https://en.wikipedia.org/wiki/Stratospheric_aerosol_injection

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When a lot is sprayed on the sky the sky turns a whiteish gray. This can happen very quickly but slowly and often enough that people have got used to it and most cannot discern what is real clouds and what is not. Because the USA started this in the 1940's Reverend Dr Barry Gumm alleges that most people under the age of 40 years old cannot remember clean or non-chemicalized skies.

Stratospheric Aerosol Injection – Smoke – Incense

Revelation 8.4 Fulfilled

REVELATION 8.5 – SCAPEGOAT

5 Then the angel took the censer, filled it with fire from the altar, and hurled it on the Earth; and there came peals of thunder, rumblings, flashes of lightning and an Earthquake.

As we wrote this book it became glaringly obvious that a scapegoat was needed. Why not use a fake alien invasion using a video audio system in the sky? Do we have one? Yes we do and it is called Starlink. Starlink is a weapon and its various weapons are many – this we allege as will be the Chinese megaconstellation and any others in the future.

To do all that Revelation chapter 8.5 has stated there may be many systems working together, not just Starlink. Many systems that have been prototypes now obsolete and replace or made larger and much more powerful. These systems are military based and therefore knowledge of them is limited.

Thankfully there have been some whistle blowers whom have told the truth or at least some of what is known or the part that they had access to within their profession.

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Reverend Graham was right off course with what is the difference between stage smoke and incense? None really.

In this case Trumpet Number One and each following Trumpet disaster events thereafter will result in many being very scared and offer their prayers up to God for help.

REVELATION 8.5.1 – HURLED IT TO EARTH

5 Then the angel took the censer, filled it with fire from the altar, and hurled it on the Earth;...

How do the globalists hurl fire to Earth? Is it literally fire as in bombs exploding or some other type of fire or both?

The answer is both.

Bombs we have all seen, both nuclear and standard kinetic weapons.

This type of fire seems different. Indeed it is.

A radio frequency can feel like fire on the skin. We wrote about these systems in the book “Savage Kings - Defeated”²²

They are called an **Active Denial System**. This is important not only to Trumpet Number One but other Trumpets as well.

Another word for the word “hurled” is launched or even threw. Has the Bible identified that the globalists Starlink

²² *Savage Kings – Defeated* by Reverend Dr Graham J Whelan OAM ISBN: 9798793639743
pages 491-497

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system will be hurling / launching microwave fire as in heat directed energy at the Earth and all who live on it?

Wildfires can be electromagnetic fires hurled to the Earth and through the Earth via Hadron Colliders it is alleged.

On Reverend Dr Graham Whelan Youtube channel @padreaustralia link below²³ to a playlist about wildfires in Australia dating back to before the early 1980's.

We show that these wildfires were created by electromagnetic fires and military conventional helicopters.

That video is titled:

Australian Fires #5 1983 Ash Wednesday was a DEW attack as is today's fires both are DEW attacks

Some from house – no fire – no frames – trees not on fire!

²³ [@padreaustralia](https://www.youtube.com/playlist?list=PLHAQcYuLzN2oSzNr_W5tBOY4G1TKnXc-f) YouTube Channel

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Smoke coming out of the building and roof without flames and the surrounding trees are not on fire.

This is an indication that an electromagnetic fire was allegedly being deployed.

REVELATION 8.5.2 – PEALS OF THUNDER

...and there came peals of thunder, rumblings, flashes of lightning and an Earthquake. NIV

KJV says it in the following way.

...and there were voices, and thunderings, and lightnings, and an Earthquake.

We ask why are there voices in the sky?

The only logical answer is that Starlink is projecting a movie hologram into the sky for all to see. The smoke is stage smoke to enhance the visibility of the projection.

That is on the night of Trumpet Number One. A build up explanation of peals of thunder in the build-up of the technology over a very long time would be radar or radiation.

Which leads us to:

US PAVE PAWS active phased array ballistic missile detection radar in Alaska. Completed in 1979, it was one of the first active phased arrays.

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Phased Array

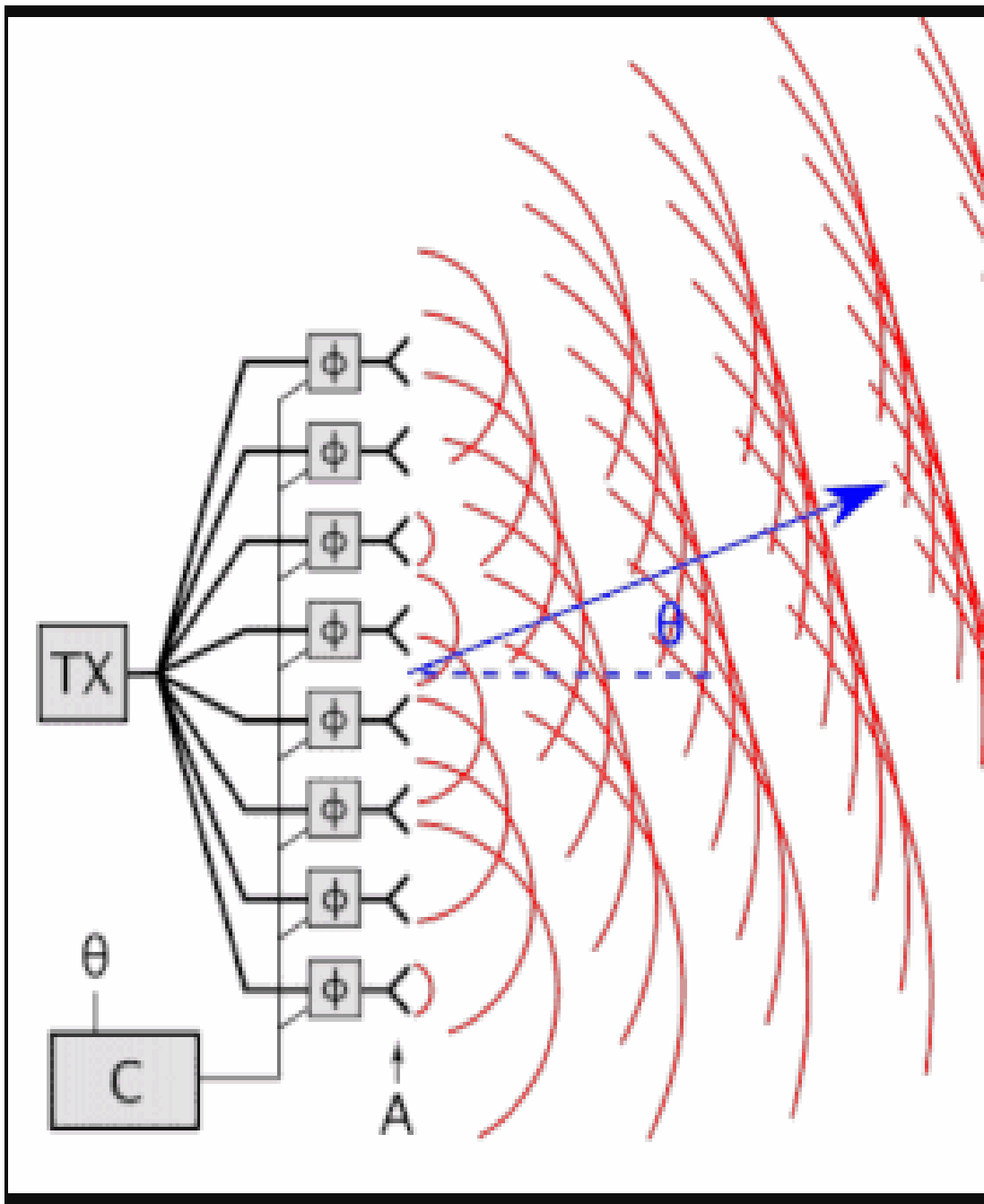


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Closeup of some of the 2677 crossed dipole antenna elements that make up the plane array. This antenna produced a narrow "pencil" beam only 2.2° wide.

Picture showing how a phased array works. It consists of an array of antenna elements (A) powered by a transmitter (TX). The feed current for each element passes through a phase shifter (ϕ) controlled by a computer (C).

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The moving red lines show the wavefronts of the radio waves emitted by each element. The individual wavefronts are spherical, but they combine (superpose) in front of the antenna to create a plane wave. The phase shifters delay the radio waves progressively going up the line so each antenna emits its wavefront later than the one below it. This causes the resulting plane wave to be directed at an angle θ to the antenna's axis. By changing the phase shifts, the computer can instantly change the angle θ of the beam. Most phased arrays have two-dimensional arrays of antennas instead of the linear array shown here, and the beam can be steered in two dimensions.

The following is taken from Wikipedia. More of this can be found in the Appendix.

In antenna theory, a phased array usually means an electronically scanned array, a computer-controlled array of antennas which creates a beam of radio waves that can be electronically steered to point in different directions without moving the antennas. The general theory of an electromagnetic phased array also finds applications in ultrasonic and medical imaging application (phased array ultrasonics) and in optics optical phased array.

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In a simple array antenna, the radio frequency current from the transmitter is fed to multiple individual antenna elements with the proper phase relationship so that the radio waves from the separate elements combine (superpose) to form beams, to increase power radiated in desired directions and suppress radiation in undesired directions. In a phased array, the power from the transmitter is fed to the radiating elements through devices called phase shifters, controlled by a computer system, which can alter the phase or signal delay electronically, thus steering the beam of radio waves to a different direction. Since the size of an antenna array must extend many wavelengths to achieve the high gain needed for narrow beamwidth, phased arrays are mainly practical at the high frequency end of the radio spectrum, in the UHF and microwave bands, in which the operating wavelengths are conveniently small.

Phased arrays were originally conceived for use in military radar systems, to steer a beam of radio waves quickly across the sky to detect planes and missiles. These systems are now widely used and have spread to civilian applications such as 5G MIMO for cell phones. The phased array principle is also used in acoustics, and phased arrays of acoustic transducers are used in medical ultrasound imaging scanners (phased array

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ultrasonics), oil and gas prospecting (reflection seismology), and military sonar systems.

The term "phased array" is also used to a lesser extent for unsteered array antennas in which the phase of the feed power and thus the radiation pattern of the antenna array is fixed. For example, AM broadcast radio antennas consisting of multiple mast radiators fed so as to create a specific radiation pattern are also called "phased arrays".

Scripture “peels of thunder” fulfilled!

REVELATION 8.5.3 – RUMBLINGS

Here we know that technology has reached into the firmament and the destroyers of the Earth destroy some of the Heavenly host. This is the meteors or comets or whatever else they want to call them. This has been proven on @padreaustralia YT channel and you can see it almost daily now somewhere around the world and usually at night.

Why at night?

It easier to hide the technology of the microwaves being used to trample the Heavenly host to the ground i.e. trample is to crush and destroy them. You can see this in the video link below at the 18.20-minute mark.²⁴

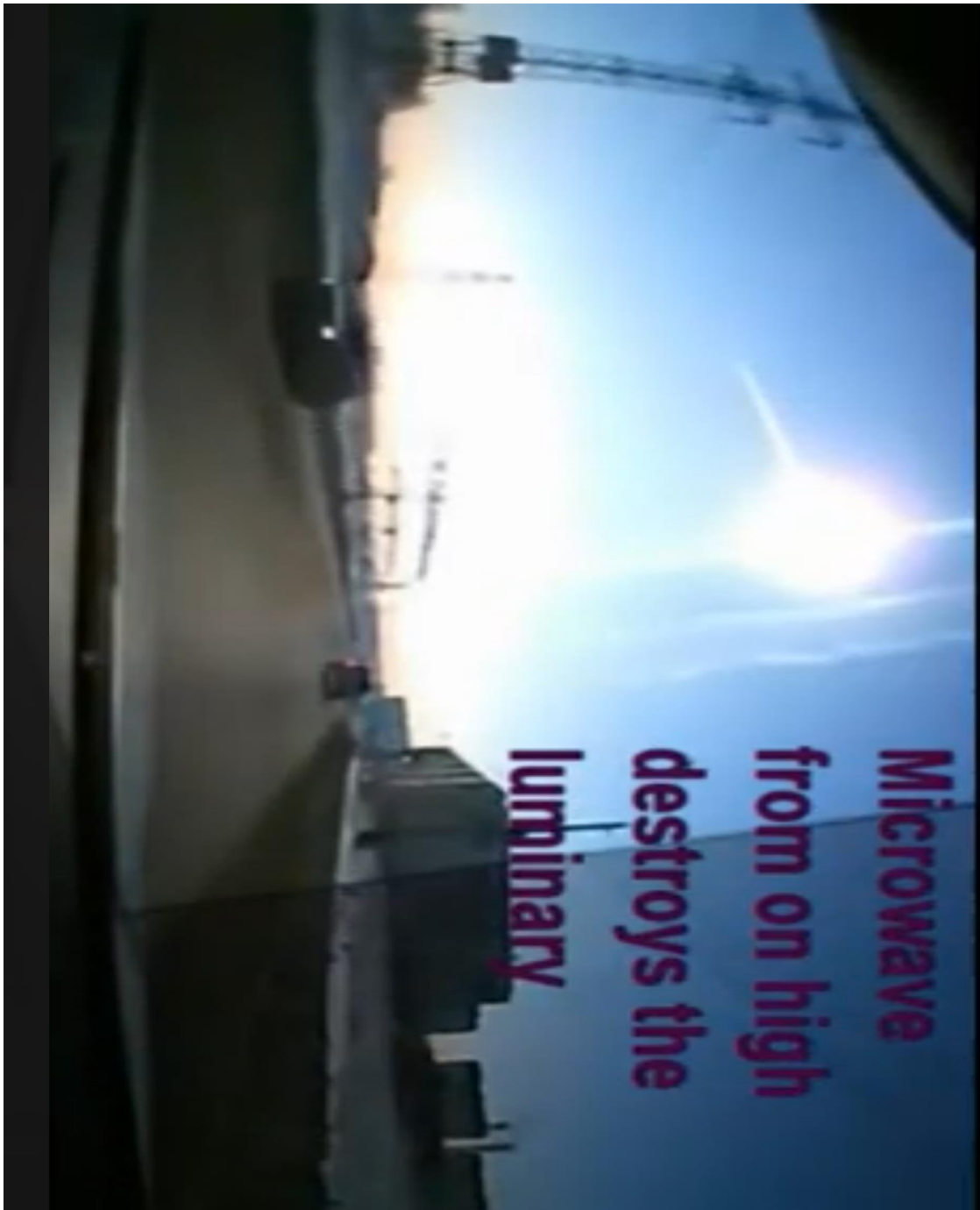
Daniel 8.10

It grew until it reached the host of the Heavens, and it threw some of the starry host down to the Earth and trampled on them.

Picture of the Russian meteor and microwave below.

²⁴ Trumpet Number Two NASA ISS potential scenario January 2031
<https://youtu.be/WuLjD3GBzKQ?si=fDS5IZGGRoiMsqaO&t=1100>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Daniel 8.10 scripture fulfilled!

Could the exploding meteor be called Thunder?

As said above it is now almost a daily event – destroying luminaries which they call comets and meteors to make you think that they don't have life! This is the killing of another part of God's creation.

Voices or, why were there voices?

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The music group called The Police – Every breath you take²⁵ –
Lyrics.

Every breath you take
And every move you make
Every bond you break
Every step you take
I'll be watching you

Every single day
And every word you say
Every game you play
Every night you stay
I'll be watching you

Oh, can't you see
You belong to me?
How my poor heart aches
With every step you take?

Every move you make
And every vow you break
Every smile you fake
Every claim you stake
I'll be watching you

... Every move you make
And every vow you break
Every smile you fake
Every claim you stake
I'll be watching you
Every move you make
Every step you take
I'll be watching you

²⁵ The Police – Every Breath you take YT link https://www.youtube.com/watch?v=_wsMEj2ZfW8

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

When this song came out in the 1970's many wondered about it greatly, however, how could teenagers at school and adults in the 1970's understand in 2024 that the song was really talking about being connected all together via a Starlink system in the sky, sea and ground?

The voices in the sky that night will be from Starlink fake movie show of an alien invasion. Voices will be from a sound system which we know as Starlink and Chinese megacontellations weapon type systems.

Some of the massive ships, the flying craft will be real. Like the one below.

This massive craft²⁶ has been captured by the International Space Station camera systems. When comparing the following picture to google Earth Reverend Barry estimates it is around 20km on the right side, 13 km wide and around 30 kms on the long side forming an arc shape when extended and if this feature exists on these craft?

This feature may or may not be the exist as the picture is not quite clear enough to see due to the cloaking mechanism of

²⁶ Massive alleged bomber electromatic flying bomber craft MrMBB333 YT Channel
<https://youtu.be/WCDaNp1cNzk?si=wjprcMlpwithhOCd>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

forming its own cloud. This arc Reverend Dr Barry believes provides an arc to create false / fake lightning.

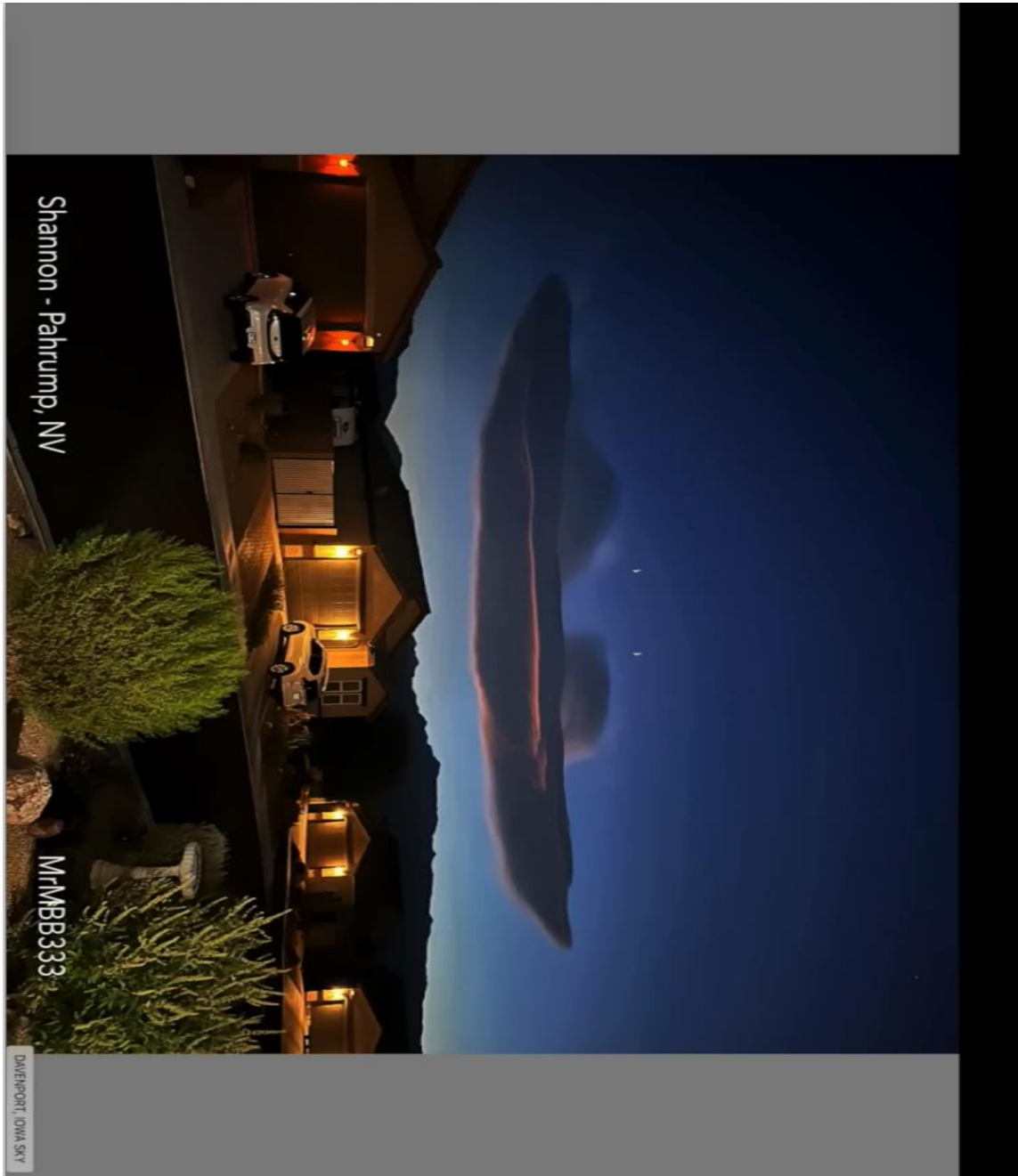
Remember Ezekiel 38.9

Thou shalt ascend and come like a storm, thou shalt be like a cloud to cover the land, thou, and all thy bands, and many people with thee.

This scripture above is in the process of being fulfilled.

The two lights above the craft in the following picture are just streetlamp reflections on the camera lens.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Craft captured in the International Space Station live public video feed²⁷.



²⁷ Massive alleged bomber electromatic flying bomber craft MrMBB333 YT Channel
<https://youtu.be/WCDaNp1cNzk?si=wjprcMlpwitrhOCd>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Notice the shadow on the ground. By approximating the craft to Google Earth and using the measuring tool one can gain an approximation in size of this one craft.

Reverend Dr Barry believes there are hundreds of electromatic craft of various sizes. Dr John R R Searl made a prototype of these in the 1960's and it was shown on BBC4 a video of this history which can be seen on @padreaustralia You Tube channel here: <https://youtu.be/iMNEbs2hvHc?si=2GvkMvD4vS8yxXhl>

With Starlink expanding every day, or more satellites put in position every day and those who by being injected with the magic juice, that the juice would be to connect you to the Internet of Bodies (IoB) via your pineal gland. See the palm / fig tree on Trumps medallion sword. It is the same palm/fig tree that was in the Holy of Holies in the Temple that King Solomon built!

Inside the Holy of Holies – artist impressions

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



The Globalist bankers plan is to connect you to the internet via the third temple. YOU.

Not only you, the Internet of Bodies is also every animal worldwide wild and not wild. Tracking the stock of cows that have been injected with C19 injections now connected to the internet! If possible, could we track animals that have not been connected with C19 injections by the animals breathing nano dust sprayed from the air!

and there came peals of thunder, (*man-made thunder*) from their Electromagnetic flying craft, Starlink & Chinese megaconstellations.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

rumblings NIV / voices KJV, lets look at Strongs' Definitions
legend concordance²⁸

φωνή phōnḗ, fo-nay'; probably akin to G5316 through the idea of disclosure; a tone (articulate, bestial or artificial); by implication, an address (for any purpose), saying or language:—noise, sound, voice.

Starlink & Chinese internet/deception network/voices in the sky!

Rumblings / voices in the sky – Scripture fulfilled

²⁸ <https://www.blueletterbible.org/lexicon/g5456/kjv/tr/0-1/>

REVELATION 8.5.3.1 – RUMBLINGS – CERN

ACCELERATORS

Accelerators are nothing new. The reported history of the construction of these machines' dates back to the 1940's.

Revelation 8.1-5 was on the build up back then only now in the last 40 years or so to 2029 are they becoming so advance they are able to do more than a little damage.

To research more on the Accelerators which include the Large Hadron Collider in Europe. A Wikipedia list of accelerators is available.²⁹

History of Accelerators PDF 1997 report can be found here Colliders History on the wayback machine on the internet.³⁰

Picture inside the HADRON Collider machine

²⁹ https://en.wikipedia.org/wiki/List_of_accelerators_in_particle_physics

³⁰ <https://web.archive.org/web/20101122110457/http://epubs.cclrc.ac.uk/bitstream/1297/RAL-TR-97-011.pdf>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

CERN MAGAZINE

CERN produces a monthly magazine. You can find it at <https://cerncourier.com/p/magazine/> if interested in the technology.³¹

One cover of the CERNCOURIER March/April 2023

³¹ <https://cerncourier.com/p/magazine/>



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The picture in the cover of the CERN COURIER says it all really. Searching for answers in “space” in the natural world when God is available in the Spiritual world by simply doing what Jesus said. What did Jesus say to do? Ye must be born again, marvel not I say unto you, you must be born again. John 3&4 Acts 2.38.

Article.

A new data centre at CERN

The new data centre complements the existing centre and will allow CERN to respond to the growing data-processing needs of the worldwide scientific community

23 February, 2024 | By Antonella Del Rosso³²

Civil Engineering and Infrastructure

The inauguration of the new data centre in Prévessin. From left to right: Pippa Wells, CERN’s Deputy Director for Research and Computing; Charlotte Warakaulle, CERN’s Director for International Relations; Aurélie Charillon, Mayor of Prévessins-Moëns; Joachim Mnich, CERN’s Director for Research and

³² <https://home.cern/news/news/computing/new-data-centre-cern>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Computing; Yves Nussbaum, Director Marché Industrie, AXIMA; and Enrica Porcari, Head of Information Technology Department at CERN.

On 23 February 2024, a brand-new data centre was inaugurated on CERN's Prévessin site (France), marking the completion of a major project for the Organization's computing strategy. Spanning more than 6000 square metres and including six rooms for IT equipment with a cooling capacity of 2 MW each, the centre will host CPU (central processing unit) servers for physics data processing as well as a small amount of CPU servers and storage capacity for business continuity and disaster recovery (for example, when data is corrupted). CERN's main data centre on the Meyrin site (Switzerland) will continue to house the majority of the Organization's data storage capacity.

The rate of data production of the experiments at the Large Hadron Collider (LHC) continues to grow, already reaching some 45 petabytes per week, and this is expected to double in the era of the High-Luminosity LHC, the major upgrade of CERN's current flagship accelerator, the LHC. The data from these experiments is fed into the Worldwide LHC Computing Grid (WLCG), a collaboration of around 170 data centres distributed across more than 40 countries, with a storage

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

capacity of about 3 exabytes and one million CPU cores distributed across the network. While the Meyrin data centre has so far performed the Tier 0 role, that is, the core for the LHC Computing Grid, the Prévessin centre will provide vital additional computing capacity to CERN.

The new building was built in a record time of less than two years. It complies with strict technical requirements to ensure its environmental sustainability, and is equipped with an efficient heat-recovery system that will contribute to heating buildings on the Prévessin site.

The backbones of our interconnected world, data centres are energy-intensive infrastructures. According to a recent report, their energy consumption accounts for about 1.5% of the European Union's total electricity consumption. Two parameters characterise the environmental sustainability of a data centre: the power usage effectiveness (PUE) – the ratio of total data centre input power to IT load power – and the water usage effectiveness (WUE) – the ratio between the use of water in data centre systems and the energy consumption of the IT equipment.

The new Prévessin centre has a PUE target of 1.1, lower than the worldwide average of 1.6, and close to 1.0, which would

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

be the value for a perfectly efficient data centre, where all the power is delivered to the IT equipment.

It has a WUE target of 0.379 litres per kWh thanks to an innovative water recycling system. The cooling system will be automatically triggered when the outside temperature reaches 20 degrees Celsius. Five huge fan-walls installed in each room will ensure that the overall temperature does not exceed 32 degrees Celsius.

The new centre was designed, built and will be operated in the framework of a FIDIC (International Federation of Consulting Engineers) Gold Book contract, which also ensures its financial sustainability. The building's IT rooms will gradually be equipped with up to 78 racks each. Starting from the top-floor rooms, they are expected to be fully equipped over the next ten years.

End of Article.

Fully equipped over the next ten years!

Plus, other technologies linked to other sites around the world.

That is interesting to the point that 10 years takes us to the year 2034.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Reverend Barry points out that 2034 or thereabouts may be the approximate time that Apollyon and the Locusts are let out of the energy prison in Trumpet Number five.

Trumpet Number Five

Scripture says Revelation 9.1-12

And the fifth angel sounded, and I saw a star fall from heaven unto the Earth: and to him was given the key of the bottomless pit.

2 And he opened the bottomless pit; and there arose a smoke out of the pit, as the smoke of a great furnace; and the sun and the air were darkened by reason of the smoke of the pit.

3 And there came out of the smoke locusts upon the Earth: and unto them was given power, as the scorpions of the Earth have power.

4 And it was commanded them that they should not hurt the grass of the Earth, neither any green thing, neither any tree; but only those men which have not the seal of God in their foreheads.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

5 And to them it was given that they should not kill them, but that they should be tormented five months: and their torment was as the torment of a scorpion, when he striketh a man.

6 And in those days shall men seek death, and shall not find it; and shall desire to die, and death shall flee from them.

7 And the shapes of the locusts were like unto horses prepared unto battle; and on their heads were as it were crowns like gold, and their faces were as the faces of men.

8 And they had hair as the hair of women, and their teeth were as the teeth of lions.

9 And they had breastplates, as it were breastplates of iron; and the sound of their wings was as the sound of chariots of many horses running to battle.

10 And they had tails like unto scorpions, and there were stings in their tails: and their power was to hurt men five months.

11 And they had a king over them, which is the angel of the bottomless pit, whose name in the Hebrew tongue is Abaddon, but in the Greek tongue hath his name

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Apollyon. 12 One woe is past; and, behold, there come two woes more hereafter.

We will wait and see when this scripture is fulfilled.

REVELATION 8.5.4 – FLASHES OF LIGHTNING

...and there came peals of thunder, rumblings, flashes of lightning and an Earthquake. NIV

Basically Starlink and the Chinese megaconstellations³³ are projecting a Tv/Video/Movie shows onto the sky enhanced by the stage smoke to make it more visual and make it look more real.

lightnings KJV Strongs definitions legend

ἀστραπή astrapḗ, as-trap-ay'; from G797; lightning; by analogy, glare:—lightning, bright shining.

Again, the Holy Bible is telling us it is Starlink, Starlink type systems like the Chinese megaconstellations, lasers and neutrinos! Holographic technology. It is important to note here there is more as seen in Trumpet Number One namely video projection technology – TV in the sky.

Take a look at the following pictures. Lasers and Starlink. When Starlink³⁴ first came online it had red lines in the sky,

³³ <https://spacenews.com/china-launches-second-batch-of-18-satellites-for-thousand-sails-megaconstellation/>

³⁴ <https://www.Starlink.com/au>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

now it has blue lines. Could the dark military be testing the image of the beast technology?

Picture of lasers in the sky over Hawaii approximately six months prior to the fires on Maui.

Following is a picture of the blue lines Starlink is using to test its systems. They are hard to see in the following picture but they are there if you look closely.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Starlink now turning blue³⁵

Space Weather News for Aug. 25, 2024

<https://spaceweather.com>

<https://www.spaceweatheralerts.com>

STARLINK SATELLITES ARE TURNING BLUE: A new type of Starlink satellite is making bright blue streaks across the night sky. Direct to Cell Starlinks have a blue coating and are as much as 5 times brighter than their internet-only cousins. Up to 7,500 may be deployed to build a "cell tower in space." Full story @ [Spaceweather.com](https://spaceweather.com).

Solar flare alerts: Sign up for [Space Weather Alerts](https://spaceweatheralerts.com) to receive instant text messages when strong solar flares are underway.



Above: A blue Starlink flies in front of a telescope in Italy. Photo credit: Paolo Palma

³⁵ <https://www.cloudynights.com/topic/934455-Starlinks-now-turning-bright-blue/>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Starlink multiple blue lines



Cherenkov Radiation

The centerpiece of IceCube is a matrix of 86 strings of basketball-sized optical detectors placed one and a half kilometers beneath the Antarctic snow. Each string includes 60 optical detectors that are so sensitive they can register a single photon. Dug into the ice by a special hot-water drill, the strings are arranged in a pattern designed to use the Cherenkov radiation to map the path of neutrinos through the ice.³⁶

Eric Hecker a electrical contractor for Raytheon a Military Industrial Complex contractor to the USA government says that the neutrinos strings can trace and track everything that gives of neutrino energy anyway in our solar system. It he says as an electromatic aircraft tracking station. He says this in his interview with Redacted YT channel.³⁷ Reverend Barry believes this is part of Trumpet Number Five as well. Tracking the “Locusts” that are released from their energy prison.

Eric Hecker is a whistle blower who has testified before congress in the USA.

³⁶ <https://news.gatech.edu/archive/features/catching-neutrinos-south-pole-block-ice.shtml#:~:text=Dug%20into%20the%20ice%20by,the%20particles%20originated%20in%20space.>

³⁷ <https://youtu.be/UOSGRv0SNfI?si=STYd0RJWbXzJWro8> He's EXPOSING the truth of Antarctica's SECRET Earthquake Generating Military Base | Redacted

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

What is a neutrino string?

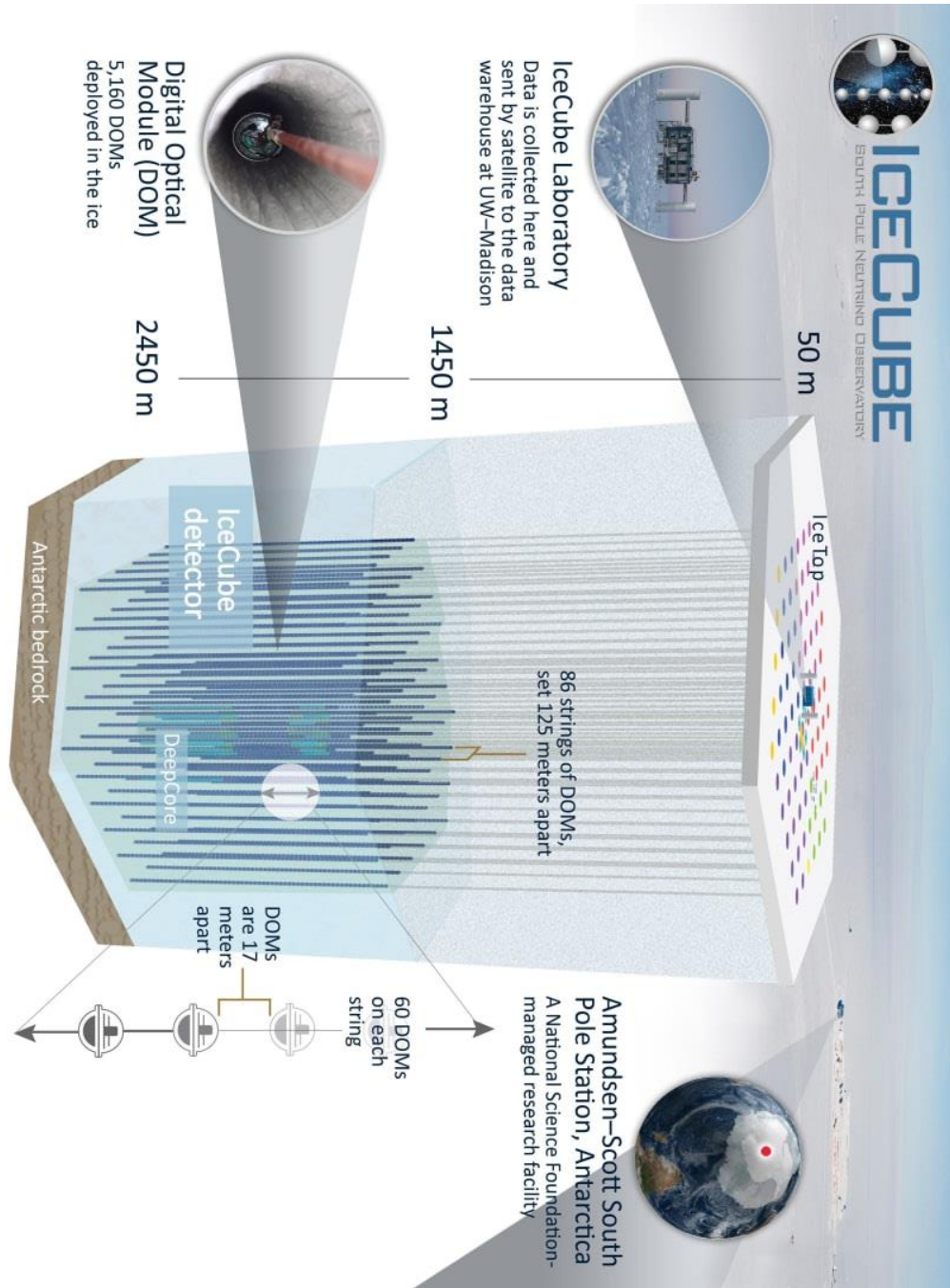
IceCUBE

Detector

IceCube, the South Pole neutrino observatory, is a cubic-kilometre particle detector made of Antarctic ice and located near the Amundsen-Scott South Pole Station. It is buried beneath the surface, extending to a depth of about 2,500 meters. A surface array, IceTop and a denser inner subdetector, Deep Core, significantly enhance the capabilities of the observatory, making it a multipurpose facility.³⁸

³⁸ <https://icecube.wisc.edu/science/icecube/>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series






IceCube is the first gigaton neutrino detector ever built and was primarily designed to observe neutrinos from the most violent astrophysical sources in our universe. Neutrinos, almost massless particles with no electric charge, can travel from their sources to Earth with essentially no attenuation and no deflection by magnetic fields.

The in-ice component of IceCube consists of 5,160 digital optical modules (DOMs), each with a ten-inch photomultiplier tube and associated electronics. The DOMs are attached to vertical “strings,” frozen into 86 boreholes, and arrayed over a cubic kilometer from 1,450 meters to 2,450 meters depth. The strings are deployed on a hexagonal grid with 125 meters spacing and hold 60 DOMs each. The vertical separation of the DOMs is 17 meters.

Eight of these strings at the center of the array were deployed more compactly, with a horizontal separation of about 70 meters and a vertical DOM spacing of 7 meters. This denser configuration forms the DeepCore subdetector, which lowers the neutrino energy threshold to about 10 GeV, creating the opportunity to study neutrino oscillations.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Detector Design

-  1 gigaton of instrumented ice
-  5,160 light sensors, or digital optical modules (DOMs), digitize and time-stamp signals
-  1 square kilometer surface array, IceTop, with 324 DOMs
-  2 nanosecond time resolution
-  IceCube Lab (ICL) houses data processing and storage and sends 100 GB of data north by satellite daily

2 nanosecond of time resolution!

There is one billion nanoseconds in one second of time!

That is screen resolution at incredible speeds!

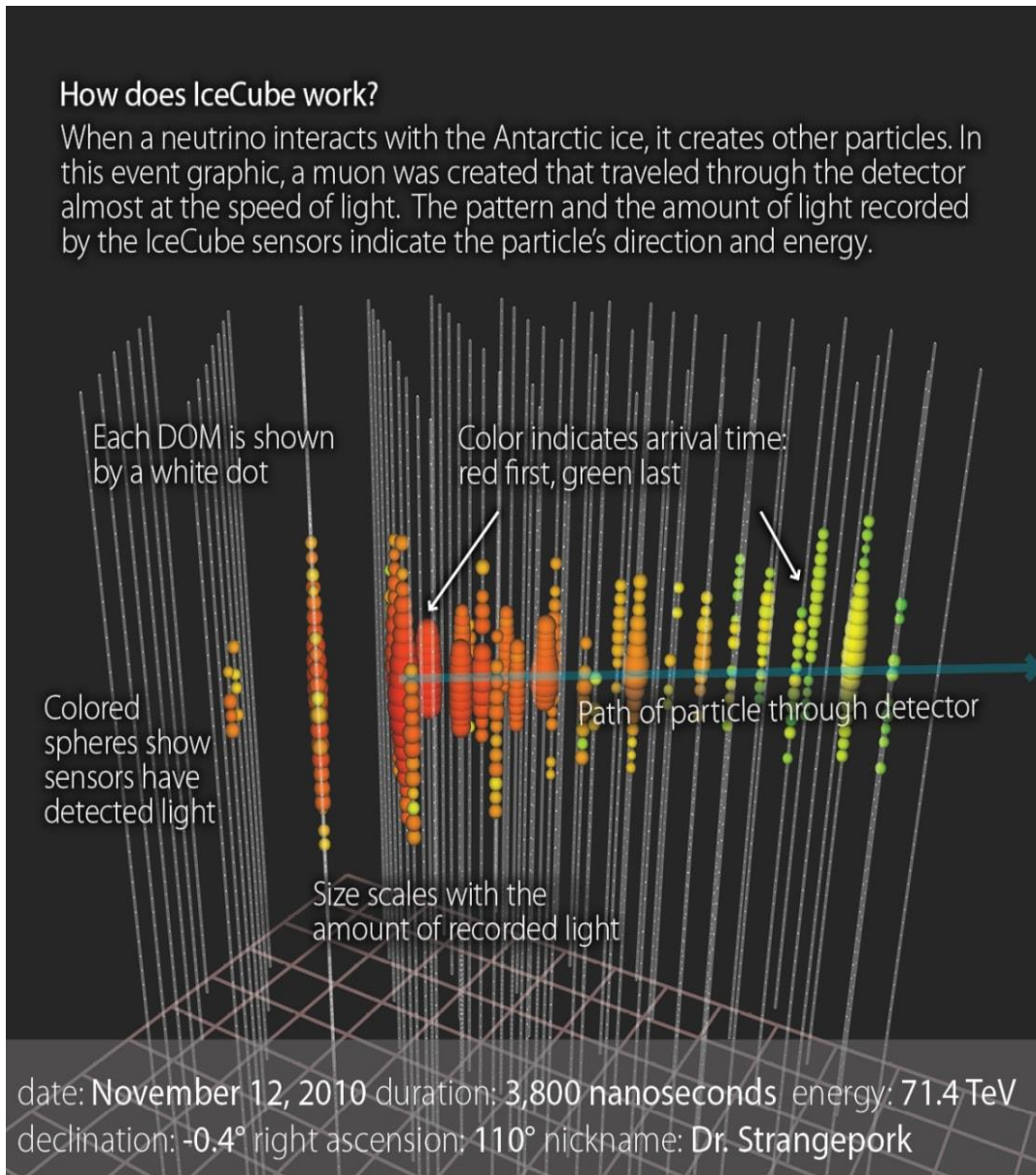
Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

IceTop consists of 81 stations located on top of the same number of IceCube strings. Each station has two tanks, each equipped with two downward facing DOMs. IceTop, built as a veto and calibration detector for IceCube, also detects air showers from primary cosmic rays in the 300 TeV to 1 EeV energy range. The surface array measures the cosmic-ray arrival directions in the Southern Hemisphere as well as the flux and composition of cosmic rays.

Developments in neutrino astronomy have been driven by the search for the sources of cosmic rays, leading at an early stage to the concept of a cubic-kilometer neutrino detector. Cosmic rays, which consist mainly of protons, are the highest energy particles ever observed, with energies over a million times those reached by today's particle accelerators on Earth.

AMANDA, the Antarctic Muon and Neutrino Detector Array, was built as a proof of concept in the mid 1990s and demonstrated that the extremely clear Antarctic ice was suitable for detecting energetic neutrinos. IceCube, the only cubic-kilometer neutrino detector constructed to date, was completed in December 2010, only six years after the deployment of the first string at the South Pole.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Neutrinos are not observed directly, but when they happen to interact with the ice they produce electrically charged secondary particles that in turn emit Cherenkov light, as a result of traveling through the ice faster than light travels in ice.

The IceCube sensors collect this light, which is subsequently digitized and time stamped. This information is sent to computers in the IceCube Lab on the surface, which converts the messages from individual DOMs into light patterns that reveal the direction and energy of muons and neutrinos.

The IceCube Neutrino Observatory was built under a National Science Foundation (NSF) Major Research Equipment and Facilities Construction grant, with assistance from partner funding agencies around the world. The NSF Office of Polar Programs supports the project with a Maintenance and Operations (M&O) grant. The University of Wisconsin–Madison is the lead institution, coordinating data-taking and M&O activities. The international IceCube Collaboration, with more than 40 institutions worldwide, is responsible for the scientific research program.

We will end the article here as it continues with how it was constructed.

The reader is encouraged to complete their own research.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

If a person believed that this was built just to observe it may be that, that person needs to rethink and think of it as a track and delivery device of energy anywhere in the world and be able to deliver that energy to many parts of the world in a single burst of energy. We will continue more on this device when we look at the word – Earthquake.

The following article is about Increasing the size of IceCube

The world's largest neutrino detector FROM ICECUBE TO ICECUBE-GEN2³⁹

With groundbreaking discoveries, IceCube has established neutrino astronomy as a new discipline for the exploration of the universe. By observing neutrinos, we can obtain knowledge about regions of the cosmos where light is unable to provide useful information. In order to fully exploit the potential of this new window to the universe, the international IceCube Collaboration is planning a significant expansion of the IceCube detector at the South Pole.

A gigantic detector deep in the ice

³⁹ https://www.icecube-gen2.de/project/index_eng.html

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The detection of neutrinos requires sophisticated technology. Although neutrinos are among the most common elementary particles in the universe, they are extremely difficult to catch. Neutrinos pass through any matter almost undisturbed. To detect them despite this very little interaction, huge detectors are needed. The current IceCube detector takes advantage of its unique geographical location at the South Pole: It uses one cubic kilometer of glacial ice as a natural medium. Once a neutrino collides with an ice molecule, it creates charged particles that emit blue to ultraviolet light on their way through the ice, known as Cherenkov light. Several thousands of light sensors thousands of meters deep in the ice capture these faint light signals. The optical sensors are placed in glass spheres attached to long cables like pearls on a string and frozen in the polar ice.

IceCube-Gen2 will enlarge the detector's volume to a gigantic eight cubic kilometers. This will increase the detection rate of cosmic neutrinos by a factor of ten. The detector will be integrated into IceCube's existing infrastructure, and three new components will be added to it: First, the optical detector will be upgraded and expanded by adding 120 additional cables equipped with thousands of new, more sophisticated light sensors. Second, radio detectors will be set up near the surface of the ice over an area of 500 square kilometers. They will improve the sensitivity of the detector at the highest

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

energies by two orders of magnitude. Third, an extended array on the ice surface will detect atmospheric particle showers that are triggered by cosmic rays.

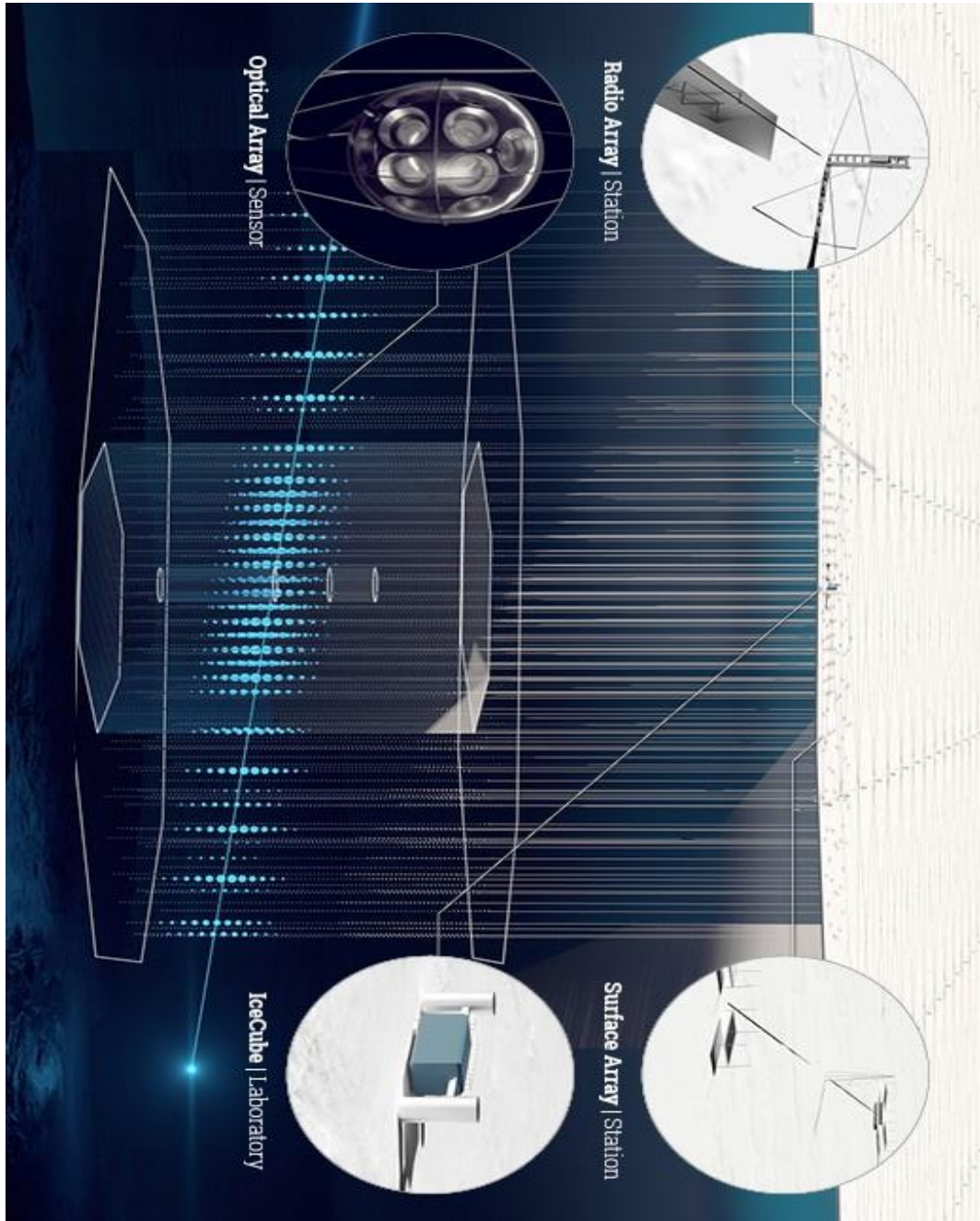
10 TIMES MORE DISCOVERIES

“So far we have only seen the tip of the iceberg – only a very small part of the neutrino sky has been resolved. With IceCube Gen2 we strive to increase the discovery rate by a factor of ten!”

*Professor Marek Kowalski,
DESY & HU Berli*

Visualization of the Ice-Cube expansion to IceCube-Gen2
(Credit: DESY, Science Communication Lab)

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The last article linked to the following article.

Beyond IceCube

Perfect for neutrino astronomy

IceCube-Gen2 will measure the properties of neutrino sources with unprecedented accuracy. Not only will the telescope's detection rate increase, but also the range of energies it will be able to detect – up to the highest neutrino energies. For this purpose, additional instrumentation will also record radio signals from neutrino interactions. The light yield of the optical sensors will be optimized using new technology to measure Cherenkov radiation. Artificial intelligence (AI) methods are used to transmit and evaluate the data from these light patterns. This also enables faster reaction times to neutrino events in order to quickly point other astronomical telescopes to their sources. A surface array of particle detectors on the ice helps to distinguish neutrinos that come from outer space from neutrinos that are generated by particle collisions in the Earth's atmosphere.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Winterover at the South Pole (Credit: Martin Wolf, TU München / IceCube, NSF).

NEW TECHNOLOGY FROM GERMANY AND EUROPE

Research groups in Germany and across Europe are already making a significant contribution to the first phase of Gen2, IceCube's upgrade. The upgrade will be completed by 2024. The full expansion to IceCube-Gen2 will be finished by 2032. Due to the special requirements of the South Pole and the deep glacial ice, most technologies have to be developed from the ground up – for instance, smart readout systems for data transmission that use extremely energy-saving electronics while achieving maximum efficiency.

High-performance optical sensors

New sensors that are being developed for IceCube-Gen2 will be able to collect almost three times as much light as current optical sensors. Instead of a single-pixel sensor, they will use 24 pixels per sensor to detect light. About 400 of these state-of-the-art sensors will be produced for phase one of IceCube-Gen2, more than 200 of them in Germany. To increase the amount of usable light and the detectable signal, another variant of novel sensors use a new technique: Wavelength shifters slide the ultraviolet portion of the light to a wavelength that can permeate the glass containers of the sensors.

Sophisticated calibration methods

To further analyze the measured signals, it is crucial to understand in detail how light moves through the ice before being detected, and what the physical significance is of a particular signal as measured by the sensors. The IceCube team uses various calibration techniques to classify and measure both the general properties of the detector and the expected paths of light through the ice.

Artificial intelligence for neutrino searches

To classify a neutrino event as such, researchers have to put a lot of effort into comparing the light patterns of the measured signals with simulations. Simulations predict which signals to expect depending on the type of triggering event, the energy it emits, and the direction it comes from. They also take into account the properties of the glacial ice as known from the calibration data. Machine learning methods can significantly accelerate the analysis process, and quickly and reliably filter out neutrino events from the noise.

End of article.

Anybody in their right mind would question that by increasing the area by seven times from 1 square kilometre to 8 square kilometre would only give a 10 times result says Reverend Barry.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Barry is not a mathematician but asks the question. If a person were to ask that by increasing the mass by a factor of 7 and increasing the power of the DOM's as well surely you would achieve a much higher increase in energy inputs and outputs of just 8 times?

More on this when we talk about the word earthquake in Revelation 8.5.

Ball lightning

Ball lightning is a rare and unexplained phenomenon described as luminescent, spherical objects that vary from pea-sized to several meters in diameter.

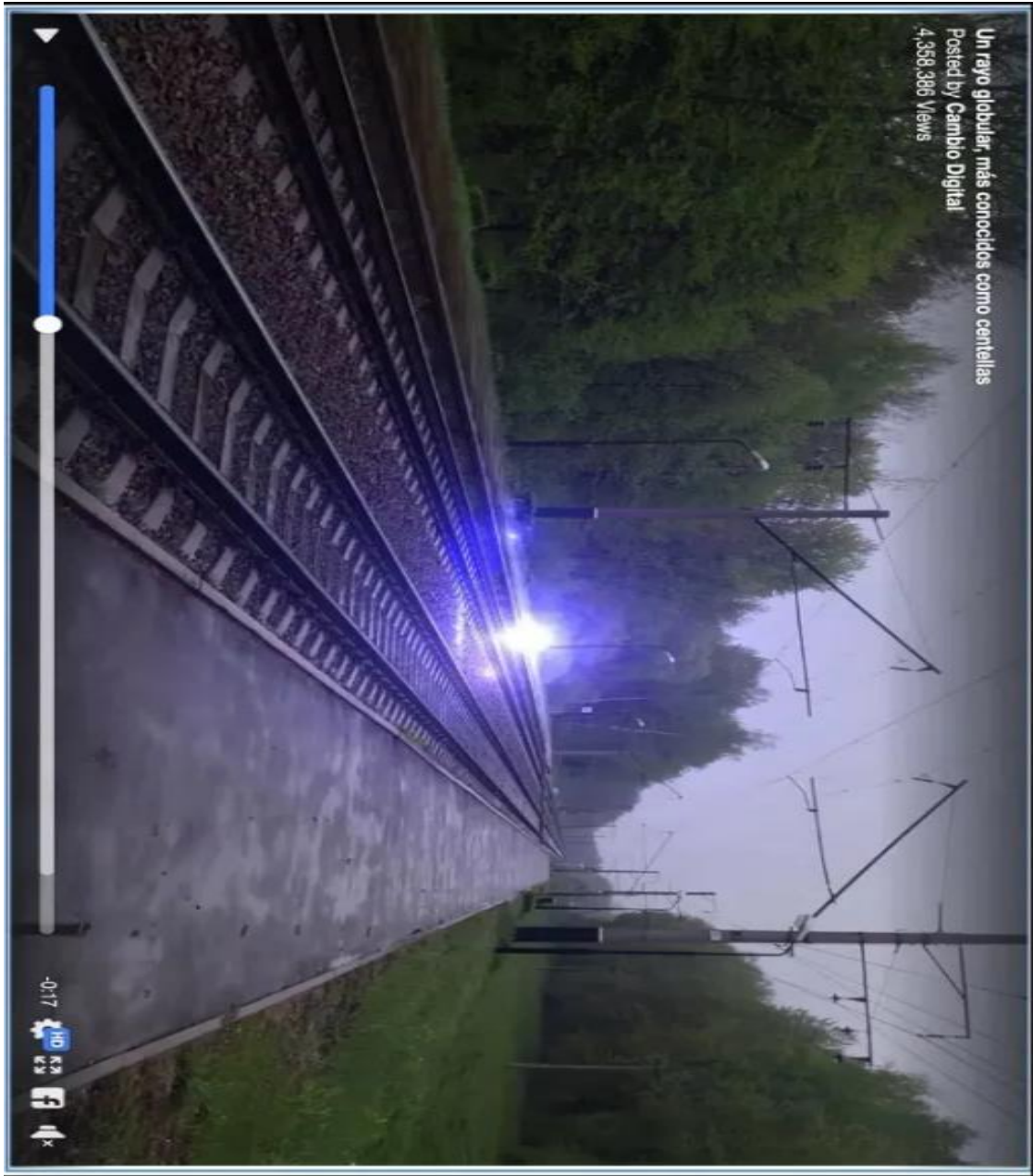
More information can be found on Wikipedia here.⁴⁰

Below we will show you some pictures of ball lightning.

The following picture of ball lightning is taken from a video that filmed the energy moving across the railway lines.

⁴⁰ https://en.wikipedia.org/wiki/Ball_lightning

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The picture above shows ball lightning in the sky.

Reverend Barry seems to believe that ball lightning may be manmade. Although it may appear natural he suggests it happens more frequently as mankind masters the energy deployment of energy more expertly.

HYPER KAMIOKANDE

Hyper-Kamiokande (also called Hyper-K or HK) is a neutrino observatory and experiment under construction in Hida, Gifu and in Tokai, Ibaraki in Japan. It is conducted by the University of Tokyo and the High Energy Accelerator Research Organization (KEK), in collaboration with institutes from over 20 countries across six continents.⁴¹ As a successor of the Super-Kamiokande (also Super-K or SK) and T2K experiments, it is designed to search for proton decay and detect neutrinos from natural sources such as the Earth, the atmosphere, the Sun and the cosmos, as well as to study neutrino oscillations of the man-made accelerator neutrino beam. The beginning of data-taking is planned for 2027.

⁴¹ <https://en.wikipedia.org/wiki/Hyper-Kamiokande>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The Hyper-Kamiokande experiment facility will be located in two places:

The neutrino beam will be produced in the accelerator complex J-PARC and studied by the set of near and intermediate detectors located in Tokai village, Ibaraki prefecture, on the east coast of Japan

The main detector, also called Hyper-Kamiokande (HK), is being constructed under the peak of Nijuugo Mountain in Hida city, Gifu Prefecture, in the Japanese Alps. The HK detector will be used for proton decay searches, studies of neutrinos from natural sources and will serve as a far detector for the measurement of the oscillations of an accelerator neutrino beam at the distance corresponding to the first oscillation maximum.

Picture workers on the boat inside the complex

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



The boat is called a Dream Boat

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Picture workers close up on the so called the Dream Boat.

Picture diagram of the under the mountain structure.

On the website trumpetdisasters.net⁴² we have listed 21 of the Neutrino Observatories alone in the world. From the mountain peaks in China to the inside the deepest lake in Russia.

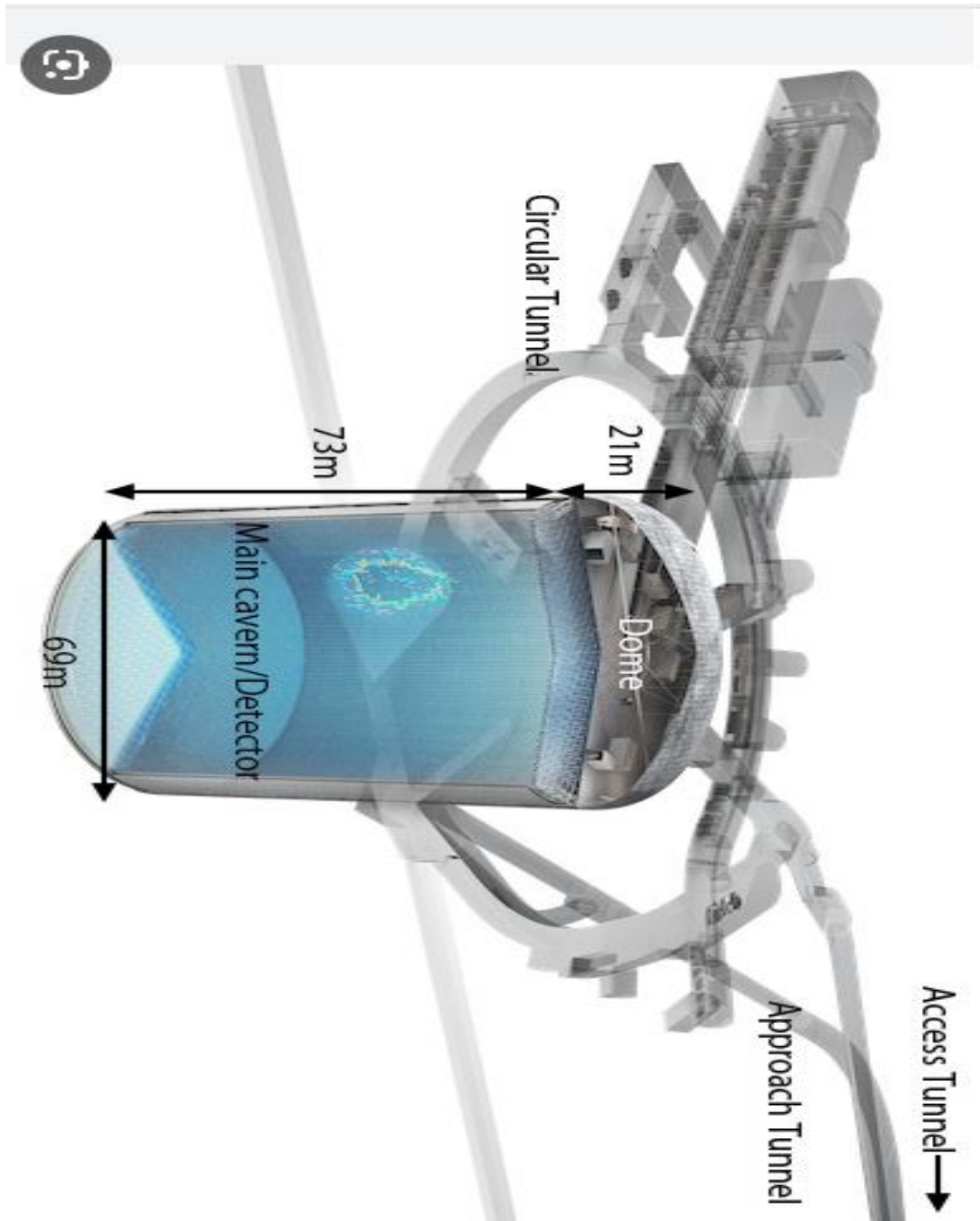
There are many types of Observatories in the world, its as though they were trying to figure out which form of light and energy would open the bottomless pit in Revelation 9.1-11. This is part of Trumpet Number Five.

⁴² <https://trumpetdisasters.net/r-8/lightnings/other-neutrino-observatories/>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



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More information is in the Appendix.

**The word “Lightnings”
in Revelation 8.5 scripture**

-

FULFILLED

REVELATION 8.5.5 – EARTHQUAKE

Revelation 8.5 KJV

5 And the angel took the censer, and filled it with fire of the altar, and cast it into the Earth: and there were voices, and thunderings, and lightnings, and an Earthquake.

and an Earthquake. *This is very interesting, is the Earthquake literal or figurative?*

Again one must refer to the Strongs Concordance.

σεισμός seismós, sice-mos'; from G4579; a commotion, i.e. (of the air) a gale, (of the ground) an Earthquake:— Earthquake, tempest.

This may seem to be before Trumpet Number One however, it is probably during Trumpet Number One. In fact, **it is the preparation in the lead up to Trumpet Number One.**

Is it the disturbance that peace has been taken from the Earth by Trump's first thrust of the sword? or is it an actual Earthquake?

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

If it is disturbance of the air, may we suggest Starlink and Starlink type systems again.

If it is an actual Earthquake, we would suggest we need to wait or there has been some like the Christchurch New Zealand earthquakes in 2011 and 2012. Reverend Barry remembers below...

Revelation 16.20

20 And every island fled away, and the mountains were not found.

Does that mean in one go? Maybe or does it mean in stages? In stages says Reverend Dr Barry – he believes in stages. That way people are terrified for a few years. Could the Bible be indicating the earthquakes are originating from one place on earth and therefore being an earthquake instead of earthquakes?

Trumpet Number One is some islands and some hills especially where those hills will act as a resistance to the Tsunamis of Trumpet Number Two. Better move those hills in Trumpet Number One!

We think these are sad, very sad times which will begin worldwide when the globalists fulfill God's warning to the humans on Earth when they fulfill Trumpet Number One

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Warning. Wickedness abounds. Death and Hell to follow into the later quarter of 2029 and into the 2030's for some years! Until Jesus returns when God says that's enough, part way through Trumpet Number seven.

Terraforming the Earth.

A few months before the hailstorm in Toormina Coffs Harbour I Barry was doing weight exercises with a friend in Durie Close. I noticed these strange looking pipes being laid. I asked the workers what the pipes were for. They answered drainage. Being a low social economical area within the town of Toormina I thought that answer must be a load of rubbish... The government looking after the poor. Yeah right!

After this I saw a video about ice in a road in Chile, I think the ice was some 4-foot-high blocking the whole road. I said to my friend, I think you are going to have to drive out of here one day over the park at the back of your place and told him what I saw. I never expected the hailstorm that happened on the 20th October 2021 a Wednesday.

A few weeks after the hailstorm I was on my pushbike and I came over the hill near the beach riding towards the race course heading north. There at the bottom of the hill was a truck with signage that said a description. In that description was the word "Drainage".

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Unfortunately, I did not stop to take a picture of the large device that had been unloaded on to the ground.

It was light brown or beige in colour. A square at one end and the other was round with a small light on it which was green. A small thick aerial was on it as well.

I went back a week later, and could not find where they had dug the hole to put that in. Allegedly they had covered the hole up very well.

Could it be that the device was a directional bomb to be used in the event of Trumpet Number One as a terraforming bomb? Why would they do this? In Trumpet Number Two we see that the waves will be hundreds, if not thousands of feet high. If there is to be terraforming Earthquake(s) the world over in Trumpet Number One there would be less resistance to the enormous waves in Trumpet Number Two. It would seem that terraforming events mentioned in Revelation 8.5 kjv are seen as repeated below for reference:

5 And the angel took the censer, and filled it with fire of the altar, and cast it into the Earth: and there were voices, and thunderings, and lightnings, and an Earthquake.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

We need to ask the question could it be that the Earthquake in Revelation 8.5 is the globalist bankers having the beaches cleared or levelled so not to would impede the Tsunamis?

Was the Tonga⁴³ explosions over two days an example of what is coming in Trumpet Number One?

Neutrino Earthquake from IceCube weapon in the South Pole.

Eric Hecker in his interview with Clayton Morris from redacted said that the Christchurch New Zealand earthquake was created in the machine from IceCube in the south pole.⁴⁴

Reverend Barry thought about the earthquake in 2020 in Christchurch when he was there. The time he was in Christchurch before that was in the 1970's. The fact that the earthquakes happen twice less than one year apart was puzzling until one realised what the military objective could be. Until the earthquake in 2011 and the one, five months before that Christchurch had a lot of really old solid buildings. It seems Christchurch did not have a lot of earthquakes over the last few centuries. A person may ask what does not go through double solid brick and stone buildings? Microwaves.

⁴³ 15th January 2022 – Video from 15.55 mark Daniel Alexander Cannon shows the Tonga event happened over two days and had explosive characteristics to it. <https://youtu.be/WuLjD3GBzKQ?si=f2PW1NEeLO5-Hkhp&t=955>

⁴⁴ <https://youtu.be/UOSGRv0SNfI?si=BURKpwQOcE5HyUfO> He's EXPOSING the truth of Antarctica's SECRET Earthquake Generating Military Base | Redacted

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The buildings have been replaced with tin and glass. What goes through tin and glass really easily? Microwaves! Wifi and data on your mobile device and now with nano technology injections allegedly you and the internet of things – the internet of bodies can be connected while in building easily because microwaves travel through tin and glass easily.

We can find this in scripture. First, we will look at the scripture in relation to humans and having their bodies connected to the internet in relation to their eyes and tongues which are extremely close to their penial gland which is the bodies third eye if you will and on Trumps Sword as identified by the palm or fig tree in the Holy of holies.

Zechariah 14.12

And this shall be the plague wherewith the Lord will smite all the people that have fought against Jerusalem; Their flesh shall consume away while they stand upon their feet, and their eyes shall consume away in their holes, and their tongue shall consume away in their mouth.

In relation to Trumpet Number One on or around the 7th-8th August 2029. One Earthquake.

Revelation 8.5

5 And the angel took the censer, and filled it with fire of the altar, and cast it into the Earth: and there were voices, and thunderings, and lightnings, and an **Earthquake.**

Notice the Holy Bible used the word earthquake not earthquakes.

This really stuck in Reverend Dr Barry's mind for a long time. How can many hills near many beaches on different islands and continents be levelled. Surely the bible should read earthquakes.

The Holy Bible was, is and will be correct.

One earthquake created at IceCube in the South Pole along with some other Neutrino observatories simultaneously sent out to multiple locations to level the beaches and some in land places that have hills that are in the way for Trumpet Number Two Tsunami's.

Added to these in the name of "drainage" the potential pre-laid bombs according to what Reverend Barry saw and seen. Also, since that date according to Eric Hecker with his recent

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

interview with Clayton Morris from You Tube Channel - Redacted⁴⁵. This is also a confirmation to Reverend Barry.

It is going to be one convincing night – a terrifying night – A real night where many hills near the beaches and some inland hill will be destroyed – moved from their place and many islands will disappear.

Also, a night fall of fakeness. An incredible fake show with real life implications and many will die and many beach and inland hills will be blown up and levelled.

Until it happens a lot cannot be said other than what has been said.

When it happens, we will be able to say the following....

Revelation 8.5 Earthquake scripture fulfilled

⁴⁵ https://youtu.be/UOSGRv0SNfI?si=fQWbFV086hy8Jk3_He's EXPOSING the truth of Antarctica's SECRET Earthquake Generating Military Base | Redacted

REVELATION 8.6 – ANGELS PREPARE

6 Then the seven angels who had the seven trumpets prepared to sound them.

We suggest that this is deep sea mining which begins on the **01/01/2025**.

Angels prepare to sound from the 01/01/2025 to Trumpet Number One disaster event in the third quarter of 2029.

We believe we have the most likely date for this Trumpet Number One disaster which potentially is 7th-8th August 2029 or written August 7-8th 2029.

Time must pass for the methane gas that is released from 5 kilometres below sea level, to rise to the surface and build up sufficiently in the atmosphere before the destruction that the globalists have planned in 2029 can happen, in Trumpets One, Two and Three as God warns in the verse revelation 8.7 Trumpet Number One.

Scapegoat is required

The banking globalists do not create these wicked events and then take the blame for them. There is always a scapegoat.

We need to ask the following:

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

- Why are there Voices?
- Why are there lightnings like pictures in the sky?
- Could the lightnings be neutrinos for the earthquakes?
- Why is there thunderings? Could the thunderings be pretend noises of flying craft we see at the movies?
- Why is there stage smoke (incense) in the sky?
- Why is there fire (lasers and microwaves) coming from the sky?
- Why is there smoke incense – stage smoke?
- Why are the saints terrified and praying?
- Why is there fire from the alter? Are people being killed?
- Is the earthquake being the hills near the beaches being terraformed? This also being fire?
- Fire from the lasers triggering the events in Trumpet Number One?

Considering the above questions may lead a person to think the following: brief description of Trumpet Number One.

Starlink, Chinese megaconstellations and other projects of similar deployment will project a “video show” into the sky. Stage smoke is to enhance the visual display.

Flying ships and aircraft would have sprayed the sky just hours before. The stage smoke incense that the angel demonstrates.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Starlink will project fake portals for both fake and real electromatic craft to fly through flown by the black military.

Both Starlink and the flying ships will project sounds including voices and weird sounding voices like you see at the movies for fake aliens including screaming. This is not new. Afterall the German aircraft were designed to scream when diving.

This alone will make some saints pray as they do not realise its pretend. It pretended until the alleged previously laid bombs at the bottom of hills explode and terraform the beaches of the Earth. Some hills inland will also be blown up allegedly. Those living on these beautiful areas will be killed or worse disabled if they survive.

Starlink and such like systems project flying craft, laser fire both real and not real will make the experience look real.

Some of the hills destroyed and dead people that lived on them will make it real and will justify many alien beliefs - false beliefs.

Fire will be the microwaves and the explosions.

After this event the Earth will be ready for the tsunamis in the warning of Trumpet Number Two that God showed John.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The angels prepared to sound. Mankind is destroying the ocean life and the earth 5 kilometres under the sea! Methane gas is rising filling the atmosphere. May we suggest by the end of January 2025 the mixture of the air we breathe will start to change so that we begin to breathe in more natural gas and thereby reduce the percentage of oxygen we breathe each breath.

The police sang – Every breath you take. Indeed, via the internet up link that was given in the C19 injections allegedly the globalists will be watching remotely as to how it affects us.

The scene is set. Jesus opens the seventh seal, the four riders of the four Horses of Revelation 6 have ridden forth and the four living creatures have said “Come and See” John has seen amazing things, things that we are experiencing today!

The COVID WAR and the Second, Third and Fourth Horse riders and those that control them the globalist bankers setting up battle scenes in the air via 5G and 6G technologies Starlink, Starlink type systems and microwaved technologies which I wrote about in my book “Savage Kings⁴⁶”. We observe other technologies and weapons people buy and put in their homes like new types of Oxygen Species reactive Air

⁴⁶ <http://padreaustralia.com/savage-kings-2/> Savage Kings – Defeated Book By Rev'd Dr Graham J Whelan OAM ISBN: 9798793639743 pages 412-488 various technologies

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Conditioning systems “Air purifiers” that diffuse reactive oxygen species that potentially cause DNA damage in the lung”⁴⁷ and 60GigHz SMART modems.

Nanotechnology shown on Trump’s sword above in people’s bodies via the vaccinations which I wrote about in my book COVID WAR – REVELATION 6 – 7 Seals⁴⁸.

Also in my book “ANTICHRIST REVEALED⁴⁹” I demonstrated that after the alleged antichrist was born there would be future ominous events as explained in the Amplified Bible of Revelation 12.1.

⁴⁷ <https://pubmed.ncbi.nlm.nih.gov/21139343/> Kosuke Kawamoto, Itaru Sato, Midori Yoshida, Shuji Tsuda PMID: 21139343 DOI: 10.2131/jts.35.929

⁴⁸ <http://padreaustralia.com/4-horses-of-revelation/> Book by Rev’d Dr Graham J Whelan OAM COVID WAR – Revelation 6 – 7 Seals ISBN: 9798437529577

⁴⁹ <http://padreaustralia.com/antichrist-revealed-3/> book “ANTICHRIST REVEALED” by Rev’d Dr Graham J Whelan OAM ISBN: 9798793555432

Revelation 12.1 amp

And a great sign [warning of an ominous and frightening future events] appeared in Heaven;

Question Since he was born on the 23/04/2018 or USA 04/23/2018 have ominous events happened in the world?

People are getting sick and dying, well above the previous average of sudden death prior to 2020. It may seem the mainstream media are covering up the tremendous amounts of deaths and vaccine adverse reactions that are totally and permanently disabling people.

We also saw that the Fourth rider was allegedly going to poison bate the ground so that the animals ate a substance that allegedly was going to protect them from Rabies. However, the animals are being injected with C19 vaccinations.⁵⁰

Also, we have seen in our book COVID WAR that plants may be injected. Now we have evidence of that.

⁵⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9398550/>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Injecting watermelons may be for food colouring only however in the video link below it shows strange texture of the watermelons.⁵¹

Vaccinating watermelons. See picture below.



This is seen in Revelation 6 that seal number five (the beheaded) and seal number six (possible multiple overlays) are

⁵¹ <https://youtu.be/CRbXXa3WguY?si=9chbVQ81Q46kgC6F>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

ongoing and presumably all the seals are ongoing until Jesus returns.

The scene is set and as we look at the Trumpets some are already in motion as I will show using the Bible and Strong's Concordance along with various reports and research. We start with the Trumpet Number One as Seal number seven is opened. We have already covered some of the technologies used in deep detail in my book "Savage Kings"⁵².

In Summary we know as far as the riders of the four Horses are concerned in our time that:

The **Whitehouse is the White Horse** and Anthony Fauci was given a crown (title) Chief Medical Officer - time in office – November 2, 1984 – December 31, 2022. 38 years he rides that Whitehorse / Whitehouse! For the final time, the most public time he rode in 2020 to end of 2022 being very public going out on TV to conquer and conquering. He had a bow for a weapon – which is the simplest piece of cloth the Strong's Concordance says. **A Bow is a face musk.**

⁵² <http://padreaustralia.com/savage-kings-2/> Savage Kings – Defeated Book By Rev'd Dr Graham J Whelan OAM ISBN: 9798793639743 pages 412-488 various technologies

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Strong's Concordance or our book COVID WAR.⁵³

Donald Trump is the **rider of the red Horse (republican)** see link below or our book COVID WAR⁵⁴

Trump is not a Christian. He said this at the TURNING POINT CONVENTION on the 26th July 2024⁵⁵. However, he also said he loves Christians. Why then we ask does he approve the wars like the COVID WAR for just one example?

⁵³ <https://padreaustralia.com/revelation-6-part-one-white-horse/>

⁵⁴ <https://padreaustralia.com/revelation-6-part-two-red-horse/>

⁵⁵ <https://trumpetdisasters.net/trumpet/t1/t1-d-j-trump/> Video - THUMP: "I'm Not A Christian" The Storm Is Near... Daniel Alexander Cannon – D J Trump

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The Holy Bible says the Rider of the Red Horse which we now know from the history while he was President is given power to take peace from the Earth. Since say just 2020 is the Earth more peaceful now in September 2024 or less peaceful?

Rider of the dark (blue) / black Horse (Democratic Party) is not known yet.

Rider of the pale horse is not known yet.

Could the pale horse be the Green Party?

The Angels with the Trumpets means messengers.

STOP PRESS

Reality is becoming clearer.

Reality of Revelation is true and real is becoming clearer

TIMING OF THE SCRIPTURES

In my book “ANTICHRIST REVEALED⁵⁶” I showed how scriptures and timings came together with Heavenly signs.

In this book we are suggesting times. The true timing of events and wonders is in the Fathers hands. We can gain potential indications of when the events of the Trumpets One and Two may happen.

Having said that it may be able to be known the timing of maybe Trumpet Two due to mankind’s evil ways and the expiration of usefulness of some technology.

We see this in Trumpet Number Two. We are reminded that although mankind has his plans God is the One in control and mankind may need to change his plans and action the finality of Trumpet Number Two quicker or slower than he currently plans.

Working backwards from Trumpet Number Two possible month and year may give us an indication of the Trumpet Number One disaster.

⁵⁶ <http://padreaustralia.com/antichrist-revealed-3/> Book ANTINCHIRST REVEALED DOWNLOAD FREE
Rev’d Dr Graham J Whelan OAM ISBN: 9798793555432

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Therefore, we are not timing the effects or events of the day but are just taking notes from what the media is saying to what the Bible has said for thousands of years.

TIMING IS OF THE LORD

TRUMPET NUMBER ONE

Who controls the food supply, controls the people!⁵⁷



⁵⁷ Henry Kissinger however some dispute that Henry Kissinger actually said it.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Revelation 8.7 niv

7 The first angel sounded his trumpet, and there came hail and fire mixed with blood, and it was hurled down on the Earth. A third of the Earth was burned up, a third of the trees were burned up, and all the green grass was burned up.

Revelation 8.7 kjv

7 The first angel sounded, and there followed hail and fire mingled with blood, and they were cast upon the Earth: and the **third part of trees was burnt up**, and **all** green grass was burnt up.

Key Words:

hail	fire	mingled	blood	cast
green	grass			

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Strong's Concordance

Word in kjv	Ref-No- for Greek word	Definition(s)
hail	5464	to lower into a void – let down, strike
fire	4442	A primary word: “fire” (literally or figuratively., spec. lightning); - fiery fire Burn utterly up and down
mingled	3396	primary verb – mix – mingle
blood	129	bloodshed humans and animals – insects (the juice of grapes)
cast	906	Violent or intense – deliberate throw - send – strike – throw - trust
green	5515	Green – verdant – dung- hay – herbage – vegetation – blade – court - garden
grass	5528	

In this edition of a detailed revision of Trumpet Number One we will try to expound each of the Strong's Concordance words in order shown above which is the order in which they are used in the Bible. However, due to the complexities of the subject sciences involved we may not always be able to define exactly. We have done our best to make it as uniform and in layman's terms as possible.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Any overlap or repeated information is not intended to make the reader bored but rather expound all the science in Trumpet Number One that is being used. From the top of the sky to the bottom of the deep sea, from under the ground to the inside of the grass and vegetation, to the burning up of one third of the trees across the world on the sides of mountains from the coastal areas of the sea.

Hail

These processes and some of the machines that cause them are detailed in my book *Savage Kings*,⁵⁸ however could this mean that there is a special event at the end of this angel sounding his message – his trumpet?

Could this be “a methane release”? A trigger set to light this up world-wide?

Could it be Methanethiol? - A substance found in blood, brain and faeces of animals (including humans) and occurring naturally in certain foods such as nuts⁵⁹

Is this one large attack or one happening over many years as the technologies are refined or both?

Could these attacks include biological gases and parasites (blood)?

Are the “mingling” different attacks or are they man-made mixtures, some releasing fast or even some releasing over days, months or even years?

⁵⁸ <http://padreaustralia.com/savage-kings-2/> Book By Rev'd Dr Graham J Whelan OAM ISBN: 9798793639743 pages 412-488 various technologies

⁵⁹ <https://en.wikipedia.org/wiki/Methanethiol>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Hail and Fire Mingled with Blood

It is easy to see fire and blood together?’ But what about hail and blood?

Could hail be used as a weapon?

Could the Prince of the power of the air use hail as a weapon?

Ephesians 2.2

2....you used to live when you followed the ways of this world and of the ruler of the kingdom of the air (satan), the spirit who is now at work in those who are disobedient.

- Could hail be used as a delivery system hidden from plain sight yet in plain view?
- Why is it that hail sometimes takes two to three days to melt?
- Why is it that hail has a dry ice vapour look to it when it falls in large amounts and the size of golf balls and larger?
- Why is it that snow sometimes does not melt under gas flame but the flame leaves black soot on the snow?
- Is there a parasite mingled in the hail that comes to life slowly as the hail melts?
- If there is a parasite does the slow melting of the ice help pollute the land?

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

- Does walking in the hail barefoot or children playing cause danger to the persons?
- Could a parasite go through our skin to do damage at a later date?
- If not a parasite, could it be some sort of very mild snake venom. Dr Bing Liu who researched the SARS-2 Covid issue was going to make a press release of his findings after five months of research that snake venom could be the root cause of some major revelations? Sadly, he was shot and killed a day or two before he was going to announce to the world his findings.

Article

Computational Biologist Bing Liu Dies in Suspected Murder?

The University of Pittsburgh scientist, who was studying SARS-CoV-2, was shot to death in his home.

Kerry Grens May 7, 2020

Bing Liu, a computational systems biologist at the University of Pittsburgh who was studying the virus that causes COVID-19, was shot to death in his home on May 2. He was 37 years old.

UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Police insist Liu's death had nothing to do with his research on SARS-CoV-2, and instead involved a personal matter. Another man, Hao Gu, was found dead in his car near Liu's home of an apparent suicide, according to news reports.

The Computational and Systems Biology Department at Pitt, where Liu was an assistant research professor, announced in a statement its mourning of Liu's death. "Dr. Bing Liu⁶⁰ was an outstanding researcher, who has earned the respect and appreciation of many colleagues in the field, and made unique contributions to science," the statement reads.

Liu earned his undergraduate and doctoral degrees from the National University of Singapore. He completed a postdoc at Carnegie Mellon University before joining the lab of Ivet Bahar at Pitt as a research associate. He was promoted to his current position in 2016, according to his CV, and he developed machine learning approaches and other models to study biological systems. His most recent publications investigated a cell death mechanism called ferroptosis and molecules that modulate autophagy.

⁶⁰ <https://rumble.com/vzIhen-explosive-watch-the-water-covid-bombshell-exclusive-the-great-lie-revealed-.html> Reference to Dr Bing Liu and the hypothesis of snake venom causing harm in SARS-2 and water

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Bahar tells the Pittsburgh Post-Gazette that Liu had been studying the infection mechanism of SARS-CoV-2. According to the department's statement, "Bing was on the verge of making very significant findings toward understanding the cellular mechanisms that underlie SARS-CoV-2 infection and the cellular basis of the following complications. We will make an effort to complete what he started in an effort to pay homage to his scientific excellence."

End of Article.

Just a coincidence – maybe?

All of the above questions are shown by different people from all over the world and going back some years or more. The reader is encouraged to do their own research by google search or youtube search or other platforms like rumble and Dlive for example to find out the truths to these questions.

Dry Ice Vapour – refer and look to the Hailstorm in Sawtell – Coffs Harbour Australia October 20th 2021 see following

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Dry Ice Vapour “look” to a Hailstorm in Sawtell – Coffs Harbour Australia October 2021



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

The hail did not seem to be normal/natural hail. It seemed to take 2 days to melt. The vapour had a strange smell to it, it could have been just the vapour. Or it could have been that the ice had condensed the air. Either way this so called hailstorm we allege, is just a trial run to get the mixture correct for the full on attack sounded by Trumpet Number One as described by John in the Book of Revelation 8.

The issue of hail mixed with blood is deeper than that of “hail kills animals and birds”. It is an issue of proving that what was found in the vaccines as proven by some medical doctors from around the world that may well be in the hail as well. Some have suggested the Hydra or Parasite allegedly found in the vaccines is in the hail. More research is required. However, when we look at Trumpet Number Three each person has to ask the question - are our water systems being polluted on purpose?

HAIL – Almeria – Spain November 2024

Picture - Hail 10 inches or 26 centimetres deep⁶¹

⁶¹ ADAPT2030 YT channel <https://www.youtube.com/watch?v=49cUfZoCZ4g>

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

HAIL – Almeria – Spain November 2024 – Vapour



Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Has God warned us that he allowed the globalist bankers to do evil and execute those plans for the Trumpets. Trumpet Number One that the hail (water-snow-fire) would be polluted and cause many types of cancer and abnormalities?

The answer - to be a resounding YES from Trumpet Number One sounding God's warnings!

Now we have allegedly weaponized hail melting into our river systems and on our land from which we grow our food!

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Alleged Potential silent flying Hail machine



Looks like the same 'Mysterious Craft' spotted in FOUR different STATES!

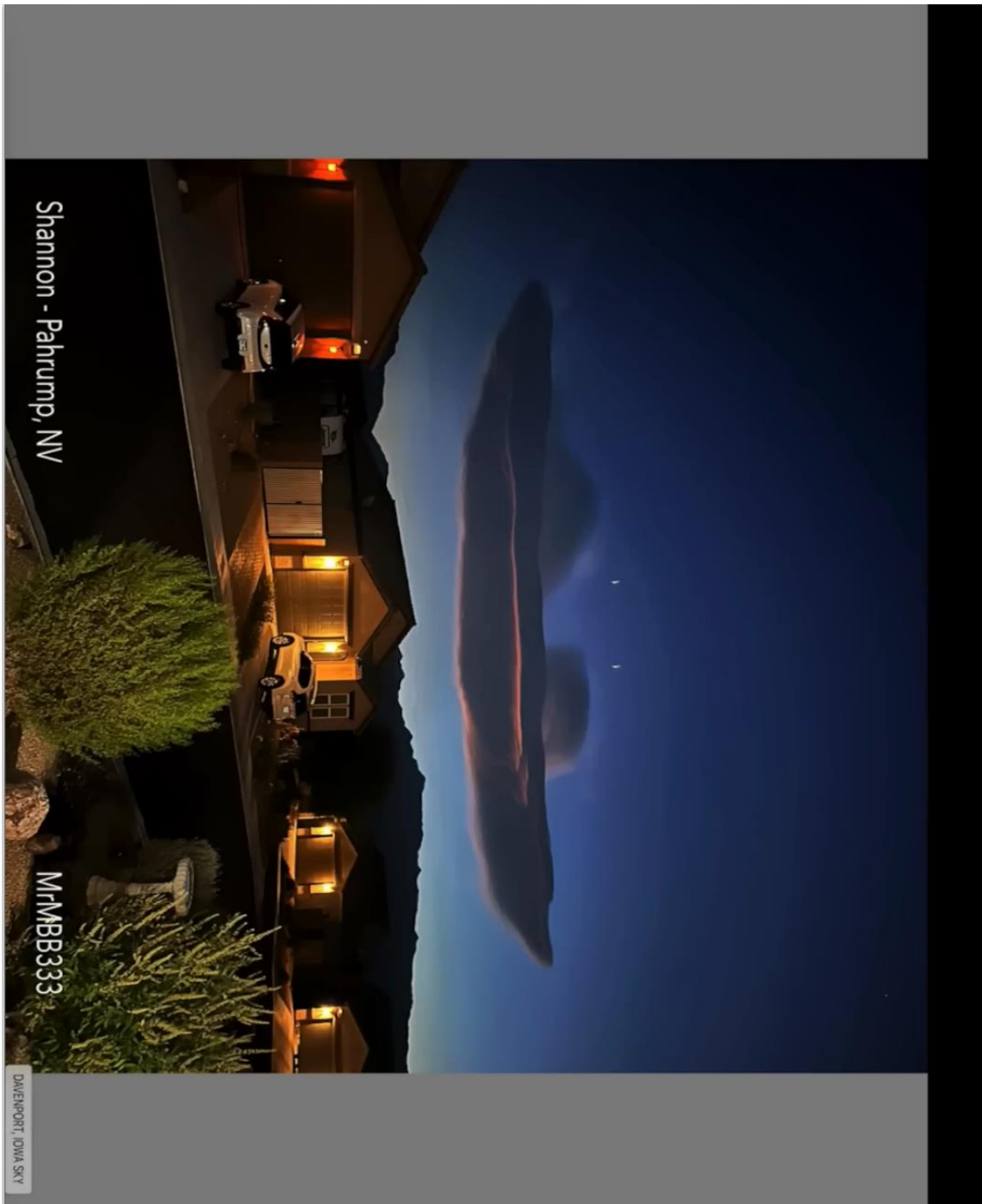
Notice the shadows on the right-hand side of the craft match the shadows cast by the fence line indicating the video was not fake.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Alleged Potential flying electromagnetic hail machine

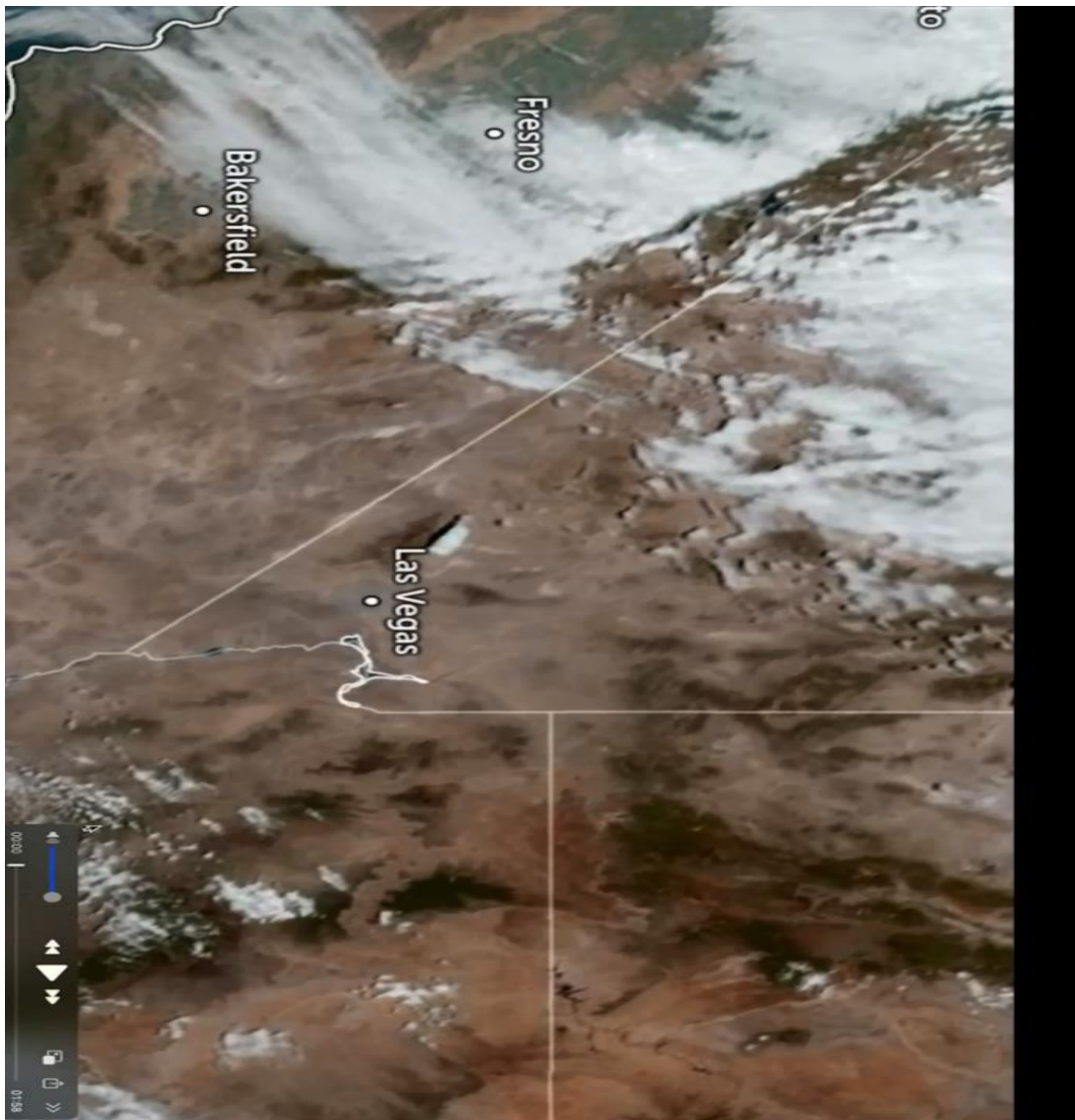
**Bomber – Hail / water / blood sprayer – rainmaker –
super flood maker**

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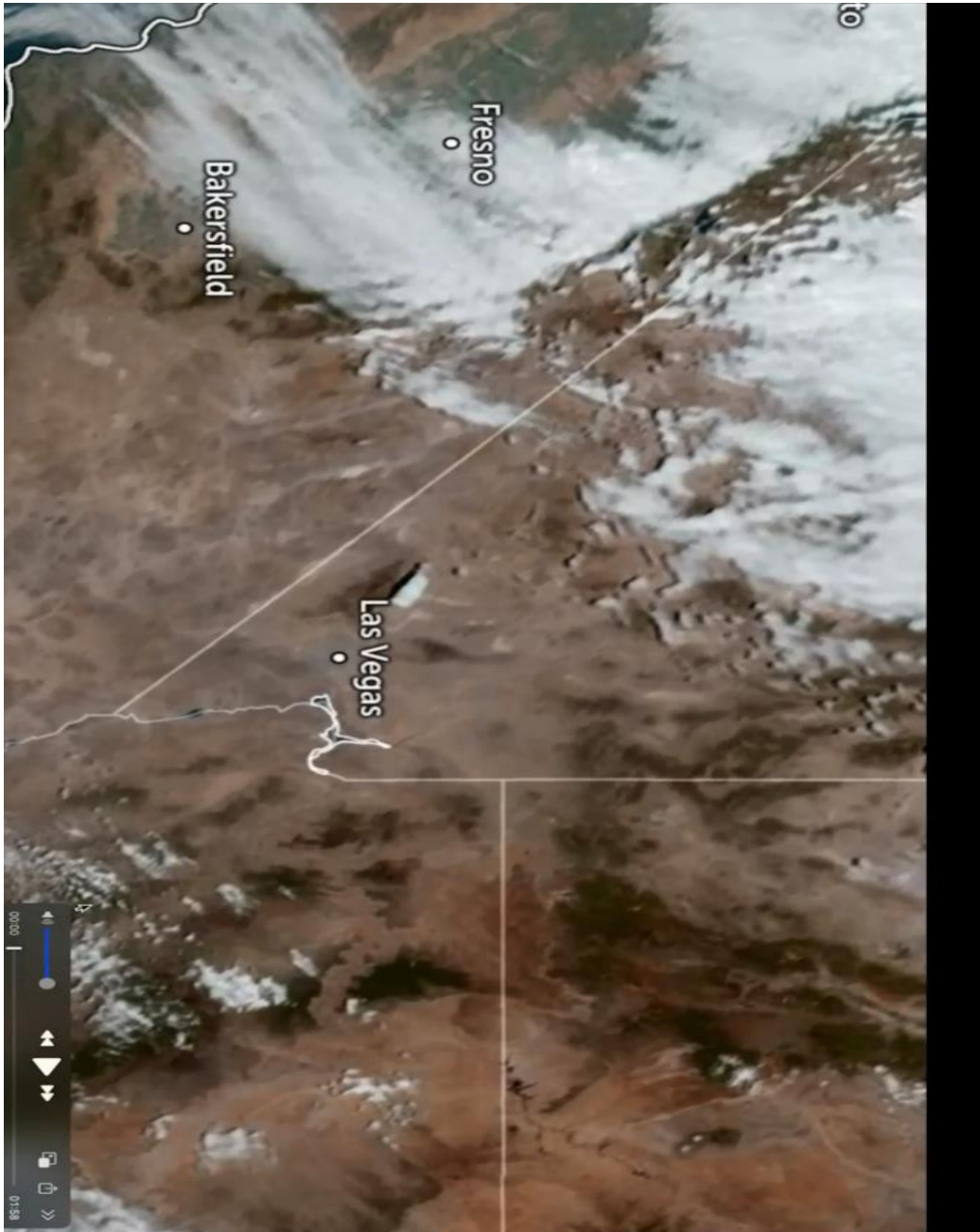


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Here it is near Las Vegas – taken from the international space station. Notice the shadow it casts on the ground. Massive machine.



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Looking at the picture above we can see that the middle of the craft right hand side is near Indian springs. Just above the “L” of Las Vegas. Measuring the distance from that area Indian Springs to the back of the craft near the lighter shaded ground gives us an approximate measurement. Further below.

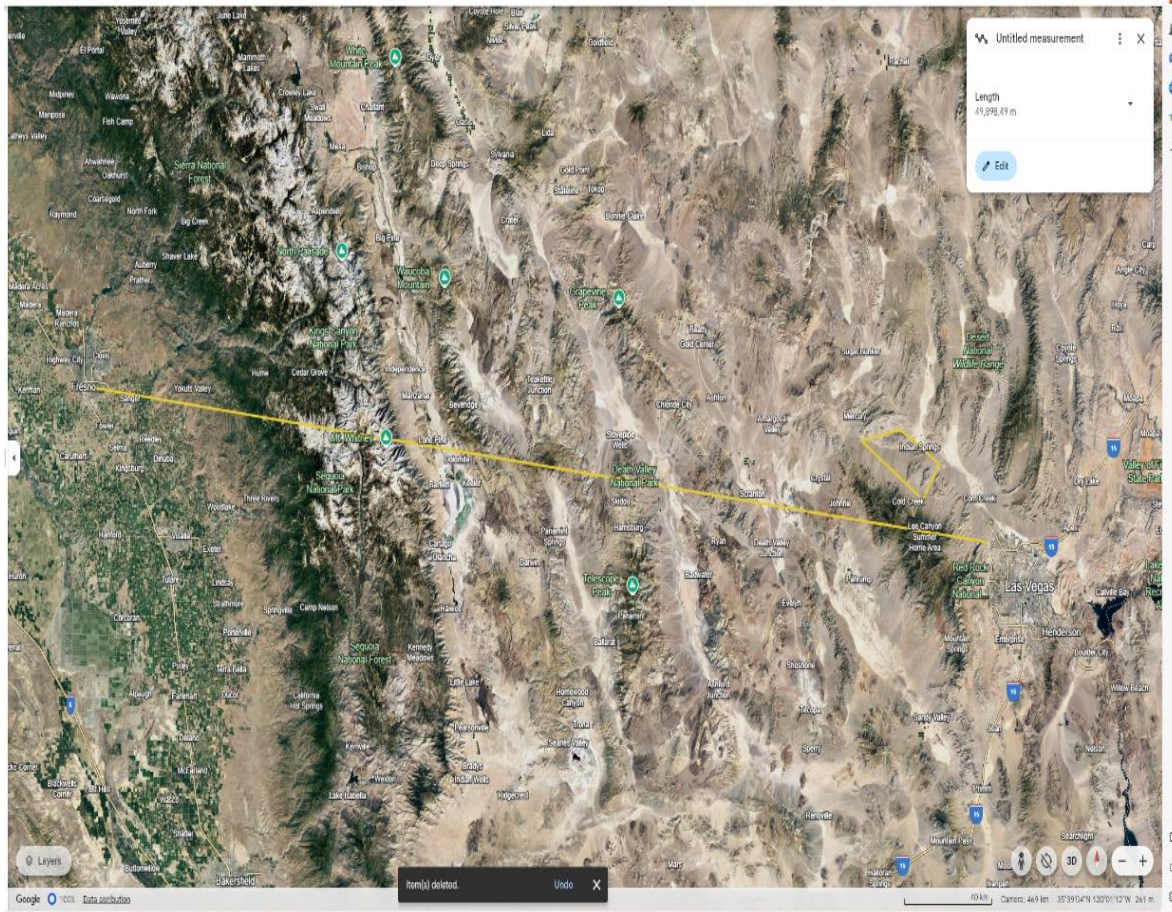
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Zoomed in view of bomber



Typical of NASA low quality pictures. We have however, worked with what we have and measured this craft approximately. The estimation may be short or longer than the actual size of the craft. Pictures from Google Earth below – see yellow rectangle.

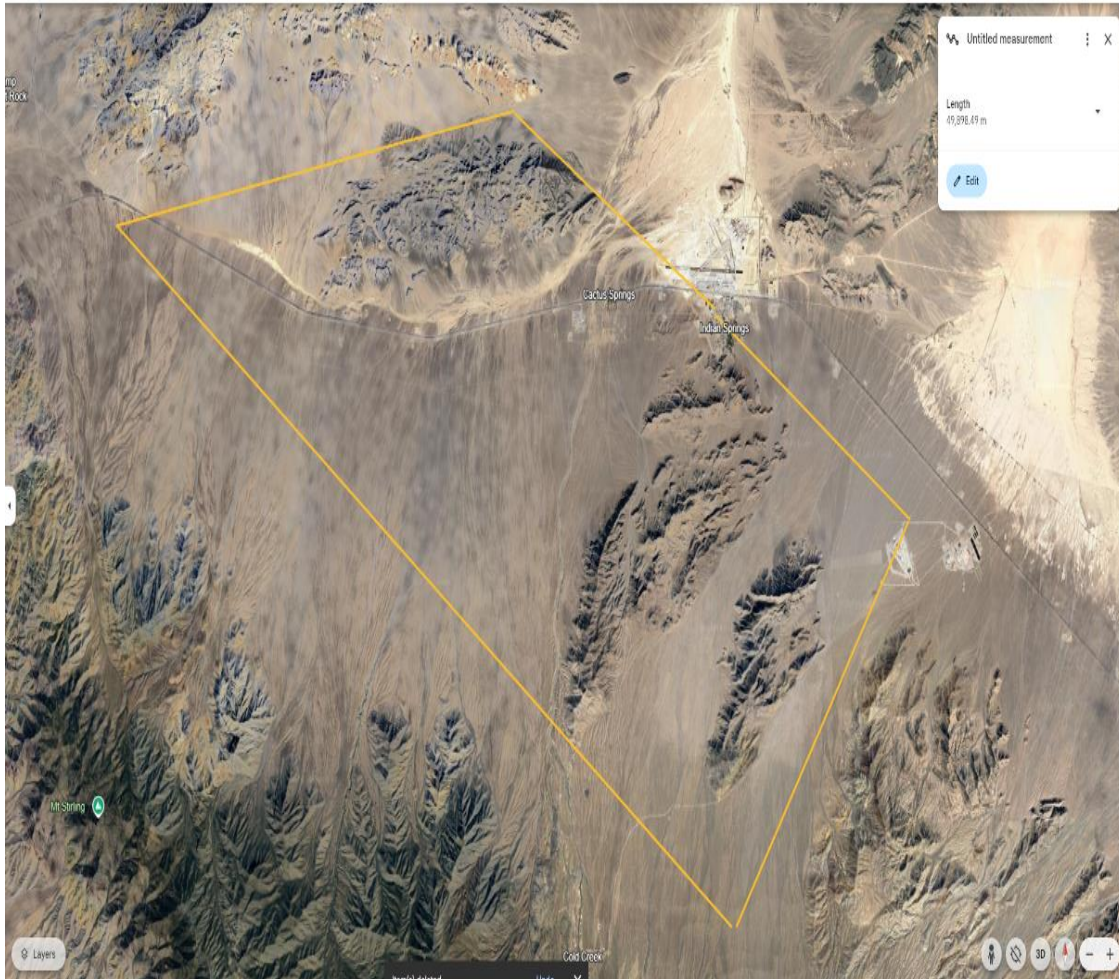
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Map of area Las Vegas to Fresno approximately 400 kilometres.

Zoomed in view

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Using the measurement tool and guessing. The estimates are at least 20km long on the short side and 30km long on the long side and 13 km wide.

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Ezekiel 38.9 kjv

9 Thou shalt ascend and come like a storm, thou shalt be like a cloud to cover the land, thou, and all thy bands, and many people with thee.

Interpretation of scripture re the pictures above.

9 Thou shalt ascend (*rise up like an aeroplane does*) and come like a storm (*very fast and cloaked in clouds to hide producing your own lightning and thunder*), thou shalt be like a cloud to cover the land (*so big you will cast a shadow over and to cover the land*), thou, (gog maygog (being USA, England, Canada, Australia and New Zealand) and all thy bands, and many people with thee.

We now from this one electromagnetic craft alone, see that this scripture can easily be fulfilled and will be.

As seen in the book *Savage Kings* and on my YouTube channel⁶² electromagnetic flying machines are nothing new. They however have been hidden from the public view for various reasons. Mainly it would seem they are used as weapons against us in the build-up of the disasters of the Trumpets.

⁶² Playlist https://www.youtube.com/playlist?list=PLHAQcYuLzN2oSzNr_W5tBQY4G1TKnXc-f

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Another view is that technology takes a long time to develop, much testing and calibration is required.

What if Trumpet Number One has been in development for over 100 years? What if there are partial fires that become more intense over the years and decades?

Could this be possible? Is it likely?

For those who live in Australia and are old enough to remember we had in Australia the Ash Wednesday fires in 1979. In 1983 we had the Ash Wednesday fires again.

A documentary was made. Dr Barry Gumm remembers this at the time and watched the fires in the Flinders Ranges in South Australia. At times he thought he saw some things in the sky. A friend of his (now deceased) sold his business in Adelaide and moved 700km inland to Coober Pedy. These events scared a lot of people, and some began to prepare. Reverend Dr Barry Gumm reviewed the documentary and found the faster than the eye can see almost, in the film clips. The video film back then was only 22 frames per second. However, he was able to find many frames where these “black military” craft appeared. He even found one frame where the craft was in two places at the same time. In one frame that is 1/22nd of a second the craft had moved almost 500 metres.

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This video is on my youtube channel @padreaustralia. Video “Australian Fires #5 1983 Ash Wednesday was a DEW attack as is today's fires both are DEW attacks”

<https://youtu.be/nfLlp3fL-GY>

The picture of the craft in 1/22nd of a film that has 22 frames per second is overleaf.

Picture 1 Ash Wednesday 1983 Electromagnetic Craft



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Picture 2 Ash Wednesday 1983 Electromagnetic Craft zoomed in 200% same craft in 1/22nd frame showing the rotation of the rollers of the Searl Effect Generator- free energy



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**Picture 3 Ash Wednesday 1983 Electromagnetic Craft zoomed
in 300%**



**Picture 4 Ash Wednesday 1983 Electromagnetic Craft zoomed
in 400%**

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Obviously, there are thousands of examples. These are from 1983! In the same video documentary, a helicopter is seen firing presumably explosives. A person has to ask the question was this for fire control or fire creation by those that destroy the Earth?

The light you see on the craft on the left is the electromatic generator. John R R Searl revealed this technology to the world in the 1960's. However, the BBC who took thousands of photographs and the supporting documentary allegedly refuse to replay the documentary today. A video of John talking

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about his technology and of the NASA adviser and some 400 scientists is on my youtube channel⁶³.

In another video on my youtube channel there is a, “wildfire” from May 2019 at Nana Glen. Dr Barry Gumm filmed on his Samsung S10+ the multiple flying craft, craft, that was flying so fast that you could barely see it/them with the naked eye. If you watch this video, look at the cloud that looks like an Owl and the long cloud pointing to it presumably. Video “Australian Fires #7 Fire over Nana Glen, NSW May 2019 was a DEW attack.” https://youtu.be/okVDX_VWMjw

In yet another wildfire at Nana Glen in 2019 Dr Barry Gumm and I made a documentary. Someone was gracious enough to provide permission to enter their land and take video and pictures. Unfortunately, one of our camera’s did not work that well that day, still we were able to take around one hundred photographs and some short videos. What we found was astounding and an explanation of the same would be too long for this book. The reader is encouraged to watch the video at the following link. Australian Fires #6 Nana Glen was a DEW

⁶³ The Searl IGV Inverse Gravity Vehicle - Like Anti-Gravity is new? It was public in the 1960's
<https://youtu.be/iMNEbs2hvHc>

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attack NOV 2019 - that's twice in one year! A Documentary

<https://youtu.be/DBPpNh7gqU>

We now have a delivery system for the alleged weaponised hail.

Namely electromagnetic flying craft and strange effects on weather and materials.

In short, we saw all the effects that Dr Judy found in her investigation of the Twin Towers of New York in her book “Where did the Towers go”?⁶⁴

I also covered the topics from Dr Judy Wood in my “Savage Kings – Defeated” book⁶⁵.

⁶⁴ Book Dr Judy Wood B.S., M.S., Ph.D Where did the Towers go? Evidence of Directed Free Energy 9/11 find the book on amazon here https://www.amazon.com/Towers-Evidence-Directed-Free-energy-Technology/dp/0615412564/ref=sr_1_fkmr0_1?crd=20URPR31QJW5Y&keywords=where+did+the+towers+go+dr.+judy+wood+paperback&qid=1562813782&s=gateway&sprefix=where+did+the+towers+%2Caps%2C833&sr=8-1-fkmr0

⁶⁵ <http://padreaustralia.com/savage-kings-2/> Savage Kings – Defeated Book By Rev'd Dr Graham J Whelan OAM ISBN: 9798793639743

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But why Hail?

If you are going to burn all the green grass why would you throw hail down from on high to set the grass and ALL vegetation including crops alight?

The answer is seen in the form or way that combustion is achieved.

What if the hail condensed the air and the methane gas?

What if the cold-water content increased the heat when the gas is set alight, that is combusted.

This is exactly what happens in combustion engines.

In internal combustion engines⁶⁶, water injection, also known as anti-detonant injection (ADI), can spray water into the incoming air or fuel-air mixture, or directly into the combustion chamber to cool certain parts of the induction system where "hot points" could produce premature ignition. In jet engines — particularly early turbojets or engines in which it is not practical or desirable to have an afterburner — water injection may

⁶⁶

[https://en.wikipedia.org/wiki/Water_injection_\(engine\)#:~:text=In%20internal%20combustion%20engines%2C%20water,points%22%20could%20produce%20premature%20ignition.](https://en.wikipedia.org/wiki/Water_injection_(engine)#:~:text=In%20internal%20combustion%20engines%2C%20water,points%22%20could%20produce%20premature%20ignition.)

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be used to increase engine thrust, particularly at low-altitudes and at takeoff.

Water injection was used historically to increase the power output of military aviation engines for short durations, such as during aerial combat or takeoff. However it has also been used in motor sports and notably in drag racing. In Otto cycle engines, the cooling effect of water injection also enables greater compression ratios by reducing engine knocking (detonation). Alternatively, this reduction in engine knocking in Otto cycle engines means that some applications gain significant performance when water injection is used in conjunction with a supercharger, turbocharger, or modifications such as aggressive ignition timing.

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Hail in Trumpet Number One seems to be used to condense the air and increase the power of the combustion when the methane gas from Deepsea Mining is set alight.

To recap hail is being used to:

- 1) Condense the air and methane gas
- 2) Draw in oxygen
- 3) Draw in methane gas
- 4) Cool the air and methane gas for greater combustion.

Mankind it seems has mastered the atmospheric pressure in the open for combustion!

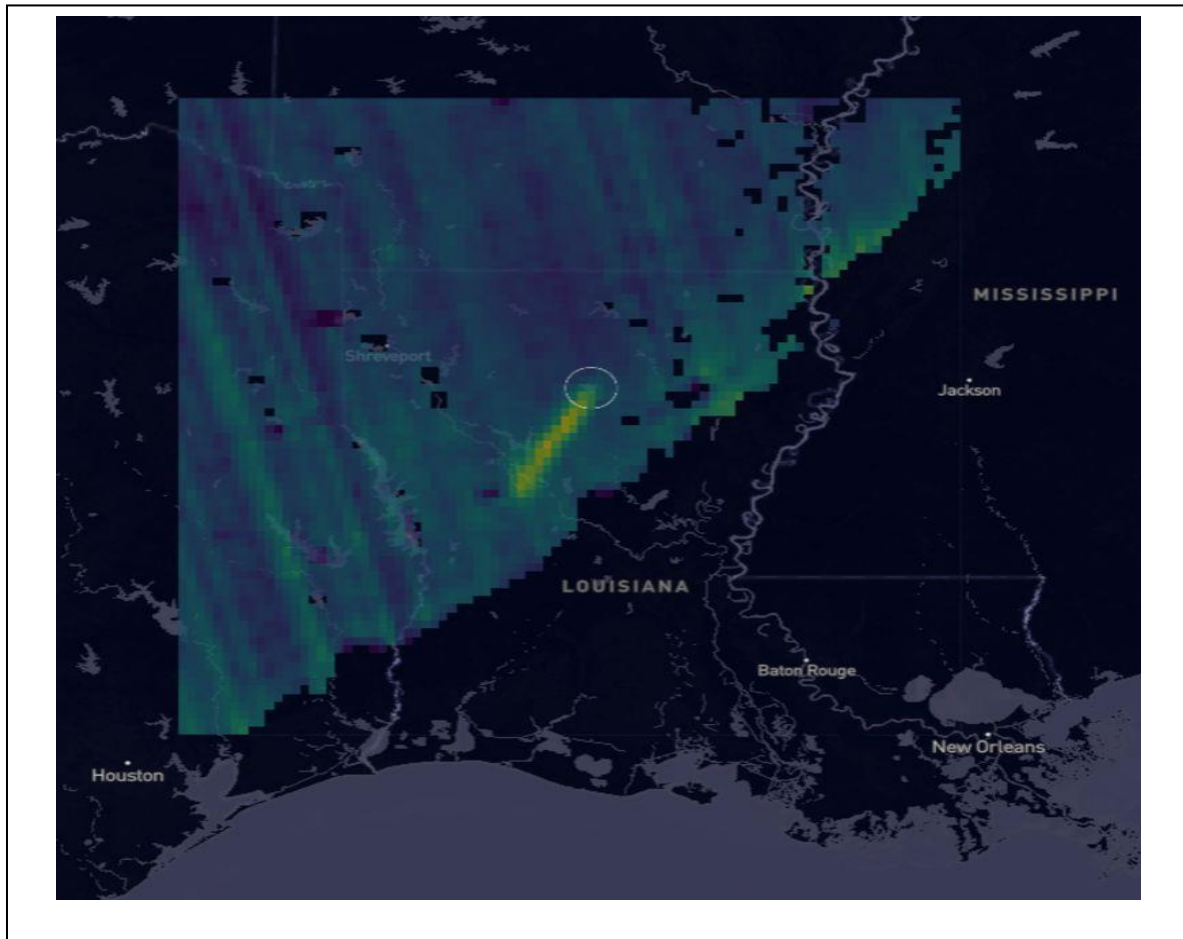
Repeated for Reference

Revelation 8.7 kjv

7 The first angel sounded, and there followed hail and fire mingled with blood, and they were cast upon the Earth: and the **third part of trees was burnt up**, and **all** green grass was burnt up.

Next, we look at Fire and what is needed to happen to provide enough combusive material/gas to set the world on fire to destroy crops/grass and trees in one day. We need firstly to find out where the methane or natural gas is going to come from.

Methane Leaks



Seen From Space: Huge Methane Leaks

A European satellite reveals sites in the United States, Russia, Central Asia and elsewhere that are “ultra-emitters” of methane. That could help fight climate change.

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We believe the globalists want the methane tracked so they know at what time they will achieve outside in the open air atmospheric combustion.



***A flare burning off methane in Watford City, N.D.
Credit...Matthew Brown/Associated Press***

By Henry Fountain Feb. 4, 2022⁶⁷

If the world is going to make a dent in emissions of methane, a potent planet-warming gas, targeting the

⁶⁷ <https://www.nytimes.com/2022/02/04/climate/methane-leaks-satellites.html> By Henry Fountain Feb. 4, 2022

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largest emitters would likely be the most cost-effective. But there's a basic problem: How to find them.

A new study has shown one way. Using data from a European satellite, researchers have identified sites around the world where large amounts of methane are pouring into the air. Most of these “ultra emitters” are part of the petroleum industry, and are in major oil and gas producing basins in the United States, Russia, Central Asia and other regions.

“We were not surprised to see leaks,” said Thomas Lauvaux, a researcher at the Laboratory for Sciences of Climate and Environment near Paris and lead author of the study, published in Science. “But these were giant leaks. It’s quite a systemic problem.”

Among gases released through human activities, methane is more potent in its effect on warming than carbon dioxide, although emissions of it are lower and it breaks down in the atmosphere sooner. Over 20 years it can result in 80 times the warming of the same amount of CO₂.

Because of this, reducing methane emissions has increasingly been seen as a way to more rapidly limit global warming this century.

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“If you do anything to mitigate methane emissions, you will see the impact more quickly,” said Felix Vogel, a research scientist with Environment and Climate Change Canada in Toronto who was not involved in the study.

Among the nearly 400 million tons of human-linked methane emissions every year, oil and gas production is estimated to account for about one-third. And unlike carbon dioxide, which is released when fossil fuels are deliberately burned for energy, much of the methane from oil and gas is either intentionally released or accidentally leaked from wells, pipelines and production facilities.

“Methane typically is something you don’t want to lose,” Dr. Vogel said. It could be captured and used — for one thing, it’s the main component of natural gas. “So it’s much easier to work toward reducing emissions,” he said.

Until recently, identifying major emitters of methane has largely been accomplished through remote sensing by airplanes, drones or surface equipment, which can only spot emissions over relatively small areas, usually for relatively short periods. These methods can be revealing — a 2019 New York Times investigation using airborne sensors, for example, showed large leaks from facilities in

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the Permian Basin in West Texas, a major oil and gas producing area.

It's a Vast, Invisible Climate Menace. We Made It Visible.

Immense amounts of methane are escaping from oil and gas sites nationwide, worsening global warming, even as the Trump administration weakens restrictions on offenders.

Satellites can provide much broader, continuous coverage, but at a lower resolution that makes it difficult to pinpoint emissions sources.

Dr. Lauvaux and his colleagues found, however, that they could detect extremely large emitters — those releasing more than 25 tons per hour — in data from a sensor aboard a European satellite, Sentinel 5. Using data from 2019 and 2020, they located about 1,200 of these ultra emitters, a large portion of them from Russia, Turkmenistan, the United States, the Middle East and Algeria.

Total emissions from these sites were estimated at about 9 million tons per year. In terms of its potential to warm the planet, that much methane is equivalent to about 275 million tons of carbon dioxide, which is the total carbon

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footprint of 40 million people, based on the global average per capita.

The reported amount of methane does not include amounts from some regions, including the Permian Basin and oil-producing areas in Canada and China, where overall emissions were so high it was not possible to distinguish large individual sources. Dr. Lauvaux estimated that if ultra emitters from those regions were included, the annual methane total would be about double.

These leaks will not ever produce enough methane gas to cover the surface of the Earth, enter deep sea mining.

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Deep Sea Mining

The United Nations on the 4th March 2023 in their High Sea Treaty approved Deep Sea Mining to begin as of 01/01/2025.

Why is this important to Trumpet Number One? It is important as shown in this video <https://youtu.be/N1uUHwvHcSQ?si=p-egv5fRgewerQ7> and in the pictures below as the collector (nice name for a big vacuum cleaner) moves along the ocean floor it will release methane/natural gas which will not be burnt off like the undersea drilling mining burns off the methane.

As the methane or natural gas is released from its normal processes and thereby rises to the surface the methane will spread across the sea and up onto and above the land, up the hills and mountains.

Model Surface ship & Collector – By the Metals Company⁶⁸

⁶⁸ <https://metals.co/>

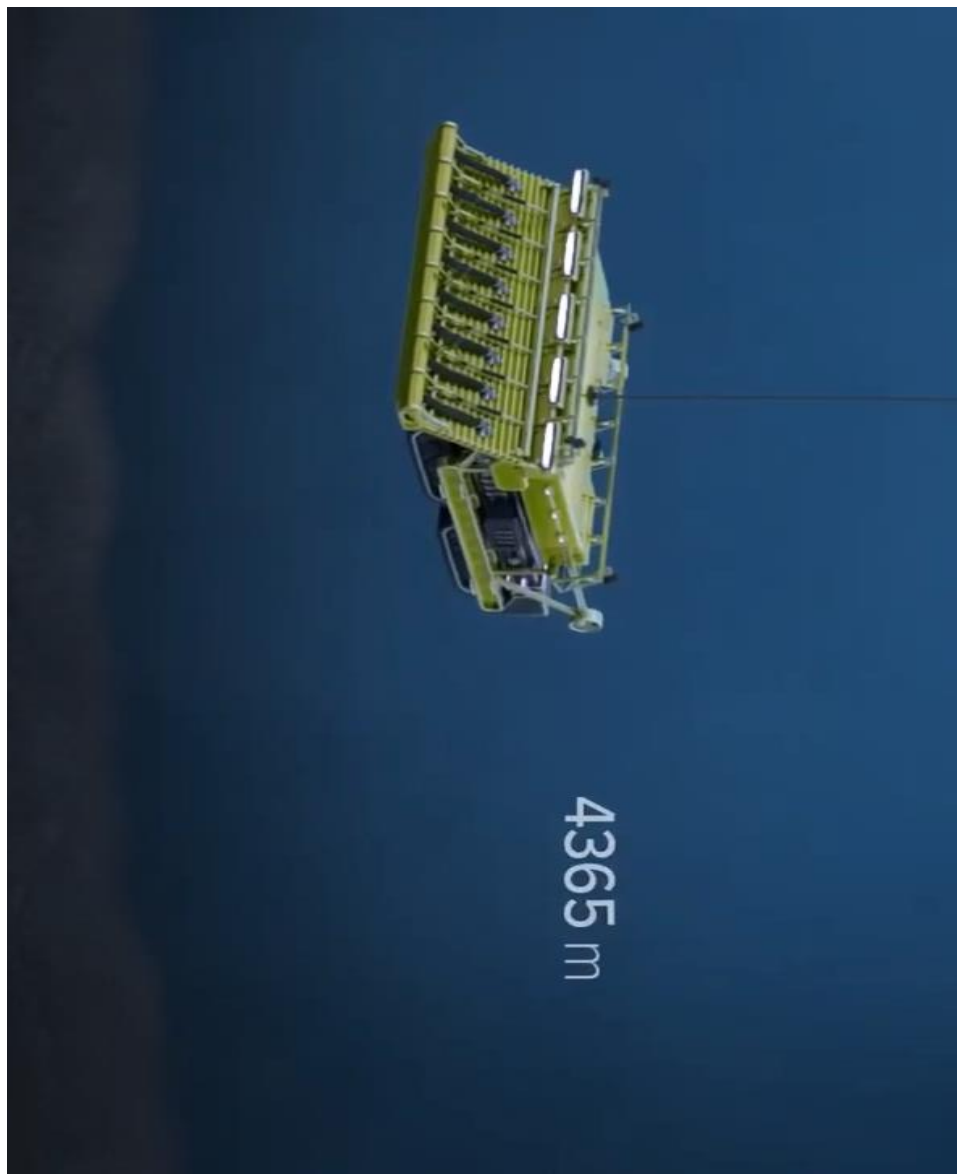
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The collector is 21 metres wide and 28 metres long.

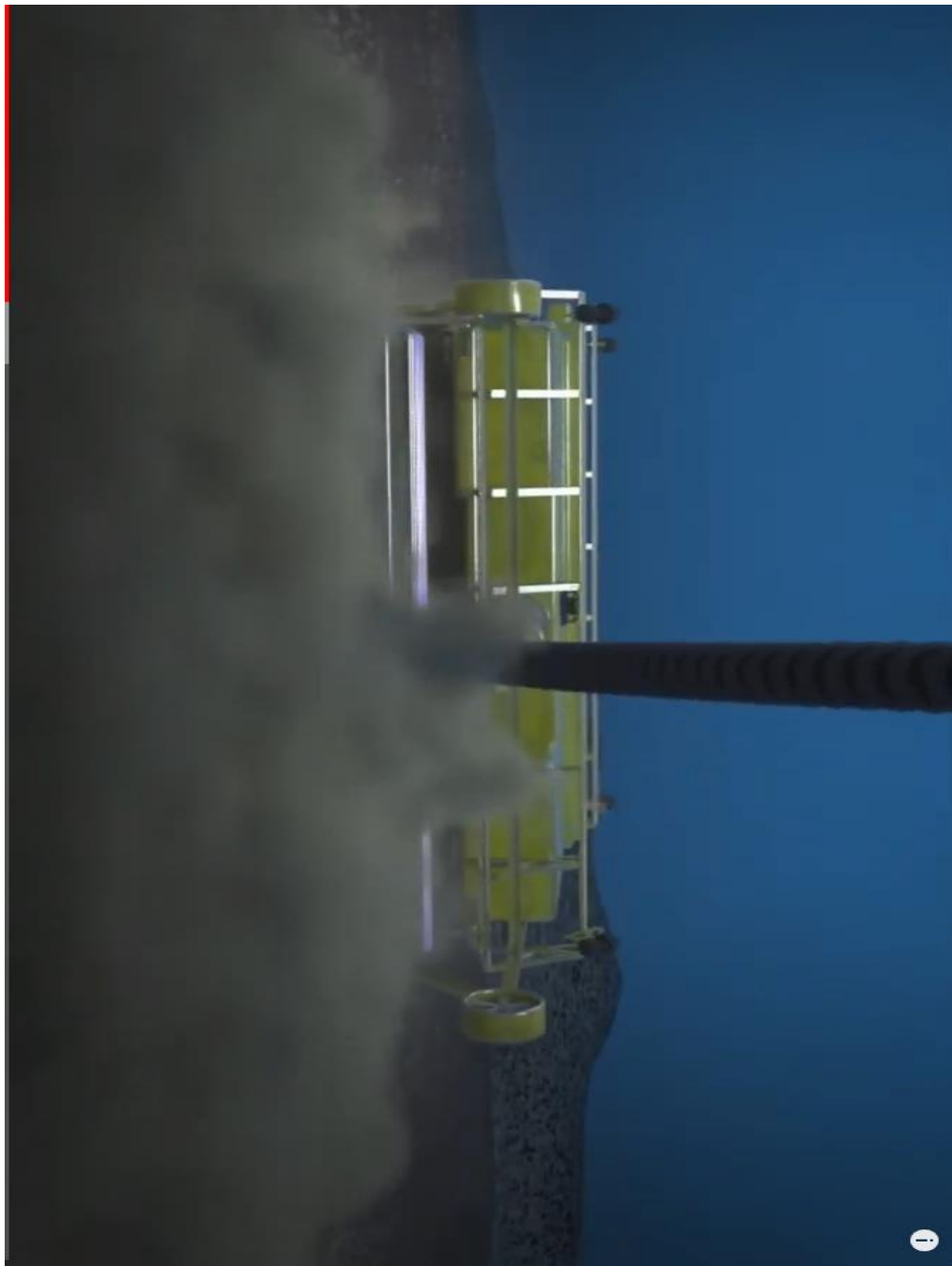
The collector up to 5,000 meters down

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Model Collector in Action

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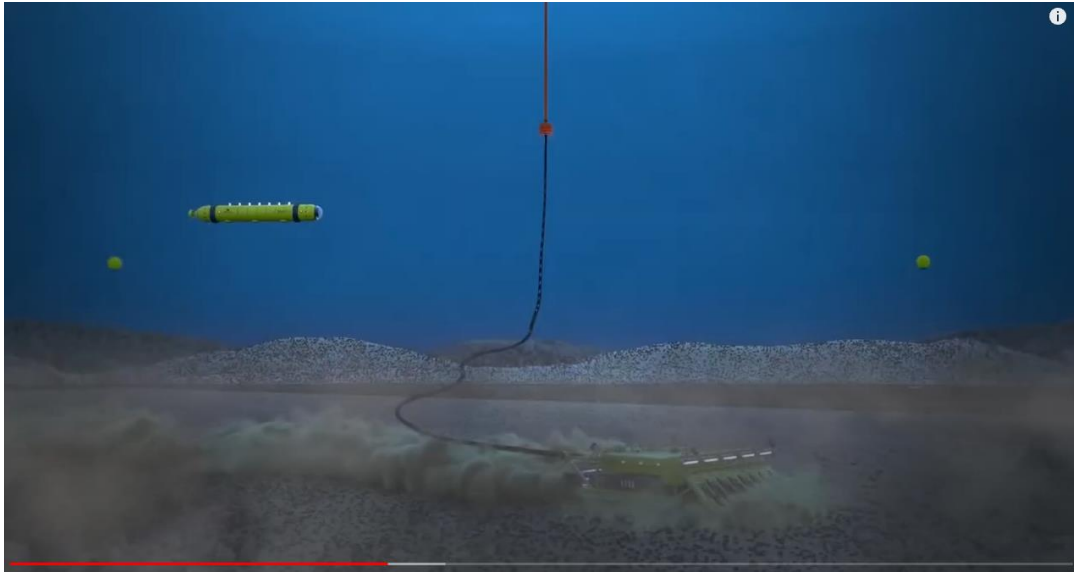
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Model Collector in Action 2 – Notice the Plume trails releasing methane and the death of sea life

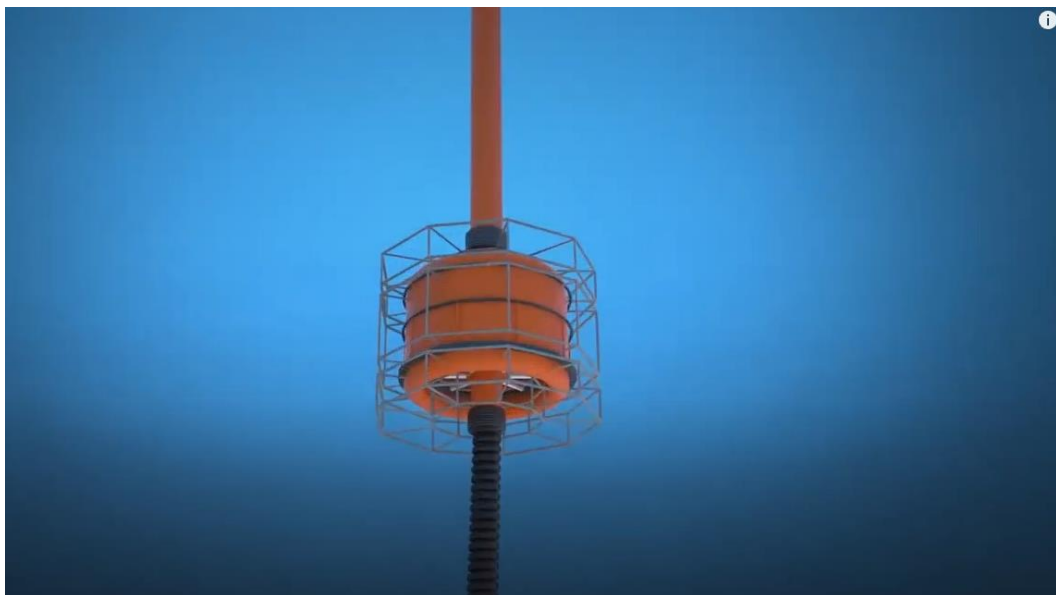


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Model Collector in Action 3 – Support Submarines



Hydraulic Pump to the surface ship



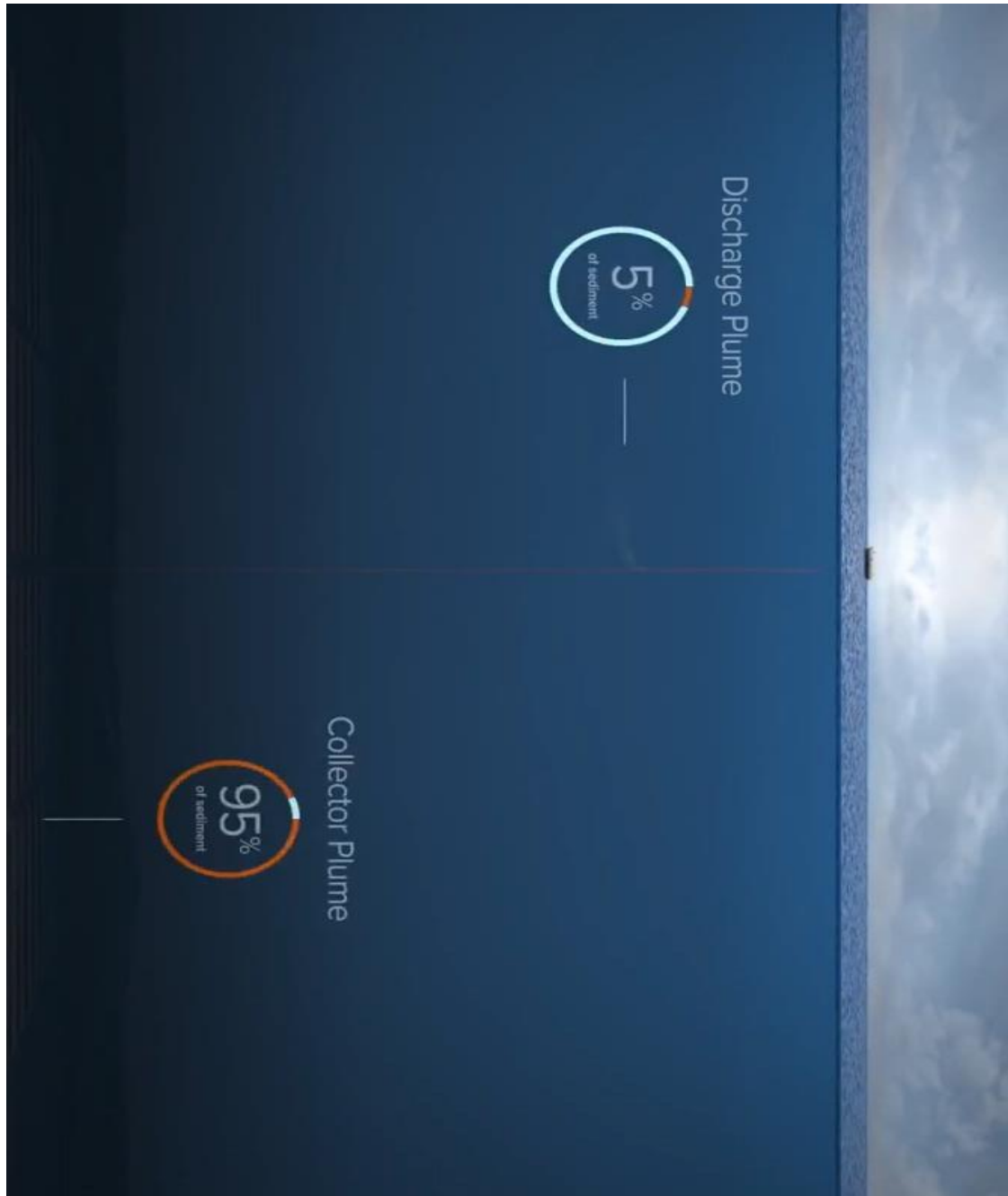
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Model Pipes up into the surface ship and down out of the surface ship – The down pipe is only 2,000 metres long



Proposed plumes

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Real Life Allseas Surface Ship – The Hidden Gem



Hidden Gem allegedly pumping waste over the side of the ship allegedly

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Allseas real collector machine which is around 21 metres wide and 28 metres long

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The nodules collected crushed washed and on conveyor belt to the holding tank on the ship



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Result and damage left on the surface for us to see what the future of the ocean will allegedly begin to look like from the 1st January 2025



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Result and water damage number 2 picture



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Result and damage number 3 & 4 Pictures



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Trumpet Number Two scripture for reference Revelation 8:8...A third of the sea turned into blood, 9 a third of the living creatures in the sea died....

This last picture is coming to a beach near you particularly after Jan 2031 when the disaster that the Bible warns is Trumpet Number Two.

Why mention deepsea mining? It is critical to the plans the destroyers of the Earth have! They need the methane / natural gas released from the bottom of the ocean to add to the **Atmospheric Force** of the fires they will create around the third quarter of 2029 or thereafter.

As the collector moves along the bottom of the ocean it will release methane/natural gas. As you have seen with drilling mining the methane gas is burned off at the time of drilling or processing which limits the gas in the atmosphere.

Deepsea mining does not allow for the gas to be burnt off. It thereafter floats to the surface of the ocean and dissipates into the atmosphere. Methane or natural gas takes 10 years to break down in the atmosphere.

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Methane is a very effective greenhouse gas.⁶⁹ While its atmospheric concentration is much less than that of carbon dioxide, methane is 28 times more effective (averaged over 100 years) at trapping infrared radiation. The atmospheric residence time of methane is approximately 9 years. Residence time is the average time it takes for a molecule to be removed from the atmosphere. In this case, every molecule of methane that goes into the atmosphere remains there for 8 years until it is removed by oxidization into carbon dioxide (CO₂) and water (H₂O). It is difficult to quantify methane emissions since sources are spread out over large areas and emission values are small and variable in time and space.

Therefore, gas is trapped as it were for around 9 years. If the concentration of the gas was high enough it could be used as an atmospheric combustion gas.

The cold hail could then be used to compress the oxygen in the air with the gas to aid in the combustion to burn all the vegetation and anything that happens to be emitting gases live

⁶⁹ https://gml.noaa.gov/education/info_activities/pdfs/CTA_the_methane_cycle.pdf

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farm animal for example and one third of the trees and all the green grass.

Radioactive Forcing – Atmospheric Methane⁷⁰

*Etminan et al. published their new calculations for methane's radiative forcing (RF) in a 2016 Geophysical Research Letters journal article which incorporated the **shortwave bands** of CH₄ in measuring forcing, not used in previous, simpler IPCC methods. Their new RF calculations which significantly revised those cited in earlier, successive IPCC reports for well mixed greenhouse gases (WMGHG) forcings by including the shortwave forcing component due to CH₄, resulted in estimates that were approximately **20–25% higher**.*

Could the destroyers of the Earth use Radio Shortwave signals to help set the world on fire, destroy the crops and poison the animals?

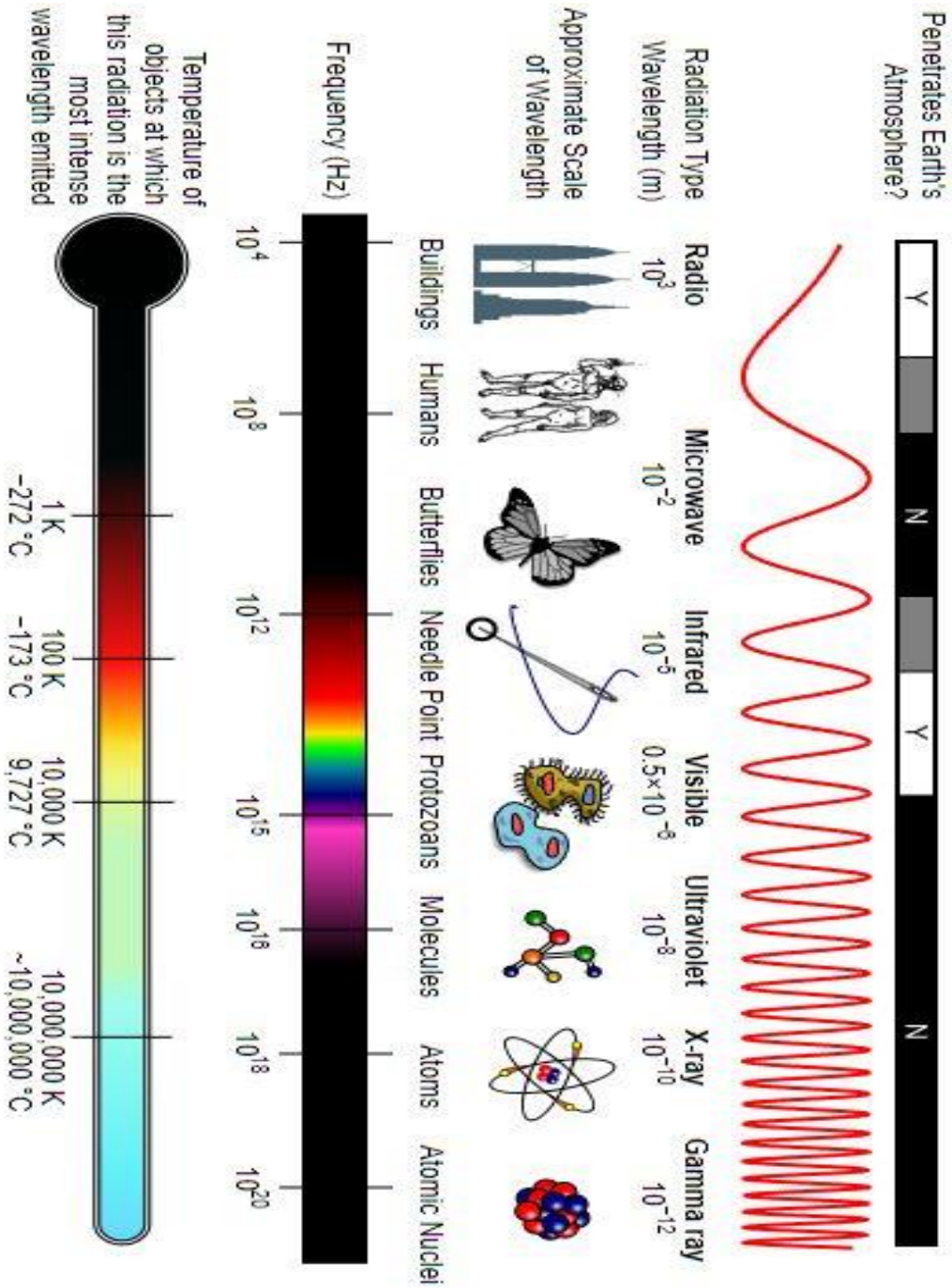
⁷⁰ https://en.wikipedia.org/wiki/Atmospheric_methane

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Light Spectrum

Electromagnetic spectrum

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The electromagnetic spectrum⁷¹ is the full range of electromagnetic radiation, organized by frequency or wavelength. The spectrum is divided into separate bands, with different names for the electromagnetic waves within each band. From low to high frequency these are: radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. The electromagnetic waves in each of these bands have different characteristics, such as how they are produced, how they interact with matter, and their practical applications.

Radio waves, at the low-frequency end of the spectrum, have the lowest photon energy and the longest wavelengths—thousands of kilometres, or more. They can be emitted and received by antennas, and pass through the atmosphere, foliage, and most building materials.

Gamma rays, at the high-frequency end of the spectrum, have the highest photon energies and the shortest wavelengths—much smaller than an atomic nucleus. Gamma rays, X-rays, and extreme ultraviolet rays are called ionizing radiation because their high photon energy is able to ionize atoms, **causing chemical reactions**. Longer-wavelength radiation such

⁷¹ https://en.wikipedia.org/wiki/Electromagnetic_spectrum

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as visible light is nonionizing; the photons do not have sufficient energy to ionize atoms.

Throughout most of the electromagnetic spectrum, spectroscopy can be used to separate waves of different frequencies, so that the intensity of the radiation can be measured as a function of frequency or wavelength. Spectroscopy is used to study the interactions of electromagnetic waves with matter.

Spectroscopy

Spectroscopy, primarily in the electromagnetic spectrum, is a fundamental exploratory tool in the fields of astronomy, chemistry, materials science, and physics, allowing the composition, physical structure and electronic structure of matter to be investigated at the atomic, molecular and macro scale, and over astronomical distances.

Historically, spectroscopy originated as the study of the wavelength dependence of the absorption by gas phase matter of visible light dispersed by a prism. Current applications of spectroscopy include biomedical spectroscopy in the areas of tissue analysis and medical imaging. Matter waves and acoustic waves can also be considered forms of

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radiative energy, and recently gravitational waves have been associated with a spectral signature in the context of the Laser Interferometer Gravitational-Wave Observatory (LIGO).

We now have the answer to why Starlink is experimenting with different colours firstly red in 2017 now blue in 2024.

Spectroscopy studies as innocent as they may can show how a laser or something linked to Starlink for example can show how a weapon as indicated in the previous verse “radiative energy” is to be calibrated!

Let's continue by looking at the word fire.

Fire by other means

Fire Strong's Concordance definitions

fire	4442	A primary word: "fire" (literally or figuratively., spec. lightning); - fiery fire Burn utterly up and down
------	------	---

How many ways can a fire be started and maintained. Many ways would be the answer however in 2022 the starting and maintaining efforts can be hidden by smoke and or unseen as in certain types of lasers and underground lightning.

Following, are a couple of pictures just to help you see just one way the sons with the spirit of disobedience in them do it.

House cut in 2/3's as laser fire is cast against it 2017⁷²

⁷² <https://planettruthblog.files.wordpress.com/2020/08/ccthe-california-fire-chronicles-first-edition.pdf>

ISBN: 9781797668697 by James W Lee

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Grass burned by laser or so it would seem⁷³

⁷³ <https://planettruthblog.files.wordpress.com/2020/08/ccthe-california-fire-chronicles-first-edition.pdf>
ISBN: 9781797668697 by James W Lee – Deceased in early 2024 or late 2023

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Notice in the picture above the precision “laser” cut / burned grass on the field. This is potentially what all the green grass will look like and all the crops world-wide on the day and day after the attack.

Take a moment or “Selah” as the Bible says and think about that. All the green grass (assumingly the crops are ready for harvest) and 1/3 of the trees will look like that. That means your back yard vegetable garden and fruit trees are dead! God told Israel when they took a piece of land from the enemy not to destroy the fruit trees. However, the evil the elite or the globalists or the children of disobedience will destroy all your outdoor plants trees and vegetables in ONE day!

When we did a little documentary of the fires at Nana Glen in New South Wales Australia we noticed a few odd things. One of them was the tree roots were burnt and burnt as in completely gone and others the trees were standing but the roots were burnt.

**Reverend Dr Graham J Whelan OAM pointing out the tree
and all the roots were gone.**

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Hadron Colliders may be able to send currents through the Earth and as the Earth is a giant dynamo sending currents or what is termed underground lightning may be standard practice in wildfires. HAARP technology the most prominent instrument at HAARP is the Ionospheric Research Instrument (IRI), a high-power radio frequency transmitter facility operating in the high frequency (HF) band.

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The IRI is used to temporarily excite a limited area of the ionosphere. Other instruments, such as a VHF and a UHF radar, a fluxgate magnetometer, a digisonde (an ionospheric sounding device), and an induction magnetometer, are used to study the physical processes that occur in the excited region.⁷⁴

In layman's terms it may be possible to excite a region to catch on fire if there are the components in the atmosphere.

When Trumpet Number One happens and the crops for ethanol, methanol and biodiesel have been destroyed how long do you think it would take for the petrol stations to run out of fuel and then how long again before they got refuelled? Add to that the truckies may not be able to get home let alone deliver any fuel!

The emotional, financial damage is going to be devastating. To add to the above one must consider the death of animals, cattle and livestock.

Food overnight will become immensely expensive. In fact, the Bible has warned about this in the following verses.

⁷⁴ https://en.wikipedia.org/wiki/High-frequency_Active_Auroral_Research_Program

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Revelation 6.5 niv

5 When the Lamb opened the third seal, I heard the third living creature say, “Come!” I looked, and there before me was a dark/black horse! Its rider was holding a pair of scales in his hand.

6 Then I heard what sounded like a voice among the four living creatures, saying, “Two pounds of wheat for a day’s wages, and six pounds of barley for a day’s wages, and do not damage the oil and the wine!”

Oil and Wine

- Hurt not the oil and the wine. This is the Muscular Vascular System of Humans and all meat and vegetables i.e. do not inject watermelon for example.⁷⁵

⁷⁵ Book Covid War by Rev’d Dr Graham J Whelan OAM and Barry Gumm page 223-229

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Wheat Flour

- Two pounds of wheat is 907grams we will round up to 1kg. 1kg of flour as of August 2024 is approximately \$1.50AUD.
- Average weekly wage in Australia is \$89,000pa. $(89,000/52\text{wks})/5 \text{ days} = \342.00 per day.
- 1kg of flour will cost around \$342.00 AUD approximately after Trumpet #1 happens.
- If we used \$342.00 per kilogram we calculate $(\$342/\$1.50) = \mathbf{228 \text{ times. 228 times is 22,800\% increase over night!}}$
- 1 loaf of Buttercup country split white bread 450 grams is \$4.00 or 89 cents per 100 gram on 22/08/2024.**⁷⁶

Could two 450 grams of loaves of bread post Trumpet Number One really cost \$342.00?

⁷⁶ https://www.woolworths.com.au/shop/productdetails/28125/buttercup-country-split-white-bread?srsId=AfmBOor2GX_oJvT7-sxi7Gvb3lCXX-vnTchVbDZ1bWDKa8n2ewGsD2-p August 2024

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Barley Flour

- Using an average of \$342.00 for 3 kg of Barley flour for example 6 pounds is 2.72155kg. \$13.50 in August 2024 into \$342.00 in September 2029 we calculate $(342/13.50) = 25.333$ times.
- \$13.50 to \$342.00 = 2,533.3% increase.
- 3kg rounded up of Barley flour costs \$13.50 on 24/08/2024.**

These are highly speculative figures the reality of the situation could mean the figures above for wheat and barley flour will vary on the country and the location within that country due to transport cost especially after Trumpet Number Two happens.

Two small loaves of bread for a day's wages could reach \$342.00* AUD or higher after Trumpet Number One has been executed.

6 pounds of Barley flour for a day's wages could reach \$342.00* AUD or higher after Trumpet Number One has been executed.

*Estimated prices only.

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Starvation

Deaths WWI & WWII

How many people died from starvation in WW1?

6.8 million civilians who died from causes such as starvation and genocide.⁷⁷

How many people died of starvation during WWII?

The casualties listed here include 19 to 25 million war-related famine deaths in the USSR, China, Indonesia, Vietnam, the Philippines, and India that are often omitted from other compilations of World War II casualties.⁷⁸

Deaths from starvation after Trumpet Number One has sounded and the workers of disobedience have done their evil deeds is unknown. Also, Trumpet Number One is an attack by the dark military on the whole worlds food supply not a limited area such as world war one and two.

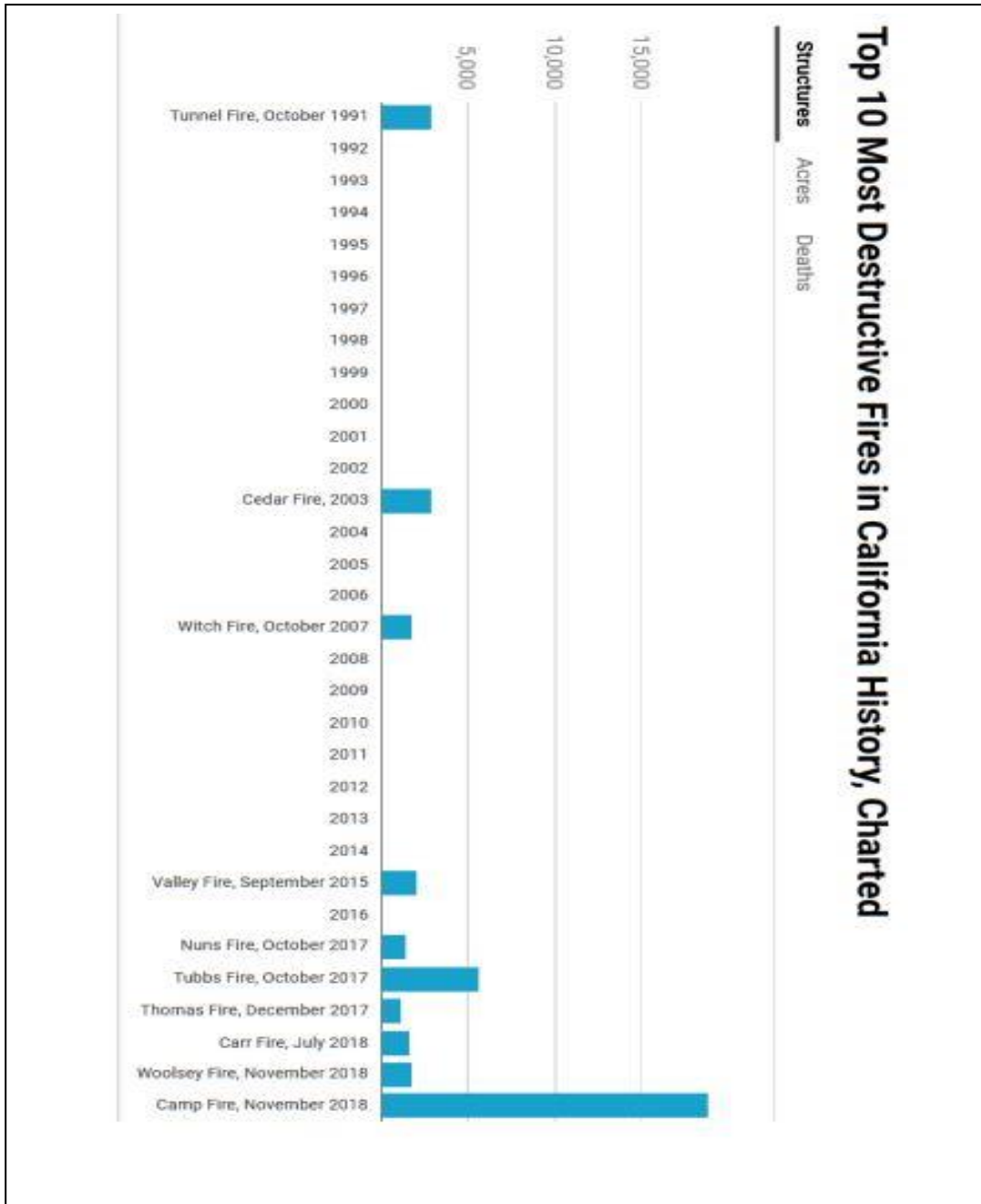
California Fires⁷⁹

⁷⁷ <https://www.history.com/news/how-many-people-died-in-world-war-i>
⁷⁸

https://en.wikipedia.org/wiki/World_War_II_casualties#:~:text=Deaths%20directly%20caused%20by%20the,war%2Drelated%20disease%20and%20famine.

⁷⁹ <https://planettruthblog.files.wordpress.com/2020/08/ccthe-california-fire-chronicles-first-edition.pdf>
ISBN: 9781797668697 by James W Lee

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It seems it's only a matter of time before some type of destruction is going to be seen in a town by you as the destroyers of the Earth do their work at their masters bidding.

The fact that the 10 most devastating fires in California have been since 1991 and most since 2017 should be highlighting to you that something has changed. Could that something be the destructive nature of mankind has become more intense?

The fact that cars, buses and trains are routinely or so it would seem almost daily somewhere in the world today should also indicate to you that something has changed. Could it be that the destroyers of the Earth want you to believe the lie of climate change in order for them to point the finger at climate when they initiate the Trumpet Number One disaster and control the worlds food by making it terribly scarce?

What kind of fire flips cars?

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In addition to all of the above in Trumpet Number One which we have had since then almost daily disasters including one in August 2023 in Maui Hawaii.

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The following picture was taken from one of the Islands in Hawaii allegedly six months before the fires in Maui. It shows around 24 laser beams coming down from the Heavens and all in a straight line. The laser beams were straight lines of course and so was the number of lasers in a straight line!

A laser beam is fire. It can create heat. Many lasers or a alternating laser can create many frequencies.

Electro laser

An electro laser first ionizes its target path, and then sends an electric current down the conducting track of ionized plasma, somewhat like lightning. It functions as a giant, high-energy, long-distance version of the Taser or stun gun.⁸⁰

We now have fire or lightning as the Bible and Strong's Concordance states. From above and from below.

Picture Laser Beams approximately six months before Maui Fires.⁸¹

⁸⁰ https://en.wikipedia.org/wiki/Laser_weapon

⁸¹ <https://www.youtube.com/@brushjunkie6384/videos> and <https://trumpetdisasters.net/trumpet/t1/fire-meth-r/t1-fire-laser/>

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Could it be that the frequency of the lasers from the sky be tuned to create the methane gas and the methanethiols to catch on fire?

If this is the case, then all the animal faeces on the farms will ignite world-wide and aid in the destruction of all the crops and green grass as Trumpet Number One indicates.

Methanethiol is mainly used to produce the essential amino acid methionine, which is used as a dietary component in poultry and animal feed. Methanethiol is also used in the plastic industry as a moderator for free-radical polymerizations and as a precursor in the manufacture of pesticides.

This chemical is also used in the natural gas industry as an odorant, **as it mixes well with methane**. The characteristic rotting vegetation smell of the mix is widely known by natural gas customers as an indicator of a possible gas leak, even a very minor one.⁸²

⁸² <https://en.wikipedia.org/wiki/Methanethiol>

Starlink

STARLINK SATELLITES ARE TURNING BLUE: When SpaceX first started launching Starlink satellites in 2019, astronomers [saw red](#). Now they're seeing blue. "Recently, a number of people have reported sightings of blue satellites," says Croatian astronomer Marko Posavec. "On the night of Aug. 11th, while observing the Perseids, I captured an entire series of them."

"It was Starlink group G9-1, launched in June," says Posavec. "These are DTC (Direct to Cell) satellites. Apparently, the material they're using to try to reduce brightness also gives them a blue color, for which SpaceX says is 'not unexpected.' The color is visible to the naked eye."

DTC satellites are SpaceX's attempt to create "a cell tower in space." The [first batch of six](#) was launched in Jan. 2024, and now there are [129](#) DTCs in orbit. According to [a recent study](#), on average they shine nearly five times brighter in the sky than earlier Starlinks. The extra brightness is a probable result of their larger antennas and lower altitudes.

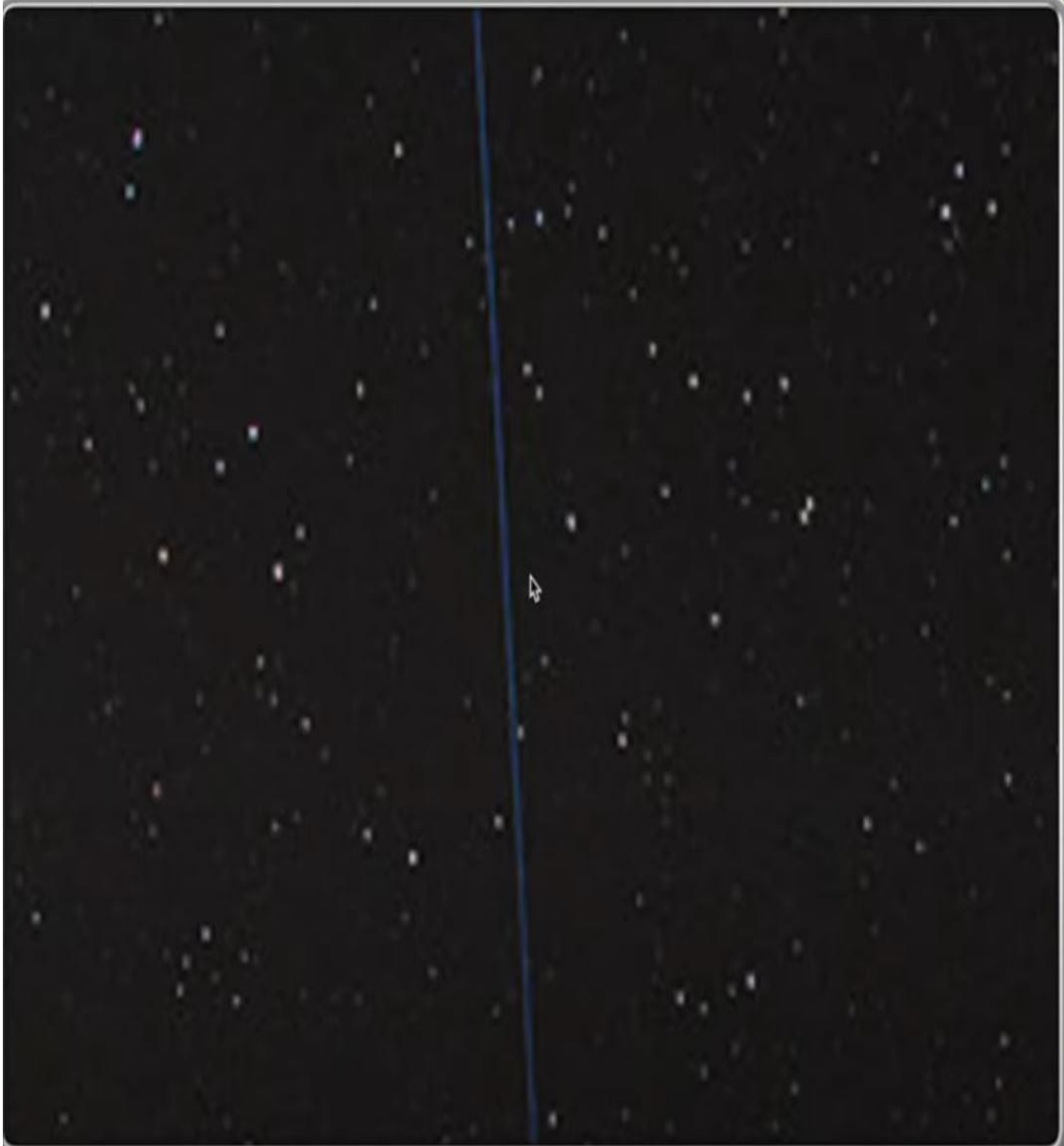
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⁸³ <https://www.youtube.com/watch?v=0qTdBx6kIsA>

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Starlink zoomed in view of the blue lines in the sky



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When most of the internet is via cables for efficiency and practicality reasons why do we need Starlink?

More than 95% of all the data that moves around the world goes through these undersea cables. These cables are capable of transmitting multiple terabits of data per second, offering the fastest and most reliable method of data transfer available today.⁸⁴

⁸⁴ <https://www.nytimes.com/interactive/2019/03/10/technology/internet-cables-oceans.html>

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Are the globalist bankers so kind they just want everyone to have internet access worldwide? Really?

Or is there another reason?

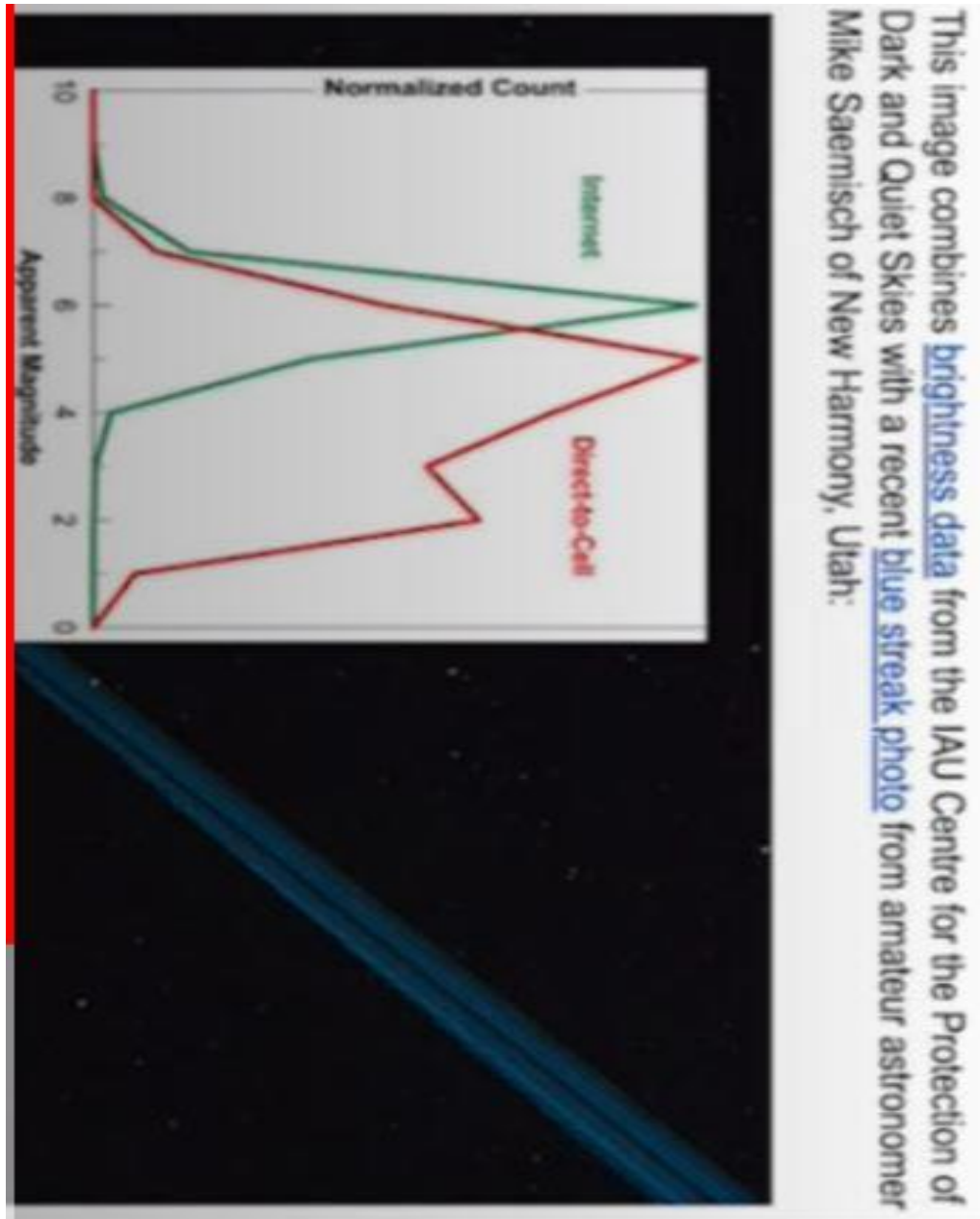
Could the reason be that a radio frequency signal sent to ignite or excite a certain gas at a certain date in the future?

Fake hologram picture show in Trumpet Number One and the image of the beast at a later date?

Could it be that in Trumpet Number Two the sea bed is blown up which will destroy the undersea cables and internet and therefore we will be forced to use Starlink and the Chinese megaconstellations and other companies starlink type services for connectivity?

Brightness data of Starlinks lines

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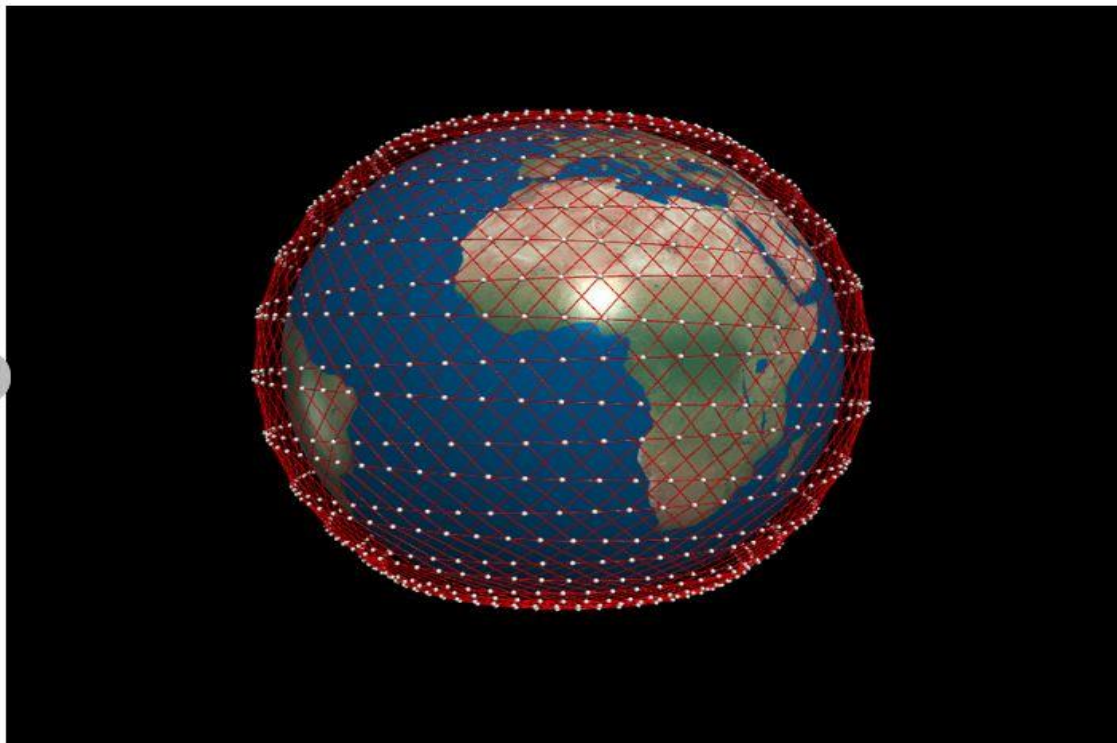
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Then why were the lines red in 2017 when Starlink first started to be set up in the sky and now turned blue?

If they were really concerned about brightness in the night sky then why use the brightest colour being blue?⁸⁵

Blue and Green are the brightest colours.

Starlink forms a grid⁸⁶



⁸⁵ <https://www.sciencealert.com/computer-model-shows-why-blues-and-greens-are-often-nature-s-brightest-colours>

⁸⁶ https://www.researchgate.net/figure/Full-network-of-the-Starlink-mega-constellation-assuming-a-grid-topology-Figure-1a_fig1_361921612

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Full network of the Starlink mega-constellation assuming a +grid topology. Figure 1a shows the full network, which is made from repeated patterns of the form shown in 1b. This network assumes that each satellite is limited to four connections due to hardware constraints. The figure also shows the positions of the satellites in the constellation in white, which are distributed evenly across 72 orbital planes with 22 satellites in each plane.

Add to this the Chinese megaconstellations and other companies, a person may consider that one of the objectives for Trumpet Number Two is indeed to blown up the sea bed floor for deep sea mining and thereby destroy the under the sea cables.

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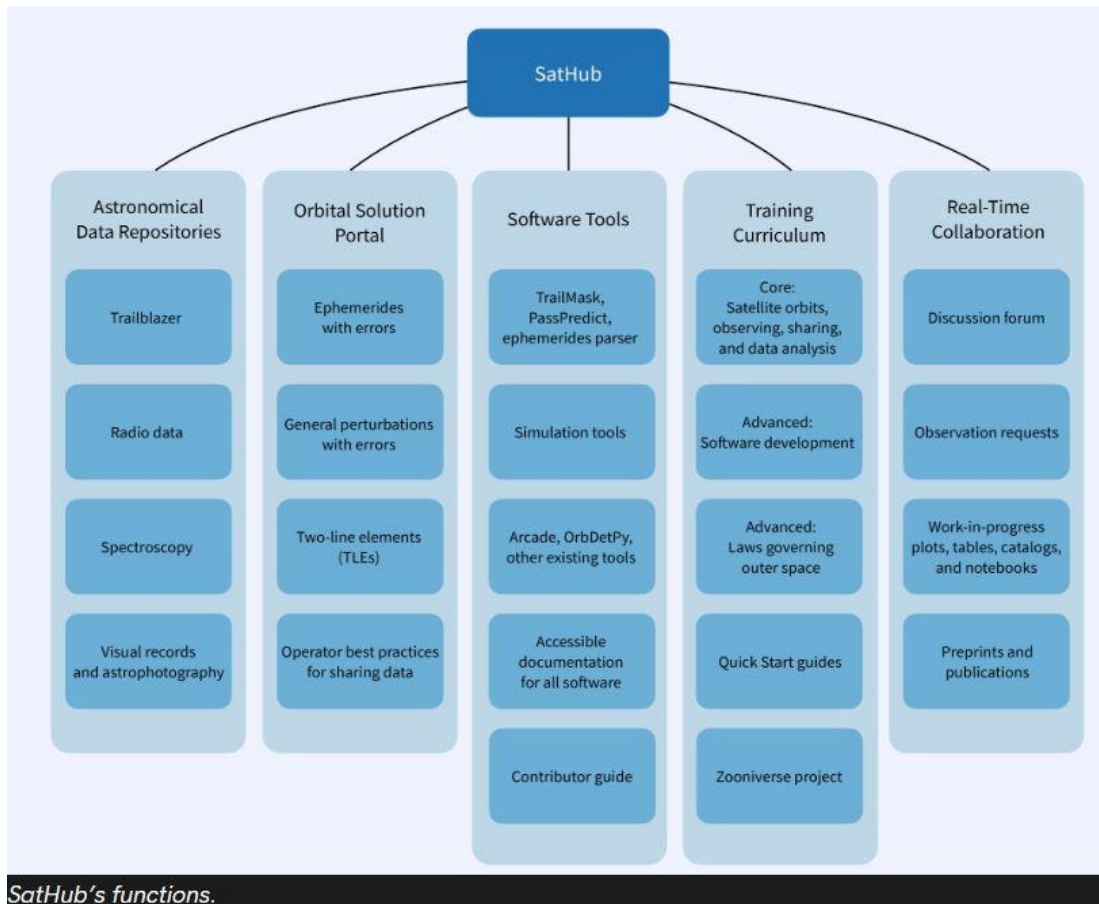


⁸⁷ This image above is of Venus and the Pleiades also showing the tracks of Starling satellites.

⁸⁷ <https://cps.iau.org/sathub/>

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SatHub's functions



Radio Data – obviously they are going to say it's all for the public good. However, is it?

Could Starlink and Starlink systems be part of the plan to burn all the green grass and 1/3 of the trees and by extension or implication, all the crops ready to be harvested at the time?

Radioactive Forcing – Atmospheric Methane⁸⁸

*Etminan et al. published their new calculations for methane's radiative forcing (RF) in a 2016 Geophysical Research Letters journal article which incorporated the **shortwave bands** of CH₄ in measuring forcing, not used in previous, simpler IPCC methods. Their new RF calculations which significantly revised those cited in earlier, successive IPCC reports for well mixed greenhouse gases (WMGHG) forcings by including the shortwave forcing component due to CH₄, resulted in estimates that were approximately **20–25% higher**.*

Could the destroyers of the Earth use Radio Shortwave signals to help set the world on fire and destroy the crops?

Article - A world on fire.

A United Nations report has concluded that the risk of devastating wildfires around the world could increase by up to 57 percent by the end of the century, as climate change

⁸⁸ https://en.wikipedia.org/wiki/Atmospheric_methane

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further intensifies what the authors of the document described as a “global wildfire crisis.”

That would account for more than 10 percent of methane emissions from the industry as a whole. Requiring companies to repair these major leaks or other problems would likely help reduce emissions more quickly and at lower net cost than detecting and repairing countless thousands of much smaller leaks.

Even though the researchers were able to detect huge emission plumes, the satellite resolution, about 15 square miles, is not high enough to give the exact location of the source — the specific pump or pipeline section that is leaking, for example.

So the research points to a need to use multiple methods to detect emissions sources, said Riley Duren, a researcher at the University of Arizona and one of the study authors. Airborne or ground-based sensors could be used to follow up at sites detected by satellites like Sentinel 5.

There is also soon to be a new generation of methane-detecting satellites with much higher resolution, capable of more precisely pinpointing sources.

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Satellites like Sentinel 5 “act like wide angle lenses on cameras,” Dr. Duren said. “They give good, wide-area global situational awareness of where hot spots are.”

Dr. Duren is also the chief executive of Carbon Mapper, a public-private partnership behind a project that will use a constellation of satellites. It and another satellite, MethaneSAT, a project of the Environmental Defence Fund, “will act more like a telephoto lens,” he said.

“We’re going to see dramatic advances in space-based monitoring of methane,” Dr. Duren said. “That’s going to push the detection limits down.”

End of Article

The author of the article above did not take into account the vast quantities of natural gas that is going to be released from the depths of the ocean! They can measure all they like. It will not stop the bankers who want the minerals mined from the bottom of the ocean so that they can trade for profit.

Are they measuring for some other reasons? To make sure the areas or all the Earth has sufficient coverage of methane gas to

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execute Trumpet Number One disaster that God has warned us about.

This seems to be a more logical reason to have a satellite in orbit measuring the methane in the atmosphere. A military reason. A military industrial complex reason it would seem.

Jesus threw the bankers/money changers out of the Temple.⁸⁹

⁸⁹ Gerald Celente – Trends Journal Magazine - <https://trendsjournal.com/>

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Jesus throwing the bankers out of the Temple. An artists view.

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Do you think that it's likely or possible that one third of the world could be on fire in an instant if enough methane is accumulated to burn the Earth, humans, animals, birds and insects in an instant or very quickly including one third of trees and all the green grass?

Mingled

The word in Revelation 8.7 for the King James Bible is mingled. In the New International Version, the word used is mixed.

We understand from the above that the vapour from the hail is going to condense the air and the methane gas released from deep sea mining as a reminder that commences on the January 1st 2025. Just a few months away.

A similar word is interface. Why would you need an interface between grass, trees and gas?

The next word is blood. Why is blood needed? Is blood an interface?

Blood

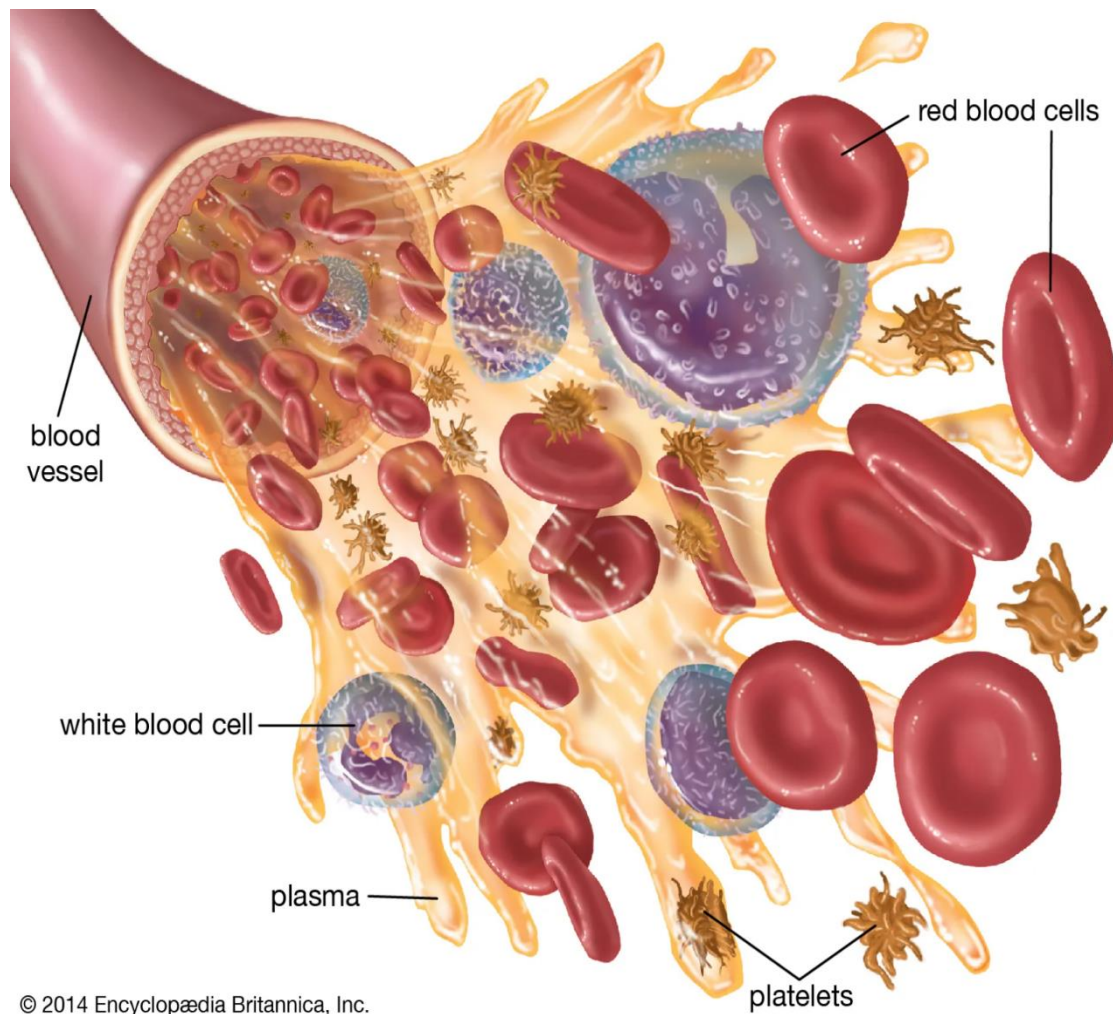
Biochemistry

Blood, fluid that transports oxygen and nutrients to the cells and carries away carbon dioxide and other waste products. Technically, blood is a transport liquid pumped by the heart (or an equivalent structure) to all parts of the body, after which it is returned to the heart to repeat the process. Blood is both a tissue and a fluid. It is a tissue because it is a collection of similar specialized cells that serve particular functions. These cells are suspended in a liquid matrix (plasma), which makes the blood a fluid. If blood flow ceases, death will occur within minutes because of the effects of an unfavorable environment on highly susceptible cells.⁹⁰

Blood is made up of multiple components, including red blood cells, white blood cells, platelets, and plasma. Picture below.

⁹⁰ <https://www.britannica.com/science/blood-biochemistry>

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Overlapping blood with methanethiols and ethanethiols

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First, we will look at the problem in a picture from Spain.

Video link below.⁹¹

As you can see from the picture below the fire which runs across the top of the green grass shows that the grass was not burnt. The “tree fluff” was burnt but not the grass.

This one picture explains the problem and that is how to get the grass, crops, vegetation and trees to burn and probably explode.

In layman’s terms you need to understand some people are not scientists and not in the black military planning and researching this attack on the worlds’ food systems.

In layman’s terms the blood works as an interface and “mingles” between the methane from the bottom of the ocean that has been condensed with the cold from the hail. Further this seems to assimilate the methane gas into the plant. We allege the methane gas mixes with the Methanethiols and Ethanethiols in the various plants. What is needed is correct frequencies via the lasers or underground lightning or both and the plant either burns or explodes!

⁹¹ <https://youtu.be/SsuN8sTk0ZQ?si=278xf36pfqguGsiU>

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Either way if it does not burn as in a fire it is burnt from within and destroyed.

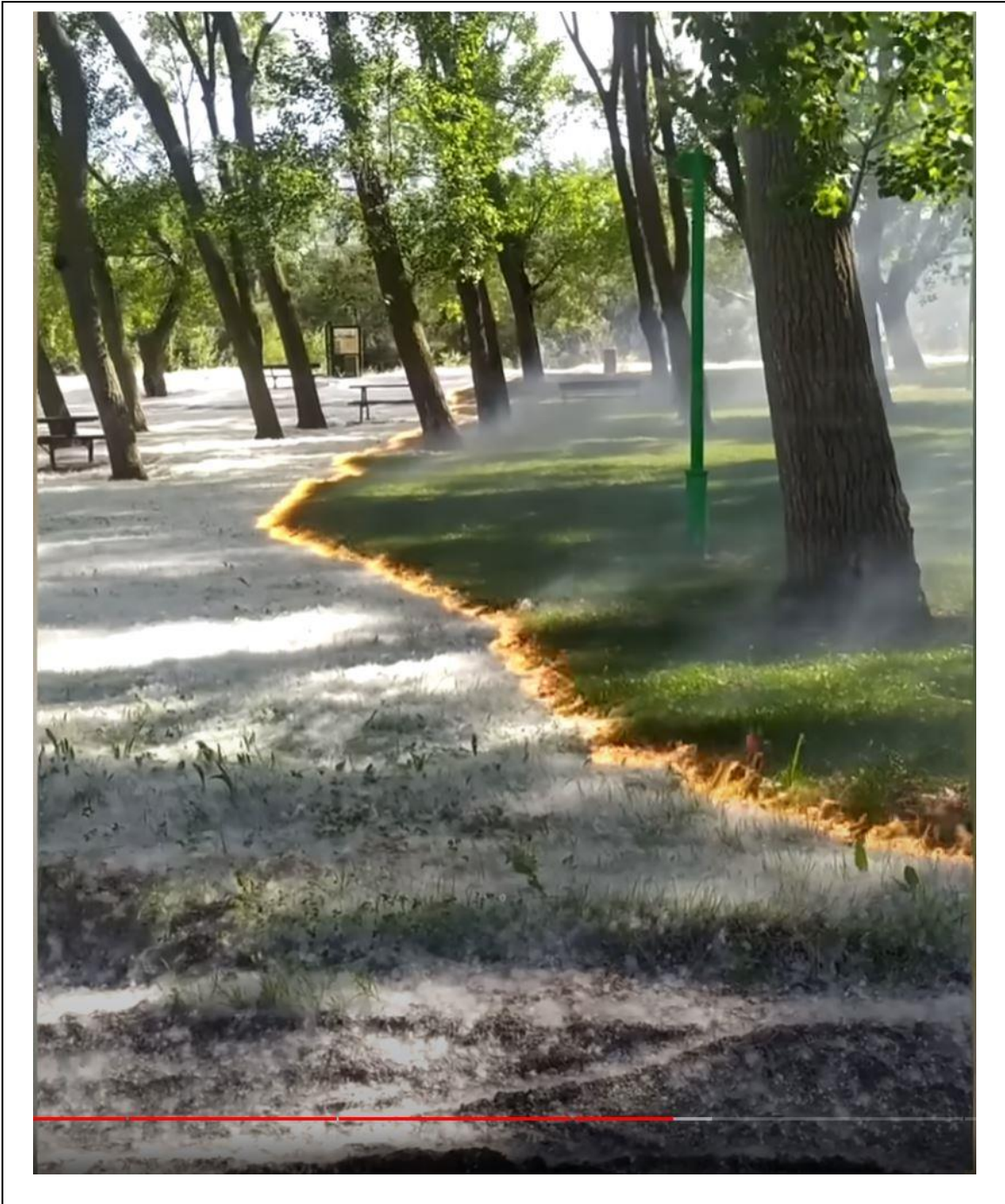
Hence we have the Scripture reprinted here for context - King James version.

Revelation 8.7 The first angel sounded, and there followed hail and fire mingled with blood, and they were cast upon the Earth: and the third part of trees was burnt up, and all green grass was burnt up.

First, in the picture then we will restate this passage with what we have learnt, from this book.

Picture of grass not burnt with flames on top

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Methane⁹²

Methane (US: /'mɛθeɪn/ METH-ayn, UK: /'mi:θeɪn/ MEE-thayn) is a chemical compound with the chemical formula CH₄ (one carbon atom bonded to four hydrogen atoms). It is a group-14 hydride, the simplest alkaline, and the main constituent of natural gas. The abundance of methane on Earth makes it an economically attractive fuel, although capturing and storing it is hard because it is a gas at standard temperature and pressure.

Naturally occurring methane is found both below ground and under the seafloor and is formed by both geological and biological processes. The largest reservoir of methane is under the seafloor in the form of methane clathrates. When methane reaches the surface and the atmosphere, it is known as atmospheric methane.⁹³

The Earth's atmospheric methane concentration has increased by about 160% since 1750, with the overwhelming percentage

⁹² https://en.wikipedia.org/wiki/Methane#cite_note-Technical_summary2-11

⁹³ Khalil, M. A. K. (1999). "Non-Co₂ Greenhouse Gases in the Atmosphere". *Annual Review of Energy and the Environment*. 24: 645–661. doi:10.1146/annurev.energy.24.1.645.

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caused by human activity. It accounted for 20% of the total radiative/radioactive forcing from all of the long-lived and globally mixed greenhouse gases, according to the 2021 Intergovernmental Panel on Climate Change report.⁹⁴

How they would know this is unknown. Are the numbers made up or have they been altered to fit a lying narrative?

Methane clathrates can form from biogenic methane, thermogenic methane, or a mix of the two. These deposits are both a potential source of methane fuel.

Methane is an odorless, colourless and transparent gas. It does absorb visible light, especially at the red end of the spectrum, due to overtone bands, but the effect is only noticeable if the light path is very long. The primary chemical reactions of methane are combustion, steam reforming to syngas, and halogenation. In general, methane reactions are difficult to control.

⁹⁴ Climate Change 2021. The Physical Science Basis. Summary for Policymakers. Working Group I contribution to the WGI Sixth Assessment Report of the Intergovernmental Panel on Climate Change". IPCC. The Intergovernmental Panel on Climate Change. Archived from the original on August 22, 2021. Retrieved August 22, 2021.

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The HCl produced in this reaction leads to catalytic ozone destruction in the stratosphere. Soils act as a major sink for atmospheric methane through the methanotrophic bacteria that reside

within them. This occurs with two different types of bacteria. "High capacity-low affinity" methanotrophic bacteria grow in areas of high methane concentration, such as waterlogged soils in wetlands and other moist environments. And in areas of low methane concentration, "low capacity-high affinity" methanotrophic bacteria make use of the methane in the atmosphere to grow, rather than relying on methane in their immediate environment. Methane oxidation allows methanotrophic bacteria to use methane as a source of energy, reacting methane with oxygen and as a result producing carbon dioxide and water.

Mean lifespan

Methanotrophs in soils and sediments

Methane releases in the Laptev Sea are typically consumed within the sediment by methanotrophs. Areas with high sedimentation subject their microbial communities to continual disturbance, and so they are the most likely to see active fluxes, whether with (right) or without active upward flow (left).

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Even so, the annual release may be limited to 1000 tonnes or less.

Forest soils act as good sinks for atmospheric methane because soils are optimally moist for methanotroph activity, and the movement of gases between soil and atmosphere (soil diffusivity) is high. With a lower water table, any methane in the soil has to make it past the methanotrophic bacteria before it can reach the atmosphere. Wetland soils, however, are often sources of atmospheric methane rather than sinks because the water table is much higher, and the methane can be diffused fairly easily into the air without having to compete with the soil's methanotrophs.

Thiols

In organic chemistry, a thiol $\theta\alpha\iota\omicron\lambda$; from Ancient Greek $\theta\epsilon\acute{\iota}\omicron\nu$ (theion) 'sulfur', or thiol derivative, is any organosulfur compound of the form R–SH, where R represents an alkyl or other organic substituent. The –SH functional group itself is referred to as either a thiol group or a sulfhydryl group, or a sulfanyl group. Thiols are the sulfur analogue of alcohols (that is, sulfur takes the place of oxygen in the hydroxyl (–OH) group of an alcohol), and the word is a blend of "thio-" with "alcohol".

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Many thiols have strong odors resembling that of garlic or rotten eggs. Thiols are used as odorants to assist in the detection of natural gas (which in pure form is odorless), and the "smell of natural gas" is due to the smell of the thiol used as the odorant. Thiols are sometimes referred to as mercaptans (/mər'kæptæn/) or mercapto compounds, a term introduced in 1832 by William Christopher Zeise and is derived from the Latin mercurio captāns ('capturing mercury') because the thiolate group (RS⁻) bonds very strongly with mercury compounds.[8]

Structure and bonding

Thiols having the structure R-SH, in which an alkyl group (R) is attached to a sulfhydryl group (SH), are referred to as alkanethiols or alkyl thiols. Thiols and alcohols have similar connectivity. Because sulfur atoms are larger than oxygen atoms, C-S bond lengths – typically around 180 picometres – are about 40 picometers longer than typical C-O bonds. The C-S-H angles approach 90° whereas the angle for the C-O-H group is more obtuse. In solids and liquids, the hydrogen-bonding between individual thiol groups is weak, the main cohesive force being Van der Waals interactions between the highly polarizable divalent sulfur centers.

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The S–H bond is much weaker than the O–H bond as reflected in their respective bond dissociation energies (BDE).

An S–H bond is moderately polar because of the small difference in the electronegativity of sulfur and hydrogen. In contrast, O–H bonds in hydroxyl groups are more polar. Thiols have a lower dipole moment relative to their corresponding alcohols.

Nomenclature

There are several ways to name the alkylthiols:

The suffix -thiol is added to the name of the alkane. This method is nearly identical to naming an alcohol and is used by the IUPAC, e.g. CH₃SH would be methanethiol.

The word mercaptan replaces alcohol in the name of the equivalent alcohol compound. Example: CH₃SH would be methyl mercaptan, just as CH₃OH is called methyl alcohol.

The term sulfhydryl- or mercapto- is used as a prefix, e.g. mercaptopurine.

Examples of thiols

Methanethiol – CH₃SH [methyl mercaptan]

Ethanethiol – C₂H₅SH [ethyl mercaptan]

1-Propanethiol – C₃H₇SH [n-propyl mercaptan]

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2-Propanethiol – $\text{CH}_3\text{CH}(\text{SH})\text{CH}_3$ [2C3 mercaptan]

Allyl mercaptan – $\text{CH}_2=\text{CHCH}_2\text{SH}$ [2-propenethiol]

Butanethiol – $\text{C}_4\text{H}_9\text{SH}$ [n-butyl mercaptan]

tert-Butyl mercaptan – $(\text{CH}_3)_3\text{CSH}$ [t-butyl mercaptan]

Pentanethiols – $\text{C}_5\text{H}_{11}\text{SH}$ [pentyl mercaptan]

Thiophenol – $\text{C}_6\text{H}_5\text{SH}$

Dimercaptosuccinic acid

Thioacetic acid

Coenzyme A

Glutathione

Metallothionein

Cysteine

2-Mercaptoethanol

Dithiothreitol/dithioerythritol (an epimeric pair)

2-Mercaptoindole

Grapefruit mercaptan

Furan-2-ylmethanethiol

3-Mercaptopropane-1,2-diol

3-Mercapto-1-propanesulfonic acid

1-Hexadecanethiol

Pentachlorobenzenethiol

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As Thoils are part of the greening process of grapes and other plants and Thoils are part of the alcohol content of plants is it likely that to create a fire the laser would be set at frequencies to set the vegetation alight as Trumpet Number One indicates?

Alcohol as a fuel⁹⁵

Various alcohols are used as fuel for internal combustion engines. The first four aliphatic alcohols (methanol, ethanol, propanol, and butanol) are of interest as fuels because they can be synthesized chemically or biologically, and they have characteristics which allow them to be used in internal combustion engines. The general chemical formula for alcohol fuel is $C_nH_{2n+1}OH$.

Most methanol is produced from natural gas, although it can be produced from biomass using very similar chemical processes. Ethanol is commonly produced from biological material through fermentation processes. Biobutanol has the advantage in combustion engines in that its energy density is

⁹⁵ https://en.wikipedia.org/wiki/Timeline_of_alcohol_fuel

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closer to gasoline than the simpler alcohols (while still retaining over 25% higher octane rating); however, biobutanol is currently more difficult to produce than ethanol or methanol. When obtained from biological materials and/or biological processes, they are known as bioalcohols (e.g. "bioethanol"). There is no chemical difference between biologically produced and chemically produced alcohols.

Methanol and Ethanol = Methanethiol & Ethanethiol

Ethanol used as a fuel.⁹⁶

Main articles: Methanol fuel and Ethanol fuel

Methanol and ethanol can both be derived from fossil fuels, biomass, or from carbon dioxide and water. Ethanol has most commonly been produced through fermentation of sugars, and methanol has most commonly been produced from synthesis gas, but there are more modern ways to obtain these fuels. Enzymes can be used instead of fermentation. Methanol is the simpler molecule, and ethanol can be made from methanol. Methanol can be produced industrially from nearly any biomass, including animal waste, or from carbon

⁹⁶ https://en.wikipedia.org/wiki/Alcohol_fuel

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dioxide and water or steam by first converting the biomass to synthesis gas in a gasifier. It can also be produced in a laboratory using electrolysis or enzymes.⁹⁷

In Trumpet Number One we have shown the following as per the Holy Scripture which said would happen, is happening and is about to happen:

⁹⁷ ENZYMATIC CONVERSION OF CARBON DIOXIDE TO METHANOL "Archived copy" (PDF). Archived from the original (PDF) on 2012-03-15. Retrieved 2010-11-28.

Blood continued

Osmotic Forces⁹⁸

The plasma COP (π_p) is the primary counterbalancing force to capillary hydrostatic pressure that promotes fluid retention in intravascular space. In his landmark publication, Starling² demonstrated that this force is generated from the osmotic pressure associated with the plasma proteins. Total osmotic pressure of plasma approximates 6000 mm Hg, but most of this pressure is generated by the electrolytes, which are present in almost equal concentrations in both the intravascular and extravascular compartments of the ECW.

Hydrostatic Pressure⁹⁹

The primary force driving fluid transport between the capillaries and tissues is hydrostatic pressure, which can be defined as the pressure of any fluid enclosed in a space. Blood hydrostatic pressure is the force exerted by the blood confined within blood vessels or heart chambers. Even more specifically, the pressure exerted by blood against the wall of a capillary is called capillary hydrostatic pressure (CHP), and is

⁹⁸ <https://www.sciencedirect.com/topics/immunology-and-microbiology/oncotic-pressure#:~:text=Osmotic%20Forces&text=Total%20osmotic%20pressure%20of%20plasma,extravascular%20compartments%20of%20the%20ECW.>

⁹⁹ <https://courses.lumenlearning.com/suny-ap2/chapter/capillary-exchange/>

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the same as capillary blood pressure. CHP is the force that drives fluid out of capillaries and into the tissues.

As fluid exits a capillary and moves into tissues, the hydrostatic pressure in the interstitial fluid correspondingly rises. This opposing hydrostatic pressure is called the interstitial fluid hydrostatic pressure (IFHP). Generally, the CHP originating from the arterial pathways is considerably higher than the IFHP, because lymphatic vessels are continually absorbing excess fluid from the tissues. Thus, fluid generally moves out of the capillary and into the interstitial fluid. This process is called filtration.

Osmotic Pressure

The net pressure that drives reabsorption—the movement of fluid from the interstitial fluid back into the capillaries—is called osmotic pressure (sometimes referred to as oncotic pressure). Whereas hydrostatic pressure forces fluid out of the capillary, osmotic pressure draws fluid back in. Osmotic pressure is determined by osmotic concentration gradients, that is, the difference in the solute-to-water concentrations in the blood and tissue fluid. A region higher in solute concentration (and lower in water concentration) draws water across a semipermeable membrane from a region higher in water concentration (and lower in solute concentration).

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As we discuss osmotic pressure in blood and tissue fluid, it is important to recognize that the formed elements of blood do not contribute to osmotic concentration gradients. Rather, it is the plasma proteins that play the key role. Solutes also move across the capillary wall according to their concentration gradient, but overall, the concentrations should be similar and not have a significant impact on osmosis. Because of their large size and chemical structure, plasma proteins are not truly solutes, that is, they do not dissolve but are dispersed or suspended in their fluid medium, forming a colloid rather than a solution.

The pressure created by the concentration of colloidal proteins in the blood is called the blood colloidal osmotic pressure (BCOP). Its effect on capillary exchange accounts for the reabsorption of water. The plasma proteins suspended in blood cannot move across the semipermeable capillary cell membrane, and so they remain in the plasma. As a result, blood has a higher colloidal concentration and lower water concentration than tissue fluid. It therefore attracts water. We can also say that the BCOP is higher than the interstitial fluid colloidal osmotic pressure (IFCOP), which is always very low because interstitial fluid contains few proteins. Thus, water is drawn from the tissue fluid back into the capillary, carrying dissolved molecules with it. This difference in colloidal osmotic pressure accounts for reabsorption.

Interaction of Hydrostatic and Osmotic Pressures

The normal unit used to express pressures within the cardiovascular system is millimeters of mercury (mm Hg). When blood leaving an arteriole first enters a capillary bed, the CHP is quite high—about 35 mm Hg. Gradually, this initial CHP declines as the blood moves through the capillary so that by the time the blood has reached the venous end, the CHP has dropped to approximately 18 mm Hg. In comparison, the plasma proteins remain suspended in the blood, so the BCOP remains fairly constant at about 25 mm Hg throughout the length of the capillary and considerably below the osmotic pressure in the interstitial fluid.

The net filtration pressure (NFP) represents the interaction of the hydrostatic and osmotic pressures, driving fluid out of the capillary. It is equal to the difference between the CHP and the BCOP. Since filtration is, by definition, the movement of fluid out of the capillary, when reabsorption is occurring, the NFP is a negative number.

NFP changes at different points in a capillary bed. Close to the arterial end of the capillary, it is approximately 10 mm Hg, because the CHP of 35 mm Hg minus the BCOP of 25 mm Hg equals 10 mm Hg. Recall that the hydrostatic and osmotic pressures of the interstitial fluid are essentially negligible. Thus, the NFP of 10 mm Hg drives a net movement of fluid out of the capillary at the arterial end. At approximately the

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middle of the capillary, the CHP is about the same as the BCOP of 25 mm Hg, so the NFP drops to zero. At this point, there is no net change of volume: Fluid moves out of the capillary at the same rate as it moves into the capillary. Near the venous end of the capillary, the CHP has dwindled to about 18 mm Hg due to loss of fluid. Because the BCOP remains steady at 25 mm Hg, water is drawn into the capillary, that is, reabsorption occurs. Another way of expressing this is to say that at the venous end of the capillary, there is an NFP of -7 mm Hg.

What does osmotic pressure do in blood?

The net pressure that drives reabsorption—the movement of fluid from the interstitial fluid back into the capillaries—is called osmotic pressure (sometimes referred to as oncotic pressure). Whereas hydrostatic pressure forces fluid out of the capillary, osmotic pressure draws fluid back in

ECW Ratio is the ratio of Extracellular Water (ECW) (water outside your cells) to Total Body Water (total amount of water inside and outside your cells), and it acts an important indicator of body water balance. The ideal ECW for a healthy population is around 38%, and when we convert it to a ratio, it becomes 0.380.

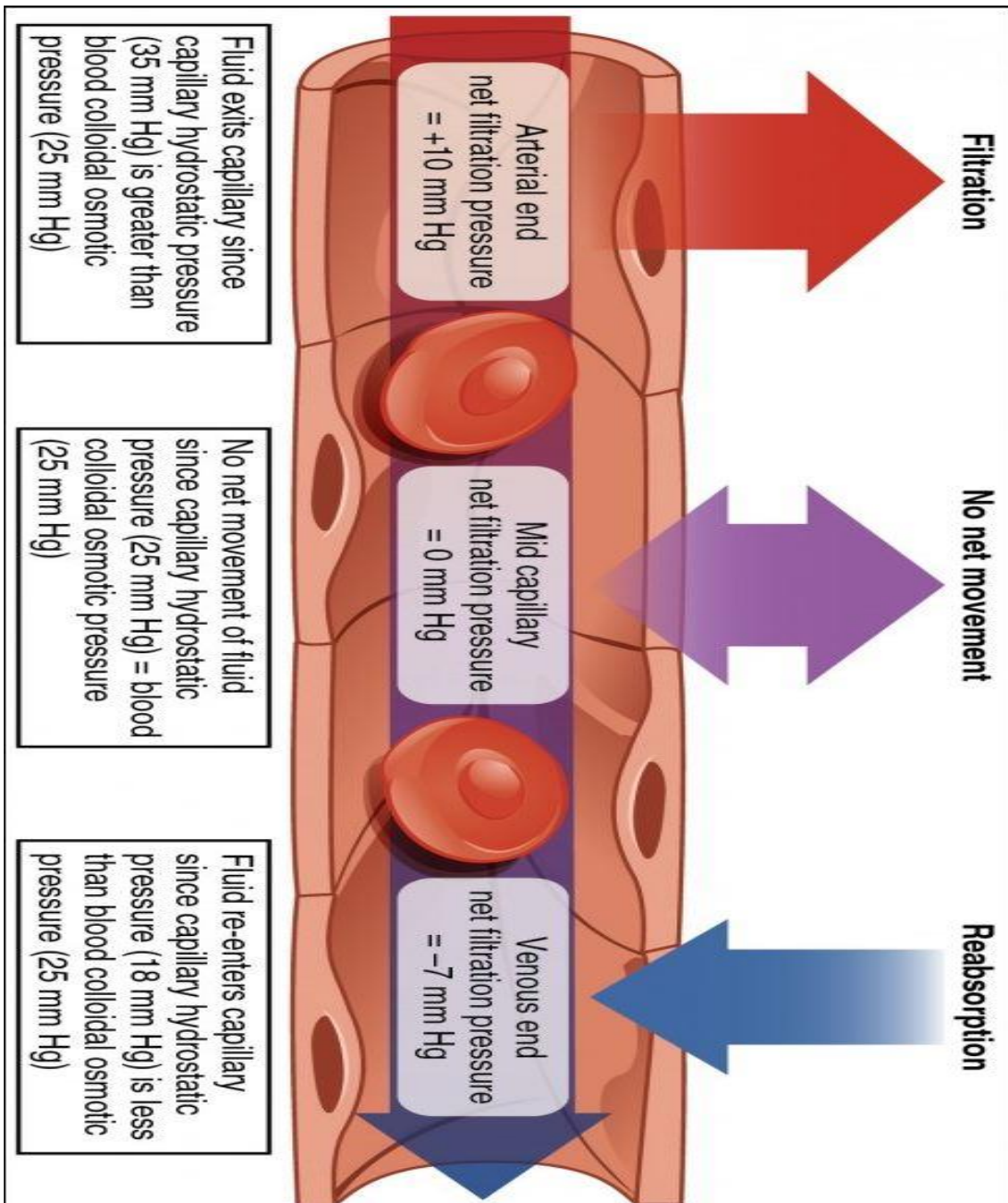
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In layman's terms the destroyers of the Earth will make sure via the blood that the explosive forces within plants and animals will be at its desired maximum.

Picture again of grass not burnt



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Let's look at cows suddenly dying near Airforce bases

Dead cows near airbase in USA



Notice the grass shrubs are all brown as if they have been burnt?

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Another picture from a “wildfire” in Australia¹⁰⁰



¹⁰⁰ <https://youtu.be/ZkdMGfJz-wU?si=UnB3bg3q5QMguMc0>

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Again, every little bit of grass is brown not black as in burnt by normal fire it is alleged. Is this just a coincidence or are they test cases of blood being sprayed to act as an interface for methanethiols and ethanethiols to be drawn in or out of the animals and grasses to burn them and kill them.

The pictures fit the description of Trumpet Number One. A person can only ask the question - are these tests?

Revelation 8.7

The first angel sounded, and there followed hail and fire mingled with blood, and they were cast upon the Earth: and the third part of trees was burnt up, and all green grass was burnt up.

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Expounded Revelation 8.7 kjv

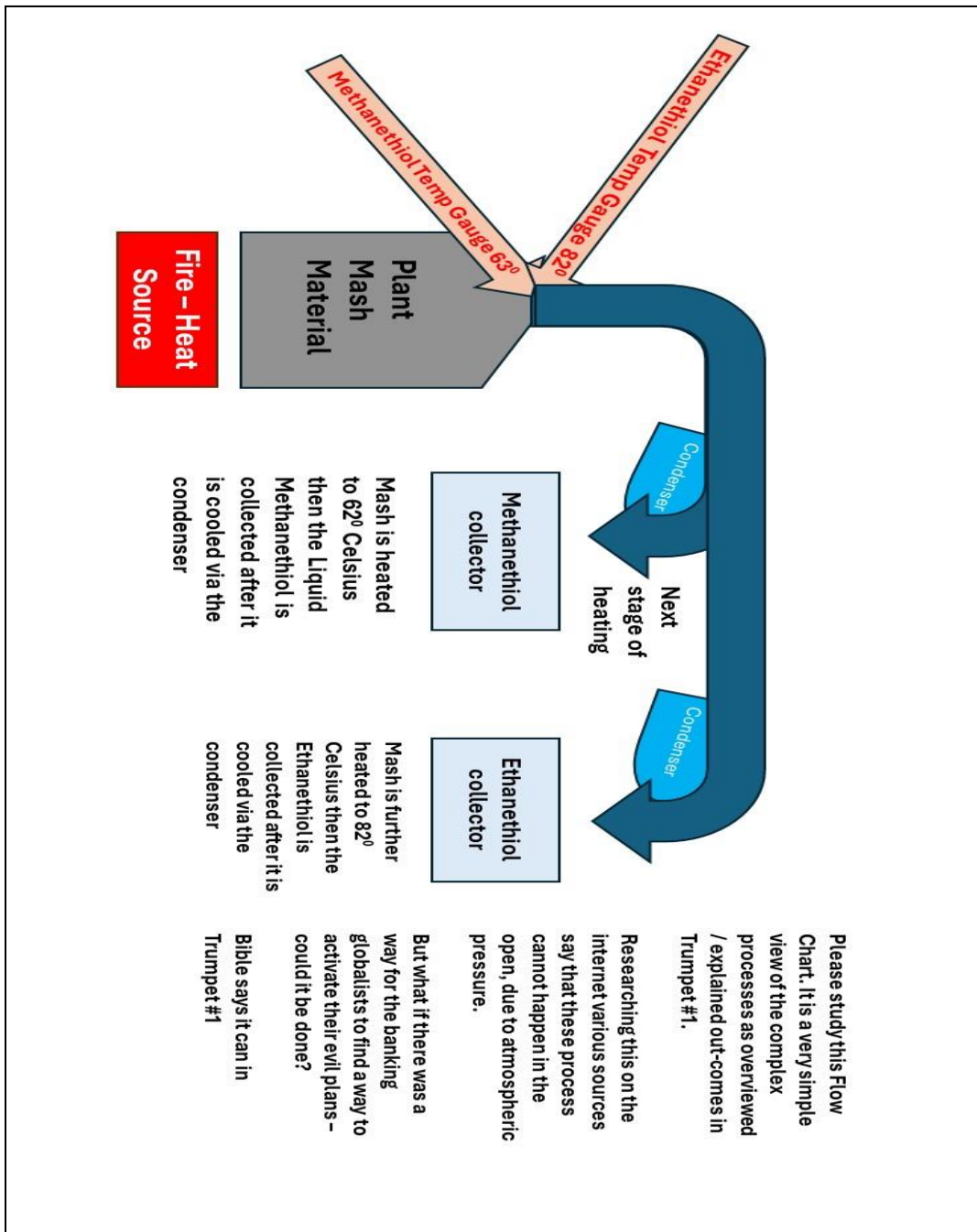
The first angel (*messenger*) sounded, (*and deep sea mining started releasing methane gas from the bottom of the ocean*) and there followed (*after the destroyers of the Earth had done all their research on how to destroy for the whole worlds grass and crops in their season to affect food supply in a day*) hail (*water and vapour for combustion*) and fire (*from above [Lasers and Starlink type weapons] and below [underground lightning] from colliders*) mingled (*interfaced*) with blood (*to draw the methane gas into the plants, crops, grass, trees and animals*) (*to mix with the methanethiols and ethanethiols in the plants and trees to burn them from the inside out,*) and they were cast upon the Earth; (*and when the mixtures were correct having learnt the mixtures to make the combustion for each plant and grass worldwide*) the third part of trees (*probably to the conservative height of 1000 metres*) was burnt up, and all green grass was burnt up (*meaning the grass and plants that still had methanethiols or ethanethiols in them, probably not the dead grass as the thiols have evaporate out of the plant matter*).

Diagrams - Flow charts and processes

Before we show you the whole of Trumpet Number One in a single flow to help you understand, we look at the processes used in production of liquid spirits or liquid alcohol.

Diagram of a simple distillery process.

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Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

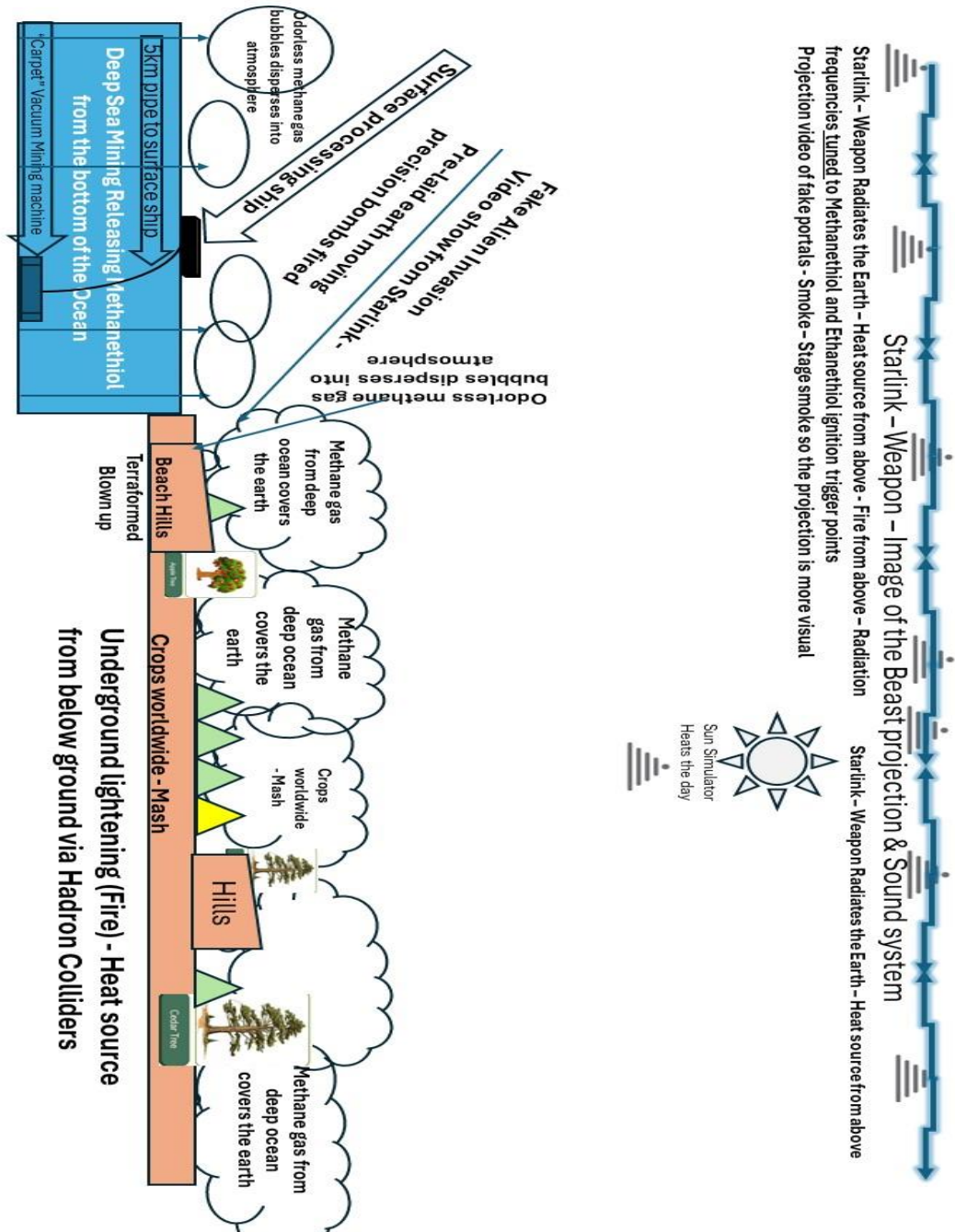
Process in simplified from is:

1. Put plant “mash” material in drum
2. Heat the mash up to 62⁰ Celsius when the methanethiol evaporates, the vapour goes through the condenser
3. The condenser cools the methane into a liquid which is then collected
4. The next step is to heat the mash to approximately 82⁰ degrees Celsius
5. When the ethanethiol turns to a vapour it passes through the condenser
6. The condenser then cools the ethanethiol in a liquid which is poured into a collector.

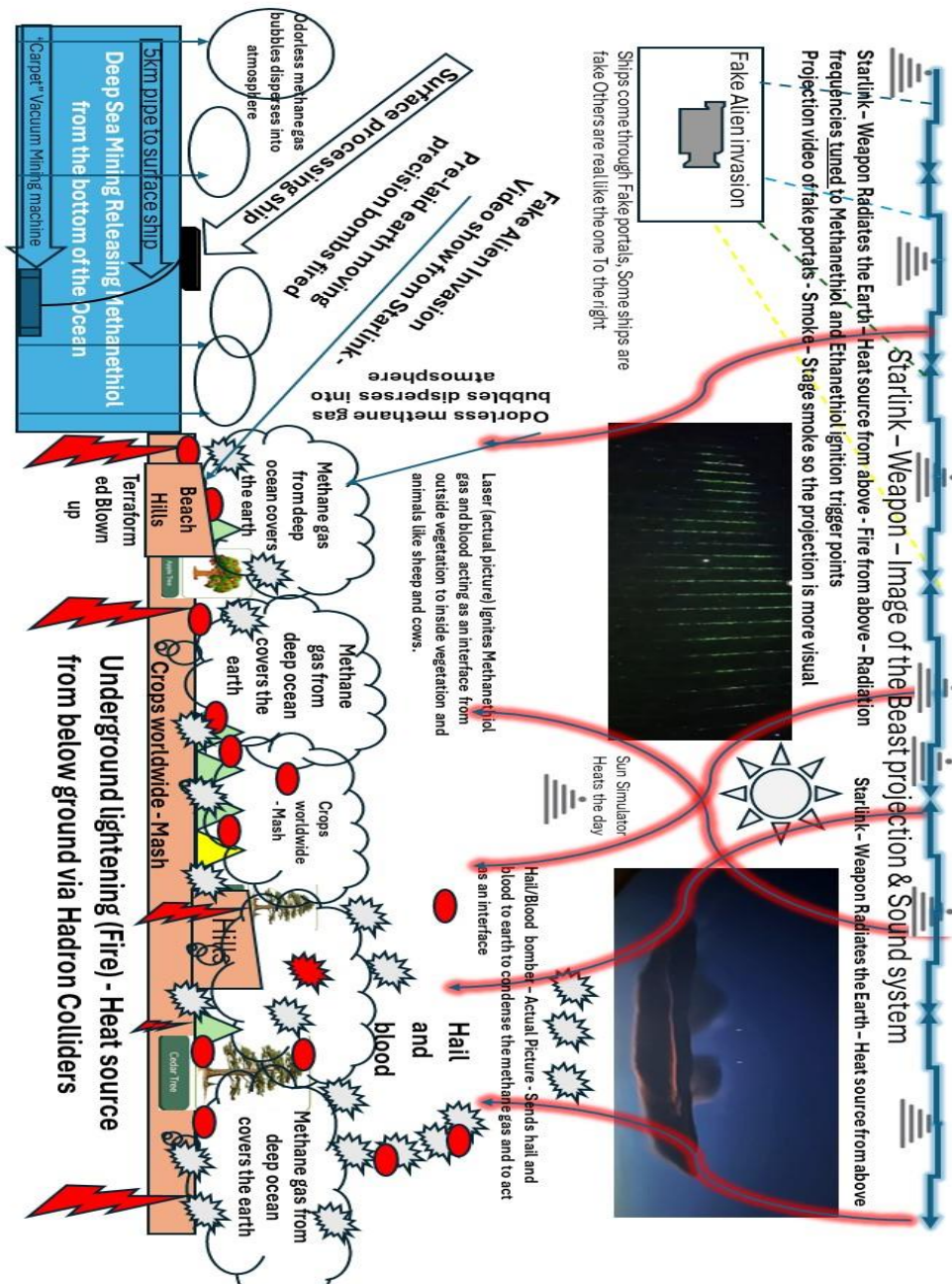
This has just explained the very basic processes of Trumpet Number One. However, most people do not believe this can be done in the open air. What if the globalist bankers could find a way? What would that look like?

Simple diagram / flow chart of the human processes in operation to fulfill the evil plan of Trumpet Number One – God’s warning to us of their evil plans soon to be deployed.

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Basic overview of the processes being deployed for Trumpet Number One:

- 1) Have crops grown and attack at best time of the year – Harvest time in northern hemisphere and sugar cane time in Australia August 2029. Crop worldwide estimate for 2029 is projected to be 139 Trillion USD. That's a lot of money to be made or transferred in one day. Even if it's only $\frac{3}{4}$ of 139 Trillion. Bankers will be extremely rewarded!
- 2) Heat source from below (Hadron Colliders) attacking the methanethiol and ethanethiol in the plant roots. – Burn from below as the Strongs Concordance points to.
- 3) Deep Sea Mining releasing natural or methane gas from 01/01/2025 has put over 4 years of methane gas into the atmosphere.
- 4) Have the Hydrostatic and Osmotic pressures calculated
- 5) Set up a Sun Simulator to mimic the sun and burn the humans and heat the plant material (mash).
- 6) Set up Starlink and Starlink type systems including the Chinese megaconstellations to microwave the plants as another heat source.
- 7) Set up Starlink, Starlink type systems including the Chinese megaconstellations for sound and video show for

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- fake alien invasion to deceive and scare most inhabitants of the Earth
- 8) Send hail down to condense the gas that has been released from the deep ocean
 - 9) Cast blood/plasma down to act as an interface between the methane gas and the thorns in the plants, crops and trees and outside animals
 - 10) The blood draws in the methane gas into the plants to help with ignite to turn them brown - Dead
 - 11) Set lasers to methane gas frequency – tune them to methane ignition frequency and fire!
 - 12) Repeat processes for plants that have ethanethiol in them and fire
 - 13) Having pre-planted precision Earth moving bombs make the fake alien craft look like they are blowing up the beach and some land-based hills when really it's the real black military craft blowing up the hills – terraforming the beaches in order for ease of water movement for the tsunamis in Trumpet Number Two.
 - 14) In addition to number 13 have an earthquake activated from the IceCUBE Lab to hit many locations on earth simultaneously
 - 15) People living on hills near beaches - dead.

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16) Most animals or just the farm animals outside will be dead.

17) Crops world-wide dead

18) 1/3 of trees dead

19) Land partially terraformed and ready for T2

Who's is to blame –

Oh, the Aliens of course!

Worldwide media given the script to program the programming of the masses left alive and now in deep distress as they try to find food and find lost friends and relatives and bury the rest.

The clean up is left to the ones alive while the globalist bankers are in their DUMB's – Deep Underground Military Bases.

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What is missing from the diagram above is the neutrino energy earthquake from IceCube that will hit the hills that are to be levelled.

The detailed analysis for Starlink & Starlink type system weapons is amazing disguised as doing good – see chart below and in appendix

Just look at the upgrade to their Landsat Next digital imaging and data analysis.

Do you really think this is for your benefit or for the benefit of the globalist who want AI to do the farming and mining remotely.

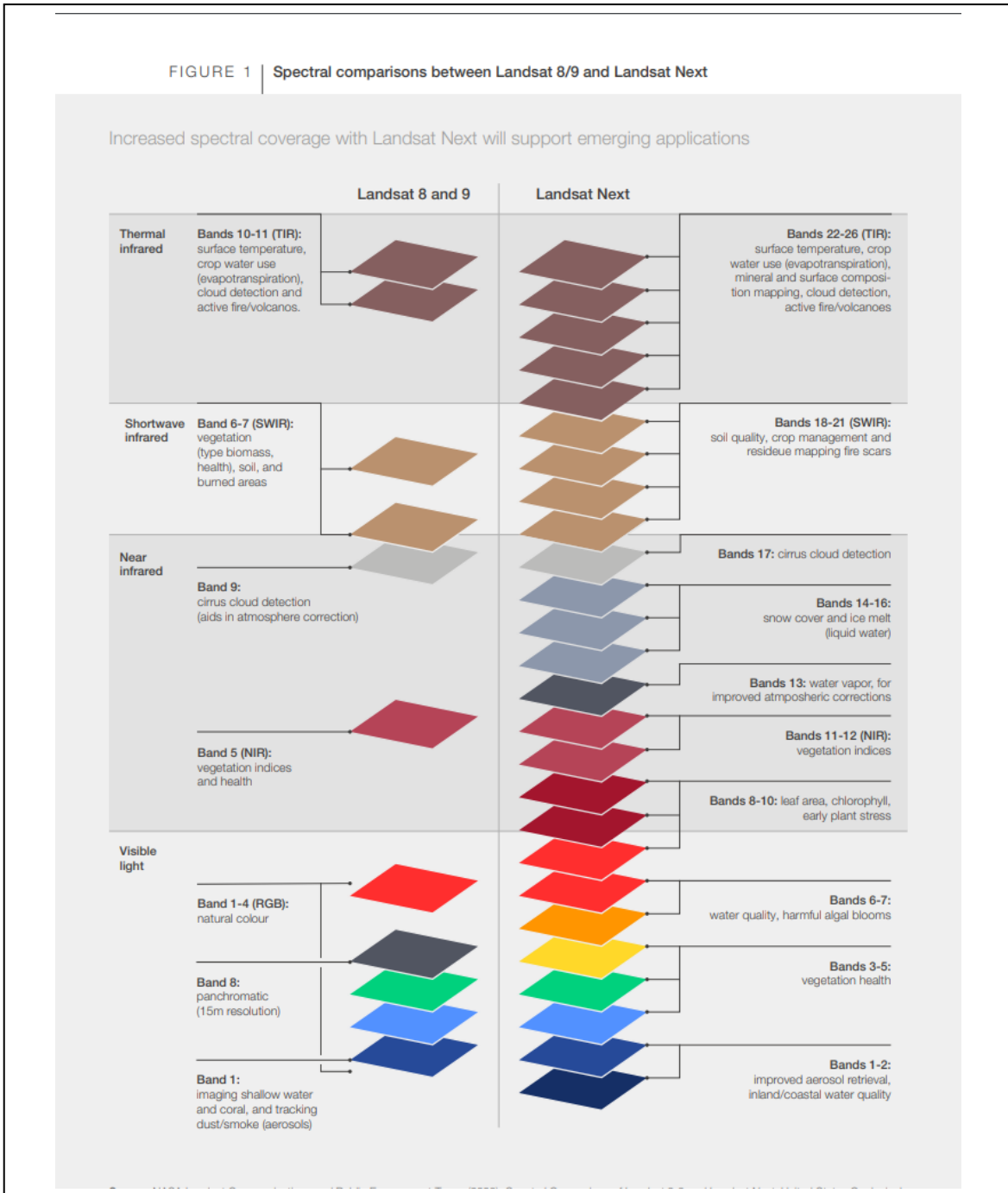
This is carbon zero plans.

Carbon zero means no you, I or anyone else!

What is missing from the diagram is the neutrino earthquake that will shake the hills near the beaches. The beaches without hills will not be affected. The beaches that have hills and are part of the military industrial complex to make the land level again as explain in Genesis 2.6 “But there went up a mist from the Earth, and watered the whole face of the ground” will be affected Reverend Barry alleges.

Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

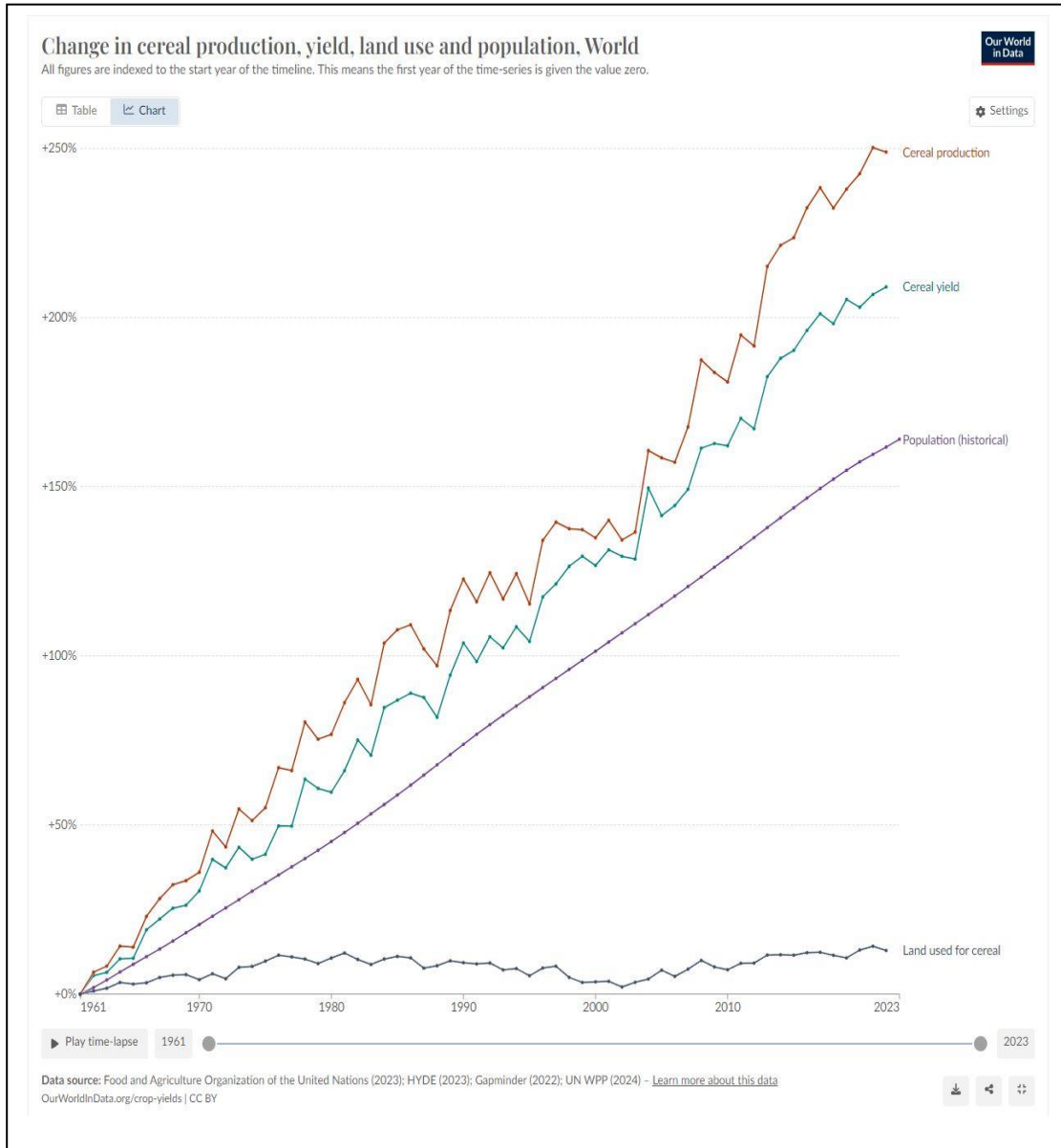
FIGURE 1 | Spectral comparisons between Landsat 8/9 and Landsat Next



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Another View of Trumpet Number One

Crop Yields since 1961 – 2023 and population growth¹⁰¹



¹⁰¹ <https://ourworldindata.org/crop-yields>

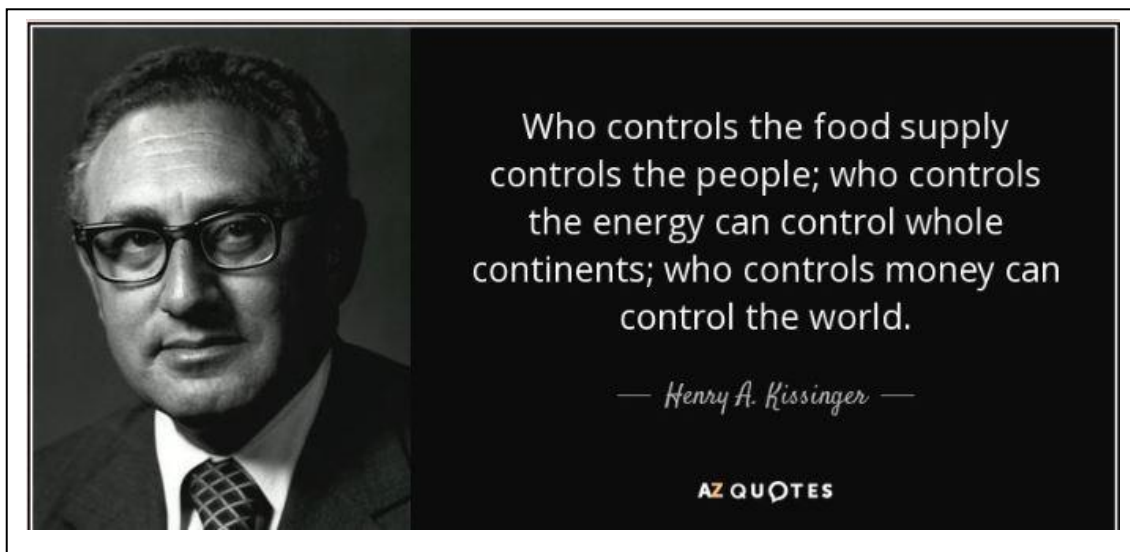
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After reviewing the chart on the previous page what do you think is going to happen to the cereal production and cereal yields when Trumpet Number One is executed?

What do you think is going to happen to the population? When there is no food to buy world-wide what do you think the general population is going to do?

How will the politicians react, how will the general population react to the fact they now know that they are going to be very hungry at best, starve at worst and yet have enough not to die?

A Reminder.



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As the workers of disobedience destroy the Earth then it would be prudent to try and plan and try to make a stand against the events.

The globalist bankers will make incredible profits that day and the days thereafter.

It may be possible to mimic what the globalist bankers will do.

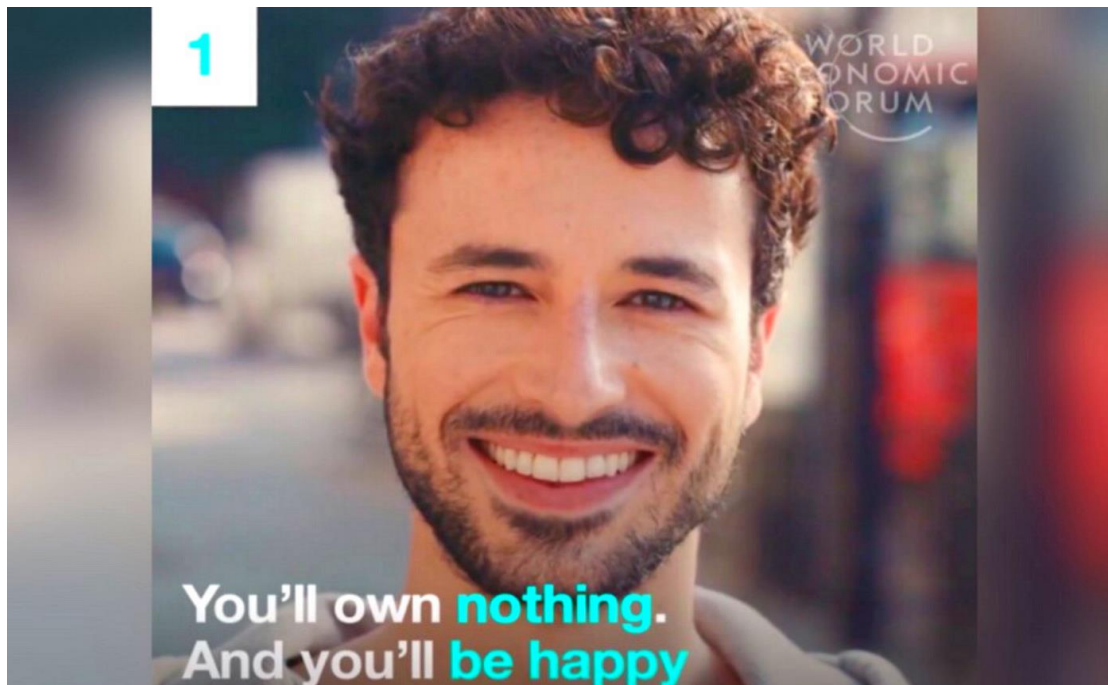
If a person is unable to do that a person finding help may be prudent.

On top of this a person may gather a few people together to buy food commodities before Trumpet Number One happens in bulk and sell them to the food manufactures after the disaster for a profit and or just to survive.

The Globalists will profit from this disaster

Trumpet Number One is a tradeable event to make the globalist incredibly rich and if already rich - have more!

The 'WEF' World Economic Forum stated that by 2030 “you will own nothing and be happy”.



Wealth is not destroyed but rather just transferred. It would be reasonable then that while the Globalists are taking from our right hand that those that want should take back with their left hand.

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How to do this is with futures and derivatives namely Options. When they destroy the crops, many farmers will potentially lose their land and or go bankrupt due to lack of insurance or by the promise of delivery of harvests which will be destroyed.

On the other hand, traders who just trade for profit will either lose from being on the wrong side of the trade or win by being on the right side of the trade. If one does not trade and or prepare in any way and does not have the Lord to help provide for them, then possible starvation as per the 4th rider of Revelation who kills by starvation awaits.

It may be possible to trade Trumpet Number One manmade disaster with level one options and/or you can buy food commodities before Trumpet Number One and sell them afterwards and use them for yourself this may also be possible.

The governments of the world are preparing for what is called in Australia as Disaster Risk Financing

Is that not nice says Reverend Dr Barry! The government knows disasters are coming and therefore plan for them and prepare to provide you with a few cents or a couple of dollars

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while the globalist bankers have your house and car destroyed allegedly!

Disaster Risk Financing & Insurance (DRFI)

The following was taken from the World Bank website!¹⁰² We modified it just for Trumpet Number One and Two. The other five Trumpets we are not interested in Trading. As the returns will potentially be lower and we will be entering the Mark of the Beast time around 2033-2034 and will not participate in that!

Beginning of quote.

“We support governments companies and individuals in designing financial protection strategies and instruments to respond to natural disasters. The Disaster Risk Financing and Insurance thematic area leads the dialogue on financial resilience as a component of the strategy support to companies and individuals in better managing disasters and climate shocks. It connects financial expertise with risk management across many sectors, bringing countries

¹⁰² <https://www.worldbank.org/en/programs/disaster-risk-financing-and-insurance-program>

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comprehensive solutions and helping them to become more effective in managing their own risk.”

End of quote.

We took out the words “world bank and countries but added in **companies and individuals.**” The governments and world banks and any banks are not interested in you doing their strategy using their products and taking money back from them on the very day they want to strip you of your money! Following is taken from the Australia Government Website about Disaster Risk Financing.¹⁰³

¹⁰³ <https://www.homeaffairs.gov.au/emergency/files/national-disaster-risk-reduction-framework.pdf>

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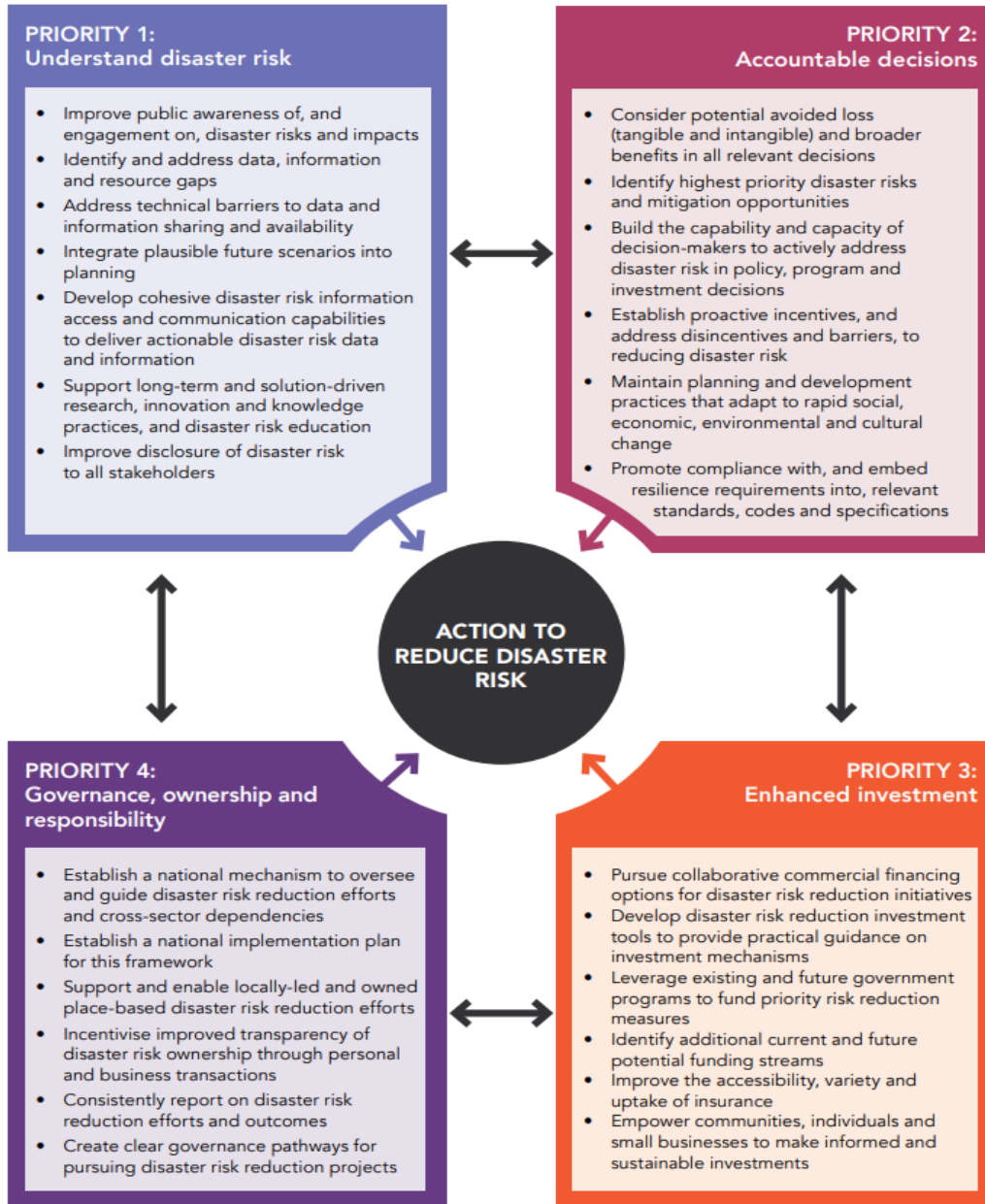


Figure 2 Priorities and strategies at a glance

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Do it yourself – The government are there to monitor and divert blame from the globalist bankers not to help you or just maybe they may give you a few crumbs!

If they are planning for the disasters, why shouldn't you?

Trading Trumpet Number One

Trading Trumpet Number One is outside the scope of this book. We recommend you go to our website trumpetdisasters.net or padreaustralia.com for redirection to website trumpetdisasters.net and click on the link for more information to trade this event.

We are not financial advisers and do not give any financial advice. However, it is envisaged that one would partnership with a person or company who knows how to trade derivatives namely Level One OPTIONS even futures and split any profits between you.

Level one options are the simplest way to trade options – they have the least risk - cannot lose anything financially other than the premium you pay for each option contract.

Further Investopedia state this about options:

The term option refers to a financial instrument that is based on the value of underlying securities, such as

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stocks, indexes, and exchange-traded funds (ETFs). An options contract offers the buyer the opportunity to buy or sell—depending on the type of contract they hold—the underlying asset.¹⁰⁴

From the analysis that Dr Barry Gumm has done it looks like but is not definite that Trumpet Number One disaster event would be around August 2029.

There are many factors to consider and are outside the scope of this book. It is also noted that 2029 is 100 years since the 1929 crash therefore the 100-year cycle may be used as something to blame for the way the markets react or the way the banker have price move to make new highs and new lows to continually activate market orders to trip them in and then have price move in the opposite direction and put those orders now activate into losing positions.

Farmers beware of planting crops for the 2028 and 2029 to 2030 of the planting of crops that are to be harvested from July to October for the years until Trumpet Number One disaster has happened. We know that Trumpet Number One will happen before January 2031 because Trumpet Number

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<https://www.investopedia.com/terms/o/option.asp#:~:text=Options%20are%20financial%20derivatives%20that,hedging%2C%20income%2C%20or%20speculation.>

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Two is when the International Space Station is cast into the sea and NASA says that will be in January 2031.

Therefore, Trumpet Number One must be before January 2031.

Best form of defence from this man-made disaster is not to be in the way.

For a Trader it is best to know when not to trade than to trade all the time or every day or every move in in every session.

Therefore, for a farmer it may be wise not to plant a crop for 2028-2030 until Trumpet Number One disaster has happened and let the land rest – it (the land) is about to take a tremendous hiding from the Elites/Globalists.

For more information on how to trade this event go to www.trumpetdisasters.net

TRUMP

President Trump in our book COVID WAR was shown to have a Sword which was on the medallion of the ABRAHAM ACCORD which he signed in 2020.

Medallion below.

Scripture says – Revelation 6:3-4 Niv

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3 When the Lamb opened the second seal, I heard the second living creature say, “Come!”

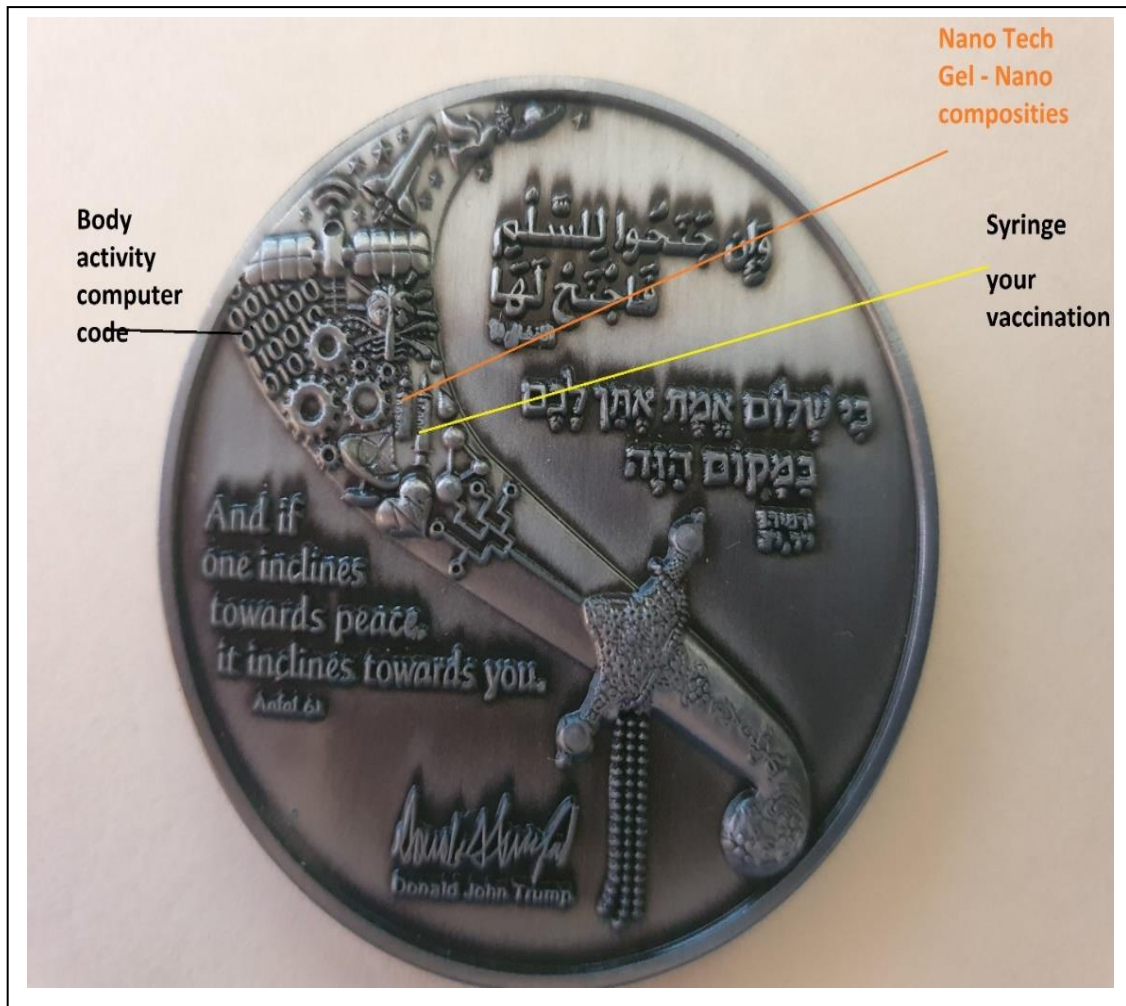
4 Then another horse came out, a fiery red one. Its rider was given power to take peace from the Earth and to make people kill each other. To him was given a large sword.

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And reverse side of the medallion

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It may be that Trump is re-elected President of the United States of America and before he steps down or near the time of the end of his presidency Trumpet Number One is fulfilled in scripture.

We will need to wait and see what the election result are in November 2024.

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Trumpet Number One – A Detailed Analysis in the 7 Trumpet Series

Another picture above of the medallion - note the stars at the top – alleged Starlink, Starlink type systems and the radiation signal from the “satellites”.

In his book: The Art of the Deal Trump writes on page 88 that he likes the saying “burn the grass”. Page below.

Trump Book “The Art of The Deal page 88¹⁰⁵

¹⁰⁵ Book The Art of The Deal page 88 Author Donald J Trump ISBN:97818447943033 Penguin Random House UK

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make of him. There was no way, however, that she was interested in Irving, and finally he gave up and we left.

About an hour later, Irving and I were sitting in his office when this huge guy, a monster, maybe 240 pounds, burst through the door. He was furious that Irving had cursed in front of his daughter, and he was ready to strangle him for coming on to his wife. The guy had murder in his eyes.

I expected Irving, if he had any sense, to run for his life. Instead, he started verbally attacking the man, flailing and screaming and chopping his hands in the air. "You get out of this office," he said. "I'll kill you. I'll destroy you. These hands are lethal weapons, they're registered with the police department."

I'll never forget how the guy looked at Irving and said, "You come outside, you fat crap, I want to burn grass with you." I always loved that phrase: "burn grass." And I thought to myself, Irving is in serious trouble. But Irving didn't seem to think so. "I'd fight you any time you want," he said, "but it's unlawful for me to fight."

All you had to do was look at Irving to know those hands were hardly registered weapons. But Irving was very much like a lion tamer. You've seen these guys, maybe 150 pounds, who walk blithely into a cage where there's a magnificent 800-pound lion pacing around. If that animal sensed any weakness or any fear, he'd destroy the trainer in a second. But instead the trainer cracks his whip, walks with authority, and, amazingly, the lion listens. Which is exactly what

TRUMPET
No: 1

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Trump with his book stating that he has “always loved that phrase: “burn grass” is purely circumstantial.

However, because he has already proven to be the rider of the red horse if he is re-selected as President then more weight to this needs to be given.

There are other circumstantial evidence(s), we will wait and watch and see if indeed he is selected as president of the USA again. However, Harris does not fit scripture. Trump does therefore Reverend Dr Barry favours a Trump selection

Trump administration over the Whitehouse the White horse (Anthony Fauci with his Chief Medical Crown/Title and his bow the face mask – See book and url below Covid War¹⁰⁶¹⁰⁷) and the red Republican horse.

¹⁰⁶ <https://padreaustralia.com/4-horses-of-revelation/> COVID WAR book Free pdf download

¹⁰⁷ <https://padreaustralia.com/revelation-6-part-one-white-horse/>

Summary Trumpet Number One:

1. Weaponized hail; Hail is needed to help in vapour and condensing air for a more explosive atmospheric force.
2. Weaponized fire – (laser-lightning-underground lightning (CERN hadron collider) just to name a few types of fire being used against us);
3. Laser lightning from the sky; Neutrino lightning from IceCube Observatory in the South Pole
4. Starlink systems may be used as a frequency transmitter to excite the methane gas and heat from above;
5. Mingled; The natural / methane gas is mixed with the blood of the sealife from deep sea mining that starts on 01/01/2025 if it is possible that nano size blood particles are attached to the methane gas and/or manufactured blood is sprayed over the ground to act as a interface to draw in the thiols into the plants and animals; This leaves it to chance, rather than the correct amount will be sprayed from above.
6. Blood; The alleged attacking of methanethiol/ethanethiol in the blood brain and feces of animals as well as in plant tissues. Along with the group of “Thiols” in vegetation.

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7. Manufactured blood to be used as an interface between the methane gas and plants and animals.
8. Cast – (laser fire for example); Weaponized man-made Hail thrown on Earth
9. Green Grass burnt in a strange way; as in the “Thoils” in vegetation
10. World-Wide Crop damage creating starvation which is one of the ways the fourth rider in Revelation chapter six kills.
11. Some hills terraformed by pre-laid bombs and by neutrino – energy blasting in the form of an earthquake from IceCube Observation station in the South Pole and from Japan and other countries to multiple locations around the world.
12. Many countries must work together to have machines around the world to execute the one world order plan commonly known also as agenda 2030.
13. Possible fake alien invasion used as a scapegoat for all the damage and setting the world in the direction of shortage or starvation.
14. If Trump who is the rider of the Red Horse (Republican Party) is re-elected as we suggest then it may be as per the COVID WAR he is set to create and approve this war as he did with the COVID WAR and disappeared, he may

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finish his next term at the beginning of January 20th 2028 and disappear again as it were not being president of the USA but like OBAMA with BIDEN / Harris be in the back ground.

15. January 20th 2029 Democrats – Dark Horse has won and the new leader a male as Revelation 6 says will be sworn in – then in August 2029 Trumpet Number One will be executed.

The Bible says His job is to “take peace” Revelation 6:3-4

“3 When the Lamb opened the second seal, I heard the second living creature say, “Come!”

4 Then another horse came out, a fiery red one. Its rider was given power to take peace from the Earth and to make people kill each other. To him was given a large sword.”

He only has to take peace from the world he does not need to be around in it during the war.

Is it possible that if he is re-elected that another run of needles for a man-made ModifiedRNA is coming. More NANO

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Technology injections? “Another pestilence” for another wave of the sword over the population?

Revelation 6.5-6

And when he had opened the third seal, I heard the third beast say, Come and see. And I beheld, and lo a black horse; and he that sat on him had a pair of balances in his hand.

And I heard a voice in the midst of the four beasts say, A measure of wheat for a penny, and three measures of barley for a penny; and see thou hurt not the oil and the wine.

We now know that the democrats in the USA will be in power and that in that time the Trumpets will commence.

Trumpet Number One – August 2029

Trumpet Number Two – January 2031

Key Dates

We look at key dates. What is important to realise is any date in the future is subject to change. God knows the timing of things and we just look into the future by looking into the past first.

Key dates - look back

11/02/1984 - Whitehouse - White Horse Rider Anthony Fauci - time in office - November 2, 1984 – December 31, 2022. 38 years he rides that White Horse! But only for the final time did he ride in 2020 to end of 2022.

He was given a crown. A crown is a title. His title was Chief Medical Officer.

He had a bow for a weapon - which is the simplest piece of cloth the Strong's Concordance says. **A Bow is a face musk.**

9/11/2001 WTC destroyed - 7 Buildings on the day and the Bankers Trust building although repaired had to be deconstructed. Making a total of 8 buildings destroyed.

2016 – November 8, 2016 – **Red horse** (Republican Party) rider is selected to be president of the USA. His name is Donald J Trump.

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2020 – Something is wrong! It's not time to enact Trumpet Number One – Oh no! Make it look like the election was stolen and make Biden president – The dark side forgot timing is of the Lord God Almighty not theirs. Delay Trumpet Number One by 4 years and make it in 2029. Fit agenda 2030!

2020 - Anthony Fauci White Horse rider - appears on Tv's around the world - going forth to conquer and conquering - destroying with the lies that of you need the magic juice injection. But only for the final time did he ride in 2020 to end of 2022.

2001 to 2021 - Silence in Heaven about half an hour or 20 years in human time frame.

2020-2021 - **Red Horse** Rider (Republican Party) enact warp speed and Trump rides off on his Horse after signing the Abraham Accord 2020 declaring and taking peace from the Earth. See all those that took the jab and Gaza.

Key dates looking forward

Look forward – Today is 09/14/2029 or 14th September 2024 5:30 pm NSW time Australia.

5th November 2024 – **Red Horse** Rider Trump is re-selected. He fits scripture. Kamala Harris does not. Simple as that.

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Unless they are going to have Harris and replace her with a male for the next election.

20th January 2025 – Trump goes back to the Whitehouse to bring his great sword back into place after swinging it for COVID WAR.

When he draws it back in, as it were, he signs off on “burn the grass” Page 88 of his book “The art of the Deal” – Trumpet Number One globalist wicked plan will be ready take place and God’s warning to us in Revelation 8.1-7 is fulfilled.

01/01/2025 – Pivot point in time – Deep Sea Carpet type mining begins/began. Releasing methane or natural gas into the atmosphere for Trumpet Number One disaster to happen – God’s warning of T#1 fulfilled – Without deep sea mining parts of T#1, T2 and T3 could not happen or would be very limited.

01/01/2025 – Oxygen mixture in air begins to change. More Natural / Methane gas in air making humans sick – Heading towards the pale horse rider.

01/01/2025 – Pivot point in time – potentially entering the final decade give or take a year or two or even three.

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March 2026 – AntiChrist or Ante'christ HRH King Charles dies or steps down as per Revelation 13.5 after reigning for just 42 months.

March 2026 – Antichrist king wounded head William becomes King, his wounded head wife HRH Kate becomes Queen. It is interesting that they are both wounded on or around their left temples. Kate covers the scar with her hair. William hides his with crappie or photoshopped pictures it seems allegedly...The Mortally wounded head yet lived. Revelation 13.

Sometime in his presidency – Trump authorises Trumpet Number One disaster – Burn Grass and leaves office 20th of January 2029 just 8 months before 8th August 2029. There's that number 8 again or 7 months and a few days if you like.

November 2028 – Dark Horse “Black/Blue Horse” Rider (Democrat) is selected – Scales are in his hand

January 2029 – Dark Horse “Black/Blue Horse” Rider (Democrat) rides (sworn in) – Revelation 6.6 NIV

7-8th of August 2029 is the most likely date that the globalists fulfil God's warning to us in Trumpet Number One. They fulfil their first major step in their wicked evil plans against humanity.

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Trumpet Number One – Winter is coming Hail, Fire, Blood, Terraforming and starvation worldwide.

Third quarter of 2029 – Trumpet Number One most likely date Reverend Dr Barry Gumm alleges will be **August the 7-8th 2029.**

January 2031 – Trumpet Number Two event happens – Destroying the Chinese Navy and 1/3 of Merchant navy - Attack on food delivery and energy and bottom of ocean to aid in mining the bottom of the sea. Bombs and earthquake(s) destroying mud mounds and cliffs under the sea will destroy beachside housing. The scape goat being the crashing of the International Space Station and SpaceX \$843 million USD tug into the sea at point nemo.¹⁰⁸

Under the sea internet cables destroyed – you must connect to Starlink type systems for phone calls and internet access.

T#3 - >2031 -

Bowl #1 possibly - Mark of the Beast (**not sure of the timing**)
or

¹⁰⁸ <https://www.bloomberg.com/news/articles/2024-06-26/spacex-wins-843-million-contract-to-bring-down-space-station>

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T#4 - > Attack on sunlight -

Bowl #1 possibly - Mark of the Beast - again **not sure of the timing here.**

T#5 - > Locusts released from Energy prison - Thank you CERN – Hadron Collider.¹⁰⁹

Pale Horse Rider - rides some time possibly Jan 2034

T#6 - Armageddon 1/3 of mankind are killed China's & Kings of East destroyed - So much for BRICS!

T#7 - Plan to wipe out Russia - God says no way, it's done - it's over - its finished boys - **FIRE** like you have never seen **FIRE** before - Mystery Babylon destroyed. Jesus and the Angel throw in their sickles and reap the harvest and those not on Jesus' side off to hades for you to await the second judgement some 1250 years guesstimate in the future in Earth/Human time frame.

¹⁰⁹ <https://home.cern/science/accelerators/large-hadron-collider>

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For us who are saved - To the Lords' Wedding Feast we go.

I Timothy 4:13

Till I come, give attendance to reading, to exhortation, to doctrine.

AN ENCOURAGEMENT FOR HOLINESS

King David records the blessedness and happiness of those who reverence the LORD's authority in repentance in faith and obedience:

Psalm 1.1-2

1 Blessed is the man who does not walk in the counsel of the wicked or stand in the way of sinners or sit in the seat of mockers.

2 But his delight is in the law of the LORD, and on his law he meditates day and night.

King David also teaches of the Messiah, Jesus, to come, whom we will see – IS VICTORIOUS – The Cross is His Victory:

Psalm 2

1 Why do the nations conspire a and the peoples plot in vain?

2 The kings of the Earth take their stand and the rulers gather together against the LORD and against his Anointed One.

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3 “Let us break their chains,” they say, “and throw off their fetters.”

4 The One enthroned in Heaven laughs; the Lord scoffs at them.

5 Then he rebukes them in his anger and terrifies them in his wrath, saying,

6 “I have installed my King on Zion, my holy hill.”

7 I will proclaim the decree of the LORD: He said to me, “You are my Son; today I have become your Father.

8 Ask of me, and I will make the nations your inheritance, the ends of the Earth your possession.

9 You will rule them with an iron scepter; you will dash them to pieces like pottery.”

10 Therefore, you kings, be wise; be warned, you rulers of the Earth.

11 Serve the LORD with fear and rejoice with trembling.

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12 Kiss the Son, lest he be angry and you be destroyed in your way, for his wrath can flare up in a moment. Blessed are all who take refuge in him.

The cross is the Victory!

It's all to do with the simple yet awesome statement “...has triumphed” - (RSV “has conquered...” AV “has prevailed”).

Jesus has overcome death (John 16:33) and He wants us to overcome as in Revelation 2:7, 11, 17, 26; 3:5, 12, 21. He gives us the right to sit with Him!! On His throne!! In a sense we are there 'now' but 'not yet'!

Jesus has “triumphed”. The Greek here is “nikao”, and it is in the aorist tense. This tense is defined as having occurred, no continuation – simply complete. Jesus' victory was won at the cross. A real Victory with real hope for the elect in each lifetime, whatever trials and suffering may occur to end human life (again Philippians 1:23; 2 Corinthians 5:6-9).

5:6 “The Lamb...standing in the centre of the throne...seven horns...seven eyes” - perfect divine power and perfect knowledge and insight.

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He is the Lamb who was slain – who saves His people through His atoning death (prophesied Isaiah 11:1-5, 10; 40:1-11; 41:14, 16, 20 cf Mark 1:24; Isaiah 52:13-53:12; 61:1-3). Yes, the Lion does not take the scroll – but the Messianic Lamb – the victorious conqueror over death and the Devil. 5:8 All fell before the Lamb.

5:9 The joy of the prayers of the saints which sometimes in the midst of trial of the saints on Earth are heard in the Council of God. Again, the 'worthy' – worth, worth-ship – worship: “You are worthy to take the scroll and to open its seals, because you were slain, and with your blood you purchased for God persons from every tribe and language and people and nation.

5:10 “You have made them to be a kingdom and priests to serve our God, and they will reign on the Earth.” A further truth supporting a pre-millennial approach. Jesus opens the scroll – He was slain – His authority given by the Father.

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Remember during the crucifixion Jesus was in charge (John 10:18 – the authority and command given in John 15:9-10). The elect, we will reign with the authority of King Jesus. We see the reality in our 'now' – each lifetime in history how we are redeemed by the Glorious Trinity

Revelation 5.5-10

5 Then one of the elders said to me, “Do not weep! See, the Lion of the tribe of Judah, the Root of David, has triumphed. He is able to open the scroll and its seven seals.”

6 Then I saw a Lamb, looking as if it had been slain, standing in the center of the throne, encircled by the four living creatures and the elders. He had seven horns and seven eyes, which are the seven spirits a of God sent out into all the Earth.

7 He came and took the scroll from the right hand of him who sat on the throne.

8 And when he had taken it, the four living creatures and the twenty-four elders fell down before the Lamb. Each one had a harp and they were holding golden

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bowls full of incense, which are the prayers of the saints.

9 And they sang a new song:

“You are worthy to take the scroll
and to open its seals,
because you were slain,
and with your blood you
purchased men for God
from every tribe and
language and people
and nation.

10 You have made them to be a kingdom and priests
to serve our God, and they will reign on the Earth.”

So, what is before us is a set of four overviews or sequences. Each subsequent overview overlays the preceding one. Each of these overviews occurred in John's time and also occur in every Christian's lifetime. The time of the beginning of “birth pangs” shortly before the rapture is excepted. Several authors have touched on this – one suggesting a post-millennial approach – that we are actually now in the 1,000-year reign of Jesus. Again, this author is researching from a

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pre- millennial approach. The millennium begins after the rapture the second coming of Christ.

Chapters 6 – 7 Times of Treacherous Evil Rulers

We see seven seals which deal with treacherous evil rulers. They are in John's time (cAD95 at time of writing).

They are also in the lifetime of every elect person. Chapters 8 – 11 Times of Total Confusion and Disorder

We see seven trumpets defining total confusion, total disorder. As we will see, Satan is responsible for the Fall, giving man without God, emotions of hopelessness, loneliness, worthlessness, helplessness, sadness, fear (slavish fear not Holy fear of reverencing God), tyranny, pain, frustration, confusion and death.

This, also, was in John's time as we will see – and in each lifetime in history until Jesus returns.

Chapters 12 – 14 Times of Enmity and Suffering

Seven signs about enmity and suffering. Again in John's time and each elect person in their lifetime.

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Chapters 15 – 16 Times which Utterly Destroy Seven plagues which utterly destroy. In each elect's lifetime in history confusion and disorder occur at the same time as treacherous actions by evil power hungry usurpers who want, at the devil's direction, to enslave and kill.

Revelation 8

1 The Seventh Seal and the Golden Censer 1 When he opened the seventh seal, there was a silence in Heaven for about half an hour.

2 And I saw the seven angels who stand before God, and seven trumpets were given to them.

3 Another angel, who had a golden censer, came and stood at the altar. He was given much incense to offer, with the prayers of all God's people, on the golden altar in front of the throne.

4 The smoke of the incense, together with the prayers of God's people, went up before God from the angel's hand.

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5 Then the angel took the censer, filled it with fire from the altar and hurled it on the Earth; and there came peals of thunder, rumblings, flashes of lightning and an Earthquake.

The Trumpets

6 Then the seven angels who had the seven trumpets prepared to sound them.

7 The first angel sounded his trumpet, and there came hail and fire mixed with blood, and it was hurled down on the Earth. A third of the Earth was burned up, a third of the trees were burned up, and all the green grass was burned up.

8 The second angel sounded his trumpet, and something like a huge mountain, all ablaze, was thrown into the sea. A third of the sea turned into blood,

9 a third of the living creatures in the sea died, and a third of the ships were destroyed.

10 The third angel sounded his trumpet, and a great star, blazing like a torch, fell from the sky on a third of the rivers and on the springs of water –

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11 the name of the star is Wormwood. A third of the waters turned bitter, and many people died from the waters that had become bitter.

12 The fourth angel sounded his trumpet, and a third of the sun was struck, a third of the moon, and a third of the stars, so that a third of them turned dark. A third of the day was without light, and also a third of the night.

13 As I watched, I heard an eagle that was flying in mid- air call out in a loud voice”

“Woe! Woe! Woe to the inhabitants of the Earth, because of the trumpet blasts about to be sounded by the other angels!”

John's Reflection Concerning His Time and/or All Lifetimes

8:1 Seventh seal opened – silence in Heaven

– this leads to the next overlay where confusion and disaster occur, overlaying John's previous unveiling of the treacherous tyrants.

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Just a comment – how frightening it would be if God, through the Holy Spirit, was silent! I would be fearfully lost! Keep trusting and obeying Jesus.

John draws a picture of dark and light. Suffering and despair interchanging with joy and gladness.

8:2 Seven angels given seven trumpets – God's judgements begin.

Remember this is no longer a Garden of Eden of paradise as in Genesis 1 – 3.

This author remembers a simple pamphlet by Reverend Phillip Jensen⁷ (see commentary on Revelation 22). About mankind rebellion and the fall and why God allows evil to happen:

God is the loving ruler of the world. He made the world. He made us rulers of the world under him.

You are worthy, our Lord and God, to receive glory and honour and power, for you created all things, and by your will they were created and have their beings. Revelation 4:11 We all reject the ruler – God – by trying to run life without Him.

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Phillip Jensen – Anglican Information Office, St Andrews, Sydney, 1989 our own way without him.

But we fail to rule ourselves or society or the world. There is no-one righteous, not even one; there is no- one who understands, no-one who seeks God. All have turned away.

Romans 3:10-12 God won't let us rebel forever.

God's punishment for rebellion is death and judgement.

Man is destined to die once, and after that to face judgement. (Hebrews 9:27) Because of his love, God sent his son into the world: the man Jesus Christ.

Jesus always lived under God's rule.

Yet by dying in our place he took our punishment and brought forgiveness. Christ died for sins once for all, the righteous for the unrighteous, to bring you to God. (1 Peter 3:18).

God raised Jesus to life again as the ruler of the world. Jesus has conquered death, now gives new life, and will return to judge.

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In his great mercy he has given us new birth into a living hope through the resurrection of Jesus Christ from the dead.

1 Peter 1:3

Whoever believes in the Son has eternal life, but whoever rejects the Son will not see life, for God's wrath remains on him. John 3:36

8:7 “A third of the Earth was burned up...a third of the trees...all the grass.

8:8 “a mountain ... ablaze ... into the sea...third of sea turned to blood.

8:9 “third of creatures in the sea...third of the ships...”

Through all this God allows a proportion. Two thirds are still alive. Will people repent?

EPILOGUE

The Holy Spirit inspired John to write the epilogue in Revelation chapters 19-22.

Revelation 19

1 After this I heard what sounded like the roar of a great multitude in Heaven shouting: “Hallelujah! Salvation and glory and power belong to our God,

2 for true and just are his judgments. He has condemned the great prostitute who corrupted the Earth by her adulteries. He has avenged on her the blood of his servants.”

3 And again they shouted: “Hallelujah! The smoke from her goes up for ever and ever.”

4 The twenty-four elders and the four living creatures fell down and worshiped God, who was seated on the throne. And they cried: “Amen, Hallelujah!”

5 Then a voice came from the throne, saying: “Praise our God, all you his servants, you who fear him, both small and great!”

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6 Then I heard what sounded like a great multitude, like the roar of rushing waters and like loud peals of thunder, shouting: “Hallelujah! For our Lord God Almighty reigns.

7 Let us rejoice and be glad and give him glory! For the wedding of the Lamb has come, and his bride has made herself ready.

8 Fine linen, bright and clean, was given her to wear.” (Fine linen stands for the righteous acts of the saints.)

9 Then the angel said to me, “Write: ‘Blessed are those who are invited to the wedding supper of the Lamb!’” And he added, “These are the true words of God.”

10 At this I fell at his feet to worship him. But he said to me, “Do not do it! I am a fellow servant with you and with your brothers who hold to the testimony of Jesus. Worship God! For the testimony of Jesus is the spirit of prophecy.” The Rider on the White Horse

11 I saw Heaven standing open and there before me was a white Horse, whose rider is called Faithful and True. With justice he judges and makes war.

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12 His eyes are like blazing fire, and on his head are many crowns. He has a name written on him that no one knows but he himself.

13 He is dressed in a robe dipped in blood, and his name is the Word of God.

14 The armies of Heaven were following him, riding on White Horses and dressed in fine linen, white and clean.

15 Out of his mouth comes a sharp sword with which to strike down the nations. “He will rule them with an iron scepter.” He treads the winepress of the fury of the wrath of God Almighty.

16 On his robe and on his thigh he has this name written:

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KING OF KINGS AND LORD OF LORDS.

17 And I saw an angel standing in the sun, who cried in a loud voice to all the birds flying in midair, “Come, gather together for the great supper of God,

18 so that you may eat the flesh of kings, generals, and mighty men, of horses and their riders, and the flesh of all people, free and slave, small and great.”

19 Then I saw the beast and the kings of the Earth and their armies gathered together to make war against the rider on the horse and his army.

Let us stop for a moment and look at the prophecy “rod of His mouth” (v4) below.

Isaiah 11.1-5

1 A shoot will come up from the stump of Jesse;
from his roots a Branch will bear fruit.

2 The Spirit of the LORD will rest on him — the Spirit of wisdom and of understanding, the Spirit of counsel and

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of power, the Spirit of knowledge and of the fear of the LORD—

3 and he will delight in the fear of the LORD. He will not judge by what he sees with his eyes, or decide by what he hears with his ears;

4 but with righteousness he will judge the needy, with justice he will give decisions for the poor of the Earth. He will strike the Earth with the rod of his mouth; with the breath of his lips he will slay the wicked.

5 Righteousness will be his belt and faithfulness the sash around his waist.

Continuing Revelation 19:

20 But the beast was captured, and with him the false prophet who had performed the miraculous signs on his behalf. With these signs he had deluded those who had received the mark of the beast and worshiped his image. The two of them were thrown alive into the fiery lake of burning sulfur.

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21 The rest of them were killed with the sword that came out of the mouth of the rider on the horse, and all the birds gorged themselves on their flesh.

Revelation 20

1 And I saw an angel coming down out of Heaven, having the key to the Abyss and holding in his hand a great chain.

2 He seized the dragon, that ancient serpent, who is the devil, or Satan, and bound him for a thousand years.

3 He threw him into the Abyss, and locked and sealed it over him, to keep him from deceiving the nations anymore until the thousand years were ended. After that, he must be set free for a short time.

4 I saw thrones on which were seated those who had been given authority to judge. And I saw the souls of those who had been beheaded because of their testimony for Jesus and because of the word of God. They had not worshiped the beast or his image and had not received his mark on their foreheads or their hands. They came to life and reigned with Christ a thousand years.

5 (The rest of the dead did not come to life until the thousand years were ended.) This is the first Resurrection.

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6 Blessed and holy are those who have part in the first resurrection. The second death has no power over them, but they will be priests of God and of Christ and will reign with him for a thousand years.

7 When the thousand years are over, Satan will be released from his prison

8 and will go out to deceive the nations in the four corners of the Earth—Gog and Magog—to gather them for battle. In number they are like the sand on the seashore.

9 They marched across the breadth of the Earth and surrounded the camp of God's people, the city he loves. But fire came down from Heaven and devoured them.

10 And the devil, who deceived them, was thrown into the lake of burning sulfur, where the beast and the false prophet had been thrown. They will be tormented day and night for ever and ever.

11 Then I saw a great white throne and him who was seated on it. Earth and sky fled from his presence, and there was no place for them.

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12 And I saw the dead, great and small, standing before the throne, and books were opened. Another book was opened, which is the book of life. The dead were judged according to what they had done as recorded in the books.

13 The sea gave up the dead that were in it, and death and Hades gave up the dead that were in them, and each person was judged according to what he had done.

14 Then death and Hades were thrown into the lake of fire. The lake of fire is the second death.

15 If anyone's name was not found written in the book of life, he was thrown into the lake of fire.

Revelation 21

1 Then I saw a new Heaven and a new Earth, for the first Heaven and the first Earth had passed away, and there was no longer any sea.

2 I saw the Holy City, the new Jerusalem, coming down out of Heaven from God, prepared as a bride beautifully dressed for her husband.

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3 And I heard a loud voice from the throne saying, “Now the dwelling of God is with men, and he will live with them. They will be his people, and God himself will be with them and be their God.

4 He will wipe every tear from their eyes. There will be no more death or mourning or crying or pain, for the old order of things has passed away.”

5 He who was seated on the throne said, “I am making everything new!” Then he said, “Write this down, for these words are trustworthy and true.”

6 He said to me: “It is done. I am the Alpha and the Omega, the Beginning and the End. To him who is thirsty I will give to drink without cost from the spring of the water of life.

7 He who overcomes will inherit all this, and I will be his God and he will be my son.

8 But the cowardly, the unbelieving, the vile, the murderers, the sexually immoral, those who practice magic arts, the idolaters and all liars—their place will be in the fiery lake of burning sulfur. This is the second death.”

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9 One of the seven angels who had the seven bowls full of the seven last plagues came and said to me, “Come, I will show you the bride, the wife of the Lamb.”

10 And he carried me away in the Spirit to a mountain great and high, and showed me the Holy City, Jerusalem, coming down out of Heaven from God.

11 It shone with the glory of God, and its brilliance was like that of a very precious jewel, like a jasper, clear as crystal.

12 It had a great, high wall with twelve gates, and with twelve angels at the gates. On the gates were written the names of the twelve tribes of Israel.

13 There were three gates on the east, three on the north, three on the south and three on the west.

14 The wall of the city had twelve foundations, and on them were the names of the twelve apostles of the Lamb.

15 The angel who talked with me had a measuring rod of gold to measure the city, its gates and its walls.

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16 The city was laid out like a square, as long as it was wide. He measured the city with the rod and found it to be 12,000 stadia in length, and as wide and high as it is long.

17 He measured its wall and it was 144 cubits thick, by man's measurement, which the angel was using.

18 The wall was made of jasper, and the city of pure gold, as pure as glass.

19 The foundations of the city walls were decorated with every kind of precious stone. The first foundation was jasper, the second sapphire, the third chalcedony, the fourth emerald,

20 the fifth sardonyx, the sixth carnelian, the seventh chrysolite, the eighth beryl, the ninth topaz, the tenth chrysoptase, the eleventh jacinth, and the twelfth amethyst.

21 The twelve gates were twelve pearls, each gate made of a single pearl. The great street of the city was of pure gold, like transparent glass.

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22 I did not see a temple in the city, because the Lord God Almighty and the Lamb are its temple.

23 The city does not need the sun or the moon to shine on it, for the glory of God gives it light, and the Lamb is its lamp.

24 The nations will walk by its light, and the kings of the Earth will bring their splendor into it.

25 On no day will its gates ever be shut, for there will be no night there.

26 The glory and honor of the nations will be brought into it.

27 Nothing impure will ever enter it, nor will anyone who does what is shameful or deceitful, but only those whose names are written in the Lamb's book of life.

Revelation 22

1 Then the angel showed me the river of the water of life, as clear as crystal, flowing from the throne of God and of the Lamb

2 down the middle of the great street of the city. On each side of the river stood the tree of life, bearing twelve crops of fruit, yielding its fruit every month. And the leaves of the tree are for the healing of the nations.

3 No longer will there be any curse. The throne of God and of the Lamb will be in the city, and his servants will serve him.

4 They will see his face, and his name will be on their foreheads.

5 There will be no more night. They will not need the light of a lamp or the light of the sun, for the Lord God will give them light. And they will reign for ever and ever.

6 The angel said to me, “These words are trustworthy and true. The Lord, the God of the spirits of the

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prophets, sent his angel to show his servants the things that must soon take place.” Jesus Is Coming

7 “Behold, I am coming soon! Blessed is he who keeps the words of the prophecy in this book.”

8 I, John, am the one who heard and saw these things. And when I had heard and seen them, I fell down to worship at the feet of the angel who had been showing them to me.

9 But he said to me, “Do not do it! I am a fellow servant with you and with your brothers the prophets and of all who keep the words of this book. Worship God!”

10 Then he told me, “Do not seal up the words of the prophecy of this book, because the time is near.

11 Let him who does wrong continue to do wrong; let him who is vile continue to be vile; let him who does right continue to do right; and let him who is holy continue to be holy.”

12 “Behold, I am coming soon! My reward is with me, and I will give to everyone according to what he has done.

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13 I am the Alpha and the Omega, the First and the Last, the Beginning and the End.

14 “Blessed are those who wash their robes, that they may have the right to the tree of life and may go through the gates into the city.

15 Outside are the dogs, those who practice magic arts, the sexually immoral, the murderers, the idolaters and everyone who loves and practices falsehood.

16 “I, Jesus, have sent my angel to give you e this testimony for the churches. I am the Root and the Offspring of David, and the bright Morning Star.”

17 The Spirit and the bride say, “Come!” And let him who hears say, “Come!” Whoever is thirsty, let him come; and whoever wishes, let him take the free gift of the water of life.

18 I warn everyone who hears the words of the prophecy of this book: If anyone adds anything to them, God will add to him the plagues described in this book.

19 And if anyone takes words away from this book of prophecy, God will take away from him his share in the

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tree of life and in the holy city, which are described in this book.

20 He who testifies to these things says, “Yes, I am coming soon.” Amen. Come, Lord Jesus.

21 The grace of the Lord Jesus be with God’s people. Amen.

Even so Lord Jesus come soon.

JESUS BREATHED ON THEM

In Revelation 19 we read:

15 Out of his mouth comes a sharp sword with which to strike down the nations. “He will rule them with an iron scepter.” He treads the winepress of the fury of the wrath of God Almighty

In Isaiah 11.4 we read:

4 but with righteousness he will judge the needy, with justice he will give decisions for the poor of the Earth. He will strike the Earth with the rod of his mouth; with the breath of his lips he will slay the wicked.

We see the power is in His breath in John 20.21-22.

21 Again Jesus said, “Peace be with you! As the Father has sent me, I am sending you.”

22 And with that he breathed on them and said, “Receive the Holy Spirit.

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In Acts 1.7 Jesus said:

8 But you will receive power when the Holy Spirit comes on you; and you will be my witnesses in Jerusalem, and in all Judea and Samaria, and to the ends of the Earth.”

Acts 2.2-4 we read:

2 Suddenly a sound like the blowing of a violent wind came from Heaven and filled the whole house where they were sitting.

3 They saw what seemed to be tongues of fire that separated and came to rest on each of them.

4 All of them were filled with the Holy Spirit and began to speak in other tongues as the Spirit enabled them.

John 1.12 we read:

12 Yet to all who did receive him, to those who believed in his name, he gave the right to become children of God

When you are “breathed on” and when given the Holy Spirit you are given the right and the power to become children of GOD and greater things shall you do in His name.

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John 14.12

12 Very truly I tell you, whoever believes in me will do the works I have been doing, and they will do even greater things than these, because I am going to the Father.

How important it is that we do when Jesus did so often and pray to the Father in Spirit and in Truth.

John 4.23-24

23 Yet a time is coming and has now come when the true worshipers will worship the Father in spirit and truth, for they are the kind of worshipers the Father seeks.

24 God is spirit, and his worshipers must worship in spirit and in truth.”

Worship in its root word from the Strong’s Concordance means:

Prep in direction of; The place; time; occasion; or respect which the destination of the relation.

God wants you to breathe and speak to and with Him in the Holy Spirit – Speaking in tongues.

THE NEED FOR PRAYER

We remember that in the beginning the LORD God created everything in Heaven and in Earth and He said all He created 'was good'. The devil enters and all becomes evil and bad.

Hence the constant need for prayer.

Matthew 6.7-15

“And when you pray, do not keep on babbling like pagans, for they think they will be heard because of their many words. Do not be like them, for your Father knows what you need before you ask him. "This, then, is how you should pray: "Our Father in Heaven, hallowed be your name, your kingdom come, your will be done on Earth as it is in Heaven. Give us today our daily bread. Forgive us our debts, as we also have forgiven our debtors. And lead us not into temptation, but deliver us from the evil one. For if you forgive men when they sin against you, your Heavenly Father will also forgive you. But if you do not forgive men their sins, your Father will not forgive your sins.”

Romans 8.26

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“In the same way, the Spirit helps us in our weakness. We do not know what we ought to pray for, but the Spirit himself intercedes for us with groans that words cannot express.”

Jude 17-21

“But, dear friends, remember what the apostles of our Lord Jesus Christ foretold. They said to you, "In the last times there will be scoffers who will follow their own ungodly desires." These are the men who divide you, who follow mere natural instincts and do not have the Spirit. But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit. Keep yourselves in God's love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.”

The Devil’s Total Evil and Destruction

The devil has been effective in trying to destroy God’s awesome creation since the beginning – from Genesis 3 as previously mentioned. Throughout all Old Testament history, the devil has hated God’s creation and tempted and led astray almost all people with whom he had contact. From the time of

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Samuel, we see Samuel's sons destroyed by the devil, along with the evil reigns of 19 evil kings before Israel and Judah went into their relative captivities. All this history in the Old Covenant was the time of ante-Christ, before Jesus came into His world. Remember:

Malachi 2.16 – 3.5

"...guard yourself in your spirit, and do not break faith. You have wearied the Lord with your words. "How have we wearied him?" you ask. By saying, "All who do evil are good in the eyes of the Lord , and he is pleased with them" or "Where is the God of justice?" "See, I will send my messenger, who will prepare the way before me. Then suddenly the Lord you are seeking will come to his temple; the messenger of the covenant, whom you desire, will come," says the Lord Almighty. But who can endure the day of his coming? Who can stand when he appears? For he will be like a refiner's fire or a launderer's soap. He will sit as a refiner and purifier of silver; he will purify the Levites and refine them like gold and silver. Then the Lord will have men who will bring offerings in righteousness, and the offerings of Judah and Jerusalem will be acceptable to the Lord , as in days gone by, as in

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former years. "So I will come near to you for judgment. I will be quick to testify against sorcerers, adulterers and perjurers..."

Malachi 4.5

"See, I will send you the prophet Elijah before that great and dreadful day of the Lord comes.

In the above truth, the Messenger who prepared the way is John the Baptist, the new Elijah, and the Messenger of the New Covenant is the Anointed One, the Messiah, the Christ Jesus.

And the new Elijah, John the Baptist and Jesus came:

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Mark 1.1-5, 7-13

“The beginning of the gospel about Jesus Christ, the Son of God. It is written in Isaiah the prophet: "I will send my messenger ahead of you, who will prepare your way" - "a voice of one calling in the desert, 'Prepare the way for the Lord, make straight paths for him.' " And so John came, baptizing in the desert region and preaching a baptism of repentance for the forgiveness of sins. The whole Judean countryside and all the people of Jerusalem went out to him. Confessing their sins, they were baptized by him in the Jordan River. And this was his message: "After me will come one more powerful than I, the thongs of whose sandals I am not worthy to stoop down and untie. I baptize you with water, but he will baptize you with the Holy Spirit." At that time Jesus came from Nazareth in Galilee and was baptized by John in the Jordan. As Jesus was coming up out of the water, he saw Heaven being torn open and the Spirit descending on him like a dove. And a voice came from Heaven: "You are my Son, whom I love; with you I am well pleased." At once the Spirit sent him out into the desert, and he was in the desert forty days, being tempted by Satan...”

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It is so important to read and study Holy Scripture. From the above truth we see Jesus being led to be tempted by the devil. Jesus is the Eternal Second Person of the Trinity in His Second Nature His Humanity. In the next Scripture we see Him being tested by the devil:

Matthew 4.1-11

“Then Jesus was led by the Spirit into the desert to be tempted by the devil. After fasting forty days and forty nights, he was hungry. The tempter came to him and said, "If you are the Son of God, tell these stones to become bread." Jesus answered, "It is written: 'Man does not live on bread alone, but on every word that comes from the mouth of God.' " Then the devil took him to the holy city and had him stand on the highest point of the temple. "If you are the Son of God," he said, "throw yourself down. For it is written: " 'He will command his angels concerning you, and they will lift you up in their hands, so that you will not strike your foot against a stone.' " Jesus answered him, "It is also written: 'Do not put the Lord your God to the test.' " Again, the devil took him to a very high mountain and showed him all the kingdoms of the world and their splendour. "All this I will give you," he said, "if you will bow down and worship me." Jesus said to him,

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"Away from me, Satan! For it is written: 'Worship the Lord your God, and serve him only.' " Then the devil left him, and angels came and attended him."

SALVATION FOR YOU TODAY

Let not your Heart be troubled – there is a way out

This book reveals last days scriptures pertaining to the end times and therefore can be distressing. The “NOW” i.e 20th and 21 Century end days up until mid-2022 and hopefully a little beyond but, also explaining what happened thousands of years ago and verse two and three of Genesis chapter 1 which has remained unexplained and generally unknown until recently.

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Due to the last days material and facts, thoughts and opinions expressed in this book are to **give you hope**. The hope has been stated at the beginning of the book, in order for you to know that there is **ONE** who saves and is **able to SAVE** and His

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name is Jesus and He died and rose again so that you may have Life Eternal and abundantly.

Matthew 24.3-8

3 As Jesus was sitting on the Mount of Olives, the disciples came to him privately. "Tell us, "they said, "when will this happen, and what will be the sign of your coming and of the end of the age?"

4 Jesus answered: "Watch out that no one deceives you.

5 For many will come in my name, claiming, 'I am the Christ,' and will deceive many.

6 You will hear of wars and rumours of wars, (*like the Ukraine-Russia situation in early 2022*) but see to it that you are not alarmed. Such things must happen, but the end is still to come.

Here we may have a link to Ezekiel 38 example

Ezekiel 38.3

3..... This is what the Sovereign LORD says: I am against you, O Gog, chief prince of Meshech and Tubal (*NATO, UK,EU USA and many others*).

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4 I will turn you around, put hooks in your jaws and bring you out with your whole army....

Putting various hooks in multiple nations jaws takes a long time and may involved some very unique situations.

7 Nation will rise against nation, and kingdom against kingdom. There will be famines and Earthquakes in various places. *(These are manmade famines – food shortages and Earthquakes).*

8 All these are the beginning of birth pains”.

John 3 – Jesus says how to get saved.

John 3.3-8

1 Now there was a man of the Pharisees named Nicodemus, a member of the Jewish ruling council.

2 He came to Jesus at night and said, "Rabbi, we know you are a teacher who has come from God. For no one could perform the miraculous signs you are doing if God were not with him."

3 In reply Jesus declared, "I tell you the truth, no one can see the kingdom of God unless he is born again. "

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4 "How can a man be born when he is old?" Nicodemus asked. "Surely he cannot enter a second time into his mother's womb to be born!"

5 Jesus answered, "I tell you the truth, no one can enter the kingdom of God unless he is born of water and the Spirit.

6 Flesh gives birth to flesh, but the Spirit gives birth to spirit.

7 You should not be surprised at my saying, 'You must be born again.'

8 The wind blows wherever it pleases. You hear its sound, but you cannot tell where it comes from or where it is going. So it is with everyone born of the Spirit."

Let me explain. Everyone who received the Holy Ghost in the past (since the day of Pentecost and until Jesus returns), that person of The Holy Spirit is by The Holy Spirit enabled to speak in tongues. That is where the wind blows you to hear the sound as the scripture says, where the Holy Spirit is accepted by a person into that person's life, they are evidence of that acceptance, and are enabled with the sign and gift of the Holy Spirit, to speak in the Holy Spirit – Speaking in Tongues. No

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speaking in Tongues means you have not received the Holy Spirit or Holy Faith as Jude 20 records.

Again:

Jude 17-21

17 But, dear friends, remember what the apostles of our Lord Jesus Christ foretold.

18 They said to you, “In the last times there will be scoffers who will follow their own ungodly desires.”

19 These are the men who divide you, who follow mere natural instincts and do not have the Spirit.

20 But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit.

21 Keep yourselves in God’s love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.

John 4.23-24 – Jesus states how God wants to be worshipped:

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23 Yet a time is coming and has now come when the true worshipers will worship the Father in spirit and truth, for they are the kind of worshipers the Father seeks.

24 God is spirit, and his worshipers must worship in spirit and in truth."

Let me explain further – God the Father actively wants you and everyone to worship Him in God the Holy Spirit – speaking in tongues which He gives you when you accept Jesus the Son and God the Holy Spirit into your life, **for these are the kind of worshipers the Father seeks.**

Acts 1.4-8

Jesus says wait to be baptised or immersed in the Holy Spirit

4 On one occasion, while he was eating with them, he gave them this command: "Do not leave Jerusalem, but wait for the gift my Father promised, which you have heard me speak about.

5 For John baptized with water, but in a few days you will be baptized with the Holy Spirit."

6 So when they met together, they asked him, "Lord, are you at this time going to restore the kingdom to Israel?"

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7 He said to them: "It is not for you to know the times or dates the Father has set by his own authority.

8 But you will receive power when the Holy Spirit comes on you; and you will be my witnesses in Jerusalem, and in all Judea and Samaria, and to the ends of the Earth."

Then we see the very first pouring out of the Holy Spirit on the day of Pentecost, just as Jesus had prophesied and promised in John 3.

Acts 2.1-4

120 people initially then 3000 on this day speak in tongues as they are enabled by the Holy Spirit.

1 When the day of Pentecost came, they were all together in one place.

2 Suddenly a sound like the blowing of a violent wind came from Heaven and filled the whole house where they were sitting.

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Then we see that the Holy Spirit was poured out on non-Jewish people, the Gentiles – you and me.

Acts 10.44-48 - Holy Spirit poured out on the Gentiles

44 While Peter was still speaking these words, the Holy Spirit came on all who heard the message.

45 The circumcised believers who had come with Peter were astonished that the gift of the Holy Spirit had been poured out even on the Gentiles.

46 For they heard them speaking in tongues and praising God.

47 Then Peter said, "Can anyone keep these people from being baptized with water? They have received the Holy Spirit just as we have."

48 So he ordered that they be baptized in the name of Jesus Christ. Then they asked Peter to stay with them for a few days.

How do we know they received the Holy Spirit back then and today? Verse 46 **“For they heard them speaking in tongues and praising God.”** There is NO other way to receive the Holy Spirit and NO other evidence of receiving The Holy Spirit except to hear someone speak in tongues.

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Acts 11.16 – Immersed in the Holy Spirit

16 Then I remembered what the Lord had said: 'John baptized with water, but you will be baptized with the Holy Spirit.'

Jude 20-21

Praying – building or immersing yourself in the Holy Spirit

20 But you, dear friends, build yourselves up in your most holy faith and pray in the Holy Spirit.

21 Keep yourselves in God's love as you wait for the mercy of our Lord Jesus Christ to bring you to eternal life.

To be clear, to be saved the way Jesus said it is best to be saved if you will, John 3, you must repent of your separation from God, be Baptized by being fully immersed in water and be Baptised fully immersed in the Holy Spirit. You will hear the Holy Spirit when you speak in tongues in prayer to God and as John 4:24 says – this is the way God the Father desires and wants you to worship Him.

Why? Why does God seek such worshippers?

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To speak to someone in a language or read or translate language, **primers of that language** are needed to enable the process.

The Miriam Learners dictionary explains a “primer” as following:¹¹⁰

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So to communicate efficiently, effectively with The Father a **primer is needed**.

God gives us His Primer – God the Holy Spirit.

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5 For John baptized with a water, but in a few days you will be baptized with the Holy Spirit.”

Acts 1.8

8 But you will receive power when the Holy Spirit comes on you;

Part of the power one receives when the Holy Spirit comes upon you is that you speak in tongues.

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4 All of them were filled with the Holy Spirit and began to speak in other tongues as the Spirit enabled them.

When you receive the Holy Spirit it is He who enables you to communicate in effectual Holy Faith prayer to The Father.

The Holy Spirit provides you with the primer to speak with The Father who is a Spirit. No primer and you do not know how to pray to The Father **as you ought to pray** or speak with Him.

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26 In the same way, the Spirit helps us in our weakness. We do not know what we ought to pray for, but the Spirit himself intercedes for us with groans that words cannot express.

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Without the primer, The person, The Holy Spirit you do **not** know how to express the right communication in the spirit.

What a wonderful gift and sign that God has given us, He enables us to speak with Him by God the Holy Spirit person who intercedes for us.

Jesus died so that we could have this wonderful gift from God the Father.

First God gave us Jesus the Son of God made flesh. Next He gives us the Holy Spirit to enable us to speak with Him as we know not how to pray in the spirit where God the Father dwells.

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know not how to pray in the spirit where God the Father dwells.

How kind, thoughtful and loving is our God!

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In summary to be saved the way Jesus said you must do, know the following:

- Repent
- Be Baptised by full immersion
- Be baptised by the Holy Spirit – voice evidence (speaking in Tongues) of this baptism
- To stay saved pray without ceasing, praying in the Holy Spirit – Speaking in Tongues. Follow Him and you will receive the gift of Eternal Life.

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Notes:

APPENDIX

APPENDIX ONE

**ENZYMATIC CONVERSION OF CARBON
DIOXIDE TO METHANOL BY
DEHYDROGENASES ENCAPSULATED IN SOL-
GEL MATRIX**

WEATHER AS A FORCE MULTIPLIER

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ENZYMATIC CONVERSION OF CARBON DIOXIDE TO METHANOL BY DEHYDROGENASES ENCAPSULATED IN SOL-GEL MATRIX Zhongyi JIANG , Hong WU , Songwei XU , Shufang HUANG State Key Lab. of C1 Chemistry and Chemical Technology, School of Chemical Engineering and Technology, Tianjin University, Tianjin 300072, China Introduction Due to the abundance of CO₂ as the major greenhouse and the most oxidized form of carbon, the efficient utilization of CO₂ has aroused much interest from fundamental research to application application. Herein, we report a novel and promising approach to convert carbon dioxide into methanol through consecutive reduction catalyzed by three different dehydrogenases. The whole process consists of three steps: reduction of CO₂ to formate catalyzed by formate dehydrogenase (FateDH), reduction of formate to formaldehyde by formaldehyde dehydrogenase (FaldDH), and reduction of formaldehyde to methanol by alcohol dehydrogenase (ADH). Reduced nicotinamide adenine dinucleotide (NADH) acts as a terminal electron donor for each dehydrogenase-catalyzed reduction. It is now well established that a wide variety of enzymes retain their characteristic reactivities and chemical functions when they are confined within the pores of the silica sol-gel derived matrix. The porosity of sol-gel glasses allows small molecules and ions to diffuse into the matrix while the enzymes remain physically trapped in the pores, and thus resulting in an enhanced probability of reaction due to an increase in local concentration of substrates within the nanopores. Our experiments demonstrated that when the above-mentioned three enzymes are encapsulated in the silica sol-gel matrix, the yield of methanol is considerably increased as compared to that in solution phase. Experimental The reaction was studied in the solution phase by using an enzyme stock solution that was comprised of 7mg/mL of FateDH, 2mg/mL of FaldDH, 2mg/mL of ADH dissolved in 0.1M phosphate buffer at pH7. Add 1.0 mL of the enzyme stock solution to 1.0 mL of NADH solution in a polystyrene cuvette such that the final concentration of NADH varied from 0.025 to 0.1M . The cuvette was covered with Parafilm to prevent the evaporation loss of methanol produced, and CO₂ was then bubbled through the solution for 8 h to ensure that the reaction equilibrium was established. The concentration of methanol was determined by gas chromatography. A calibration curve was established for methanol aqueous solutions with known concentration of methanol ranging from 0.001 to 0.005M . To evaluate the concentration of methanol produced as a result of the enzyme-catalyzed reaction. 1.0μL of the final reaction solution was used for GC measurements. The concentration of methanol was calculated by using peak areas for the characteristic methanol band in the chromatogram. The sol-gel encapsulated samples were prepared as follows: Tetraethoxysilane (TEOS) was used as precursor for making the silica sol-gel. The initial sol was prepared by mixing 2.60g of TEOS , 1.10g of 3%(v/v) of HCl solution . The mixture was then vigorously mixed for 10 min to form sol. The gel were prepared by adding 1.0 mL of the stock enzyme solution to 1.0mL of the sol in a polystyrene cuvette. Typical gelation

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times are on the order of 10-30s. The cuvette was then covered with Parafilm and gel was allowed to age at 4°C for 24 h. The aged gel was then put into a dialysis membrane using 250 mL of 0.1M phosphate buffer at pH7 as dialysis solution, and placed in refrigerator at 4°C with frequent change of 0.1M phosphate buffer at pH7. The dialysis lasted 24-48 h to completely remove ethanol generated in the sol-gel process. 0.1 mL of NADH solution diffused into the gel by dialysis in the similar manner (the final concentration of NADH varied from 0.025 to 0.1M), the sample containing the gel and the NADH solution was left undisturbed for 48h. To this mixture, CO₂ was then bubbled for 8h for production of methanol. The concentration of methanol produced was determined using GC by taking a 1.0μL aliquot of the solution. Results and Discussion Table 1 shows the preliminary methanol yields in solution and sol-gel matrix. The overall yield of the reaction in solution is near to 100%. In sol-gels, the production yield of methanol is substantially decreased due to the distribution effect, stereo hindrance, diffusion resistance. Table 1 Representative methanol yields in solution and sol-gel matrix

Reaction Temperature °C	NADH (μmol)	Methanol yield (%)
25	100	98.0
37	100	100
Solution	37	150
94.8	25	100
30.0	37	100
91.9	Solution	37
150	42.2	It is also found that all four species (i.e. FateDH, Fald DH, ADH,NADH) must be present to generate methanol. The introduction of chemical modification to the enzymes and the creation of mesoporous structure of gel by biomimetic synthesis is under investigation. To sum up, the feasibility of enzymatic conversion of carbon dioxide to methanol is tentatively explored. The consecutive reduction of carbon dioxide by three different dehydrogenases encapsulated in sol-gel matrix results in enhanced yields for generation of methanol. This will open up a new avenue not only for on-site production of methanol from cheap raw material but also for efficient fixation of the greenhouse carbon dioxide. Acknowledgment This work was supported by the National Natural Science Foundation of China, under the contract 20176039

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Weather as a force multiplier Weather as a Force Multiplier: Owning the Weather in 2025

Miscellaneous Citation | Accession Number: ADA333462 | [Open PDF](#)

Abstract:

In 2025, US aerospace forces can own the weather by capitalizing on emerging technologies and focusing development of those technologies to war fighting applications. Such a capability offers the war fighter tools to shape the battlespace in ways never before possible. It provides opportunities to impact operations across the full spectrum of conflict and is pertinent to all possible futures. The purpose of this paper is to outline a strategy for the use of a future weather modification system to achieve military objectives rather than to provide a detailed technical road map. A high risk, high reward endeavor, weather modification offers a dilemma not unlike the splitting of the atom. While some segments of society will always be reluctant to examine controversial issues such as weather modification, the tremendous military capabilities that could result from this field are ignored at our own peril. From enhancing friendly operations or disrupting those of the enemy via small scale tailoring of natural weather patterns to complete dominance of global communications and counterspace control, weather modification offers the war fighter a wide range of possible options to defeat or coerce an adversary. Some of the potential capabilities a weather modification system could provide to a war fighting commander in chief CINC are listed in table 1. Technology advancements in five major areas are necessary for an integrated weather modification capability 1 advanced nonlinear

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modeling techniques, 2 computational capability, 3 information gathering and transmission, 4 a global sensor array, and 5 weather intervention techniques. Some intervention tools exist today and others may be developed and refined in the future.

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Author(s):

House, Tamzy J.; Near, James B., Jr.; Shields, William B.; Celentano, Ronald J.; Husband, David M.

Author Organization(s):

AIR WAR COLL MAXWELL AFB AL

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The balance of this report is on our website www.trumpetdisasters.net

APPENDIX TWO -

**CHARTING THE FUTURE OF EARTH
OBSERVATION: TECHNOLOGY INNOVATION
FOR CLIMATE INTELLIGENCE**

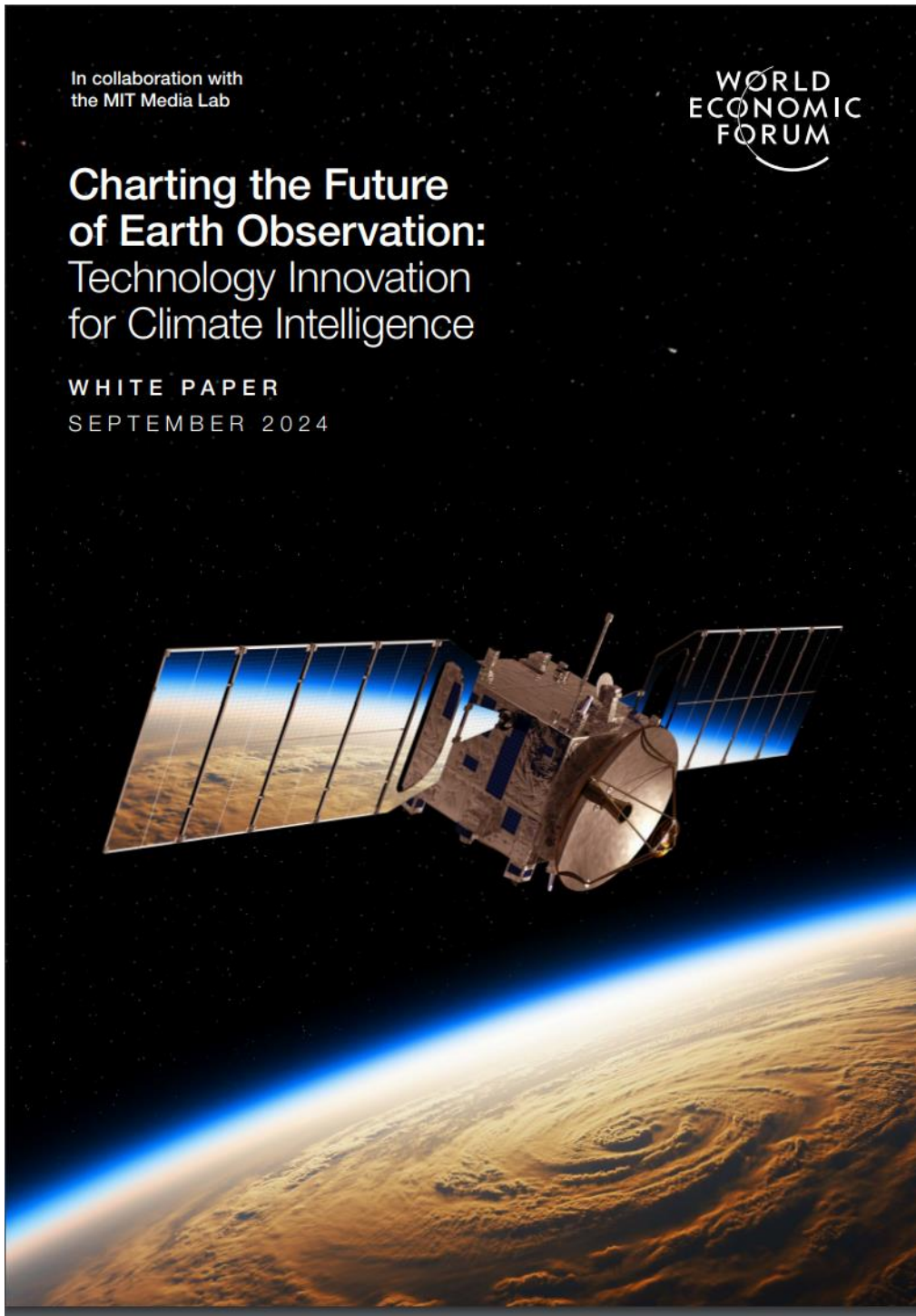
And the band played “believe this if you like”!

Link to book is here

https://www3.weforum.org/docs/WEF_Charting_the_Future_of_Earth_Observation_2024.pdf

The book is reprinted below for your convenience.

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Images: Getty Images

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September 2024

Charting the Future of Earth Observation:
Technology Innovation for Climate Intelligence

Foreword



Sebastian Buckup
Head, Network and
Partnerships; Member,
Executive Committee,
World Economic Forum



Dava Newman
Director, MIT Media Lab;
Apollo Program Professor
of Astronautics, MIT

With escalating temperatures, increasingly severe weather events and unprecedented levels of greenhouse gas emissions, the world stands at a crossroads. Scientific consensus underscores that immediate measures are essential to mitigate the most catastrophic impacts of climate change. In this new paradigm, Earth observation (EO) technology and innovation are championing a new era for climate intelligence, offering unprecedented insights and solutions to address these urgent challenges. Recent EO innovations, combined with the growth of synergistic technologies (technologies that enhance each other's effectiveness), are eliminating barriers to the effective use of EO at scale. Today's transformational technologies, including advanced satellite sensors, algorithms and artificial intelligence (AI), are proving to be the "enablers" we need, broadening our understanding of our changing environment. At the same time, the launch of additional EO satellites from many nations – and an increasing number of private sector EO data providers – has widened access to images and

observable measurements from satellites with the highest revisit times (satellites that visit certain geographic regions more frequently). In turn, this provides more detailed remotely sensed data relating to various elements of climate change.

This white paper, written in collaboration with the Massachusetts Institute of Technology (MIT) Media Lab, highlights the transformative potential of EO for climate intelligence and forecasting. By combining the research capabilities of the MIT Media Lab with the global platform of the World Economic Forum, the paper identifies technology pipelines accelerating the processing and analysis of satellite EO data to provide unparalleled insights into climate change. The paper also highlights the need for accessible and inclusive climate insights, especially for communities most vulnerable to the effects of climate change. We hope this publication will serve as a valuable resource on technology pipelines in EO to address the pressing challenges of climate change.

Executive summary

Earth observation technologies and advanced data processing are revolutionizing climate intelligence, offering unprecedented insights for proactive action.

Systemic challenges have historically prevented EO data from being fully integrated into climate solutions, primarily due to its large volume and complexity. Rapid technological advancements in satellite and sensor technologies are addressing these systematic issues alongside new and open artificial intelligence (AI) algorithms, machine learning (ML) techniques and advanced data visualization platforms. These synergistic technologies have allowed the processing of an immense volume of data in almost real time, transforming raw satellite imagery into actionable climate insights in minutes. These advancements are driven by:

More insightful data than ever before:

Recent advancements in satellite EO sensors drive improved global coverage, resolution, accuracy and a wider array of observable measurements. This enables monitoring of larger swaths of land and more frequent revisit rates. These advancements assist the detection and analysis of climate-related events in regions that were traditionally hard to map in detail.

Unprecedented data processing speeds:

Sophisticated AI and ML algorithms enable more detailed climate impact assessments (such as those used in post-disaster management) in hours or minutes. This task can take weeks when using traditional models or on-site inspections. Climate ML-based models trained on existing data can produce the same predictions at approximately 1,000 times the speed of traditional models. These improvements in data processing speeds enable timely decision-making, which is particularly relevant in situations requiring real or near-real-time insights, such as rapidly changing weather conditions.

Evolution of large and small EO satellites: EO satellite systems have advanced on two opposite fronts. The rise of small satellites and miniaturization of EO sensor technology have enabled more

nations and small- and medium-sized enterprises (SMEs) to launch their own satellites, increasing the volume of publicly available EO data. At the same time, there is an increase in the development of larger, more sophisticated satellite platforms. These platforms can host larger sensor instruments and power facilities to meet the growing demand for reliable and continuous EO data transmission.

Higher resolution climate forecasting: Climate ML-based models and foundation models are increasing the resolution of climate and weather forecast models twelvefold. These enhanced weather predictions help communities and policy-makers plan targeted mitigation and adaptation strategies to improve climate resilience.

Contextual data for end-user needs: Data immersion through augmented reality (AR) and virtual reality (VR) are transforming complex EO datasets into interactive models that help users understand the data and intuitive visual insights that improve decision-making. Digital twins use advanced analytics, ML and AI to analyse data from multiple sources and simulate complex "what if" scenarios. These intuitive technologies allow users to explore and interpret climate data more effectively in a way customized to their needs.

Key next steps include:

- Expanding EO data access for climate-vulnerable communities
- Investing in technology pipelines to drive further innovation in EO-derived climate insights
- Integrating EO data into decision-support systems and climate policies to enable informed, actionable and accountable climate strategies.
- Enabling cross-sector collaboration

Introduction

Integrating complementary technologies with satellite EO converts complex data into actionable climate insights.

By 2032, satellite EO is expected to generate over 2 exabytes of data cumulatively.

Since 1980, the US has experienced 391 weather disasters causing damages of over \$2.755 trillion,¹ including severe storms, hurricanes, floods and wildfires. The World Meteorological Organization (WMO) estimates the global socioeconomic benefits of weather forecasting at no less than \$158 billion per year.²

Earth observation (EO) is critical to monitoring and responding to these climate challenges. It involves the collection of data on Earth's physical, chemical, biological and human systems using remote-sensing and in-situ data methods from an array of sensors and sources. Remote-sensing data is acquired via platforms such as satellites, piloted aircraft, high-altitude platform stations (HAPS) and drones. Conversely, in-situ data is gathered through GPS-enabled devices, the internet of things (IoT) sensors, and a range of various human-operated or automated measurements. While other remote sensing technologies (such as drones and HAPs) are valuable, over 50% of the essential climate variables (ECVs), can only be measured effectively from space. Therefore, satellite EO offers unparalleled advantages in terms of global coverage, scalability, longevity, and continuous and regular monitoring.

Climate intelligence refers to the gathering, analysis and application of historical, current and predictive data about Earth's systems to manage and mitigate climate risks. Next-generation technology pipelines in satellite EO technology, in combination with synergistic technologies such as artificial intelligence (AI), machine learning (ML) and deep learning (DL), are laying the foundation for transforming large datasets into actionable climate insights. By democratizing access to critical climate data, these technologies promote informed decision-making from governments, the private sector and civil society organizations. Such access is pivotal to addressing climate change both nationally and globally, preparing for a future where the full potential of EO data can be harnessed for climate intelligence.

By 2032, satellite EO is expected to generate up to 2 exabytes (2 billion gigabytes) of data cumulatively, accounting for approximately 86% of the total data produced by the space application segment for the forecast period.³ However, the full potential of satellite EO data in managing climate impacts remains underutilized. This is partially due to the inherent complexity of large satellite EO datasets that require extensive processing and analysis to convert data into actionable climate insights, as well as experts and others requiring ongoing technical training. This complexity can limit its accessibility and timeliness, reducing the effectiveness of climate and disaster response applications.

Advancements in technology within the space industry, such as improved sensors and satellite edge computing, are enhancing EO with higher spatial and temporal resolution as well as on-board processing capabilities for near-real-time climate-related disaster insights. Trends in EO satellites are evolving in two distinct ways: firstly, new entrants are increasingly launching smaller satellites with EO capabilities. This is due to decreasing launch costs that lower the threshold to entry for many nations with emerging space capabilities and small- and medium-sized enterprises (SMEs). Secondly, there is a trend towards developing larger satellites with advanced and sophisticated EO sensors.

In parallel, the development of synergistic technologies is also laying the ground for advanced data processing, analysis, visualization and communication of climate insights. The increased integration of AI with these technologies is enhancing data processing capabilities at a previously unattainable pace and scale. The expanded development of digital twins for generating and testing various climate scenarios, immersive AR/VR data-decision platforms and data cubes allows users to contextualize and tailor EO data based on their specific needs and requests. In addition, the ability to fuse satellite EO and in-situ data through these platforms helps support global to local-level preparedness and response efforts.

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1 Bytes to insights

Revolutionizing real-time climate intelligence for disaster response and management with advanced EO technologies.

Real-time data tools that track climate-related events can monitor changes in weather conditions and help predict a disaster's path. In a disaster response situation, where accurate and fast data analysis is crucial for timely decision-making,

EO data decreases in value as it ages. However, emerging technology innovations are driving new opportunities to provide EO-enabled near-real-time climate-related disaster insights.

1.1 Enhanced resolution and diversification in sensing capabilities

Satellites with high-resolution and diverse sensing capabilities are more capable of accurately detecting and monitoring climate-related disasters. For example, in wildfire scenarios, being able to detect new fires and hot spots with satellites every few hours (or less) at a high resolution greatly enhances disaster response and provides better operational guidance to first responders.

Technology pipeline: New developments in satellite EO sensor technology

Driven by the rapidly expanding market opportunity and increasing number of potential customers and applications, the potential economic value of EO is expected to exceed \$700 billion by 2030.⁴ This increasing demand for data has driven advancements in satellite technology (e.g. increasing temporal, spatial and spectral resolution of EO satellite sensors), allowing for better monitoring and analysis of environmental changes, as well as the detection and recording of disasters such as wildfires, floods and droughts.

In 2024, satellite start-up Albedo raised a total of \$97 million in early investments (series A-1 funding) to build and launch its first fleet of 24 high-resolution

Earth imaging satellites into very low Earth orbit. The company intends to offer high-resolution electro-optical satellite imagery (10cm) and thermal imagery (2 metres). This means that each pixel in the electro-optical imagery represents an area of 10x10 cm on the ground, providing a level of detail previously only available from aeroplanes or classified reconnaissance satellites.⁵ South Africa and Belgium-based EO optical imaging solution company Simera Sense raised \$15 million in 2024 to accelerate the development of higher resolution and advanced short-wave infrared camera products to match the rising demand from EO satellite manufacturers.⁶

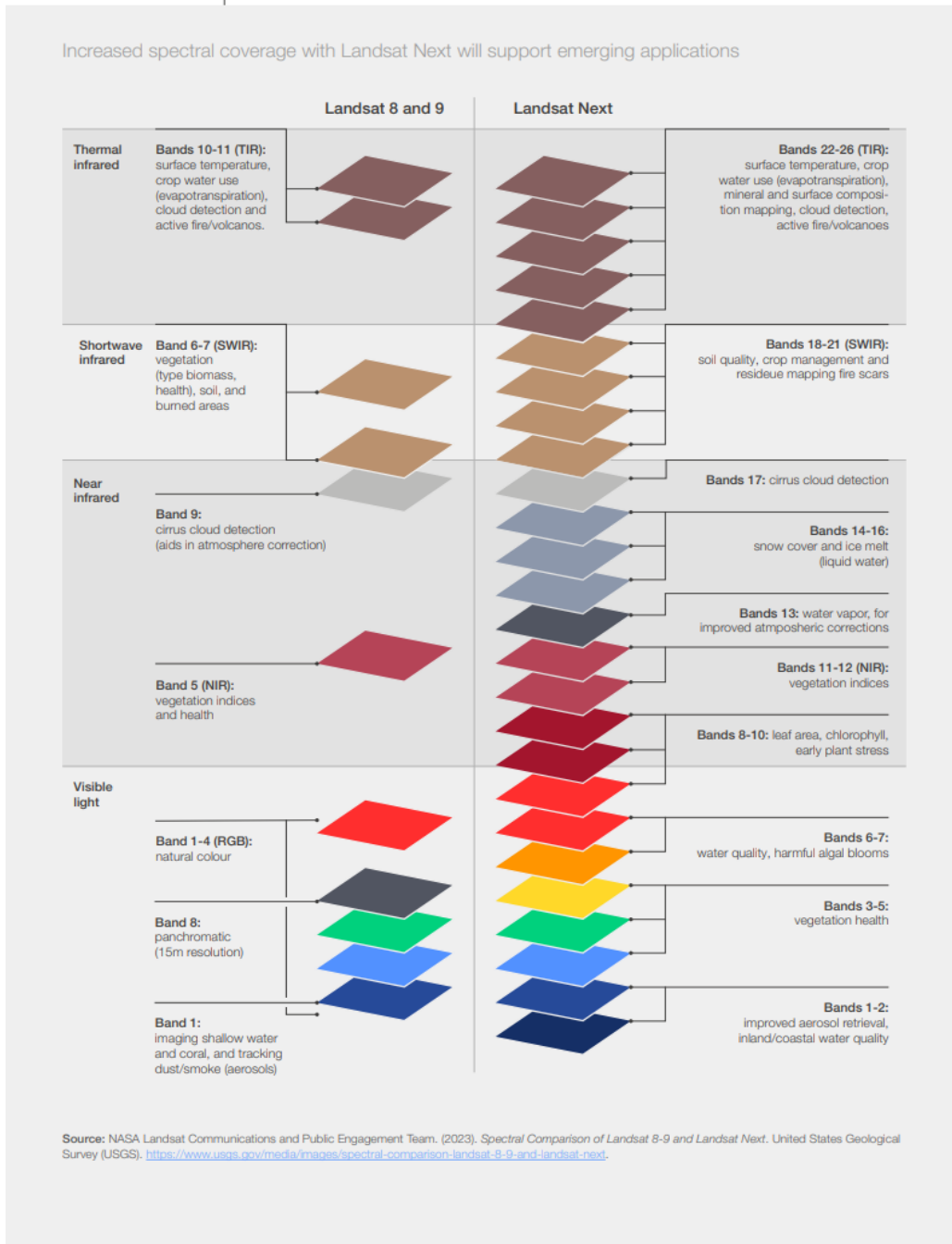
Building on the success of the Landsat program, NASA is also expanding its array of sensors for EO satellites. The Landsat Next mission, slated for launch in 2030, is designed to collect all 26 "superspectral" bands, compared to the 11 "multispectral" bands of previous Landsat missions. Multispectral satellite imagery typically captures 4-12 bands of the electromagnetic spectrum ranging from visible to non-visible light. Superspectral imagery will capture even more bands, enabling more detailed and refined data. LandsatNext's superspectral bands will produce 2-3 times the temporal, spatial and spectral resolution.⁷



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FIGURE 1 | Spectral comparisons between Landsat 8/9 and Landsat Next



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Integrating AI and edge computing into EO platforms is revolutionizing data processing and analysis.

Muon Space, a start-up developing small satellites to monitor Earth's climate, announced a partnership with the non-profit Earth-Fire Alliance to build a constellation of 50 satellites focused on wildfire prevention and monitoring. The first phase of the three satellites will be launched in 2026 and is equipped with six-band multispectral infrared instruments that provide high-fidelity data to detect fires faster than on-the-ground observations. The multispectral infrared instruments will differentiate genuine wildfire events from false positives and enhance wildfire detection and assessment of fire intensity. FireSat will operate in low Earth orbit with an observation swath of 1,500 kilometres and an average ground sample size of 80 metres. This will allow it to detect fire ignition sites as small as 25 metres squared (m²) with a revisit time of

20 minutes. This can significantly improve initial response and monitoring, especially in remote areas. For comparison, NASA's Fire Information for Resource Management System (FIRMS) uses satellite observations from the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Visible Infrared Imaging Radiometer Suite (VIIRS) instruments to detect active fires and thermal anomalies. MODIS typically detects both flaming and smouldering fires of 1,000m² in size. In very good conditions, high-quality observations can detect fires one-tenth of this size (100m²), and under optimal and extremely rare conditions, even smaller fires of 50m² can be detected.⁸ FireSat provides a 100% improvement over MODIS under optimal conditions and up to 300% in good conditions.

1.2 Reduced EO data processing time to enable near-real-time climate response

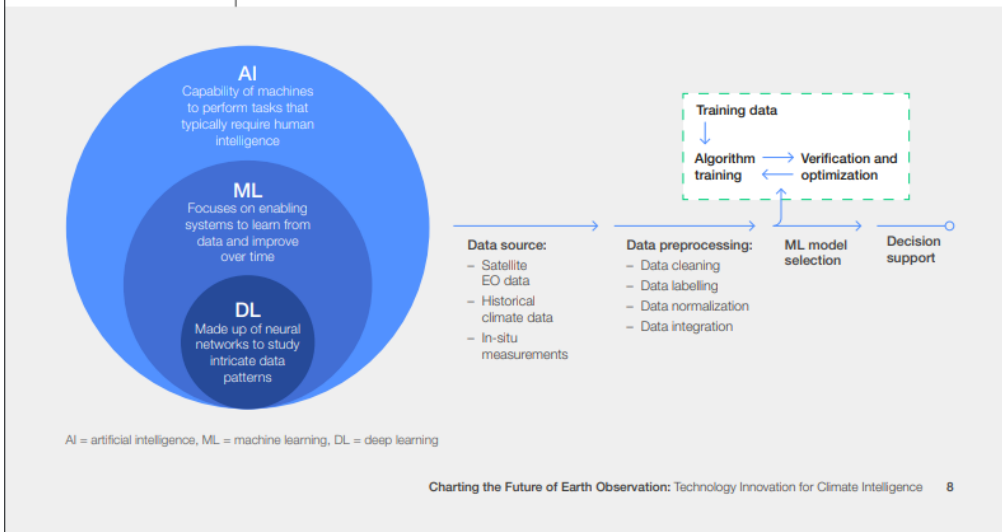
With increasing global demand for timely climate intelligence, the time between data acquisition and actionable insights needs to be significantly reduced. Integrating AI and edge computing into EO platforms is revolutionizing data processing and analysis. These advances greatly increase computational efficiency and enable real-time analysis to improve the speed and accuracy of climate-related decision-making.

Technology pipeline: AI, machine learning and deep learning models

The increased availability and complexity of high-resolution EO data has called for the use

of advanced AI, ML and DL. In the context of satellite EO data, AI executes the broad analysis of data, while ML, a subset of AI, focuses on the recognition of patterns and anomalies within large EO datasets. A further subset is DL, which facilitates the extraction of detailed features from high-resolution satellite imagery. These algorithms can process large amounts of complex EO data in almost real time, resulting in less time between data collection and the generation of insights. By improving computational efficiency, ML technologies overcome several limitations of traditional data processing methods.

FIGURE 2 Data processing framework – using AI to transform EO data into actionable climate insights



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In post-disaster events, where there is an urgent need to accelerate damage assessments, high-resolution EO data and ML models use "semantic segmentation" to categorize each pixel of a satellite image, not unlike object recognition.⁹ This allows detailed and accurate damage assessments that once took weeks to be completed in hours or minutes. Traditionally, geospatial damage assessments take 30 seconds per structure, which means evaluating 4.1 million structures after a disaster like Hurricane Ian would take one person 16 years. In the case of Hurricane Ian, ML algorithms were used, resulting in rapid evaluation

and \$80 million in expedited assistance for disaster survivors.¹⁰ Recently, for example, Microsoft partnered with Planet to use AI models and satellite EO imagery to assess the extent of damage from Hurricane Beryl in Carriacou, Grenada. Microsoft trained a change detection model that analysed both pre- and post-event EO imagery and intersected this data with building footprint layers from an incomplete OpenStreetMap dataset. While the analysis only covered a portion of the affected area, this approach allowed the model to quickly identify 888 damaged buildings out of 1,937 in the area analysed.

FIGURE 3 Post-disaster building assessment in response to Hurricane Beryl in Carriacou, Grenada



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Technology pipeline: In-orbit data processing with satellite edge computing

In-orbit data processing represents a significant advancement in the management and use of EO data. Satellite edge computing processes EO data directly onboard the satellite, integrating advanced computational capabilities. Edge computing can also facilitate spike-based processing, whereby the satellite processes and downlinks data only when its sensors detect a change in the surrounding environment. This helps in extracting higher performance on low power and storage, increasing the per orbit efficiency by smart capture, processing and dissemination. By shifting data processing from ground stations to the satellites themselves, this approach greatly reduces latency and the need for data download.

SkyServe, an Indian space technology start-up focused on onboard AI and edge computing for satellites, recently demonstrated the delivery of real-time insights using optical imagery on their [Mission Matterhorn](#). The SkyServe STORM system was successfully deployed in orbit aboard D-Orbit's

ION Satellite Carrier, a fleet of orbital transfer vehicles. Using D-Orbit's live EO data feed, on-board computer and data distribution resources, the STORM satellite edge computing system showcased its ability to process live images using DL models for real-time vegetation classification. This demonstration is crucial for disaster response as it significantly enhances the efficiency and speed of data processing, allowing faster transmission of vital information to emergency responders.

SkyServe is further scaling the solution for multi-sensor fusion of multispectral and hyperspectral data from space by partnering with Loft Orbital. SkyServe's Mission Denali will install the SkyServe STORM platform on the YAM-6 spacecraft, Loft Orbital's first spacecraft capable of performing "virtual missions". By decoupling the concepts of "satellites" (a platform with payload hardware) and "missions" (an objective executed by the payload), the SkyServe STORM platform aims to scale the practical application of in-space data processing by executing geospatial AI models on a whole host of satellites.

FIGURE 4 Demonstration of satellite edge computing with EO data



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1.3 Parallel evolution of small and large EO satellites

EO satellites have evolved on two fronts: the miniaturization of sensor capabilities and the development of larger, more sophisticated satellite platforms. Miniaturized sensors, as well as reduced manufacturing and launch costs, have enabled more nations to manufacture and launch their own EO satellites and increase publicly available EO data. This revolution democratizes access to timely, high-quality climate insights for a range of stakeholders – from individuals to local decision-makers and non-governmental organizations (NGOs) – where they previously might have been unattainable due to costs or technical constraints.

Conversely, the rise of larger satellites highlights a trend towards greater reliability and capability of EO satellites to host advanced sensors, data processing power and power facilities for continuous data transmission. These larger platforms can house instruments such as multispectral and hyperspectral imaging, synthetic aperture radar (SAR) and advanced radiometers.

Technology pipeline: Miniaturization of EO sensors

The proliferation of small EO satellites and progress in the field of material science has spurred the development of EO sensors that are not only compact and lightweight but also possess enhanced capabilities to perform complex observations compared to their predecessors. Advancements in microelectronics and semiconductor technologies have integrated greater processing power into smaller chips, facilitating data analysis on the sensor hardware itself. Advancements in 3D printing manufacturing methods have enabled the fabrication of miniaturized sensors at a lower cost. The miniaturization of sensors could create opportunities for high-altitude platform stations (HAPS) offering consistent monitoring over specific areas.

Optical monitoring is already possible with HAPS, but advancements in SAR and other sensors, such as thermal infrared remote sensing, could be revolutionary for monitoring disasters such as wildfires.

WildFireSat, the Canadian Space Agency's (CSA) wildfire monitoring satellite mission, uses a new type of infrared sensor based on 10 years of development of microbolometer technology.¹¹ With the ability to function at room temperature, these infrared sensors represent a major advancement over previous large-scale and resource-hungry sensors that required cooling to extremely low temperatures. Without the reliance on heavy equipment and high energy demands, sensors continue to become smaller and more efficient. This is particularly relevant for developing nations or SMEs who are looking to operate their own EO satellite at low costs.

Technology pipeline: Embracing larger satellite designs for advanced capabilities

The addition of larger EO satellites is a new trend for many EO satellite operators, who have been focused on small satellites over the past decade. This change is partly driven by anticipated reductions in launch costs for heavier payloads, facilitated by new launchers entering the market. As a result, priorities are shifting from satellite mass to capacity, performance, operational lifetime and the need for robust, high-performing and continuous EO solutions. For example, companies like Planet and Capella Space are adding to their fleet of EO satellites with significantly larger satellite bus designs. While Planet continues to provide near-daily, 3-metre monitoring via the Dove constellation, it is also expanding its offerings to larger satellite designs, such as the Pelican and Tanager systems, weighing between 100 to 200 kilograms.

BOX 1 New radio frequencies allocated

Governments and regulators have previously taken measures to ensure the availability of Earth Exploration Satellite Service (EESS) passive bands for crucial weather prediction activities and improved imaging activities. Recently, member states of the International Telecommunication Union (ITU) allocated additional radio spectrum for climate monitoring, weather prediction, and other scientific and satellite missions. However, the World Radiocommunication Conference (WRC) 2023 was only a partial success for EO activities. While it provided more spectrum for passive EESS, enabling advanced measurements of ice clouds for better

weather forecasting and climate monitoring, it also identified critical frequencies for the measurement of sea-surface temperature (SST) to mobile phone networks (i.e. 5G). This forced the EO community to study the feasibility of SST in other frequency bands. The upcoming ITU WRC in 2027 will consider the introduction of new mobile phone networks, such as 6G, in the X band. The X band operates in the 8-12 gigahertz range and is the primary spectrum for downlinking satellite EO data. If allocated to 6G, the X band could restrict EO ground stations to remote areas, thereby reducing the resilience of the EO sector and the reliability of data transmission.

2 New era in climate forecasting for adaptation and resilience

Accurate weather and climate predictions strengthen community preparedness for future climate challenges.

🔗 An ML-based model trained on existing data can produce the same estimates approximately 1,000 times faster than traditional models.

Satellite EO data, combined with evolving synergistic technologies, offers valuable insights for forecasting future climate scenarios and their global and local impacts. While AI and ML have been in development for over 25 years, their advancements have only accelerated in the last decade, making AI and ML applications increasingly competitive with traditional numerical methods. Systemic data-driven and digital technologies provide critical insights to enable climate adaptation and build resilience in communities and businesses.¹² Looking ahead, several key trends are set to transform weather and climate forecasting even more in the years to come. The move from artisanal to industrial-grade data science will make it easier and more efficient than ever for climate scientists to build and deploy large-scale AI models.¹³ This will allow AI models to enhance the scalability and efficiency of climate predictions. The rise of customized AI models will allow for more tailored and precise forecasting solutions, addressing the requirements of specific regions and sectors. In addition, the integration of multimodal capabilities, like those seen in the most recent generative AI models, will enable the concurrent processing and analysis of diverse data types,¹⁴ improving the quality and reliability of climate models.

Technology pipeline: Climate ML-based models

Climate ML-based models use ML to process and learn from large datasets derived from traditional physics-based models to rapidly assess the uncertainties and risks of climate extremes. These models mimic physical processes by identifying statistical patterns in model inputs and outputs. Once trained, the ML-based models substitute

specific parts of traditional models to reduce the computational demand while maintaining the model's accuracy. Traditional Earth system models are computationally intensive and can be unfeasible for localized studies due to the need to process petabyte-scale datasets. Climate models that integrate physics-informed ML can overcome these challenges, using multiscale ML-based operators to deliver accurate and fast predictions. For example, traditional weather models allocate 30-80% of their computation time to estimating the movement of solar energy through the atmosphere. An ML-based model trained on existing data can produce the same estimates approximately 1,000 times faster than traditional models.

DL has emerged as an innovative approach to climate emulations due to its ability to process large datasets and improved emulation of weather forecasts at high spatiotemporal resolutions and low computational costs. Recent developments in generative adversarial networks (GANs) and diffusion models have created photorealistic imagery of faces, animals, satellite views and street-level flood scenes. However, climate disaster planners and responders need more than photorealistic images; they also need physically reliable information.¹⁵ The Climate Pocket is an innovative climate education simulation that harnesses fast ML-based climate models to illustrate the localized flood impacts of global climate policy decisions. It integrates physics-informed ML and EO data with physics-based models to provide reliable, physics-consistent predictions. The tool combines GANs with climate science models to produce photorealistic, synthetic and localized climate estimates for any location on Earth for the next 70 years.

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FIGURE 5 Photorealistic visualization of AI-generated flood risk



Technology pipeline: Geospatial AI foundational models

Foundation models can use ML to process and analyse large amounts of satellite EO data, which allows them to capture complex patterns within the climate system. These models develop a comprehensive understanding of atmospheric dynamics by learning from diverse datasets, enabling them to perform a wide range of tasks with accuracy and efficiency. They enable localized studies that would be infeasible through traditional Earth system models and could significantly reduce computational demands while maintaining precision.

Developed by a team of researchers at Microsoft, Aurora is a cutting-edge AI foundational model that can forecast global levels of six key air pollutants – carbon monoxide, nitrogen oxide, nitrogen dioxide, sulphur dioxide, ozone and particulate matter – in under a minute. These predictions extend up to five days and are achieved at a significantly lower computational cost compared to traditional models. By using large EO datasets to develop general-purpose representations, Aurora is set to generate high-resolution weather forecasts for up to ten days, surpassing both traditional simulation tools and specialized DL models. According to its developers, Aurora is about 5,000 times faster than state-of-the-art numerical integrated forecasting systems.¹⁶

As an example of a public-private partnership (PPP), NASA and International Business Machines (IBM) Research have developed the Prithvi-weather-climate model, an AI foundation model aimed at applications for shorter-term weather and longer-range climate forecasts. The geospatial foundational model, developed with NASA satellite data, will be publicly available on the AI platform Hugging Face. It will be among the largest models uploaded to Hugging Face while being one of the first open-source ML models built in partnership and collaboration with NASA. Trained using Harmonized Landsat Sentinel-2

(HLS) satellite data, the model was originally built for flood and burn scar mapping. However, it can also track deforestation, predict crop yields and monitor greenhouse gases. The MERRA-2 dataset, known for integrating space-based aerosol observations, provided the training foundation for the model, which has since been fine-tuned to enhance climate model resolution twelvefold.¹⁷ The model employs downscaling techniques to generate high-resolution outputs from coarse data at low computational costs.

Climate ML-based models and geospatial AI foundation models – what, why and how do they relate?

Climate ML-based and foundation models serve distinct but complementary roles in climate forecasting, harnessing ML capabilities to address different aspects of climate data processing. Climate ML-based models approximate specific selected physical processes within traditional climate models by identifying and using the statistical patterns in large datasets. They are effective for local studies and quick, high-resolution predictions at low computational costs. They are most useful for applications that need to iterate quickly and often, such as forecasting localized extreme weather.

At the other end of the spectrum, geospatial AI foundational models are designed to detect high-level patterns from large amounts of satellite EO data. These models are trained on many different datasets in a self-supervised way, learning patterns from data without labels, enabling the models to understand atmospheric dynamics. geospatial AI models perform well across a wide range of applications and are suitable for both global and local scales, providing high-resolution views of climate events. They can create highly accurate models of global patterns while remaining computationally efficient by incorporating advanced ML methods to process and normalize data.

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TABLE 1 | Enhancing data visualization and decision-making – ML-based vs geospatial AI models

	ML-based models	Geospatial AI foundational models
What are the primary applications and what type of outputs do they generate?	Uses classification, regression and clustering techniques to make localized predictions, scenario analysis and risk assessments	Produces global predictions, multiscale models and general-purpose representations
How do they enhance data visualization and decision-making?	Heatmaps, 3D models and dashboards	Interactive maps, simulation tools and AR/VR experiences

🔗 Digital twins use advanced analytics, ML and AI to analyse data from multiple sources, predict environmental changes and simulate complex “what if” scenarios.

The use of EO data in ML-based and foundational models can decrease the build time of a flood map by as much as 80%,¹⁸ helping to convert data into more precise predictions of floods. EO data was proven to increase the accuracy of predicting flood susceptibility by up to 20%,¹⁹ and using EO data with ML algorithms has led to a near-100 times larger dataset when modelling storms and hurricanes compared to traditional methods.²⁰

In flood forecasting, these models could help city planners recognize flood-prone areas and prioritize the deployment of temporary designs like sandbags and other immediate flood defences. Longer-term measures, such as improved evacuation strategies, may simultaneously be implemented.

In the case of flash flooding, a 12-hour lead time can potentially reduce damage by up to 60%. In comparison, just a one-hour advance lead time can reduce damage by 20%.^{21,22} Better flood vulnerability maps facilitate preventative action that can reduce the cost of a major flood. Annual investments in flood defences of \$50 billion for coastal cities could cut expected losses in 2050 from up to \$1 trillion a year to \$60-63 billion,²³ with a further \$12-71 billion required by 2100 to address sea-level rise.²⁴ AI-driven, detailed flood mapping and accurate forecasting can help direct resources to the most vulnerable regions.

While ML has significantly improved weather forecasting, a challenge remains in applying the same techniques to long-term climate predictions of more than 10 years. Climate systems are more complex with longer timescales, requiring more advanced models that can capture the intricate feedback mechanisms and long-term trends. Additionally, the lack of transparency in foundation models remains an issue compared to traditional weather and climate models. Combining these models through physics-informed neural networks (PINNs) might allow users to achieve the best of both worlds, integrating the advanced pattern recognition of foundation models with the interpretability and physical consistency of traditional models.

Technology pipeline: Digital twins

Digital twins represent an advanced simulation model that integrates EO data to simulate various climate scenarios. These models can be used by city planners and policy-makers for simulations of possible strategies and their impacts on the virtual outcome. Digital twins use advanced analytics, ML and AI to analyse data from multiple sources, predict environmental changes and simulate complex “what if” scenarios. They achieve this by creating a dynamic, digital replica of the Earth’s system. This novel approach enables high-fidelity climate simulations, providing a crucial sandbox for testing and refining climate-related strategies.

The Destination Earth (DestinE) initiative from the European Commission is an example of the pioneering efforts in developing a detailed digital twin of the Earth. Using advances in high-performance computing, EO data and ML techniques, DestinE will provide predictions of global environmental change scenarios and their impacts, drawing from capabilities of the European Centre for Medium-Range Weather Forecasts (ECMWF), the European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). The first prototype has been delivered at EuroHPC LUMI Supercomputer Centre in Kajaani, Finland.²⁵ Currently in its second phase, DestinE’s Open Core Service Platform offers a user-friendly, secure cloud-based digital modelling and open simulation platform to complete a full digital replica of Earth by 2030.

In another demonstration of PPPs, Lockheed Martin and NVIDIA are advancing AI-driven EO digital twins for the National Oceanic and Atmospheric Administration (NOAA). Through Lockheed Martin’s open Rosetta 3D for AI-driven data fusion and NVIDIA’s Omniverse Nucleus for seamless data sharing, these digital twins are increasing the precision of environmental monitoring by integrating diverse data from NOAA’s extensive collections on the cryosphere, land, atmosphere, space weather and ocean domains. Both satellite EO and ground-based observations are used to create an exact representation of the Earth at high resolution.

3 Democratizing climate insights

Providing accessible climate intelligence empowers diverse stakeholders to make informed decisions.

Democratizing climate insights means overcoming technological and accessibility barriers to empower a range of stakeholders – from policy-makers to local communities – to use and act on critical climate. This involves a more inclusive and informed approach using innovative technology tools and platforms that translate raw climate data into meaningful, contextual climate insights.

Data visualization and decision support tools, particularly those built on open-source platforms, are transforming how we understand and respond to climate threats. Advancements in AR, VR and data cube technologies enhance data accessibility, support informed decision-making and promote collaborative solutions to climate challenges. These tools translate complex EO datasets (in combination with in-situ data) into visual formats, enabling all stakeholders – regardless of their technical expertise or background knowledge – to easily understand crucial climate insights. While AR and VR technologies provide users with

an immersive experience to interact with digital representations of climate data in a more intuitive way, Earth system data cubes are a novel approach for addressing data interoperability. They achieve this by integrating multiple data dimensions (such as spatial, temporal and variable grids) for analysis at various scales and complexity levels.

Technology pipeline: AR/VR data immersive platforms

AR and VR are transformative tools that provide immersive experiences, allowing users to interact with digital environments. When combined with EO data, these technologies turn complex multidimensional EO datasets into comprehensible and interactive models. These Earth system models immerse users as if they are experiencing a situation firsthand, encouraging a nuanced and holistic understanding of climate issues. They achieve this by employing intuitive, interactive visual data presentation alongside depth of information while encouraging data literacy.



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A leading example is the Massachusetts Institute of Technology (MIT) [Media Lab's Earth Mission Control \(EMC\)](#). EMC's purpose-built interactive environment enables the exploration and analysis of complex climate data, facilitating more informed decision-making on a broad array of topics. It also enriches analysis and climate decision-making, deepening the user's understanding of various climate projects and policies. Through hyperlocal storytelling components and spotlighting the human impact of climate change, EMC provides users with the insight to

make proactive climate decisions and the agency to advocate for climate action. In its current beta phase, EMC includes a location-based decision table, information dashboards and global data projections on a sphere. These modules provide users with powerful insights focusing on hyperlocal features using EO data. By layering EO data with AI and user-friendly interfaces, EMC democratizes access to critical environmental information, providing powerful tools for environmental and socioeconomic advocacy as well as strategic planning for climate resilience.

FIGURE 6 MIT Media Lab's EMC immersive AR/VR platform



Source: MIT Media Lab. (2024). Project: Earth Mission Control (EMC). <https://www.media.mit.edu/projects/earth-mission-control/overview/>.

BOX 2 ESA unveils AI-driven EO assistant

ESA's planned development of an "Earth observation digital assistant" (a ChatGPT-style text-based enquiry with EO data) is a key demonstration of generative AI and EO. Designed to accept natural language

questions and process them through advanced EO foundational models, ESA's envisioned digital assistant will also generate responses through images, making complex EO data more accessible.

Technology pipeline: Data cubes

EO open data cubes represent a transformative approach to managing and analysing multidimensional EO data. They allow access to EO data through coordinates rather than traditional file names or directory structures, resulting in easier and more efficient access to the large archive of satellite EO datasets, particularly when using cloud-based computing infrastructures. The popularity of EO data cubes has increased in recent years as the structured format allows for more complex analysis and understanding of environmental processes, patterns and trends.

A major barrier identified by users of EO data is the high effort required for data preparation. To increase the usability of EO data, initiatives such as the [Committee of Earth Observation Satellites Analysis Ready Data \(CEOS-ARD\)](#) are helping countries and international organizations overcome this barrier by offering EO data that has been processed to a minimum set of requirements. This data is formatted to enable immediate analysis with minimal additional user effort, as well as interoperability with other datasets.

Digital Earth Africa (DE Africa) is an initiative that aims to use satellite EO data for developmental purposes across the African continent. It uses

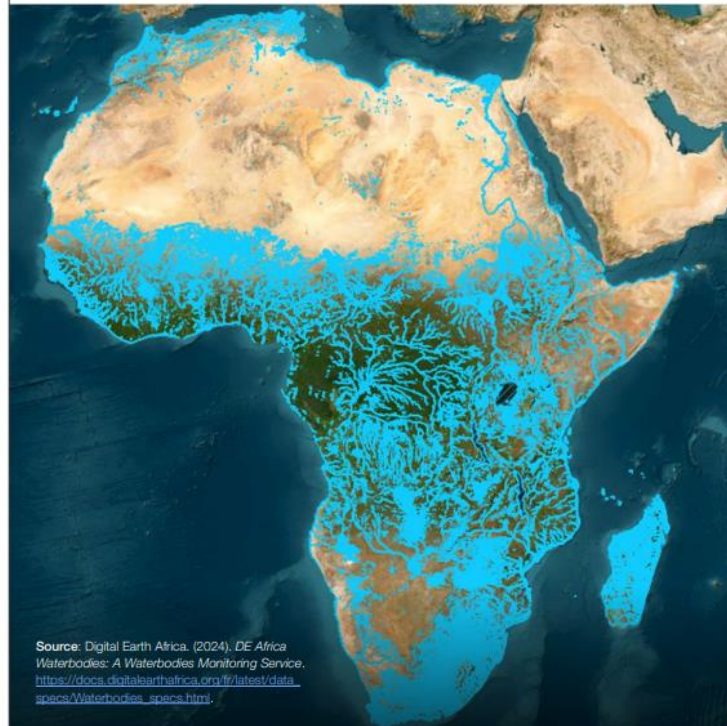
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Open-source AI platforms are also able to quickly process new data and feed it into early warning systems.

the open data cube technology to organize large amounts of satellite imagery into multidimensional arrays (i.e. sorting data by time, location or spectral bands), making it easier to extract and analyse useful insights. DE Africa announced the release of the Waterbodies Monitoring Service (WMS) in 2024. WMS is a tool that delivers a dynamic time series of wet, dry and unobserved surface area as a proportion of the historical water body extent. Overall, it does this for over 700,000 unique water bodies across the African continent on a weekly basis. It is projected that the amount of urban land at high risk from frequent flooding could rise by 270% in North Africa and by as much as 800% across southern African zones; mid-latitude areas could see a dramatic increase of nearly 2,600% by 2030.²⁶ Open-source AI platforms are also able to quickly process new data and feed it into early warning systems.²⁷

Clay, an open-source and non-profit project, is democratizing access to complex Earth analysis by developing large-scale foundation models on satellite-borne data, starting with Sentinel-1 and Sentinel-2 imagery. The outputs of these models are called vector embeddings, which effectively compress the relevant spatial and temporal signals of EO data cubes to be accessed through simple point-and-click web interfaces. While there are several open EO foundational models, Clay's approach to open-source mission-specific product development, coupled with its non-profit status, sets it apart. It assembles donated compute resources to train the largest open models, sets meaningful benchmarks to assess model quality and publishes gold-standard, easily accessible training data.

FIGURE 7 DE Africa WMS for over 700,000 waterbodies across Africa



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Conclusion

EO data is pioneering climate intelligence and disaster response with increased levels of accuracy, efficiency and timeliness. As both EO and synergistic technologies such as AI, ML, advanced sensors and data visualization continue to evolve, so will the way EO data is processed, analysed and used. This transformation will allow practitioners at all levels to grasp climate-specific problems and will enable relevant actors to make data-informed, proactive decisions.

Addressing the complexities of climate change requires a collaborative approach. Governments, private sector entities and academic institutions must work together to support the rapid development of EO and synergistic technologies. They must prioritize a human-centric approach that includes making critical climate insights more accessible, understandable and intuitive. This will require investment in infrastructure, promotion of data sharing and the development of the necessary skills to use these advanced tools. Increased PPPs and research collaborations are needed to continue to stimulate innovation, share expertise and accelerate the uptake of EO-based solutions. Equally important is the need to prioritize

community engagement, education and capacity development around climate insights, particularly for those in regions most vulnerable to the impact of climate change.

Moving forward, the emphasis should be on building a strong, data-driven ecosystem around climate. This includes establishing a support system for rapid data collection and integration, championing collective efforts in analysis and exploratory solutions, and ensuring scalable, open-source platforms for accessing curated datasets. These design principles can also act as a bridge to fill the gap between raw EO data and actionable climate intelligence, paving the way for a more resilient and informed response to climate challenges.

The integration of satellite EO data and next-generation technologies will enable a future whereby climate intelligence is more actionable and aimed at empowering communities with the agency, tools and knowledge they need to prepare and react to climate change. Through continued development of technology pipelines and collective commitment, it is possible to transform the approach to climate action, ensuring a sustainable future for generations to come.

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Contributors

MIT Media Lab

Minoo Rathnasabapathy

Research Engineer, MIT Media Lab; Fellow, Space Technology, World Economic Forum

World Economic Forum

Helen Burdett

Head, Technology for Earth

Valentin Golovtchenko

Lead, Climate Technology

Nikolai Khlystov

Lead, Space Technology

Hazuki Mori

Lead, Space Technology

Acknowledgements

Arthur Anglin

US Specialist Leader, Deloitte

Bethany Baldwin-Pulcini

Lead, Virtual Missions Frameworks, Loft Orbital

Giuseppe Borghi

Head, Φ-lab Division, European Space Agency (ESA)

Joey Couture

Fellow, World Economic Forum; US Manager, Deloitte

Matteo Emanuelli

Manager, Radar Programs, Airbus Defence and Space

Casper Fibæk

Earth Observation Applications Specialist, European Space Agency (ESA)

Dan Hammer

Co-Founder, Clay

Björn Lütjens

Postdoctoral Associate, Massachusetts Institute of Technology

Ana-Mia Louw

Operations Manager, Simera Sense

Seamus Lombardo

Impact Metric Associate, Planet Labs

Goutam Naik

Founder's Office Executive, SkyServe

Masami Onoda

Director, International Relations and Research Department, Japan Aerospace Exploration Agency

Lisa-Maria Rebelo

Lead Scientist, Digital Earth Africa

Steven Ramage

Executive Officer, Committee on Earth Observation Satellites (CEOS)

Kati Tolomei

Head, Marketing, Loft Orbital

Andrew Zolli

Chief Impact Officer, Planet Labs

Production

Laurence Denmark

Creative Director, Studio Miko

Rose Chilvers

Designer, Studio Miko

Willem Liley

Editor, Studio Miko

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World Economic Forum
91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org

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Comment on last Appendix

Re WEF Statement

“COMMITTED TO IMPROVEMENT TO THAT STATE OF THE WORLD”

God said in Genesis 1.31 KJV

And God saw everything that he had made, and, behold, it was very good. And the evening and the morning were the sixth day.

And mankind is going to improve the state of the world that God said was very good!

Rev'd Dr Barry D G Gumm says – I suppose its what state of the world a globalist group are aiming for....a carbon net zero... meaning the state of the world they are aiming for is a dead state... which has been Satan's aim from the beginning.

**APPENDIX THREE -
STRATOSPHERIC AEROSOL INJECTION**

The complete article can be found at

<https://trumpetdisasters.net/r-8/stage-smoke/sai-2/>

REVIEW

Stratospheric aerosol injection may impact global systems and human health outcomes

Samantha M. Tracy^{1,2,*}, Jonathan M. Moch^{3,4,5}, Sebastian D. Eastham^{6,7}, and Jonathan J. Buonocore^{3,8}

Solar radiation management (SRM) is a climate engineering strategy to reduce temperature increases due to global climate change. The most well-researched SRM methodology is stratospheric aerosol injection (SAI), which involves increasing the concentration of aerosol particles in the stratosphere to reduce the amount of solar radiation reaching Earth's surface. The most considered and heavily researched aerosol for SAI is sulfate. SAI has been extensively modeled using various climate scenarios and investigated using data from previous volcanic eruptions, which provide an analog of the climate effects of SAI. Prior research has determined that SAI will not only decrease global temperatures but is likely to have direct impacts on ecosystem and public health. This review seeks to investigate the various ways by which SAI may impact global public health outcomes related to hydrologic cycling, atmospheric chemical cycling, frequency of natural disasters, food system disruptions, and ecological health through the pathways of water, air, soil, and biota. SAI has the potential to decrease negative health outcomes associated with rising temperatures but may have a myriad of impacts on global environmental systems. Anthropogenically altering the global climate, through both the release of greenhouse gases or through climatic engineering, has unknown consequences, many of which will likely impact global health and quality of life. A more holistic approach is necessary to understand the relative benefits and harms in using SAI as compared to the implication of global climate change.

Keywords: Solar geoengineering, Stratospheric aerosol injection, Public health, Climate change

1. Introduction

Solar radiation management (SRM) is a proposed method to reflect incoming solar radiation and aims to reduce some of the negative consequences resulting from greenhouse gas (GHG) emissions (MacMartin et al., 2014; Irvine et al., 2016). A frequently examined method of SRM

involves deploying stratospheric aerosol injection (SAI), which increases the concentration of aerosol particles, usually sulfate, in the stratosphere (Keith and Irvine, 2016). Although there are some studies exploring the use of non-sulfate aerosols for SAI (Weisenstein et al., 2015; Keith et al., 2016), the most widely researched aerosol for SAI is sulfate and there is inadequate literature to review on the impacts of such nonsulfate SAI. This review therefore focuses only on SAI using sulfate aerosols. The additional aerosol particles in the stratosphere would reflect incoming sunlight, thereby reducing the downwelling radiation reaching Earth's surface (Irvine et al., 2016). These effects lead to a decrease in overall global average temperature and could therefore mitigate some of the worst effects associated with climate change (Irvine et al., 2019). While there is a high degree of confidence in the use of SAI to offset the worst climatic effects of rising GHG concentrations, there are also some concerns regarding potential unintended consequences including ramifications for both ecological and public health (Intergovernmental Panel on Climate Change [IPCC], 2021).

Multiple methods have been proposed for the injection of aerosols into the stratosphere. While aircraft-based delivery mechanisms still need to be developed for successful deployment, estimates suggest SAI direct implementation costs are likely very cheap compared to the direct implementation costs of mitigation or the costs of

¹ Department of Environmental Health, Harvard T.H. Chan School of Public Health, Harvard University, Cambridge, MA, USA

² Present Address: Yale School of Environment, Yale University, New Haven, CT, USA

³ Center for Climate, Health, and the Global Environment, Harvard T.H. Chan School of Public Health, Boston, MA, USA

⁴ John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, USA

⁵ Present Address: AAAS Science and Technology Policy Fellowship Program, U.S. Department of State, Washington, DC, USA

⁶ Laboratory for Aviation and the Environment, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA, USA

⁷ Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, Cambridge, MA, USA

⁸ Present Address: Department of Environmental Health, Boston University School of Public Health, Boston, MA, USA

* Corresponding author:
Email: samantha.tracy@yale.edu

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unmitigated climate change (Barrett, 2008; Smith and Wagner, 2018). For example, SAI direct implementation costs have been estimated to be on the order of several billion USD per year, while global mitigation costs consistent with a pathway limiting warming to less than 1.5°C are estimated to be on the order of several trillion USD per year for just the electricity sector (Smith and Wagner, 2018; Riahi et al., 2021). The process of aerosol injection has been modeled using various scenarios and different locations for injection points. The most extensive research and modeling scenarios have focused on injection in the tropics (between 30°N and 30°S). Injection scenarios focus on the location of the aerosol emissions and the influence across the globe. As temperature changes can depend on the injection mechanism, other ecological, atmospheric, and public health outcomes are also dependent on the location of injection (Kravitz et al., 2015; Ferraro and Griffiths, 2016).

Aerosol injection through anthropogenic intervention is a relatively new concept; however, natural variations of this same phenomenon have occurred throughout history in the form of volcanic eruptions. During volcanic eruptions, sulfur dioxide (SO₂) is released into the atmosphere, leading to increases in stratospheric sulfate aerosols and inducing a series of environmental changes. Volcanic eruptions have therefore often been used as an analog for the implications of SAI, providing insights on the possible temperature and precipitation changes that may be induced by such an injection (Trenberth and Dai, 2007; Robock et al., 2010; Robock et al., 2013; Laakso et al., 2016; Proctor et al., 2018; Lopes et al., 2019). Regional temperature and precipitation changes following a volcanic eruption are also highly dependent on sampling and magnitude of injected aerosol, and this is likely also true of SAI, where regional impacts will be reliant on the amount of aerosol and injection location (Polvani et al., 2019; Polvani and Camargo, 2020; Azoulay et al., 2021; Banerjee et al., 2021).

Human climate control through SAI will not only present questions of governance, ethics, and technology development but likely pose additional questions about the long-term potential benefits or harms to global natural systems. Increases in planetary albedo from SAI have been modeled to show impacts on the global hydrologic cycle, reducing overall global precipitation (Ferraro and Griffiths, 2016; Ji et al., 2018; Tilmes et al., 2020). Other effects include changes in particulate air pollution, tropospheric ozone formation, and other aspects of atmospheric chemistry (Xia et al., 2017; Eastham et al., 2018b). These consequences must be weighed against the risk of not implementing SAI and the resulting challenges from climate change. The current impacts of climate change bring the possibility of many global public health challenges, such as natural disasters and heat waves, shifting ranges for disease vectors and changes in global agricultural production (Lobell and Field, 2007; Lafferty, 2009; Mitchell et al., 2016). Without GHG mitigation, these public health issues will occur regardless of SAI implementation, but deploying SAI may prevent some of the worst impacts.

A large body of research has evaluated social and political risks associated with SAI without GHG mitigation. These include geopolitical risks like weaponization of the

technology and use for terrorism, "moral hazard" of over-reliance on SRM to mitigate harm resulting from climate change, inequitable distribution of climate risk, and risks due to faulty implementation including "termination shock" if the use of SAI ceases abruptly (McCusker et al., 2014; Faran and Olsson, 2018; Flegal and Gupta, 2018; Parker and Irvine, 2018; Grieger et al., 2019). A smaller body of literature focuses on possible implications for human health and related ecological impacts (Irvine et al., 2017; Zarnetske et al., 2021). Here, we review the literature on unintended atmospheric, hydrologic, ecological, and food system disturbances from SAI that have the potential to impact global public health outcomes and identify gaps in the literature.

2. Methods

To investigate potential unintended ecological and public health consequences associated with SAI deployment, we reviewed the existing literature to build a preliminary qualitative health impact assessment (HIA) through causal chain analysis (Qiu et al., 2018). The causal chain analysis combines previously held theories and ideas with cited literature sources to bridge pathways between SAI deployment, environmental impacts, and human health effects. To build this, we begin with the literature on SAI and the natural analogs to understand how this might perturb the atmosphere. From those perturbations, we then review the literature to understand linkages throughout the earth and atmospheric systems, ecosystems, and eventually to human health. While this is not a comprehensive evaluation of the possible consequences of SAI, we attempted to collect the existing evidence on major linkages to ecosystems and health and to identify research gaps. This article focuses exclusively on effects and public health implications linked to sulfate SAI unless otherwise explicitly stated.

This review explores the major pathways by which changes in environmental exposures driven by geoengineering impact global public health and ecosystem health. The major pathways include air, water, and soil transport. Some implications of SAI's direct effects on atmospheric chemistry, air pollution, and precipitation have been previously cataloged; however, the indirect effects have been studied only in a limited capacity. The literature review here focuses on SAI modeling studies and studies including volcanic eruptions which can act as a proxy for SAI and their implications on air pollutant concentrations and associated public health consequences. While volcanic eruptions can act as an analog for SAI, the effects observed from volcanic emissions are an imperfect analog for the modeled effects of SAI, as a volcanic eruption represents a pulse injection rather than a sustained injection and there are additional differences such as latitude of injection and spatial distribution (Duan et al., 2019).

The reviewed pathways also included feedback cycles, linking multiple variables together in a single outcome path. We do not examine governance, political, or technological complications associated with deployment and the potential consequences associated with termination shock as previous literature already focuses on this (Frumhoff and Stephens, 2018; MacMartin et al., 2019; Reynolds, 2019).

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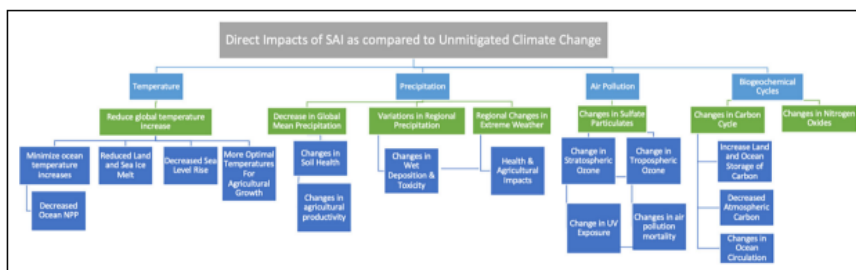


Figure 1. Diagram of select major of impacts and pathways of importance for stratospheric aerosol injection (SAI) as compared to unmitigated climate change. Light blue boxes indicate a primary pathway for SAI impacts. Green boxes indicate a primary impact of SAI, while dark blue boxes indicate a secondary impact.

A complication when reviewing the SAI literature is that the response for a given pathway can vary based on the way in which SAI is implemented and the underlying scenario in which the implementation occurs. The location, timing, and magnitude of the SAI can all alter the magnitude and sometimes even direction of the impact that SAI has on different global systems (Kravitz et al., 2015; Ferraro and Griffiths, 2016; Tilmes et al., 2017; Tilmes et al., 2018b; Irvine et al., 2019; Kravitz et al., 2019; Visoni et al., 2020; Krishnamohan and Bala, 2022). The counterfactual with which an SAI scenario is compared to, such as different trajectories for GHG emissions, can change the impact of a given SAI intervention (Jones et al., 2018). Although some impacts of SAI have been examined across multiple studies, for other impacts, the literature is more limited. For these less studied impacts, there remains the possibility that the impact of SAI could change under different scenario designs.

We classify the known direct impacts of SAI into seven direct effects, specifically changes in sea-level and sea-ice, hydrologic cycling, temperature, sunlight, particulate air pollution, tropospheric ozone, and stratospheric ozone. Effects were further categorized based on the environmental medium of interest (air, water, or soil) and potential pathway of influence (agriculture, contamination, direct exposure, pathogenic, food/water, or ecological). From the initial seven direct pathways, additional downstream effects were incorporated into the HIA. For example, potential air pathways include public health effects, such as asthma related to $PM_{2.5}$ and ozone and additional outcomes associated with fluctuations in ultraviolet (UV) light exposure.

3. Results and discussion

The resulting literature review consisted of an analysis of over 200 papers on the potential consequences of SAI. Of those papers, the majority specifically addressed downstream SAI effects using climate modeling, while some papers relied on information collected from previous volcanic eruptions and others relied on information from solar reduction models. The literature covered a wide range of effects including multifaceted climate change

implications, such as temperature change; ice and permafrost changes; soil, sea-level, and ocean response; hydrological changes; agriculture and vegetation; air quality; chemical cycling; and ecosystem impacts. We also included numerous papers that do not deal directly with SAI but can be used to elucidate potential consequences of SAI deployment. The results and pathways of importance are summarized in **Figure 1**. A listing of the number of sources referenced for each paper subsection is shown in Supplementary Table S1.

3.1. Atmospheric disruption

3.1.1. Tropospheric air pollution

A direct public health consequence of SAI deployment is changes in air quality. The injection of sulfur into the stratosphere induces changes in atmospheric chemistry. SAI results in changes in atmospheric concentrations of tropospheric ozone and particulate matter (PM) through a variety of mechanisms including changes in photochemistry and changes in wet and dry deposition (Eastham et al., 2018b; Visoni et al., 2018). SAI deployment results in increased sulfur particulates in the Earth's stratosphere, altering a series of reactions that result in stratospheric ozone depletion (Pitari et al., 2014; Xia et al., 2017). Tropospheric ozone, or surface ozone, is an air pollutant with known human health consequences and is linked to a myriad of respiratory illnesses (Nuvolone et al., 2018; Lu et al., 2020). Changes in stratospheric ozone concentrations also impact the composition of the troposphere due to photochemical reactions resulting from changes in UV absorption (Jacob, 2000).

The potential public health implications of SAI need to be considered in the context of climate change. Changes in future air pollution concentrations will be driven by both changes in emissions levels and changes in climate (Jacob and Winner, 2009; West et al., 2013; Silva et al., 2016; Shen et al., 2017; Markandya et al., 2018). Therefore, several variables such as those related to potential policy changes, emission types, population levels and distribution, and warming scenarios can complicate attempts to quantify premature mortality changes due to changing air pollution and climate.

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We are aware of only one published study so far that looks at the health impacts of SAI on health due to air quality changes (Eastham et al., 2018b). The scenario of Eastham et al. (2018b) uses SAI sufficient to offset 1°C of surface warming in 2040 to examine how air quality changes may influence public health. Understanding the changes in air pollutants due to SAI was done using v11-01 of the GEOS-Chem global chemistry-transport model. SAI health impacts from photochemical changes are dominated by the likely decrease in tropospheric ozone, which occurs due to decreased ozone mixing into the troposphere and from changes in tropospheric ozone photochemistry (Eastham et al., 2018b). One other study has examined the impact of SAI on tropospheric ozone, also finding a general decrease in surface ozone due to SAI, but with a slight increase in surface ozone in the tropics and without a calculation of resulting health impacts (Xia et al., 2017). Cooling due to SAI can impact air quality by decreasing surface ozone concentrations through slowing down the photochemical reactions that produce ozone. However, the lower temperatures due to SAI can also increase surface PM_{2.5} concentrations by promoting increased particulate nitrate due to greater partitioning of gaseous nitrate into aerosol. Increased mortality due to PM_{2.5} was also simulated due to decreases in rainfall and resulting wet deposition as well as an increase in particulate sulfate due to the settling of the injected stratospheric sulfate (Eastham et al., 2018b).

For Eastham et al. (2018b), the comparison of estimates between global SAI injection scenarios and unmitigated climate change scenarios suggests that air pollution and UV exposure-related premature mortality and additional deaths may be slightly higher in a scenario with SAI introduced. There is large uncertainty, even within this single study, with regard to both the sign and magnitude of the impact of SAI on air pollution-related mortality. In total, it was simulated that changes in UV, PM_{2.5}, and ozone exposure due to SAI could cause between a net decrease in mortality of 30,000 deaths per year to a net increase in mortality of 79,000 deaths per year. This net change is due to an increase in mortality related to PM_{2.5} (+88,000 deaths per year; 95% CI: 53,000 to 120,000) and a small increase related to UV exposure (+4,500 deaths per year; 95% CI: 1,600 to 8,800), counterbalanced by a decline in mortality related to ozone exposure (−67,000 deaths per year; 95% CI: −110,000 to 28,000). Mechanistically, photochemical changes were simulated to decrease mortality, driven by declines in ozone, while changes in temperature and precipitation caused increases in mortality, driven by increases in PM_{2.5}. The impact of changes in photochemistry, rainfall, and temperature changes due to SAI were all simulated independently, leaving the interactions between these 3 mechanisms as an additional unexamined source of uncertainty. Another source of uncertainty is the changes in population-level pollutant exposure that would result from changes in atmospheric dynamics due to SAI, which have yet to be examined in any study.

Limited other modeling work has specifically calculated the potential air quality-related public health impacts of SAI. One additional study has characterized

potential occupational and exposure impacts from potential SAI materials, but these toxicity measures have largely been limited to direct sulfate inhalation within an occupational scenario (Effiong and Neitzel, 2016). As noted above, sulfur aerosols and related dry and wet deposition products of SO₂ and sulfate may impact human health as respiratory irritants and induce cell damage in respiratory tissue. Related compounds such as hydrogen sulfide and carbonyl sulfide also have known adverse health effects, including respiratory distress, neurological complications, and cardiac arrhythmia (Reiffenstein et al., 1992; Jäppinen et al., 1993; Effiong and Neitzel, 2016). However, additional modeling efforts are needed to investigate the potential atmospheric changes, regional differences, and temperature fluctuations and how these may influence human health.

Through changes in atmospheric dynamics and temperatures, SAI may also affect particulate air pollution by changing the sources and distribution of dust or wildfire smoke. Future desertification due to climate change can result in dustier environments, with negative downstream consequences for public health though both increases in airborne particles and dust-borne diseases such as Valley fever (Achakulwisut et al., 2018; Li et al., 2021). SAI could reduce the potential for dust increases under such scenarios. Wildfire smoke is also a cause of premature mortality that may increase along with global temperatures (Reid et al., 2016; Li et al., 2020b). If SAI can reduce the incidence of wildfires, which has not yet been investigated, it could also reduce mortality due to smoke exposure. Overall SAI changes to atmospheric chemistry will not only induce public health implications but may also have long-term effects for wildlife and global habitats.

3.1.2. Stratospheric ozone and UV radiation

SAI is known to have various interactions with stratospheric ozone levels, such as changes in heterogeneous chemistry, photolysis rates, and changes in stratospheric dynamics (Heckendorn et al., 2009; Tilmes et al., 2009; Pitari et al., 2014; Tilmes et al., 2022). Although the importance of different mechanisms varies among studies, examinations of the impact of SAI generally find that SAI decreases stratospheric ozone in high latitudes compared to a scenario without SAI, while the simulated effects in the midlatitudes and tropics can vary depending on how different stratospheric processes are included in the model (Heckendorn et al., 2009; Tilmes et al., 2009; Tilmes et al., 2012; Pitari et al., 2014; Xia et al., 2017; Robrecht et al., 2021; Tilmes et al., 2022).

A main negative repercussion of decreases in stratospheric ozone is increased UV radiation at the planet's surface (Pitari et al., 2014; Nowack et al., 2016; Eastham et al., 2018a). As mentioned above, decreased stratospheric ozone may also lead to decreased tropospheric ozone pollution, assuming ozone transport remains the same. Reduced tropospheric ozone exposure is a function of decreased transport of stratospheric ozone to the troposphere and of changes in photochemistry. As compared to global warming scenarios, SAI will reduce surface-level ozone exposure as ozone concentrations will decrease

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with temperature as photochemical production slows (Eastham et al., 2018b).

For SAI, the frequently simulated depletion of stratospheric ozone may alter the distribution of UV radiation reaching Earth's surface (Pitari et al., 2014; Eastham et al., 2018b; Madronich et al., 2018). While SAI has generally been modeled to increase UV-B irradiation, there is evidence that SAI may both increase or decrease UV-B transmission. UV-B is normally absorbed by stratospheric ozone, limiting transmission to the Earth's surface; however, when sulfate particles are introduced into the atmosphere, the particulates may alter the optical path of the UV-B transmission as well as induce changes in stratospheric ozone, enhancing or reducing UV-B transmission depending on the relative changes in particulates and stratospheric ozone (Xia et al., 2017; Madronich et al., 2018).

Modeling studies indicate that increases in UV wavelength exposure due to stratospheric ozone depletion may be more important than UV wavelength decrease due to increased reflection by higher levels of stratospheric aerosol, although there are latitudinal variations in the balance between these two effects (Pitari et al., 2014; Eastham et al., 2018b). UV radiation exposure has known human health consequences particularly related to increased rates of melanoma and potential long-term DNA damage. High levels of UV exposure have genotoxic impacts as DNA absorbs UV-B, converting it to photochemical energy which may distort DNA strands (Roy, 2017). Increases in UV exposure are an important factor in causing skin cancer, but SAI modeling to date has been limited. Eastham et al.'s (2018b) results suggest global net mortality changes due to UV exposure-related skin cancers may be small, on the order of approximately 4,100 additional deaths per year. However, this does not take into account that UV exposure may be nonlinearly related to skin cancer and global skin cancer rates are underreported, particularly in the Global South.

Unmitigated climate change will also impact the interaction between stratospheric ozone and UV radiation. Under a global warming scenario, additional climate change-related factors may interact with UV radiation and lead to subsequent increases in exposure (Bornman et al., 2019). Changes in Earth's surface due to climate change, such as temperature increase, alterations in land cover, increases in carbon dioxide (CO₂) levels, and decreasing water availability, may alter UV exposure levels. Shifting weather patterns and related changes in cloud cover linked to increasing global temperature as also likely to impact UV exposures, potentially increasing in some regions and decreasing in others. Climate change-related changes in UV will also change biogeochemical cycles, impacting the carbon cycle and cycles of GHGs (Zepp et al., 2011). Climate change will also impact stratospheric ozone levels, and in some cases, stratospheric ozone depletion is directly contributing to increased climate change in the Southern Hemisphere (Barnes et al., 2019; Bornman et al., 2019). Changes in the climate modifying temperature, moisture, wind speed, and direction can deplete stratospheric ozone and therefore influence levels

of UV radiation reaching Earth's surface. Various GHGs, including methane and nitrous oxide, also modify the atmospheric chemistry regulating ozone level (Barnes et al., 2019). Continued increases in GHG concentrations along with the potential impacts of climate change are likely to change both stratospheric ozone concentration and human exposure to UV radiation.

The likely impacts of SAI on stratospheric ozone and UV radiation are largely comparable to the impacts that are predicted to occur due to unmitigated climate change. Both SAI and global warming contribute to decreased levels of stratospheric ozone and likely increased levels of UV radiation, which has known adverse health impacts. The magnitude of risk of these impacts is currently uncertain as they depend on either the quantity and duration of SAI or the quantity of GHGs released into the atmosphere.

3.1.3. Biogeochemical cycling

SAI can have consequences on atmospheric chemistry and on the biogeochemical cycling and distribution of elements including nitrogen, sulfur, and carbon (Tjiputra et al., 2016; Lee et al., 2021a). Existing modeling evidence suggests that introduction of SAI may lead to a decrease in atmospheric CO₂ concentrations through an increased ocean CO₂ uptake (Tjiputra et al., 2016; Tilmes et al., 2020). There is also evidence to suggest that introduction of any SRM, including SAI, would impact vegetative carbon storage, most prominently carbon storage changes due to land cover changes, but this effect varies by regional biome (Cao and Jiang, 2017; Lee et al., 2021a). The cooling effects of SAI would also decrease ocean temperatures, increasing CO₂ solubility and ocean CO₂ uptake by as much as 10% (Tilmes et al., 2008; Tjiputra et al., 2016). The effects of SAI on terrestrial and ocean CO₂ uptake are still relatively unknown and could be greatly impacted by nitrogen cycling effects (Thornton et al., 2009; Glienke et al., 2015; Tjiputra et al., 2016). Research also suggests the impacts of SAI on the land-carbon cycle, where lower temperatures improve soil carbon retention, thereby decreasing atmospheric carbon concentration (Tjiputra et al., 2016). Other research suggests SAI could reduce net terrestrial ecosystem respiration and lead to fewer ecosystem disturbances, also leading to an increased land carbon sink (Yang et al., 2020). Lastly, SAI is likely to impact methane concentrations (Visioni et al., 2017), although the amount and magnitude of the change remain unclear.

Stratospheric aerosols can also play a direct role in the overall chemical balance of the atmosphere. Stratospheric sulfate aerosols are also particularly important in midlatitudes for the conversion of nitrogen oxide (NO_x) compounds to reservoir form HNO₃ (Fahey et al., 1993; Pope et al., 2012). Changes in NO_x alter the balance of photochemical reactions that produce and destroy ozone, which, as mentioned above, may have effects on UV light penetration and subsequent public health outcomes, such as increases in UV-related skin cancers (Fahey et al., 1993; van Dijk et al., 2013). Changes to atmospheric ozone are also largely dependent on the aerosol distribution, which is likely to vary depending on SAI altitude

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(Tilmes et al., 2018b). For a tropical injection scenario, modeling suggests a small increase (less than 5%) in stratospheric ozone (Butler et al., 2016; Tilmes et al., 2018b).

It is not surprising that the purposeful injection of aerosols into the stratosphere, through geoengineering, may alter global biogeochemistry and atmospheric cycling; however, humans have been injecting particulates into the atmosphere in mass quantities since the start of the industrial revolution. Under a scenario of unmitigated climate change, global biogeochemical cycles will be altered due to increased air pollution, increased temperature, and changes in precipitation patterns (Piao et al., 2019; Piao et al., 2020). Increased global temperatures are linked directly to a higher concentration of CO₂ in the atmosphere through a positive feedback cycle where increased CO₂ emissions generate increased temperature, in turn leading to an increase in atmospheric CO₂ concentrations (Harde, 2019). Climate change reduces both land and ocean uptake of CO₂, leading to even higher concentrations in the atmosphere (Friedlingstein et al., 2001; Mitchard, 2018). The impacts of major weather events and extreme changes in regional climates (increased high temperatures and decreased low temperatures) will also induce regional implications for the global carbon cycle in relation to terrestrial carbon storage (Piao et al., 2019). As discussed in the previous section, unmitigated climate change will also have direct implications on stratospheric ozone concentrations. Several other global chemical cycles, notably nitrogen, methane, and mercury, will also be disrupted in various directions and magnitudes with increasing global temperatures (Schaefer, 2019; Yang et al., 2019; Li et al., 2020a).

The implications of SAI are likely to change global biogeochemical cycling in ways that both mirror and oppose the global responses initiated by unmitigated climate change. However, SAI is modeled to decrease atmospheric CO₂ concentrations due to decreases in global temperature, resulting in increased ocean and land carbon storage. Additional biogeochemical implications of both SAI and climate change are still being investigated, as many variables and nuanced mechanisms can have a drastic impact on changes in global cycling and downstream impacts on ecological systems.

3.2. Hydrologic system disruption

The global hydrological system is vital for human life with direct impacts on global drinking water supply, crop production, and ocean productivity. The global hydrologic cycle is likely to be altered by SAI and climate change. One of the most well-known and strongly studied implications of SAI is the overall decrease in global mean precipitation (MacMartin et al., 2018). While the decrease in global mean precipitation is modeled to be small in magnitude, larger magnitudes of fluctuation (both increases and decreases) will be experienced regionally (Ferraro et al., 2011; 2014; MacMartin et al., 2018). SAI can affect precipitation through changes in atmospheric circulation. Hydrologic systems are sensitive to SAI-induced changes in downwelling solar radiation, which can impact the frequency and amount of precipitation events. The

magnitude of precipitation changes is highly dependent on the magnitude of temperature change due to SAI (Keith and MacMartin, 2015).

The current literature suggests that global mean precipitation will decrease as temperature increases are prevented, but this will likely result in an unequal decrease and in some cases a precipitation increase across global regions (MacMartin et al., 2018). Precipitation will generally increase as global temperatures increase through unmitigated climate change, so SAI can play a role in counteracting this increase (Keith and MacMartin, 2015).

3.2.1. Monsoons and tropical storms

Along with alterations in precipitation, SAI may impact the frequency and intensity of extreme precipitation events. Currently, there is conflicting evidence within modeled systems regarding the direction and magnitude of potential effects, as effects are dependent on the amount of aerosol and location of injection (Kravitz et al., 2019). Some studies have found that tropical SAI may suppress monsoon precipitation, such as over the Asian and African monsoon regions (Robock et al., 2008; Ferraro et al., 2014; Sun et al., 2020). A modeling study specifically focusing on monsoon effects in West Africa showed that a level of SAI effective enough to mitigate all future warming would offset precipitation changes in the Northern and Southern Sahel Regions but overcompensate and lead to decreased precipitation in Western Africa (Da-Allada et al., 2020). However, additional modeling evidence suggests that effects on regional monsoon variation are highly dependent on the latitude of injection. While injection at any latitude is likely to alter global mean temperature and global mean precipitation, greater variation is seen in regional temperature changes and regional precipitation changes. A scenario where 12 Tg of SO₂ are injected at various latitudes (30°S, 15°S, equator, 15°N, and 30°N) demonstrated that relative to an RCP8.5 scenario, mean summer monsoon precipitation decreased in the hemisphere, where aerosols were injected and increased in the opposite hemisphere (Krishnamohan and Bala, 2022). A similar result was found for a study of the effect of SAI via Arctic injection, where monsoon precipitation decreased in the northern hemisphere but increased in the southern hemisphere (Nalam et al., 2018).

Variability in monsoonal precipitation has a direct effect on agricultural production and associated economic productivity. For example, in Indian agricultural production, deficit rainfall is more damaging than increased monsoon precipitation (Gadgil and Gadgil, 2006). Rainfall dependability is a major factor in crop determination and yield; regions experiencing decreased rainfall due to climate change have already started changing their normal crop production to accommodate new rainfall patterns (Surianarayanan et al., 2018). As compared with an unmitigated climate change scenario where wet regions will likely get wetter and dry regions will have an increased risk of drought, model simulations find SAI may overmitigate current climate change trends for some regions, such as the tropics (Abiodun et al., 2021). On the other hand, different simulations find a more complicated

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picture, such as simulating a net increase in tropical precipitation outside of cyclone season (Ji et al., 2018). It is thus currently unclear whether SAI would over or under-compensate for precipitation changes relative to global temperature changes as this would be dependent on injection strategy.

In addition to impacts on monsoonal precipitation, a major implication of unmitigated climate change is the increased intensity of natural disasters, including higher precipitation associated with cyclones (IPCC, 2018). Natural disasters, including cyclones and monsoons, lead to human mortality and infrastructure destruction, as well as contamination of local water systems, increased risk of communicable disease, and forced human migration (Diaz, 2007). SAI could reduce climate change implications associated with natural disasters by preventing increasing global temperature, but the impact would vary based on injection methodology. Models suggest global application of SAI would decrease tropical cyclone formation relative to unmitigated climate change, although this is heavily dependent on the latitude and location of injection (Moore et al., 2015; Jones et al., 2017). Additional evidence using data following volcanic eruptions suggests that low-latitude eruptions also decrease tropical cyclone frequency in the Atlantic (Guevara-Murua et al., 2015). Some modeling studies also suggest SAI could reduce tropical cyclone intensity (Moore et al., 2015; Ji et al., 2018; Irvine et al., 2019).

Changes in precipitation frequency or variations in precipitation volume can have wide implications for potential droughts and flooding. Observational and modeling evidence from the eruption of Mt. Pinatubo in 1991, used as a proxy of pulse injection SAI and not as a direct analog, show drought effects in water scarce regions of the world or areas that rely on isolated precipitation events to supply the majority of annual water supply (Trenberth and Dai, 2007). SAI modeled using Stratospheric Aerosol Geoengineering Large Ensemble (GLENS) models at a level to compensate for changes in temperature was shown to overcompensate for precipitation, changing drought risk over major river basins in Africa (Abiodun et al., 2021). Other work has found SAI can change the drought pattern over East Asia (Liu et al., 2021). Work examining SRM with a uniform solar reduction has found that, with globally varying effectiveness, SAI may reduce the likelihood of drought by reducing the frequency of heatwaves and consecutive dry days (Dagon and Schrag, 2017). Drought conditions can have major public health impacts as well as ecological implications, including famine, water scarcity, and decreased quality of available water (Alpino et al., 2016; Liu et al., 2020b). For example, recent work has suggested a drought may increase arsenic levels in private well water sources suggesting an SAI pathway to affect water quality via impacts on drought (Effiong and Neitzel, 2016; Lombard et al., 2021).

There are also major consequences of SAI associated with flooding. In normally arid areas of the world, increases in precipitation could pose a serious threat to flood plain regions by causing massive runoff as the soil is not equipped to handle large precipitation volumes (Bae

et al., 2015). Flooding can also lead to increased toxic runoff from agricultural systems or industrial areas, leading to freshwater contamination and associated public health and ecological toxicity repercussions (Euripidou and Murray, 2004; Alderman et al., 2012). SAI has the potential to reduce flooding risk, particularly in the flood prone regions of Southeast Asia; however, flood risk may be increased in drought prone regions, such as Mexico, Australia, and the Southwestern United States (Wei et al., 2018). If by changing regional precipitation levels SAI can reduce flooding, it could therefore have important public health benefits.

Extreme precipitation events including changes in monsoon patterns, droughts, and flooding are all also likely outcomes of unmitigated climate change (Bell and Masys, 2020). An increase in extreme weather (hurricanes, floods, and droughts) has been linked with increases in global temperatures and changes to atmospheric circulation due to climate change (Mann et al., 2018). As with SAI, these effects will be seen largely at a regional level with small island nations, coastal communities, and the Global South seeing the strongest magnitude of impact (Le, 2020; Thomas et al., 2020). In contrast to predictions from SAI models, unmitigated climate change has been modeled to increase the magnitude and duration of monsoon season in Asia and Africa, likely increasing the humidity over desert biomes in these regions (Seth et al., 2019; Jackson et al., 2022). Extreme weather events from climate change pose many of the same public health implications as potential weather modifications due to SAI, including increased risk of disease, displacement, and threats to global food and water supply (Tong and Ebi, 2019).

3.2.2. Ice melt, runoff, and sea-level rise

One of the most widely publicized and well-known implications of unmitigated global climate change is the melting of polar ice caps. Ice caps and glaciers are one of the largest reservoirs of freshwater; however, this water is mostly inactive in the global hydrologic cycle as its natural residence time in ice caps is long enough to be considered irrelevant for human time scales (United States Geological Survey, 2020). In addition, melting ice generates a positive climate feedback loop, with declines in ice surface area decreasing surface albedo leading to further warming (Curry et al., 1995). Under a tropical injection SAI scenario equivalent to $\frac{1}{4}$ of the Pinatubo Volcano eruption (G4 scenario), SAI have been modeled to slow mass loss from the melting of the Greenland ice sheet by 15%–20% as compared with RCP4.5, stabilizing radiative forcing at 4.5 watts per meter squared in the year 2100 (Moore et al., 2019). Modeled effects on ice melt are directly dependent on the injection scenario and injection amount, with different injection latitudes contributing to different effects on ice melt, temperature change, and overall climatic effects. Additional studies have also noted a likely decline in surface ice melt of the Greenland ice sheet through the use of SAI as compared to historical data (Tilmes et al., 2020). Preservation of ice, particularly in the Arctic, is also sensitive to location and timing of injection, with some models indicating greater ice preservation with injection

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in the spring months to alleviate increased summer heat (Lee et al., 2021b).

Prevention of ice melt and decreased risk of sea-level rise directly protects coastal dwellings from flooding damage and prevents saltwater intrusion of city water supplies (Werner and Simmons, 2009). SAI could also improve climate resilience in small island states, which have a disproportionately higher risk of damage due to unmitigated climate change (Pernetta, 1992).

In addition to sea-level rise from ice cap melting, thermal expansion of sea water can contribute to sea-level change. Recent modeling suggests SAI will actively prevent sea-level rise related to thermal expansion of sea water; however, there is uncertainty surrounding the response of ice sheets and precipitation reductions (Irvine et al., 2016). One study estimates that SAI of a constant 4 W m^{-2} reduction in radiative forcing could delay sea-level rise by 40–80 years under the RCP3PD scenario (Moore et al., 2010). Previous models and estimates derived from historical sea level data after volcanic eruptions show a global mean sea-level decline of up to 5 mm 1 year after the eruption, due to both reduced thermal expansion and decreased precipitation; however, any changes in sea level linked to volcanic eruptions are directly dependent on the magnitude of the eruption (Church et al., 2005).

Along with terrestrial ice melt, another impact of climate change is the disappearance of sea ice (Johannessen et al., 2004). As atmospheric temperatures rise, so does global ocean temperature leading to increased melting of sea ice (Serreze et al., 2019). Due to the concept of displacement, the melt of sea ice does not directly impact sea-level rise; however, it will have ecosystem impacts (i.e., habitat loss, ocean freshening) and could lead to shifts in weather patterns (Wadhams and Munk, 2004). Sea ice loss can also reduce surface albedo and lead to further warming as positive feedback (Dai et al., 2019). A simulation of arctic injection of SO_2 at an altitude of 14.5 km in a 1-km deep layer showed remediation of losses of Arctic sea ice by the year 2043 (Jackson et al., 2015). Models using the GLENS simulation under RCP8.5, with injection occurring at multiple latitudes and altitudes (15°N and 15°S at 25 km, 30°N and 30°S at 22.8 km) (Tilmes et al., 2018a) found that SAI will have influence over high-altitude seasonal cycles resulting in warmer winters and cooler summers, leading to an overcompensation of 52% in summer arctic sea ice recovery and an under compensation of 8% in the winter as compared to the present-day climate (Jiang et al., 2019). While additional climatic variables are difficult to predict, a decrease in global temperature by SAI is likely to decrease the loss of sea ice and possibly reverse sea ice loss that has already commenced.

3.2.3. Ocean circulation and biogeochemistry

The oceans are also a key stabilizer of the global climate with direct connections to atmospheric circulation and global food supply. They also act as the one of the most important global carbon sinks alongside the biosphere. Public health is directly connected to the ocean, particularly in communities deriving most of their food from the oceans. There are several mechanisms through which SAI

could change the circulation of the ocean, such as the effect of SAI on ocean temperatures or surface winds. Changes in the circulation within the ocean, along with global temperature reductions caused by SAI, could have effects on the ocean temperature distribution (Cao et al., 2016). For large-scale ocean circulation, multiple studies have found that SAI can lead to an acceleration in the Atlantic meridional overturning circulation compared to a scenario without geoengineering (Muthers et al., 2016; Fasullo et al., 2018; Xie et al., 2022).

Oceanic phytoplankton, such as diatoms, are a crucial component of ocean ecosystems and the functioning of the planet as a whole, acting as both a food source for ocean ecosystems and as a major carbon sink (Benoiston et al., 2017). As diatom growth depends on the radiative spectra of light, if SAI changes the profile of light reaching diatoms, it could affect their growth and the functioning of this keystone component of the ocean ecosystem and climate system (Lavaud et al., 2007). SAI only indirectly affects ocean acidification through biogeochemical processes, but since ocean acidification is primarily driven by GHG emissions, SAI does little to address the root cause of ocean acidification. However, as ocean acidification is accelerated by rising ocean temperatures, SAI may deter further ocean acidification by reducing global mean temperature. Temperature is also directly related to additional ocean health phenomenon including events like coral bleaching (Cornwall et al., 2021). SAI would most likely impact ocean health indirectly by controlling global temperature. Due to this temperature effect, one study found SAI could reduce coral bleaching in the Caribbean (Zhang et al., 2018).

Ocean biogeochemistry also has impacts on oceanic net primary production (NPP) (Rubin et al., 1998). Tropical injection SAI with an injection strength of 40 Tg of SO_2 per year was modeled to induce a decrease in ocean NPP relative to an RCP4.5 Scenario by the year 2100 (Lauvset et al., 2017). This decrease was due mostly to circulation changes but also influenced by changes in incoming solar radiation, decreased temperature, nutrient availability, and subsequent impacts on phytoplankton biomass, which persist up the food chain (Lauvset et al., 2017). Additional models have demonstrated opposite effects, showing that SAI of a magnitude to keep temperature at 1.5°C above preindustrial levels, will mitigate the impacts of climate change on ocean NPP, particularly in North Atlantic regions (Tilmes et al., 2020).

Unmitigated climate change will also have direct implications for ocean circulation, chemical cycling, and net primary productivity (Bijma et al., 2013). Global ocean temperatures are expected to rise in accordance with global increases in atmospheric temperature, contributing to large-scale ocean warming. Along with temperature increase, high concentrations of GHGs are a known contributor to ocean acidification, which can have detrimental impacts on ocean organisms, particularly those with calcium carbonate shells (Rastrick et al., 2018). Widespread ecological impacts, like coral bleaching, also result from the combined effects of ocean acidification, changes in chemical cycling, and rising ocean temperatures

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(Diraviya Raj et al., 2018). While contradictory evidence exists on the implications for net primary productivity in the oceans, recent reports estimate that total marine animal biomass will decrease significantly under an RCP8.5 scenario (Bijma et al., 2013; Bryndum-Buchholz et al., 2019). Ocean warming is also predicted to change global ocean currents including alterations to the intensity and frequency of seasonal events, such as El Niño and La Niña (Allison and Bassett, 2015). The magnitude of these impacts is difficult to determine as it depends heavily on atmospheric CO₂ concentrations and efforts to reduce GHG emissions. As compared with SAI, unmitigated climate change presents many of the same if not more risks to oceanic system disruption that will directly stem from increases in atmospheric global temperature and increased GHG concentrations.

3.2.4. Wet deposition and toxicity

Significant evidence has been collected regarding the association between atmospheric particle number concentration, particle type, and acidic wet deposition (Stumm et al., 1987; Pye et al., 2020). The impacts of acid rain on ecosystem health were critical for the development of regulatory limitations on emissions of SO₂ and NO_x (Menz and Seip, 2004). Acid rain is formed by atmospheric processes, which convert SO₂ and NO_x compounds to sulfuric and nitric acid, leading to decreased precipitation pH (U.S. Environmental Protection Agency, 2016). Acid rain causes pH changes to lakes, rivers, and streams, disrupting water quality used for ecosystem and human consumption and resulting in harm to the health of humans and ecosystems (Likens and Bormann, 1974; Singh and Agrawal, 2008).

As of 2015, approximately 125 Tg of SO₂ are released to the atmosphere annually from anthropogenic sources, though emissions are trending downward globally due to technological advancement (Aas et al., 2019). Sulfur emissions are also naturally released by various environmental processes every year, including volcanic eruptions, fires, and biogeochemical cycles, but anthropogenic emissions are the main source of atmospheric sulfur (Fioletov et al., 2016). Almost all of the sulfur currently emitted into the atmosphere is wet deposited to the Earth's surface (Aas et al., 2019). For reference, the amount of SO₂ for SAI to maintain temperatures at 1.5°C above preindustrial levels is approximately 48 Tg per year; however, this amount is dependent on the climate scenario at the time of deployment and injection strategy (Tilmes et al., 2020).

While SAI injection would take place at a much higher altitude than the bulk of SO₂ and NO_x emissions that affect the troposphere, interactions between the stratosphere and troposphere do take place, and over time particles will eventually settle down to Earth's surface (Visioni et al., 2020). Modeling studies have not shown a significant increase in surface sulfur deposition from the direct settling of injected sulfur in SAI (Kravitz et al., 2009; Visioni et al., 2020). Prior estimates suggest that the largest additional deposition resulting from SAI use, approximately 0.05 mEq m⁻²a⁻¹, is not enough deposition to negatively impact ecosystems; although the magnitude of the effect does depend on both injection mechanism

of SAI and geographic variation (Kravitz et al., 2009). Other work suggests that the deposition of injected sulfur particles may increase acid deposition in pristine areas and in the ocean (Visioni et al., 2020). The deployment of global aerosols over a century for SAI would also be counterbalanced by the subsequent decreases in anthropogenic SO₂ emissions as humans shift from the use of fossil fuel sources (Visioni et al., 2020). However, work to date on the effects of SAI on deposition to the surface may underestimate the impact of SAI on sulfur deposition as prior work has not included variations deposition due to interaction with the nitrogen cycle (Gao et al., 2018; Visioni et al., 2020).

In contrast to the impact of settling stratospheric aerosol particles, decreases in precipitation due to SAI can lead to decreased rainout of particulates, slowing wet deposition, and increasing the lifetime of surface air pollution. This effect has only been calculated in a single study, but the calculated impact of decreased rainout on mortality due to air pollution was about twice as important, with an additional 14,000 (7,100–21,000) premature mortalities per year, as the mortality impact of increased settling of stratospheric aerosol particles (Eastham et al., 2018b).

SAI may also affect cycling of nitrogen or other nutrients important for aquatic and marine ecosystems, possibly changing the magnitude, intensity, extent, and spatial distribution of algae blooms and hypoxic "dead zones." Nutrient cycling and associated water quality has direct links to public health in terms of aquatic-based food supply, drinking water quality, and access to recreational water bodies. Currently, there is little clarity on the exact implication of SAI and water contamination and this area of research requires further exploration.

Unmitigated climate change, or unregulated emission increases, will also have direct impacts on wet deposition, with associated public health implications linked to toxicity of water and soil (Grennfelt et al., 2020). This is primarily through acid rain and linked to increased GHGs in the atmosphere that interact with the hydrological cycle resulting in rainwater that infiltrates surface water systems and soils. While continuing the current global path of continued warming does not directly introduce new compounds into the atmosphere, like with SAI, it results in a further accumulation of GHGs and particulates and could easily reach levels higher than those proposed in SAI models.

3.3. Surface disturbances

3.3.1. Soil

Healthy soils are important for agriculture, water quality, biodiversity, and promoting uptake of large quantities of GHGs including CO₂ (Lal, 2004). Anthropogenic activities (e.g., farming, construction, urban development) have introduced toxins, pesticides, and fertilizers that increase the release of GHGs and disrupt the sequestration of soil carbon (Snyder et al., 2009). Understanding the impacts of SAI intervention on soil moisture and soil health is critically important for understanding potential long-term impacts of SAI on weather, biodiversity, and ecosystems, as well as direct relationships to human health, such as

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through connections to agriculture, drought, and forest fire risk.

Modeling of geoengineering scenarios with SAI shows likely changes in precipitation frequency and amount with high levels of regional variation, as compared to climate mitigation without the introduction of SAI (MacMartin et al., 2018). Precipitation patterns are directly associated with soil moisture, a critical variable for soil health and agricultural productivity (Kibblewhite et al., 2008). The effect of SAI on soil moisture remains uncertain and can depend on the specifics of the geoengineering scenario. Scenarios modeling multiple different aerosol injection sites predict that if SAI is implemented under high CO₂ conditions, global mean soil moisture will be retained compared to unmitigated climate change where global mean soil moisture is simulated to decline; however, there is a high potential for regional variability associated with changes in precipitation patterns (Cheng et al., 2019). Comparing the GLENS 20-member ensemble of simulations with a high emissions global warming scenario, simulated soil moisture is most heavily impacted by SAI in equatorial regions, which see the largest decreases in precipitation, with simulated SAI reducing summer soil moisture in India and the Amazon by $42 \pm 11 \text{ kg/m}^2$ (3.5%) and $27 \pm 16 \text{ kg/m}^2$ (2.1%) compared to near present-day conditions (Cheng et al., 2019). Along with changes in soil moisture, changes in precipitation also perpetuate changes in soil carbon storage. Lower global temperatures, as compared to the current state, will decrease the respiration rate of vegetation, leading to increased soil carbon storage (Tjiputra et al., 2016). Other models using GeoMIP G4 scenarios have shown increases in soil moisture in southern Africa, southwestern North America, and South America, with decreases in soil moisture occurring in tropical Africa, South Asia, and most of middle North America (Wei et al., 2018).

SAI also has the potential to impact soil pH and influence soil toxicity. As discussed previously, SAI would lead to changes in both wet and dry deposition of air pollutants. Wet deposition of PM_{2.5} can directly impact soil pH, leading to decreased soil quality (Nam et al., 2008). For example, decreased soil pH allows for greater mobilization of aluminum due to increased aluminum solubility, leading to increases in soil toxicity (Visioni et al., 2020). Aluminum is a metal naturally occurring in many soils; however, it can lead to toxic effects if mobilization occurs, impacting the health of plants, wildlife, and aquatic systems where aluminum runoff might occur (De Vries et al., 1989). More investigation into the route of SAI consequences on agricultural lands and associated soil systems will be necessary to understand how SAI may impact global food supply. However, existing modeling results suggest SAI may increase the potential for aluminum mobilization and thus soil toxicity in some areas of North America, Northern Europe, and Oceania (Visioni et al., 2020). Regardless of SAI introduction, global climate change will also drive large-scale ecosystem changes, leading to decreased soil quality, pH changes, and metal mobility (Rengel, 2011). While geographical deposition will vary and it is challenging to predict deposition

patterns and exact effects, SAI appears likely to result in less disruption in soil quality and toxicity as compared to unmitigated climate change.

The role of vegetation and agriculture in regulating soil moisture is also highly variable as plant water use depends on a combination of atmospheric CO₂ concentrations, temperature, and precipitation. Soil moisture variations due to SAI could disturb the pattern of evapotranspiration, photosynthetic rates, and subsequently soil moisture and quality (Dagon and Schrag, 2016). Since precipitation rates will vary by region, soil moisture will also vary. These changes will depend both on precipitation variation and on baseline soil types. An area with low soil moisture, and high heat such as the desert, may see improved crop production due to improved soil health. However, an area with already high soil moisture, such as the rainforest, may have decreased crop or ecological activity if precipitation rates increase, as this may oversaturate soils and disrupt evapotranspiration rates. Changes in soil moisture are also likely to vary by region and by variations in precipitation.

3.3.2. Permafrost

Anthropogenic climate change has led to an increase in high-latitude temperatures, causing increases in melting of what was once permafrost. Permafrost is not only necessary for maintaining ecological biomes but also prevents the release of sequestered soil carbon (Schuur et al., 2008). Frozen soils have limited activity within the global carbon cycle, not emitting or absorbing CO₂ or other GHGs. Concerns therefore exist about a positive feedback between permafrost thaw and climate change by which melting permafrost releases GHGs into the atmosphere and further adds to climate warming (Schuur et al., 2015), which would exacerbate all the public health issues connected to a warming climate. Permafrost is known to be sensitive to surface temperature and also dependent on yearly rainfall and snowfall, providing 2 major pathways by which SAI can impact permafrost thaw (Lee et al., 2019). Current modeling to predict the effects of SAI on permafrost shows that compared to the unmitigated climate trajectory, SAI with the previously mentioned GeoMIP G4 scenario, by decreasing global temperatures, could prevent the melting of permafrost layers (Chen et al., 2020). This could also prevent substantial carbon emissions; the same modeling study found that each 1°C warming in the Arctic permafrost resulting in a loss 13.7 Pg of carbon (Chen et al., 2020). A study using GLENS found an Arctic permafrost area decrease of only 5% by the end of the century as compared to models under the RCP8.5 scenarios, where annual permafrost area may decrease as much as 83% (Jiang et al., 2019). Another study found that under SAI sufficient to decrease global mean warming under the RCP8.5 scenarios to the RCP4.5 level, permafrost area decreases from approximately $11 \times 10^6 \text{ km}^2$ to $4.5 \times 10^6 \text{ km}^2$ by the year 2100, as opposed to decreases under the RCP8.5 scenarios where area is expected to diminish to approximately $2.5 \times 10^6 \text{ km}^2$ (Lee et al., 2019).

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3.4. Ecosystem disruption

3.4.1. Vegetation

Global vegetation plays a critical role in maintaining biodiversity, preserving habitats, and serving as a food source for both human and animal populations. Vegetation is also critical to the global hydrological cycle as evapotranspiration rates directly influence atmospheric water content (Wang et al., 2018). Adequate sunlight and water are the major requirements for maintaining rich global vegetation and a diversity of species (Zhu et al., 2008). One of the most well-known consequences of SRM implementation is the decrease in downwelling solar radiation and the blockage of sunlight dispersed by aerosol particles. Modeling has shown decreases in vegetative productivity with SRM implementation (Dagon and Schrag, 2019). The interaction between vegetation presence and the hydrological cycle may also potentially generate a positive feedback loop, where precipitation decreases lead to decreases in vegetation and subsequent decreases in evapotranspiration (Dagon and Schrag, 2019). However, SAI can also increase diffuse solar radiation even while net radiation reaching the surface declines (Xia et al., 2016). An increase in diffuse radiation can promote plant productivity due to more light reaching vegetated areas normally covered in shadows, such as those cast by other vegetation (Roderick et al., 2001). Work examining the effect of SAI on vegetation has found that this increase in diffuse radiation, together with decreases in temperature, can be more important than an overall decrease in solar radiation and thereby increase terrestrial gross primary productivity (Xia et al., 2016). Other work has found that, while the increase in diffuse light does impact photosynthesis, changes in temperature and precipitation changes from SAI may be larger drivers in changes in net primary productivity, which can be either positive or negative depending on the regional changes in precipitation and temperature (Lee et al., 2021a).

Vegetative systems are also impacted by the dry deposition of ozone. Ozone deposition into the plant's stomata can damage plant tissues and prevent continued growth (Clifton et al., 2020). Decreases in tropospheric ozone levels allow for healthier plant growth and subsequently greater uptake of CO₂ and increased leaf area index of vegetation (Zhou et al., 2018). SAI has been simulated to reduce tropospheric ozone levels (Xia et al., 2017; Eastham et al., 2018b), but the impacts of SAI on vegetation through changes in surface ozone have yet to be examined.

3.4.2. Biodiversity

Limited studies have explored the relationship between SAI implementation and ecological biodiversity (Zarnetske et al., 2021). The pathways connecting SAI and biodiversity are highly dependent on impacts to global temperature, precipitation, air quality, vegetative prevalence, and soil productivity. Current literature suggests that many risks to biodiversity are linked to termination shock—a fast, drastic rise in global temperature resulting from the sudden stoppage of SAI that occurs as global temperatures quickly rebound to what would have occurred in the

absence of SAI (Parker and Irvine, 2018; Trisos et al., 2018a). Termination shock is not a feature of SAI deployment but rather a potential risk that may occur if once deployed SAI is suddenly stopped. However, the longer term impacts of SAI on biodiversity in the absence of termination shock have yet to be fully investigated. Biological hot spots, situated mostly over equatorial and tropical regions, are at the greatest risk of extinction due to unmitigated climate change (Trew and Maclean, 2021) but also may see the greatest changes in precipitation and soil moisture with SRM implementation counteracting the largest magnitude in changes from unmitigated climate change (Ji et al., 2018; Cheng et al., 2019).

The effects of SAI may lead to ecosystems disruption potentially causing additional stress among species sensitive to temperature and precipitation fluctuations; however, unmitigated climate change will also induce major changes in global temperature and precipitation patterns that will also incur additional stress. In both scenarios, specialized species that may vacate ecosystem niches leave opportunity for more generalist species, those with a wider range of suitable conditions, to fill in and out compete more specialized species. Ecosystem disruptions, from either SAI or continued climate change without intervention, could be propagated across various ecological niches and lead to major fluctuations in species interconnectedness through changes in food webs, species locations, and alterations in predator–prey relationships (Ainsworth and Drake, 2020; Henderson et al., 2020).

3.4.3. Zoonotic infection

Infectious disease and the transfer of potentially serious viral or bacterial infections from the animal kingdom to human populations has been a long-standing concern of global public health officials. The most notorious vectors (mosquitoes, mice, bats, and microorganisms) often live in prescribed optimized ranges, where they are adapted to thrive (Lafferty, 2009). The increasing global temperatures from climate change have extended the ranges of zoonotic infectors northward, while simultaneously allowing for the reemergence of endemic disease pathogens (Ogden and Gachon, 2019). The extended range of pathogens is a primary concern for human health specialists focused on mitigating climate change. There is also evidence to suggest an interactive effect between rising temperatures from climate change and animal infection rates, making some species increasingly sensitive to temperature fluctuations (Greenspan et al., 2017) and therefore sensitive to changes from SAI.

SAI deployment will uniquely modify global temperature gradients to control habitat range changes. Modeling scenarios conducted by MacMartin et al. (2017) suggest that atmospheric and climatic temperature response to SAI can be partially controlled with innovative deployment techniques, which could limit the potential for drastic temperature fluctuations and prevent increased ranges for zoonotic vectors. While there may be a certain degree of control possible over temperature gradients with SAI, other preliminary modeling work suggests that SAI could substantially increase malaria risk in low-lying West

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African and Southern Asian countries while decreasing risk in high elevation areas of East Africa by roughly the same amount due to elevation-dependent temperature variations induced by SAI deployment (Carlson et al., 2022). However, this increase may also occur if carbon emissions were to decrease, as it is temperature dependent; any increase in global temperature would decrease malaria ranges and transmissibility across a wide portion of the globe (Mordecai et al., 2020; Diouf et al., 2022).

3.5. Global food system disturbances

3.5.1. Agriculture

Commercial and subsistence-based agriculture dominate the food supply, nutrition, and the livelihoods of millions of people. Agricultural success is heavily based on weather patterns and long-term predictable climate conditions (Musshoff et al., 2011). Global food systems and productive agriculture are also necessary to achieve adequate global nutrition and maintain regional populations through the prevention of malnourishment. The greatest benefits to agriculture from SAI are due to stabilization of global temperatures, creating more ideal growing conditions (Proctor et al., 2018; Xia et al., 2018). A simulation (GeoMIP) using G4 SAI, to offset RCP4.5, found that temperature is the dominant driver in predicting rice yield in China, with SAI resulting in yield increases throughout most areas of China (Zhan et al., 2019). Additional simulations focused on Chinese rice and maize production found that there was limited change in rice production, but an increase in maize production when using SAI (Xia et al., 2014). Models conducted on U.S. corn production show similar results when comparing G4 SAI (5 Tg SO₂/year) with carbon concentrations consistent with RCP4.5; where projected yields are higher under the SAI scenario, particularly in southeastern states which will experience greater extreme heat events in an unmitigated scenario (Crane-Droesch et al., 2018). As SAI effects differ regionally, agricultural impacts around the world are not likely to be equal. Models investigating the effects of GeoMIP G3 SAI on the Indian groundnut found that yields may decrease as much as 20% for the first 50 years of SAI until eventually stabilizing to current yield values (Yang et al., 2016). Empirical estimates using Mount Pinatubo and El Chichón eruptions also suggest a possible decline in sunlight, which may induce a negative impact on crops; however, volcanic eruptions exhibit pulse injection with a stronger concentration of sulfate particles in a single area (Proctor et al., 2018). Regional precipitation reductions due to SAI may also impact crop growth, particularly for water intensive crops like rice (Trisos et al., 2018b).

In addition to impacts on agriculture through changes on light and climate, SAI may lead to increases in crop growth through a reduction in tropospheric ozone levels (Xia et al., 2018). Ozone can damage crops by entering crop leaves through the stomata and causing internal damage to plant tissues, thereby significantly diminishing crop yields (Tai et al., 2014; Tai and Val Martin, 2017).

Agricultural pest populations are also impacted by global weather patterns and climate systems and could be affected by SAI. Warming temperatures extend the

range of many species and the absence of cold weather spikes leads to larger ranges and increased populations numbers for multiple pest species (Estay et al., 2009; Langille et al., 2017). Climate change also may potentially wipe out natural pest predators leading to exponential pest population increases (Thomson et al., 2010). SAI has the potential to mitigate temperature changes due to global climate change and potentially control the exponential increase in agricultural pest populations that accompany unmitigated temperature changes. However, agricultural pests are also subject to the complexities of ecological system disturbances with dramatic climate events having major repercussions on their populations. SAI deployment and potential unknown consequences may lead to major fluctuations in species interactions and the natural predator-prey relationships that exist (Zarnetske et al., 2021). Disturbances in predator-prey relationships may also cause farmers to alter pesticides application practices, which could further disrupt ecosystems. Additional investigation into the relationship between SAI deployment and predator-prey relations is necessary to fully investigate potential public health effects associated with disruptions in agricultural production.

3.5.2. Ocean food systems

Ocean food systems are a primary food source for over 1 billion people (Dewailly and Knap, 2006). Ocean health is of particular importance for individuals from small island states and those dependent on the oceans as a source of food. Conservation of food systems and protections from overfishing are vital to the continuation of adequate nutrition for communities relying on ocean food systems. Ocean NPP measures the amount of organic material in the ocean and provides an estimate of the material available to fuel the food webs (Finkel, 2014) and has been studied in the context of SAI. As previously noted, SAI would generate a global decrease in ocean net primary productivity (NPP) relative to the RCP4.5 scenario, having potential implications for the entire ocean food system (Lauvset et al., 2017). Also as previously noted, SAI will indirectly impact ocean chemistry including pH. SAI may lead to a small increase in pH; however, simulations suggest SRM at a level to return temperatures to pre-industrial levels would not affect levels of aragonite saturation due to opposing responses to temperature changes for aragonite saturation and pH (Matthews et al., 2009). Aragonite saturation levels are key to the shell forming ability of calcifying oceanic organisms (Orr et al., 2005), suggesting that SAI may not significantly diminish this threat to oceanic ecosystems.

Coral reef fisheries, an important part of the global food supply, may also be impacted by SAI. Climate change and additional anthropogenic disturbances have led to coral reef decline and coral bleaching events as a result of temperature changes and ocean acidification (Hughes et al., 2012). Coral reefs are extremely sensitive environments, dependent on specific conditions, such as temperature, sunlight, and water quality. While SAI does not substantially change global CO₂ concentrations, a major

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driver of coral reef bleaching, solar radiation is also an important component of overall coral reef health (Crabbe, 2009). Ocean NPP, which may slightly decrease due to SAI (Lauvset et al., 2017), may also be an important driver of coral reef health. Coral reefs are also a primary driver of ocean primary production due to the recycling of organic material and the NPP from reefs is then distributed to the larger ocean environment (Crossland et al., 1991).

3.6. Pathways of major importance

All the exposure pathways for the effects of SAI on global public health discussed in this review are important to consider when determining the implications of SAI deployment. While all pathways are relevant for determining the total effects of SAI deployment on public health outcomes, there are some pathways that are more crucial than others for public health. Pathways with the greatest potential to influence public health are those pathways affecting water quality, water security, and global food systems, since these may influence the largest number of people. The dynamic connections between ecosystem and public health impacts also demonstrate a high degree of overlap between water, food, soil, and human health. Water quality, affected by rainfall and potential wet deposition from changes in particulate air pollution, has direct impacts on drinking water and ecological systems. Unintended consequences impacting water systems bridge into impacts on soil moisture, which has direct effects on agricultural food production. Soil moisture is also directly related to metal mobility in soils, potentially leading to toxic effects.

The other more obvious major pathway of influence is the downstream public health consequences from changes in atmospheric chemistry. Changes in particulate air pollution, in tropospheric ozone, and in sunlight exposures are all factors of concerns. Simulations suggest SAI deployment will not significantly change the total amount of particulate air pollution in the atmosphere, so particulate pollution effects appear likely to be small in magnitude.

Overall, all aspects of the ecosystems and implications for public health are either directly or indirectly connected. Any change in atmospheric dynamics will likely initiate change in other environmental domains including water, soil, food production, the animal kingdom, and human health. Since all ecological systems are connected and dependent upon one another, all pathways influenced by SAI are likely to have implication for other pathways, potentially resulting in unintended positive or negative consequences for global health.

3.7. Further research exploration

Additional investigation into SAI outcome pathways that may have a direct or indirect effect on public health requires continued extensive analysis and is necessary to better understand, and possibly quantify, the potential unintended consequences of SAI. Specifically, further analysis on the impacts to air and soil pathways that may impact agricultural systems and subsequently global food supply is critical as these will likely have large-scale global

implications. While current climate models can make it challenging to look at downstream interactions and the many confounding variables present in a living system may make results uncertain, continued investigations taking into account potential public health implications of climate engineering should help reduce the uncertainty surrounding potential effects of SAI deployment or at least begin to illuminate a range of potential impacts.

Our review can help guide future research by highlighting the important pathways through which SAI can affect public health and inform additional pathways that future modeling research on SAI could include. This can help build a more holistic understanding of potential public health consequences, both helpful and harmful, of SAI, as compared to appropriate counterfactual scenarios of climate change. The response of vegetation and animal life to SAI deployment will also be increasingly important as we consider the interactions between human life, planetary health, and ecological systems. The relationship between anthropogenic action, the ecological world, and human health has become increasingly visible in light of the COVID-19 pandemic, with additional emphasis focusing on the need for climate action and preservation of biodiversity (Dobson et al., 2020). Our analysis shows that a joint ecosystem and human HIA and risk assessment framework is helpful, and possibly necessary, to capture the system interlinkages between ecosystem health and public health. More holistic modeling may be needed to understand these more distal linkages and interactions between the atmosphere, ecosystems, global carbon cycling, and health. A fuller HIA, directly assessing the various public health pathways, may become possible as the modeling of SAI progresses, and representation of these earth system linkages improves.

4. Conclusion

SAI has the potential to both help and harm public health and global ecosystems, and these consequences are still being evaluated. While mitigating the most severe consequences of global climate change, such as increased surface temperatures, SAI may introduce potential unknown consequences for public health outcomes that will need continued investigation. SAI has the potential to reduce the public health and ecosystem effects associated with temperature rise but may disrupt global environmental systems, potentially impacting water quality, agriculture, and zoonotic infection; however, continued unmitigated climate change will also bring about a variety of disruptions. There are many unknown or unintended consequences that may develop from fundamentally altering the global climate through SAI. While current models have predicted minimal negative impacts and highlight multiple positive impacts to improve public health and global ecology, there are many uncertainties surrounding SAI that remain. Geoengineering research has now reached a point at which some countries are beginning to develop national research programs (Temple, 2022). As research continues in this new era, it will be important to carry out more holistic modeling, including a focus on impacts, to continue to reduce the uncertainty surrounding the

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potential positive and negative consequences of SRM, especially those surrounding potential public health concerns.

Supplemental files

The supplemental files for this article can be found as follows:

Table S1. Summary of sources referenced for the direct implications of SAI. (Docx)

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Author contributions

- Substantial contributions to conception and design: SMT, JMM, JJB.
- Analysis and interpretation of complied articles: SMT, JMM, JJB.
- Drafted and revised article: SMT, JMM, SDE, JJB.
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APPENDIX FOUR – NEXRAD

The following can be found here

<https://en.wikipedia.org/wiki/NEXRAD>

NEXRAD or Nexrad (Next-Generation Radar) is a network of 159 high-resolution S-band Doppler weather radars operated by the National Weather Service (NWS), an agency of the National Oceanic and Atmospheric Administration (NOAA) within the United States Department of Commerce, the Federal Aviation Administration (FAA) within the Department of Transportation, and the U.S. Air Force within the Department of Defense. Its technical name is WSR-88D (Weather Surveillance Radar, 1988, Doppler).

NEXRAD detects precipitation and atmospheric movement or wind. It returns data which when processed can be displayed in a mosaic map which shows patterns of precipitation and its movement. The radar system operates in two basic modes, selectable by the operator – a slow-scanning clear-air mode for analyzing air movements when there is little or no activity in the area, and a precipitation mode, with a faster scan for tracking active weather. NEXRAD has an increased emphasis on automation, including the use of algorithms and automated volume scans.

Deployment

Testbed of the WSR-88D on display at the National Severe Storms Laboratory.

In the 1970s, the U.S. Departments of Commerce, Defense, and Transportation, agreed that to better serve their operational needs, the existing national radar network needed to be replaced. The radar network consisted of WSR-57 developed in 1957, and WSR-74 developed in 1974. Neither system employed Doppler technology, which provides wind speed and direction information.

The Joint Doppler Operational Project (JDOP) was formed in 1976 at the National Severe Storms Laboratory (NSSL) to study the usefulness of using Doppler weather radar to identify severe and tornadic thunderstorms. Tests over the next three years, conducted by the National Weather Service and the Air Weather Service agency of the U.S. Air Force, found that

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Doppler radar provided much improved early detection of severe thunderstorms. A working group that included the JDOP published a paper providing the concepts for the development and operation of a national weather radar network. In 1979, the NEXRAD Joint System Program Office (JSPO) was formed to move forward with the development and deployment of the proposed NEXRAD radar network. That year, the NSSL completed a formal report on developing the NEXRAD system.[1][2]

When the proposal was presented to the Reagan administration, two options were considered to build the radar systems: allow corporate bids to build the systems based on the schematics of the previously developed prototype radar or seek contractors to build their own systems using predetermined specifications. The JSPO group opted to select a contractor to develop and produce the radars that would be used for the national network. Radar systems developed by Raytheon and Unisys were tested during the 1980s. However, it took four years to allow the prospective contractors to develop their proprietary models. Unisys was selected as the contractor, and was awarded a full-scale production contract in January 1990.[1][2]

NEXRAD sites within the Contiguous U.S.

NEXRAD sites in Alaska, Hawaii, U.S. territories, and military bases.

Installation of an operational prototype was completed in the fall of 1990 in Norman, Oklahoma. The first installation of a WSR-88D for operational use in daily forecasting was in Sterling, Virginia on June 12, 1992. The last system deployed as part of the installation program was installed in North Webster, Indiana on August 30, 1997. In 2011, the new Langley Hill NEXRAD was added at Langley Hill, Washington to better cover the Pacific Coast of that area;^[3] other radars also filled gaps in coverage at Evansville, Indiana and Ft. Smith, Arkansas, following the initial installations.[citation needed] The site locations were strategically chosen to provide overlapping coverage between radars in case one failed during a severe weather event. Where possible, they were co-located with NWS Weather Forecast Offices (WFOs) to permit quicker access by maintenance technicians.[4]

The NEXRAD radars incorporated a number of improvements over the radar systems that were previously in use. The new system provided Doppler velocity, improving tornado prediction ability by detecting rotation present within the storm at different scan angles. It provided improved resolution and sensitivity, enabling operators to see features such as cold fronts, thunderstorm gust fronts, and mesoscale to even storm scale features of thunderstorms that had never been visible on radar. The NEXRAD radars also provided volumetric scans of the atmosphere allowing operators to examine the vertical structure of storms and could act as wind profilers by providing detailed wind information for several

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kilometers above the radar site. The radars also had a much increased range allowing detection of weather events at much greater distances from the radar site.[5]

WSR-88D development, maintenance, and training are coordinated by the NEXRAD Radar Operations Center (ROC) located at the National Weather Center (NWC) in Norman, Oklahoma.[6]

The University of Louisiana at Monroe in Monroe, Louisiana operates a "WSR-88D clone" radar that is used by local National Weather Service offices in Shreveport, Little Rock and Jackson to fill gaps in NEXRAD coverage in northeastern Louisiana, southeastern Arkansas and western Mississippi. However, the radar's status as being part of the NEXRAD network is disputed.

Radar properties

A standard WSR-88D operates in the S band, at a frequency of around 2800 MHz, with a typical gain around 53 dB using a center-fed parabolic antenna. The pulse repetition frequency (PRF) varies from 318 to 1300 Hz with a maximum power output of 700 kW at Klystron output, although dependent on the volume coverage pattern (VCP) selected by the operator. All NEXRADs have a dish diameter of 9.1 m (30 ft) and an aperture diameter of 8.5 m (28 ft). Using the predetermined VCPs, NEXRADs have a traditional elevation minimum and maximum ranging from 0.1 to 19.5 degrees, although the non-operational minimum and maximum spans from -1 to +45 degrees. Unlike its predecessor, the WSR-74, the antenna can not be manually steered by the operator. WSR-88D Level I data is the recorded output of the digital receiver.[7] Spatial resolution varies with data type and scan angle – level III data has a resolution of 1 km x 1 degree in azimuth, while super-res level II, (implemented in 2008 nationwide), has a resolution of 250m by 0.5 degrees in azimuth below 2.4 degrees in elevation.[8]

Scan strategies

The NEXRAD radar system continually refreshes its three-dimensional database via one of several predetermined scan patterns. These patterns have differing PRFs to fit the respective use, but all have a constant resolution. Since the system samples the atmosphere in three dimensions, there are many variables that can be changed, depending on the desired output. With all traditional VCPs, the antenna scans at a maximum of 19.5 degrees in elevation, and a minimum of .5, with some coastal sites scanning as low as .2 or lower. Due to the incomplete elevation coverage, a phenomenon known as "The Cone of Silence" is present with all NEXRAD radars.[9] The term describes the lack of coverage directly above the radar sites.

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There are currently seven Volume Coverage Patterns (VCP) available to NWS meteorologists, with an eighth in the process of replacing one of the existing seven. Each VCP is a predefined set of instructions that control antenna rotation speed, elevation angle, transmitter pulse repetition frequency and pulse width. The radar operator chooses from the VCPs based on the type of weather occurring:

Enhancements

Super resolution

Deployed from March to August 2008 with all level II data,[16] the Super Resolution upgrade permitted the capability of the radar to produce much higher resolution data. Under legacy resolution, the WSR-88D provides reflectivity data at 1 km (0.62 mi) by 1 degree to 460 km (290 mi) range, and velocity data at 0.25 km (0.16 mi) by 1 degree to a range of 230 km (140 mi). Super Resolution provides reflectivity data with a sample size of 0.25 km (0.16 mi) by 0.5 degree, and increase the range of Doppler velocity data to 300 km (190 mi). Initially, the increased resolution is only available in the lower scan elevations. Super resolution makes a compromise of slightly decreased noise reduction for a large gain in resolution.[17]

The improvement in azimuthal resolution increases the range at which tornadic mesoscale rotations can be detected. This allows for faster lead time on warnings and extends the useful range of the radar. The increased resolution (in both azimuth and range) increases the detail of such rotations, giving a more accurate representation of the storm. Along with providing better detail of detected precipitation and other mesoscale features, Super Resolution also provides additional detail to aid in other severe storm analysis. Super Resolution extends the range of velocity data and provides it faster than before, also allowing for faster lead time on potential tornado detection and subsequent warnings.[18]

Dual polarization

See also: Joint Polarization Experiment

Non-Polarimetric Radar

Polarimetric Radar

WSR-88D sites across the nation have been upgraded to polarimetric radar, which adds a vertical polarization to the traditional horizontally polarized radar waves, in order to more accurately discern what is reflecting the signal. This so-called dual polarization allows the

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radar to distinguish between rain, hail, and snow, something the horizontally polarized radars cannot accurately do. Early trials showed that rain, ice pellets, snow, hail, birds, insects, and ground clutter all have different signatures with dual polarization, which could mark a significant improvement in forecasting winter storms and severe thunderstorms.[19] The deployment of the dual polarization capability (Build 12) to NEXRAD sites began in 2010 and was completed by the summer of 2013. The radar at Vance Air Force Base in Enid, Oklahoma was the first operational WSR-88D modified to utilize dual polarization technology. The modified radar went into operation on March 3, 2011.[20]

AVSET

When the NEXRAD system was initially implemented, the radar automatically scanned all scan angles in a Volume Coverage Pattern, even if the highest scan angles were free of precipitation. As a result, in many cases when severe weather was farther from the radar site, forecasters could not provide as timely severe weather warnings as possible. The Automated Volume Scan Evaluation and Termination (AVSET) algorithm[21] helps solve this problem by immediately ending the volume scan when precipitation returns at higher scan angles drop below a set threshold (around 20 dBZ). This can often allow for more volume scans per hour, improving severe weather detection without the need for hardware upgrades[22][23] AVSET was initially deployed in RPG build 12.3, in Fall of 2011.

SAILS and MESO-SAILS

Main article: MESO-SAILS

One of the primary weaknesses of the WSR-88D radar system was the lack of frequency of base (0.5 degree) scans, especially during severe weather. Forecasters, and TV viewers at home, often had access to images that were four or five minutes old, and therefore had inaccurate information. TV viewers at home could be lulled into a false sense of security that a tornado was farther away from them than it really was, endangering residents in the storm's path. The Supplemental Adaptive Intra-Volume Low-Level Scan (SAILS) technique, deployed with Build 14 in the first half of 2014, allows operators the option to run an additional base scan during the middle of a typical volume scan.[24] With one SAILS cut active on VCP 212, base scans occur about once every two and a half minutes, with more frequent updates if AVSET terminates the volume scan early.

Multiple Elevation Scan Option for Supplemental Adaptive Intra-Volume Low-Level Scan (MESO-SAILS) is an enhancement to SAILS, which allows the radar operator to run one, two or three additional base scans during the course of a volume scan, per the operators request.[12]

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During June 2013, the Radar Operations Center first tested SAILSx2, which adds two additional low-level scans per volume. It was executed for approximately 4.5 hours and during the testing, an Electronics Technician observed the pedestal/antenna assembly's behavior. No excessive wear was noted. Two days later, SAILSx3 was executed, which added 3 additional low-level scans to a volume. During this 1.5 hour test of SAILSx3, a ROC Radar Hardware Engineer accompanied the ROC Electronics Technician to observe the antenna/pedestal assembly. Again, no excessive wear was noted.[25] MESO-SAILS was deployed with Build 16.1, in spring of 2016.

MRLE

Mid-Volume Rescan of Low-Level Elevations (colloquially known as M.R.L.E.) is a dynamic scanning option for the WSR-88D derived from MESO-SAILS,[26] a separate scanning option implemented in NEXRAD RPG 14.0, in the Spring of 2014.[27]

During quasi-linear convective systems (QLCS), colloquially known as squall lines, the detection of mesovortices, which generate at 4,000 to 8,000 feet above ground level,[28] is not always possible with SAILS cuts, as the base 0.5 degree scan travels below the formation of mesovortices at closer distances to the radar. MRLE consecutively scans either the two, three or four lowest scan angles during the middle of a typical volume scan, allowing more frequent surveillance of mesovortex formation during QLCS events.[29] MRLE will be deployed on a non-operational basis in RPG 18.0 in spring of 2018, with possible operational deployment with RPG 19.0, if proven useful or of importance.

Deployment was anticipated by the Radar Operations Center to commence in October 2017, along with the RPG 18.0 build, on a non-operational basis. The scanning option will only be available for use with Volume Coverage Patterns 21, 12, 212, and additionally 215.[30] If proven to be significant in terms of warning dissemination, MRLE will deploy operationally nationwide with RPG 18.0, planned for 2018.

Concept

Spin-up tornado associated with a QLCS as seen from a nearby Doppler weather radar, which often goes unseen.

The concept of MRLE derives from the need of more frequent low-level scans during quasi-linear convective systems (QLCSs). During QLCSs, it is not uncommon for brief and otherwise un-noticeable mesovortices to spawn at points along the line.[31] Due to untimely radar data and time being taken to complete the entire volume, these vortices often spawn without warning or prior notice. With MRLE, the operator has the choice between 2 and 4 low-level

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scans. Unlike MESO-SAILS, which scans at one angle and can only do up to 3 low-level scans per volume, MRLE scans at 4 possible angles, and can cut into a volume up to 4 times, depending on the operators choice.

The operator can not use MESO-SAILS alongside MRLE simultaneously. If one is selected while the other is active, the NEXRAD algorithms will automatically set the other "off".

Service Life Extension Program

Started on March 13, 2013, the SLEP, or Service Life Extension Program, is an extensive effort to keep and maintain the current NEXRAD network in working order for as long as possible. These improvements include Signal Processor upgrades, Pedestal upgrades, Transmitter upgrades, and shelter upgrades. The program is anticipated to be finished by 2022, which coincides with the beginnings of a nationwide implementation of Multi-function Phased Array Radars (see below).[33]

Coverage gaps

NEXRAD coverage below 10,000 feet

WSR-88D has coverage gaps below 10,000 feet (or no coverage at all) in many parts of the continental United States, often for terrain or budgetary reasons, or remoteness of the area. Such notable gaps include most of Alaska; several areas of Oregon, including the central and southern coast and much of the area east of the Cascade Mountains; many portions of the Rocky Mountains; Pierre, South Dakota; portions of northern Texas; large portions of the Nebraska panhandle; the Four Corners region; the area around the Northwest Angle in Minnesota; an area near the Connecticut River in Vermont; and areas near the borders of the Oklahoma and Texas Panhandles. Notably, many of these gaps lie in tornado alley. At least one tornado has gone undetected by WSR-88D as a result of such a coverage gap – an EF1 tornado in Lovelady, Texas in April 2014. As a result of the coverage gap, initial reports of tornadic activity were treated with skepticism by the local National Weather Service forecast office.[34][35]

Coverage gaps can also be caused during radar outages, especially in areas with little to no overlapping coverage. For example, a hardware failure on July 16, 2013 resulted in an outage and coverage gap for the Albany, New York area that lasted through early August.[36]

A coverage gap in North Carolina encouraged Senator Richard Burr to propose S. 2058, also known as the Metropolitan Weather Hazard Protection Act of 2015. The act mandates that

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any city with a population of 700,000 or more must have Doppler Radar coverage <6,000 feet above ground level.[37] The bill passed the Senate, but died in a House committee.[38]

It is not likely that additional WSR-88Ds will be deployed, as the production line was shut down in 1997, and the National Weather Service has an insufficient budget to restart production.[35] In 2011, a known coverage gap was filled when the Langley Hill radar in southwestern Washington was installed, using the last remaining spare. This radar opportunity was spearheaded by a public campaign led by Professor Cliff Mass at the University of Washington, and likely helped the NWS office in Portland, Oregon issue a timely warning for the Manzanita, OR EF-2 tornado in October, 2016.

In 2021, the National Weather Service office in Slidell, Louisiana announced that they would move the office's NEXRAD from the office building in Slidell west to Hammond at the end of 2022. Along with a lower elevation angle, the new location would enable lower level monitoring of storm activity in the Baton Rouge area, where the lowest sampling elevation would drop from 4000-6000 feet above the surface to 300-600 feet.[39]

Destroyed radars

The NEXRAD site located in Cayey, Puerto Rico was destroyed during the passage of Hurricane Maria through the region in September 2017.[40] In addition to a neighboring Terminal Doppler Weather Radar (TDWR) site that was rendered temporarily inoperable but ultimately survived, the Department of Defense deployed two short-range X-band radars on the island to provide radar coverage until the FAA-maintained NEXRAD site was restored.[41] In June 2018, this NEXRAD radar site was restored to fully operational condition and was reinforced with several lightning rods and secured with a stronger fiberglass dome that included using more than 3,000 bolts.[42]

On August 27, 2020, the NEXRAD radar site located in Lake Charles, Louisiana, was destroyed by Hurricane Laura as the eye of the Category 4 storm—which packed wind gusts recorded around 135 mph (217 km/h) in the city—passed over the site after it made landfall. NEXRAD radars based in Houston, Shreveport and Fort Polk were used to fill gaps in radar coverage within portions of Southwestern Louisiana until the Lake Charles site was rebuilt; the NWS Radar Operations Center also deployed a SMART-R vehicle on loan from the University of Oklahoma to provide supplemental radar data on Hurricane Delta in advance of its track into the region (nearly paralleling that of Hurricane Laura) in late October.[43][44][45] Operational service to the Lake Charles NEXRAD radar site was restored in January 2021, following a four-month, \$1.65-million reconstruction project that included the replacement of the radome and

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internal equipment and repairs to the station's radome pedestal, tower, fence and equipment shelters.[46]

On May 24, 2023, the NEXRAD radar site located on Guam, was damaged by Typhoon Mawar as the eye of the Category 4 typhoon passed over the northern end of the island. After initially being restored back into operation, the installation suffered from ongoing issues and, as of April 24, 2024, has been reported as "unserviceable" in NOTAMs.[47] Future plans for restoring weather radar to Guam and the CNMI are unknown.

Future enhancements

See also: Advanced Technology Demonstrator

Current NEXRAD system

The National Weather Service keeps a list of upcoming improvements to the WSR-88D system.[48]

Multi-function Phased Array Radar (MPAR)

Main article: Multifunction Phased Array Radar

Multi-Function Phased Array Radar during installation in Norman, Oklahoma, 2003

Beyond dual-polarization, the advent of phased array radar will probably be the next major improvement in severe weather detection. Its ability to rapidly scan large areas would give an enormous advantage to radar meteorologists.[49] Its additional ability to track both known and unknown aircraft in three dimensions would allow a phased array network to simultaneously replace the current Air Route Surveillance Radar network, saving the United States government billions of dollars in maintenance costs.[49][50] The National Severe Storms Laboratory predicts that a phased array system will eventually replace the current network of WSR-88D radar transmitters.[51]

Applications

Usage

NEXRAD data is used in multiple ways. It is used by National Weather Service meteorologists and (under provisions of U.S. law) is freely available to users outside of the NWS, including researchers, media, and private citizens. The primary goal of NEXRAD data is to aid NWS meteorologists in operational forecasting. The data allows them to accurately track precipitation and anticipate its development and track. More importantly, it allows the

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meteorologists to track and anticipate severe weather and tornadoes. Combined with ground reports, tornado and severe thunderstorm warnings can be issued to alert the public about dangerous storms. NEXRAD data also provides information about rainfall rate and aids in hydrological forecasting. Data is provided to the public in several forms, the most basic form being graphics published to the NWS website. Data is also available in two similar, but different, raw formats. Available directly from the NWS is Level III data, consisting of reduced resolution, low-bandwidth base products as well as many derived, post-processed products; Level II data consists of only the base products, but at their original resolution. Because of the higher bandwidth costs, Level II data is not available directly from the NWS. The NWS distributes this data freely to Amazon Web Services[52][53] and several top-tier universities, which in turn distribute the data to private organizations. List of NEXRAD sites and their coordinates[55]

See also

Canadian weather radar network

Australian Weather Radars

Low level windshear alert system (LLWAS)

Terminal Doppler Weather Radar (TDWR)

High Resolution Rapid Refresh (HRRR)

Geostationary Operational Environmental Satellite

To go to the reference links first goto the Wikipedia article here
<https://en.wikipedia.org/wiki/NEXRAD>

APPENDIX FIVE – PHASED ARRAY

The article from Wikipedia can be found here

https://en.wikipedia.org/wiki/Phased_array

Types

Phased arrays take multiple forms. However, the four most common are the passive electronically scanned array (PESA), active electronically scanned array (AESA), hybrid beam forming phased array, and digital beam forming (DBF) array.[12]

A passive phased array or passive electronically scanned array (PESA) is a phased array in which the antenna elements are connected to a single transmitter and/or receiver, as shown in the first animation at top. PESAs are the most common type of phased array. Generally speaking, a PESA uses one receiver/exciter for the entire array.

An active phased array or active electronically scanned array (AESA) is a phased array in which each antenna element has an analog transmitter/receiver (T/R) module[13] which creates the phase shifting required to electronically steer the antenna beam. Active arrays are a more advanced, second-generation phased-array technology that are used in military applications; unlike PESAs they can radiate several beams of radio waves at multiple frequencies in different directions simultaneously. However, the number of simultaneous beams is limited by practical reasons of electronic packaging of the beam formers to approximately three simultaneous beams for an AESA. Each beam former has a receiver/exciter connected to it.

A hybrid beam forming phased array can be thought of as a combination of an AESA and a digital beam forming phased array. It uses subarrays that are active phased arrays (for instance, a subarray may be 64, 128 or 256 elements and the number of elements depends upon system requirements). The subarrays are combined to form the full array. Each subarray has its own digital receiver/exciter. This approach allows clusters of simultaneous beams to be created.

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A digital beam forming (DBF) phased array has a digital receiver/exciter at each element in the array. The signal at each element is digitized by the receiver/exciter. This means that antenna beams can be formed digitally in a field programmable gate array (FPGA) or the array computer. This approach allows for multiple simultaneous antenna beams to be formed.

A conformal antenna[14] is a phased array in which the individual antennas, instead of being arranged in a flat plane, are mounted on a curved surface. The phase shifters compensate for the different path lengths of the waves due to the antenna elements' varying position on the surface, allowing the array to radiate a plane wave. Conformal antennas are used in aircraft and missiles, to integrate the antenna into the curving surface of the aircraft to reduce aerodynamic drag.

History

Ferdinand Braun's 1905 directional antenna, which used the phased array principle, consisting of three monopole antennas in an equilateral triangle. A quarter-wave delay in the feedline of one antenna caused the array to radiate in a beam. The delay could be switched manually into any of the three feeds, rotating the antenna beam by 120°.

US PAVE PAWS active phased array ballistic missile detection radar in Alaska. Completed in 1979, it was one of the first active phased arrays.

Closeup of some of the 2677 crossed dipole antenna elements that make up the plane array. This antenna produced a narrow "pencil" beam only 2.2° wide.

BMEWS & PAVE PAWS radars

Mammut phased-array radar, World War II

Phased array transmission was originally shown in 1905 by Nobel laureate Karl Ferdinand Braun who demonstrated enhanced transmission of radio waves in one direction.[15][16] During World War II, Nobel laureate Luis Alvarez used phased array transmission in a rapidly steerable radar system for "ground-controlled approach", a system to aid in the landing of aircraft. At the same time, the GEMA in Germany built the Mammut 1.[17] It was later adapted for radio astronomy leading to Nobel Prizes for Physics for Antony Hewish and Martin Ryle after several large phased arrays were developed at the University of Cambridge Interplanetary Scintillation Array. This design is also used for radar, and is generalized in interferometric radio antennas.

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In 1966, most phased-array radars use ferrite phase shifters or traveling-wave tubes to dynamically adjust the phase. The AN/SPS-33 -- installed on the nuclear-powered ships Long Beach and Enterprise around 1961 -- was claimed to be the only operational 3-D phased array in the world in 1966. The AN/SPG-59 was designed to generate multiple tracking beams from the transmitting array and simultaneously program independent receiving arrays. The first civilian 3D phased array was built in 1960 at the National Aviation Facilities Experimental Center; but was abandoned in 1961.[18]

In 2004, Caltech researchers demonstrated the first integrated silicon-based phased array receiver at 24 GHz with 8 elements.[19] This was followed by their demonstration of a CMOS 24 GHz phased array transmitter in 2005[20] and a fully integrated 77 GHz phased array transceiver with integrated antennas in 2006[21][22] by the Caltech team. In 2007, DARPA researchers announced a 16-element phased-array radar antenna which was also integrated with all the necessary circuits on a single silicon chip and operated at 30–50 GHz.[23]

The relative amplitudes of—and constructive and destructive interference effects among—the signals radiated by the individual antennas determine the effective radiation pattern of the array. A phased array may be used to point a fixed radiation pattern, or to scan rapidly in azimuth or elevation. Simultaneous electrical scanning in both azimuth and elevation was first demonstrated in a phased array antenna at Hughes Aircraft Company, California in 1957.[24]

Applications

Broadcasting

In broadcast engineering, the term 'phased array' has a meaning different from its normal meaning, it means an ordinary array antenna, an array of multiple mast radiators designed to radiate a directional radiation pattern, as opposed to a single mast which radiates an omnidirectional pattern. Broadcast phased arrays have fixed radiation patterns and are not 'steered' during operation as are other phased arrays.

Phased arrays are used by many AM broadcast radio stations to enhance signal strength and therefore coverage in the city of license, while minimizing interference to other areas. Due to the differences between daytime and nighttime ionospheric propagation at mediumwave frequencies, it is common for AM broadcast stations to change between day (groundwave) and night (skywave) radiation patterns by switching the phase and power levels supplied to the individual antenna elements (mast radiators) daily at sunrise and sunset. For shortwave broadcasts many stations use arrays of horizontal dipoles. A common arrangement uses 16

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dipoles in a 4×4 array. Usually this is in front of a wire grid reflector. The phasing is often switchable to allow beam steering in azimuth and sometimes elevation.

Radar

Phased arrays were invented for radar tracking of ballistic missiles, and because of their fast tracking abilities phased array radars are widely used in military applications. For example, because of the rapidity with which the beam can be steered, phased array radars allow a warship to use one radar system for surface detection and tracking (finding ships), air detection and tracking (finding aircraft and missiles) and missile uplink capabilities. Before using these systems, each surface-to-air missile in flight required a dedicated fire-control radar, which meant that radar-guided weapons could only engage a small number of simultaneous targets. Phased array systems can be used to control missiles during the mid-course phase of the missile's flight. During the terminal portion of the flight, continuous-wave fire control directors provide the final guidance to the target. Because the antenna pattern is electronically steered, phased array systems can direct radar beams fast enough to maintain a fire control quality track on many targets simultaneously while also controlling several in-flight missiles.

The AN/SPY-1 phased array radar, part of the Aegis Combat System deployed on modern U.S. cruisers and destroyers, "is able to perform search, track and missile guidance functions simultaneously with a capability of over 100 targets." [25] Likewise, the Thales Herakles phased array multi-function radar used in service with France and Singapore has a track capacity of 200 targets and is able to achieve automatic target detection, confirmation and track initiation in a single scan, while simultaneously providing mid-course guidance updates to the MBDA Aster missiles launched from the ship. [26] The German Navy and the Royal Dutch Navy have developed the Active Phased Array Radar System (APAR). The MIM-104 Patriot and other ground-based anti-aircraft systems use phased array radar for similar benefits.

See also: SAMPSON, Active Phased Array Radar, SMART-L, Active Electronically Scanned Array, Aegis combat system, and AN/SPY-1

Space probe communication

The MESSENGER spacecraft was a space probe mission to the planet Mercury (2011–2015 [27]). This was the first deep-space mission to use a phased-array antenna for communications. The radiating elements are circularly-polarized, slotted waveguides. The antenna, which uses the X band, used 26 radiative elements and can gracefully degrade. [28]

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Weather research usage

AN/SPY-1A radar installation at National Severe Storms Laboratory, Norman, Oklahoma. The enclosing radome provides weather protection.

The National Severe Storms Laboratory has been using a SPY-1A phased array antenna, provided by the US Navy, for weather research at its Norman, Oklahoma facility since April 23, 2003. It is hoped that research will lead to a better understanding of thunderstorms and tornadoes, eventually leading to increased warning times and enhanced prediction of tornadoes. Current project participants include the National Severe Storms Laboratory and National Weather Service Radar Operations Center, Lockheed Martin, United States Navy, University of Oklahoma School of Meteorology, School of Electrical and Computer Engineering, and Atmospheric Radar Research Center, Oklahoma State Regents for Higher Education, the Federal Aviation Administration, and Basic Commerce and Industries. The project includes research and development, future technology transfer and potential deployment of the system throughout the United States. It is expected to take 10 to 15 years to complete and initial construction was approximately \$25 million.[29] A team from Japan's RIKEN Advanced Institute for Computational Science (AICS) has begun experimental work on using phased-array radar with a new algorithm for instant weather forecasts.[30]

Optics Main article: Phased-array optics

Within the visible or infrared spectrum of electromagnetic waves it is possible to construct optical phased arrays. They are used in wavelength multiplexers and filters for telecommunication purposes,[31] laser beam steering, and holography. Synthetic array heterodyne detection is an efficient method for multiplexing an entire phased array onto a single element photodetector. The dynamic beam forming in an optical phased array transmitter can be used to electronically raster or vector scan images without using lenses or mechanically moving parts in a lensless projector.[32] Optical phased array receivers have been demonstrated to be able to act as lensless cameras by selectively looking at different directions.[33][34]

Satellite broadband internet transceivers

Starlink is a low Earth orbit satellite constellation that is under construction as of 2021. It is designed to provide broadband internet connectivity to consumers; the user terminals of the system will use phased array antennas.[35]

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Radio-frequency identification (RFID)

By 2014, phased array antennas were integrated into RFID systems to increase the area of coverage of a single system by 100% to 76,200 m² (820,000 sq ft) while still using traditional passive UHF tags.[36]

Human-machine interfaces (HMI)

A phased array of acoustic transducers, denominated airborne ultrasound tactile display (AUTD), was developed in 2008 at the University of Tokyo's Shinoda Lab to induce tactile feedback.[37] This system was demonstrated to enable a user to interactively manipulate virtual holographic objects.[38]

Radio astronomy

Phased Array Feeds (PAF)[39] have recently been used at the focus of radio telescopes to provide many beams, giving the radio telescope a very wide field of view. Three examples are the ASKAP telescope in Australia, the Apertif upgrade to the Westerbork Synthesis Radio Telescope in The Netherlands, and the Florida Space Institute in the United States .

Critical theory and arithmetic

Coordinate frame of phased array used in calculation of array factor, directivity, and gain.

Array factor

The total directivity of a phased array will be a result of the gain of the individual array elements, and the directivity due their positioning in an array. This latter component is closely tied (but not equal to[40]) to the array factor.[41][page needed][40] In a (rectangular) planar phased array, of dimensions

Different types of phased arrays

Main article: Beamforming

There are two main types of beamformers. These are time domain beamformers and frequency domain beamformers. From a theoretical point of view, both are in principle the same operation, with just a Fourier transform allowing conversion from one to the other type.

A graduated attenuation window is sometimes applied across the face of the array to improve side-lobe suppression performance, in addition to the phase shift.

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Time domain beamformer works by introducing time delays. The basic operation is called "delay and sum". It delays the incoming signal from each array element by a certain amount of time, and then adds them together. A Butler matrix allows several beams to be formed simultaneously, or one beam to be scanned through an arc. The most common kind of time domain beam former is serpentine waveguide. Active phased array designs use individual delay lines that are switched on and off. Yttrium iron garnet phase shifters vary the phase delay using the strength of a magnetic field.

There are two different types of frequency domain beamformers.

The first type separates the different frequency components that are present in the received signal into multiple frequency bins (using either a Discrete Fourier transform (DFT) or a filterbank). When different delay and sum beamformers are applied to each frequency bin, the result is that the main lobe simultaneously points in multiple different directions at each of the different frequencies. This can be an advantage for communication links, and is used with the SPS-48 radar.

The other type of frequency domain beamformer makes use of Spatial Frequency. Discrete samples are taken from each of the individual array elements. The samples are processed using a DFT. The DFT introduces multiple different discrete phase shifts during processing. The outputs of the DFT are individual channels that correspond with evenly spaced beams formed simultaneously. A 1-dimensional DFT produces a fan of different beams. A 2-dimensional DFT produces beams with a pineapple configuration.

These techniques are used to create two kinds of phased array.

Dynamic – an array of variable phase shifters are used to move the beam

Fixed – the beam position is stationary with respect to the array face and the whole antenna is moved

There are two further sub-categories that modify the kind of dynamic array or fixed array.

Active – amplifiers or processors are in each phase shifter element

Passive – large central amplifier with attenuating phase shifters

Dynamic phased array

Each array element incorporates an adjustable phase shifter. These are collectively used to move the beam with respect to the array face.

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Dynamic phased arrays require no physical movement to aim the beam. The beam is moved electronically. This can produce antenna motion fast enough to use a small pencil beam to simultaneously track multiple targets while searching for new targets using just one radar set, a capability known as track while search.

As an example, an antenna with a 2-degree beam with a pulse rate of 1 kHz will require approximately 8 seconds to cover an entire hemisphere consisting of 8,000 pointing positions. This configuration provides 12 opportunities to detect a 1,000 m/s (2,200 mph; 3,600 km/h) vehicle over a range of 100 km (62 mi), which is suitable for military applications.[citation needed]

The position of mechanically steered antennas can be predicted, which can be used to create electronic countermeasures that interfere with radar operation. The flexibility resulting from phased array operation allows beams to be aimed at random locations, which eliminates this vulnerability. This is also desirable for military applications.

Fixed phased array

An antenna tower consisting of a fixed phase collinear antenna array with four elements

Fixed phased array antennas are typically used to create an antenna with a more desirable form factor than the conventional parabolic reflector or cassegrain reflector. Fixed phased arrays incorporate fixed phase shifters. For example, most commercial FM Radio and TV antenna towers use a collinear antenna array, which is a fixed phased array of dipole elements.

In radar applications, this kind of phased array is physically moved during the track and scan process. There are two configurations.

Multiple frequencies with a delay-line Multiple adjacent beams

The SPS-48 radar uses multiple transmit frequencies with a serpentine delay line along the left side of the array to produce vertical fan of stacked beams. Each frequency experiences a different phase shift as it propagates down the serpentine delay line, which forms different beams. A filter bank is used to split apart the individual receive beams. The antenna is mechanically rotated.

Semi-active radar homing uses monopulse radar that relies on a fixed phased array to produce multiple adjacent beams that measure angle errors. This form factor is suitable for gimbal mounting in missile seekers.

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Active phased array

Active electronically-scanned arrays (AESA) elements incorporate transmit amplification with phase shift in each antenna element (or group of elements). Each element also includes receive pre-amplification. The phase shifter setting is the same for transmit and receive.[42]

Active phased arrays do not require phase reset after the end of the transmit pulse, which is compatible with Doppler radar and pulse-Doppler radar.

Passive phased array

Passive phased arrays typically use large amplifiers that produce all of the microwave transmit signal for the antenna. Phase shifters typically consist of waveguide elements controlled by magnetic field, voltage gradient, or equivalent technology.[43][44]

The phase shift process used with passive phased arrays typically puts the receive beam and transmit beam into diagonally opposite quadrants. The sign of the phase shift must be inverted after the transmit pulse is finished and before the receive period begins to place the receive beam into the same location as the transmit beam. That requires a phase impulse that degrades sub-clutter visibility performance on Doppler radar and Pulse-Doppler radar. As an example, Yttrium iron garnet phase shifters must be changed after transmit pulse quench and before receiver processing starts to align transmit and receive beams. That impulse introduces FM noise that degrades clutter performance.

Passive phased array design is used in the AEGIS Combat System[45] for direction-of-arrival estimation.

See also

icon Electronics portal

Aperture synthesis

History of smart antennas

Huygens–Fresnel principle

Interferometric synthetic-aperture radar

Inverse synthetic-aperture radar

Multi-user MIMO

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Optical heterodyne detection

Radar MASINT

Reconfigurable antenna

Side-scan sonar

Single-frequency network

Smart antenna

Standard linear array

Synthetic-aperture radar

Synthetic aperture sonar

Synthetically thinned aperture radar

Thinned-array curse

Wave field synthesis

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APPENDIX SIX – HYPER KAMIOKANDE

More information can be found at this link <https://en.wikipedia.org/wiki/Hyper-Kamiokande>

Hyper-Kamiokande (also called Hyper-K or HK) is a neutrino observatory and experiment under construction in Hida, Gifu and in Tokai, Ibaraki in Japan. It is conducted by the University of Tokyo and the High Energy Accelerator Research Organization (KEK), in collaboration with institutes from over 20 countries across six continents.[1][2] As a successor of the Super-Kamiokande (also Super-K or SK) and T2K experiments, it is designed to search for proton decay and detect neutrinos from natural sources such as the Earth, the atmosphere, the Sun and the cosmos, as well as to study neutrino oscillations of the man-made accelerator neutrino beam.[3]: 6, 20–28 The beginning of data-taking is planned for 2027.

The Hyper-Kamiokande experiment facility will be located in two places:

The neutrino beam will be produced in the accelerator complex J-PARC (36.445°N 140.606°E) and studied by the set of near and intermediate detectors located in Tokai village, Ibaraki prefecture, on the east coast of Japan.[3]: 31

The main detector, also called Hyper-Kamiokande (HK), is being constructed under the peak of Nijuugo Mountain in Hida city, Gifu Prefecture, in the Japanese Alps (36°21′20.105″N 137°18′49.137″E[3]: 56). The HK detector will be used for proton decay searches, studies of neutrinos from natural sources and will serve as a far detector for the measurement of the oscillations of an accelerator neutrino beam at the distance corresponding to the first oscillation maximum.[3]: 53–56 [5]

Physics program

Accelerator and atmospheric neutrino oscillations

Neutrino oscillations are a quantum mechanical phenomenon in which neutrinos change their flavour (neutrino flavours states:

while moving, caused by the fact that the neutrino flavour states are a mixture of the neutrino mass states (ν_1 , ν_2 , ν_3 mass states with masses m_1 , m_2 , m_3 , respectively). The oscillation probabilities depend on the six theoretical parameters: three mixing angles (θ_{12} , θ_{23} and

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θ_{13}) governing the mixing between mass and flavour states, two mass squared differences (Δm_{221}^2 and Δm_{232}^2 , where $\Delta m_{2ij}^2 = m_{2i}^2 - m_{2j}^2$) one phase (δ_{CP}) responsible for the matter-antimatter asymmetry (CP symmetry violation) in neutrino oscillations, and two parameters which are chosen for a particular experiment:

neutrino energy

Continuing studies done by the T2K experiment, the HK far detector will measure the energy spectra of electron and muon neutrinos in the beam (produced at J-PARC as an almost pure muon neutrino beam) and compare it with the expectation in case of no oscillations, which is initially calculated based on neutrino flux and interaction models and improved by measurements performed by the near and intermediate detectors. For the HK/T2K neutrino beam peak energy (600 MeV) and the J-PARC – HK/SK detector distance (295 km), this corresponds to the first oscillation maximum, for oscillations driven by Δm_{232}^2 . The J-PARC neutrino beam will run in both neutrino- and antineutrino-enhanced modes separately, meaning that neutrino measurements in each beam mode will provide information about muon (anti)neutrino survival probability allows measurement of the δ_{CP} phase. δ_{CP} ranges from $-\pi$ to $+\pi$ (from -180° to $+180^\circ$), and 0 and $\pm\pi$ correspond to CP symmetry conservation. After 10 years of data taking, HK is expected to confirm at the 5σ confidence level or better if CP symmetry is violated in the neutrino oscillations for 57% of possible δ_{CP} values. CP violation is one of the conditions necessary to produce the excess of matter over antimatter at the early universe, which forms now our matter-built universe. Accelerator neutrinos will be used also to enhance the precision of the other oscillation parameters, $|\Delta m_{232}^2|$, θ_{23} and θ_{13} , as well as for neutrino interaction studies.[3]: 202–224

In order to determine the neutrino mass ordering (whether the ν_3 mass eigenstate is lighter or heavier than both ν_1 and ν_2), or equivalently the unknown sign of the Δm_{232}^2 parameter, neutrino oscillations must be observed in matter. With HK beam neutrinos (295 km, 600 MeV), the matter effect is small. In addition to beam neutrinos, the HK experiment studies atmospheric neutrinos, created by cosmic rays colliding with the Earth's atmosphere, producing neutrinos and other byproducts. These neutrinos are produced at all points on the globe, meaning that HK has access to neutrinos that have travelled through a wide range of distances through matter (from a few hundred metres to the Earth's diameter). These samples of neutrinos can be used to determine the neutrino mass ordering.[3]: 225–237

Ultimately, a combined beam neutrino and atmospheric neutrino analysis will provide the most sensitivity to the oscillation parameters δ_{CP} , $|\Delta m_{232}^2|$, $\text{sgn } \Delta m_{232}^2$, θ_{23} and θ_{13} . [3]: 228–233

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Neutrino astronomy and geoneutrinos

Core-collapse supernova explosions produce great quantities of neutrinos. For a supernova in the Andromeda galaxy, 10 to 16 neutrino events are expected in the HK far detector. For a galactic supernova at a distance of 10 kpc about 50,000 to 94,000 neutrino interactions are expected during a few tens of seconds. For Betelgeuse at the distance 0.2 kpc, this rate could reach up to 108 interactions per second and such a high event rate was taken into account in the detector electronics and data acquisition (DAQ) system design, meaning that no data would be lost. Time profiles of the number of events registered in HK and their mean energy would enable testing models of the explosion. Neutrino directional information in the HK far detector can provide an early warning for the electromagnetic supernova observation, and can be used in other multi-messenger observations.[3]: 263–280 [7]

Neutrinos cumulatively produced by supernova explosions throughout the history of the universe are called supernova relic neutrinos (SRN) or diffuse supernova neutrino background (DSNB) and they carry information about star formation history. Because of a low flux (few tens/cm²/sec.), they have not yet been discovered. With ten years of data taking, HK is expected to detect about 40 SRN events in the energy range 16–30 MeV.[3]: 276–280 [8]

For the solar

Search for a day-night asymmetry in the neutrino flux – resulting from different distances travelled in matter (during the night neutrinos additionally cross the Earth before entering the detector) and thus the different oscillation probabilities caused by the matter effect.

Measurement of the

e survival probability for neutrino energies between 2 and 7 MeV – i.e. between regions dominated by oscillations in vacuum and oscillations in matter, respectively – which is sensitive to new physics models, like sterile neutrinos or non-standard interactions. Comparison of the neutrino flux with the solar activity (e.g. the 11-year solar cycle).

Geoneutrinos are produced in decays of radionuclides inside the Earth. Hyper-Kamiokande geoneutrino studies will help assess the Earth's core chemical composition, which is connected with the generation of the geomagnetic field.[3]: 292–293

Proton decay

The decay of a free proton into lighter subatomic particles has never been observed, but it is predicted by some grand unified theories (GUT) and results from baryon number (B) violation.

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B violation is one of the conditions needed to explain the predominance of matter over antimatter in the universe.

Dark matter

Dark matter is a hypothetical, non-luminous form of matter proposed to explain numerous astronomical observations suggesting the existence of additional invisible mass in galaxies. If the dark matter particles interact weakly, they may produce neutrinos through annihilation or decay. Those neutrinos could be visible in the HK detector as an excess of neutrinos from the direction of large gravitational potentials such as the galactic centre, the Sun or the Earth, over an isotropic atmospheric neutrino background.[3]: 281–286

Experiment description

The Hyper-Kamiokande experiment consists of an accelerator neutrino beamline, a set of near detectors, the intermediate detector and the far detector (also called Hyper-Kamiokande). The far detector by itself will be used for proton decay searches and studies of neutrinos from natural sources. All the above elements will serve for the accelerator neutrino oscillation studies. Before launching the HK experiment, the T2K experiment will finish data taking and HK will take over its neutrino beamline and set of near detectors, while the intermediate and the far detectors have to be constructed anew.[13]

Intermediate Water Cherenkov Detector

The Intermediate Water Cherenkov Detector (IWCD) will be located at a distance of around 750 metres (2,460 ft) from the neutrino production place. It will be a cylinder filled with water of 10 metres (33 ft) diameter and 50 metres (160 ft) height with a 10 metres (33 ft) tall structure instrumented with around 400 multi-PMT modules (mPMTs), each consisting of nineteen 8 centimetres (3.1 in) diameter PhotoMultiplier Tubes (PMTs) encapsulated in a water-proof vessel. The structure will be moved in a vertical direction by a crane system, providing measurements of neutrino interactions at different off-axis angles (angles to the neutrino beam centre), spanning from 1° at the bottom to 4° at the top, and thus for different neutrino energy spectra.[note 1]

Combining the results from different off-axis angles, it is possible to extract the results for nearly monoenergetic neutrino spectrum without relying on theoretical models of neutrino interactions to reconstruct neutrino energy. Usage of the same type of detector as the far detector with almost the same angular and momentum acceptance allows comparison of results from these two detectors without relying on detector response simulations. These two facts, independence from the neutrino interaction and detector response models, will enable

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HK to minimise systematic error in the oscillation analysis. Additional advantages of such a design of the detector is the possibility to search for sterile oscillation patterns for different off-axis angles and to obtain a cleaner sample of electron neutrino interactions, whose fraction is larger for larger off-axis angles.[3]: 47–50 [14][15][16][17]

Hyper-Kamiokande far detector

A schematic of the Hyper-Kamiokande Far Detector, a water Cherenkov detector

The Hyper-Kamiokande detector will be built 650 metres (2,130 ft) under the peak of Nijuugo Mountain in the Tochibora mine, 8 kilometres (5.0 mi) south from the Super-Kamiokande (SK) detector. Both detectors will be at the same off-axis angle (2.5°) to the neutrino beam centre and at the same distance (295 kilometres (183 mi)) from the beam production place in J-PARC.[note 2][3]: 35 [18]

3-inch PMT (Photomultiplier) and WLS (Wavelength-Shifting Fiber) plate for Hyper-Kamiokande Far Detector Outer Detector

HK will be a water Cherenkov detector, 5 times larger (258 kton of water) than the SK detector. It will be a cylindrical tank of 68 metres (223 ft) diameter and 71 metres (233 ft) height. The tank volume will be divided into the Inner Detector (ID) and the Outer Detector (OD) by a 60 cm-wide inactive cylindrical structure, with its outer edge positioned 1 meter away from vertical and 2 meters away from horizontal tank walls. The structure will optically separate ID from OD and will hold PhotoMultiplier Tubes (PMTs) looking both inwards to the ID and outwards to the OD.[18][19]

In the ID, there will be at least 20,000 50 centimetres (20 in) diameter PhotoMultiplier Tubes (PMT) of R12860 type by Hamamatsu Photonics and approximately 800 multi-PMT modules (mPMTs). Each mPMT module consists of nineteen 8 centimetres (3.1 in) diameter photomultiplier tubes encapsulated in a water-proof vessel. The OD will be instrumented with at least 3,600 8 centimetres (3.1 in) diameter PMTs coupled with $0.6 \times 30 \times 30$ cm³ wavelength shifting (WLS) plates (plates will collect incident photons and transport them to their coupled PMT) and will serve as a veto[note 3] to distinguish interactions occurring inside from particles entering from the outside of the detector (mainly cosmic-ray muons).[18][19][17]

J-PARC neutrino beam Japan to Korea

HK detector construction began in 2020 and the start of data collection is expected in 2027.[3][4][13]: 24 Studies have also been undertaken on the feasibility and physics benefits

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of building a second, identical water-Cherenkov tank in South Korea around 1100 km from J-PARC, which would be operational 6 years after the first tank.[5][20]

History and schedule

The Hyper-Kamiokande detector construction schedule

A history of large water Cherenkov detectors in Japan, and long-baseline neutrino oscillation experiments associated with them, excluding HK:

1983-1996: Kamiokande (Kamioka Nucleon Decay Experiment), which main goal was proton decay searches (the Nobel Prize in Physics 2002 for Masatoshi Koshihara) – the predecessor of Super-Kamiokande[1]

1996–present: Super-Kamiokande experiment – the predecessor of the Hyper-Kamiokande experiment, studying neutrinos from natural sources and searching for proton decay (the Nobel Prize in Physics 2015 for Takaaki Kajita)[1]

1999–2004: K2K experiment – the predecessor of the T2K experiment

2010–present: T2K experiment – the predecessor of the Hyper-Kamiokande experiment, studying accelerator neutrino oscillations

A history of the Hyper-Kamiokande experiment:

September 1999: First ideas of the new experiment presented[21]

2000: The name "Hyper-Kamiokande" used for the first time[22]

September 2011: Submitting LOI[23]

January 2015: MoU for cooperation in the Hyper-Kamiokande project signed by two host institutions: ICRR and KEK. Formation of the Hyper-Kamiokande proto-collaboration[24][25]

May 2018: Hyper-Kamiokande Design Report[3]

September 2018: Seed funding from MEXT allocated in 2019[26]

February 2020: The project officially approved by the Japanese Diet[4]

June 2020: Formation of the Hyper-Kamiokande collaboration

May 2021: Start of the HK detector access tunnel excavation[27]

2021: Beginning of the photomultiplier tubes mass production[28]

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February 2022: Completion of the access tunnel construction[29]

October 2023: Completion of the HK detector main cavern dome section[30]

2027: The expected beginning of data-taking[4]