



PROFESSOR

DAVID

KEITH

1
00:00:03,820 --> 00:00:09,640

Welcome to Tales From the Rabbit Hole. I'm your host Mick West. My guest today is Professor David Keith

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00:00:10,420 --> 00:00:17,780

Professor Keith has been a target of conspiracy theorists. And the reason is that he is a professor who is an expert

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00:00:18,970 --> 00:00:21,390

geoengineering also known as climate engineering

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00:00:22,570 --> 00:00:30,060

Geoengineering is the science of deliberately modifying the climate of the earth by doing things like spraying the

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00:00:30,939 --> 00:00:32,939

At the moment is a very theoretical

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00:00:33,070 --> 00:00:35,729

Science because really nothing's have been done yet

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00:00:35,890 --> 00:00:42,719

but it hasn't stopped the conspiracy theorists who think that the chemtrails conspiracy theory is actually about

8
00:00:43,239 --> 00:00:44,289
covert

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00:00:44,289 --> 00:00:45,550
geoengineering

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00:00:45,550 --> 00:00:49,950

Couple of terminology points we talk about radiative forcing

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00:00:50,080 --> 00:00:56,640

That's the difference between incoming and outgoing heat on the planet and it's what the carbon dioxide green

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00:00:56,860 --> 00:01:04,120

Modifies and it's also what we would try to modify by doing some kind of geoengineering to reflect more heat b

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00:01:04,660 --> 00:01:06,720

We also talked about Arctic methane

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00:01:07,420 --> 00:01:09,659

These are large deposits of methane

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00:01:09,659 --> 00:01:13,019

which is a very powerful greenhouse gas in the Arctic and

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00:01:13,420 --> 00:01:19,049

There's a concern that this might all melt rather rapidly and cause a kind of runaway global warming

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00:01:19,630 --> 00:01:21,340

some people have been quite

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00:01:21,340 --> 00:01:25,170

apocalyptic in their predictions of this Arctic methane and that's been seized upon by the

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00:01:25,360 --> 00:01:30,720

Conspiracy theorists as being some kind of rationale for a secret geoengineering chemtrails program

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00:01:31,180 --> 00:01:34,199

We discuss all these things with Professor David Keith

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00:01:37,450 --> 00:01:38,590

So

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00:01:38,590 --> 00:01:42,689

Professor David Keith welcome to tales from the rabbit hole and thank you very much for being here

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00:01:43,420 --> 00:01:49,229

Thanks. Great to be here pleasure. Okay, so you are the professor of Applied Physics at Harvard and

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00:01:49,750 --> 00:01:52,020

you were also one of the founders of

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00:01:52,870 --> 00:01:54,160

carbon

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00:01:54,160 --> 00:01:58,679

Engineering and you are the head of the the Keith group at Harvard

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00:01:59,500 --> 00:02:04,500

Well, that doesn't mean anything other than I'm a professor at Harvard. So okay sounded very impressive to me

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00:02:05,170 --> 00:02:07,590

I'm a professor at the Kennedy School of Government

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00:02:07,960 --> 00:02:14,040

Okay, Austin, earring and an engineering and Sciences at at Harvard and most other big science faculty

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00:02:14,110 --> 00:02:16,440

We just call individual people's

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00:02:17,530 --> 00:02:19,530

research groups by the name of the person

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00:02:19,930 --> 00:02:24,390

Not just standard doesn't mean anything right? Okay. All right

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00:02:31,350 --> 00:02:25,060

so

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00:02:31,510 --> 00:02:38,549

Have been affected by conspiracy culture and you are one of the people I think who whose name comes up most

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00:02:38,860 --> 00:02:40,780

in terms of

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00:02:40,780 --> 00:02:46,020

Targets of people who are interested in the chemtrail conspiracy theory and the chemtrail conspiracy

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00:02:46,480 --> 00:02:48,929

theory kind of focuses around the idea that

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00:02:49,600 --> 00:02:54,149

Trails being sprayed out of planes are some kind of secret form of

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00:02:54,640 --> 00:02:58,890

geoengineering, which is altering the climate and this of course is your

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00:02:59,709 --> 00:03:01,769

principal area of research

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00:03:02,590 --> 00:03:06,270

geoengineering your your history of geoengineering goes back a long way back to

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00:03:06,850 --> 00:03:10,709

92 I think is when you had your first paper published on the subject

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00:03:11,650 --> 00:03:13,650

Yeah, I think that's right. I got interested in

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00:03:14,140 --> 00:03:19,919

Climate in the late 80s and I think I began to work on geo sharing among other

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00:03:20,290 --> 00:03:23,519

Topics sort of around 89 probably, okay

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00:03:24,520 --> 00:03:30,329

When did you first become aware of this kind of strange intersection between your work and this?

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00:03:31,330 --> 00:03:39,059

Chemtrails last covert geoengineering conspiracy theory. That's a good question. I don't think I remember that.

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00:03:39,880 --> 00:03:42,779

Looked through my email inbox beforehand, but I would say

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00:03:43,750 --> 00:03:46,259

more than 10 years ago, but certainly in the

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00:03:46,780 --> 00:03:51,819

2000s. I feel like I didn't see it before that, but I could be wrong. I actually just don't remember

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00:03:52,220 --> 00:03:52,720

Yeah

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00:03:52,720 --> 00:03:58,809

You think he kind of gradually kind of crept into your consciousness perhaps because it was perhaps not that b

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00:03:59,930 --> 00:04:04,959

Well, it was it felt pretty big pretty early. I'm it certainly felt pretty big sort of ten years ago. Um

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00:04:06,769 --> 00:04:09,009

But I think it wasn't I don't remember

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00:04:09,650 --> 00:04:11,650

Seeing this much in the 90s

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00:04:16,329 --> 00:04:13,790

but

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00:04:17,450 --> 00:04:19,450

targeting me or things that were you know using

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00:04:19,850 --> 00:04:26,469

Using my words or speeches edited somehow to to in part of the the conspiracy culture world

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00:04:26,510 --> 00:04:29,950

So I think that's more recent really the last decade. Yeah

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00:04:29,950 --> 00:04:33,939

I was just looking through some of the stuff that on you on YouTube and

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00:04:35,389 --> 00:04:41,589

You you did a TED talk back in 2007, which was just basically laying out, you know

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00:04:41,590 --> 00:04:44,799

the type of things that you've been researching and the possibility of doing a

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00:04:45,110 --> 00:04:50,350

Climate engineering in the future and the comment stream on that is still

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00:04:50,630 --> 00:04:56,380

Even though that it was published in 2007 those comments from last week. Oh well saying that

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00:04:57,229 --> 00:05:01,689

Yeah, you are destroying the world and things like that. Yeah, so I think there's been a kind of constant

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00:05:02,510 --> 00:05:08,589

constant stream of people commenting on that one video since 2007, which is quite quite impressive you

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00:05:09,740 --> 00:05:11,740

published the book a case for climate engineering

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00:05:12,740 --> 00:05:14,690

in

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00:05:14,690 --> 00:05:15,770

2013

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00:05:15,770 --> 00:05:21,250

proximately, and I remember you you went on The Colbert Report at the time and

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00:05:21,830 --> 00:05:26,229

I remember something's strange is the seemed very strange to be having at the end of that

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00:05:26,229 --> 00:05:31,389

So discussion with Stephen Colbert, is that at the end he actually made a joke about chemtrails

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00:05:32,240 --> 00:05:34,570

Yeah, I thought it kind of

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00:05:35,120 --> 00:05:38,889

Took the wind out of all the good points that you've been making up to that point

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00:05:39,200 --> 00:05:41,169

How did you feel about that when that happened?

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00:05:41,169 --> 00:05:46,989

I was really pissed off about it and I talked to him afterwards and I had a really thoughtful

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00:05:47,300 --> 00:05:54,910

Conversation with him in the inlet in the greenroom afterwards, which yeah made me actually think what a sma

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00:05:56,060 --> 00:06:00,609

I think his attitude is make fun of anything and that's his job

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00:06:02,020 --> 00:06:05,470

And I think my view was that the way he did it tended to lead

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00:06:05,720 --> 00:06:08,259

Credence to that point of view in a way that I thought was destructive

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00:06:08,990 --> 00:06:10,400

and

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00:06:10,400 --> 00:06:14,859

That he didn't do it in a way that kind of made fun of the conspiracy theorists in a way that I thought was effecti

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00:06:14,860 --> 00:06:17,620

So I was kind of disappointed in that but you know, yeah

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00:06:17,990 --> 00:06:22,090

Yeah, I was also a bit disappointed as well when I watch that that episode

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00:06:22,090 --> 00:06:25,209

I thought that you know you made a lot of very good points and he didn't

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00:06:25,700 --> 00:06:29,289

He didn't really help with just kind of turning the whole thing into a jerk at the end

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00:06:29,600 --> 00:06:32,379

Well, I mean his job is to make each interview a bit of a joke

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00:06:32,380 --> 00:06:36,400

So making the whole idea joke, I think is kind of kind of okay. That's what his shows stuff

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00:06:36,400 --> 00:06:41,709

Yes, but I felt like throwing on the chemtrail conspiracy theory

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00:06:42,320 --> 00:06:46,030

Was was for my point of view about thing, but I've never had you know, I guess he would argue

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00:06:46,130 --> 00:06:51,640

He's in that show was trying to pretend to be a right-wing nut job. And so maybe it was consistent, right?

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00:06:52,310 --> 00:06:59,109

Yeah, and you talked about a few things in that show that I think have kind of become or always work and talki

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00:06:59,110 --> 00:07:01,389

these conspiracy theorists and one of those was about

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00:07:02,150 --> 00:07:03,890

you know, essentially

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00:07:03,890 --> 00:07:05,890

How many people would die?

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00:07:06,380 --> 00:07:10,030

And I was just talking to a Kentrell conspiracy theorist the other day

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00:07:10,030 --> 00:07:16,569

and he was saying that you were said that the projections for a certain type of geoengineering is that if you did

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00:07:16,880 --> 00:07:19,810

10,000 people would die directly because of this

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00:07:20,330 --> 00:07:26,410

This type of geoengineering attest some kind of stratospheric aerosol injection of sulfur dioxide or something lik

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00:07:26,510 --> 00:07:29,200

but you know my point to him was that this is

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00:07:29,840 --> 00:07:32,019

Balanced out by the people who wouldn't die now

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00:07:32,020 --> 00:07:37,329

do you remember the point you are making there with with that how many people are actually going to die and

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00:07:38,000 --> 00:07:40,000

it is it's

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00:07:40,580 --> 00:07:44,979

How is it balanced so I don't remember specifically what I said

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00:07:45,290 --> 00:07:51,280

But the point that I was trying to make is at least for me in that interview and many others. I've been trying to av

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00:07:53,450 --> 00:07:57,850

You're really trying to emphasize the risks of solar tearing and avoid over selling it

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00:07:57,850 --> 00:08:02,709

and so I think it's important to emphasize specific risks we know about and for

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00:08:03,350 --> 00:08:08,649

sulfuric acid in the stratosphere one of the things we for sure know about us but some that's all gonna come do

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00:08:08,650 --> 00:08:10,310

lower atmosphere and

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00:08:10,310 --> 00:08:14,080

It'll be it aerosol like the sulfur aerosol that's already there

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00:08:14,080 --> 00:08:19,689

So we put roughly a little now but we're putting 50 million tons a year of sulfur in lower atmosphere

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00:08:20,690 --> 00:08:25,239

From fossil fuel combustion and so it would be adding to that and we have you know

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00:08:25,240 --> 00:08:28,420

a pretty good understanding of the link epidemiological link between

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00:08:29,390 --> 00:08:31,390

particulate matter so-called PM 2.5

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00:08:32,390 --> 00:08:35,259

And in air pollution so you can at least could've crudely

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00:08:35,599 --> 00:08:41,739

Think about what the total direct risks would be and I mean, you know long after that interview

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00:08:41,740 --> 00:08:43,330

We've actually now published papers

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00:08:43,330 --> 00:08:48,009

we've looked in some detail about exactly how big that risk is and it's actually kind of interesting cuz you can

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00:08:48,230 --> 00:08:51,130

Calculate the direct risk from particles that actually make it down

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00:08:51,740 --> 00:08:52,460

You know

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00:08:52,460 --> 00:08:57,910

From that particular kind of to ensuring which of course might not be used with a particular level which might not

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00:08:57,910 --> 00:08:59,450

calculate direct risk

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00:08:59,450 --> 00:09:05,919

And it's you know for reasonable scenarios is actually quite a bit under ten thousand year more like a few thousand

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00:09:05,990 --> 00:09:06,550

Mm-hmm

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00:09:06,550 --> 00:09:10,780

But it's important to say that it actually turns out to be that that number small compared to other

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00:09:11,240 --> 00:09:13,750

indirect changes in in air pollution

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00:09:14,030 --> 00:09:19,059

mortality that actually go in both directions as actually turns out to be quite confusing because there's some eff

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00:09:19,910 --> 00:09:22,660

Reducing reversing climate change the climate change

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00:09:23,540 --> 00:09:26,560

Interacts with air pollution in ways that make some pollutants worse than some better

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00:09:26,560 --> 00:09:33,910

So when you partially reverse climate change you reverse those changes and those indirect effects turned out

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00:09:34,790 --> 00:09:39,190

So it's kind of here's a small amount. He's kind of lost in the noise of all these different

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00:09:40,070 --> 00:09:42,070

Ups and downs

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00:09:42,110 --> 00:09:45,669

Certainly is pretty small, but you can argue and be very small

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00:09:45,670 --> 00:09:50,080

We think compared to the you know, what would appear to be the benefits of reduced say

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00:09:50,960 --> 00:09:53,469

Deaths from heat stress that would come from climate change

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00:09:53,690 --> 00:09:57,700

But again, you know, this is not a you know on your debate

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00:09:57,700 --> 00:10:00,879

I think we're not trying to debate here exactly the merits of solar Jewish here

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00:10:00,880 --> 00:10:06,340

I think that the question is the way this has been picked up in this conspiracy culture. It's this kind of

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00:10:07,310 --> 00:10:11,380

Data point that seems to be unmoored from reality

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00:10:12,080 --> 00:10:14,080

Mm-hmm. Yeah, I think it's a big challenge

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00:10:14,900 --> 00:10:16,510

Explaining these things to people, you know

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00:10:16,510 --> 00:10:21,849

I I spend a lot of time trying to explain things to people and they were pointing to things like yeah

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00:10:21,850 --> 00:10:25,839

you said a certain thing like a famous thing is that

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00:10:26,450 --> 00:10:34,119

Yes, something that goes back to your paper in mm that you injuring in the climate history and prospects you ta

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00:10:34,580 --> 00:10:37,149

yeah, a problem of geoengineering and

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00:10:37,850 --> 00:10:40,089

Then in a talk that you gave

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00:10:40,610 --> 00:10:44,770

You and you said it wasn't immoral so it wasn't so much a moral hazard

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00:10:45,380 --> 00:10:46,730

right

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00:10:46,730 --> 00:10:48,130

Yes on a miss point of view

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00:10:48,130 --> 00:10:50,649

I think it's actually correct, but it's really funny

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00:10:50,649 --> 00:10:55,569

Then all these conspiracy theorists think that I'm somehow saying it's a good thing for people are free right on t

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00:10:55,570 --> 00:11:00,549

Which is obviously the opposite of what I actually think and and this is where you can just tell it these people ar

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00:11:00,980 --> 00:11:04,089

either not trying or they're not honest because you know

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00:13:42,009 --> 00:11:06,080

a

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00:13:42,010 --> 00:13:44,010

So I do get people

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00:13:44,420 --> 00:13:46,420

apologizing for tone for sure

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00:13:46,490 --> 00:13:51,579

And I get and I have dialogues where it's clear that people do seem to have changed their minds or even clear

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00:13:51,580 --> 00:13:53,580

Minds about get dressed. Yes

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00:13:53,720 --> 00:13:58,629

Yeah, I think one of the things about you is that they portray you as a monster

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00:13:59,960 --> 00:14:04,750

Alleging a terrible thing and yet if they're to read your book like you

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00:14:05,270 --> 00:14:10,360

You lay out your own background and you you're kind of an environmentalist you you like being in the outdoors

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00:14:10,360 --> 00:14:16,089

You you go camping and things like that and you're obviously a very big fan of the environment and you seem

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00:14:16,090 --> 00:14:20,740

Guy, well, that's true, but that but that doesn't necessarily so what's really interesting. I feel like Chris

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00:14:20,740 --> 00:14:21,730

I mean first of all

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00:14:21,730 --> 00:14:22,460

I think the chemtrails

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00:14:22,460 --> 00:14:27,460

Conspiracy from what I can tell there's some polling data that we've we've done some of it it's both changed over

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00:14:27,460 --> 00:14:34,750

I feel like it used to be that they would latch onto solar general hearing but the but my impression could be wrong

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00:14:34,750 --> 00:14:36,750

We don't have good polling data was that

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00:14:37,820 --> 00:14:40,029

The theories were more linked to mass

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00:14:40,460 --> 00:14:46,540

Extermination or mind control and and solar gene measuring was kind of just a part of it. Yeah and

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00:14:47,810 --> 00:14:54,399

now what's interesting is at least some people in the conspiracy culture around chemtrails actually sound like

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00:14:54,650 --> 00:15:00,279

In a sense saying Ruiz things about governance of solar to hearing except for the fact that's not happening yet

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00:15:01,250 --> 00:15:06,580

So there's rage like you could almost see some of them morphing into kind of quite legitimate and sensible

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00:15:06,890 --> 00:15:10,749

opposition to deployment of solar tea or sharing which I think is a really reasonable thing to be opposed to

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00:15:12,110 --> 00:15:13,610

so

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00:15:13,610 --> 00:15:20,529

It's kind of interesting. It's moving and the other issue is is the left-right divide. So yeah, I'm a Mentalist lefty

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00:15:20,529 --> 00:15:22,070

So presumably if you're an environmentalist

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00:15:22,070 --> 00:15:27,249

lefty the fact that I am makes you feel more kinship and so on but lots of people are actually

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00:15:27,560 --> 00:15:33,190

Hard right in the chemtrails were like it may actually be better equal but for the hard right ones

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00:15:33,440 --> 00:15:37,150

The environmentalism that I have is in no way. It's a sign that I'm

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00:15:37,670 --> 00:15:39,729

it's just a sign of my my

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00:15:41,870 --> 00:15:47,529

Believe well or I think I think yeah or I think there's another show trying to get respect

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00:15:47,529 --> 00:15:53,919

so I think he said that that people on the right legitimately don't want to see an extension of state power and

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00:15:54,440 --> 00:15:56,890

Don't want to see reduction in individual rights

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00:15:57,440 --> 00:15:59,440

they view

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00:15:59,870 --> 00:16:02,859

international environmental controls is a bad thing a priori and

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00:16:17,260 --> 00:16:05,060

so

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00:16:18,260 --> 00:16:25,270

Belief in climate change or willingness to take it seriously from that part of the right is a sense that believing in c

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00:16:25,670 --> 00:16:30,670

necessarily means believing in certain kinds of internationalism and government control that

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00:16:31,760 --> 00:16:33,999

they think is overrated or they don't like

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00:16:34,760 --> 00:16:42,760

Yeah, because you know what you're doing obviously would require a lot of cooperation a lot of the people who

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00:16:42,760 --> 00:16:45,729

their fear is that there's going to be a one world government that there is some kind of

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00:16:46,040 --> 00:16:51,280

you know some Illuminati New World Order United Nations taking over the world and

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00:16:52,190 --> 00:16:53,690

geoengineering

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00:16:53,690 --> 00:16:55,690

kind of in a way relies upon

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00:16:56,150 --> 00:16:58,150

You know at least the international cooperation

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00:16:58,580 --> 00:17:00,580

Yeah to a degree that they don't like

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00:17:01,220 --> 00:17:07,150

So do you engine do you engineering research a lot of people that I talk to in the conspiracy?

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00:17:07,339 --> 00:17:10,538

Community kind of assume that there's already geoengineering going on

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00:17:11,750 --> 00:17:16,779

Can you say what the actual state is of geoengineering specifically solar do engineering?

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00:17:17,809 --> 00:17:21,038

Sure, I can say but also we've you know, published and websites

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00:17:21,039 --> 00:17:25,509

I mean there's a you know, this point sort of like five hundred scientific papers, which means that

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00:17:26,959 --> 00:17:33,788

scientists and academics and research institutes around the world have sat around their offices and written papers

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00:17:34,880 --> 00:17:41,499

There been some laboratory experiments and there been a couple outdoor experiments the most, you know

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00:17:41,840 --> 00:17:46,779

clear-cut outdoor experiment probably something called Epeace eastern pacific regional experiment done by some

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00:17:47,809 --> 00:17:49,809

at a

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00:17:50,149 --> 00:17:52,689

Scripps Institute was releasing a kind of

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00:17:53,480 --> 00:17:54,890

smoky

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00:17:54,890 --> 00:17:58,959

Smoke basically into marine clouds to see the effect on cloud whitening

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00:17:59,570 --> 00:18:06,399

And so that's that's the state of what there is and the number of kind of really active researchers who are spending

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00:18:06,399 --> 00:18:09,909

Their time on solar GINA sharing is probably I don't know twenty thirty

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00:18:10,549 --> 00:18:15,278

worldwide with you know, hundreds and hundreds of researchers who the topic and there's

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00:18:16,250 --> 00:18:21,609

You know not even remotely close to developing hardware for deployment. Let alone deployment

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00:18:21,610 --> 00:18:24,309

I mean that gets into the whole the parts of the star just you know

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00:18:24,980 --> 00:18:27,579

insane in the sense that people think that

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00:18:28,909 --> 00:18:34,749

That these contrails are seeing are too much nearing but the kind of Jewish hearing that we're talking about

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00:18:35,270 --> 00:18:39,909

Wouldn't make contrails and wouldn't be at that altitude. It wouldn't even look like that

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00:18:40,190 --> 00:18:44,950

so there's sort of this total disconnect and the other part of this connect is

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00:18:45,470 --> 00:18:46,880

some people

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00:18:46,880 --> 00:18:53,349

Say they're researchers. I mean most prominently probably Naomi Wolf who you know, it's just that she's resea

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00:18:54,350 --> 00:18:58,240

two days of research around a few research groups would easily show

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00:18:58,580 --> 00:19:01,360

To a pretty high degree of certainty that there was no big conspiracy

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00:19:01,429 --> 00:19:04,298

I mean, and she keeps wanting to talk to me

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00:19:04,299 --> 00:19:08,918

I think that's probably for her own benefit or ego or something if you really wanted to check

225

00:19:09,110 --> 00:19:12,849

And you actually doubted I thought I might be lying. You wouldn't waste your time talking to me

226

00:19:12,850 --> 00:19:18,520

What you do is go interview a bunch of people around and research groups like around my group at Harvard p

227

00:19:18,620 --> 00:19:21,219

People who might you think not like me who'd be likely

228

00:19:22,399 --> 00:19:29,378

The theory is that there's some big secret then the issue would be to find out and universities are extraordinaril

229

00:19:29,379 --> 00:19:36,279

so it's very easy to walk into our group and just ask questions and I don't think anybody's ever tried to do that a

230

00:19:36,889 --> 00:19:39,098

That gives sense to me that

231

00:19:39,769 --> 00:19:45,998

it's some level people must just like saying this but they can't be serious if you were really waking up in the mor

232

00:19:45,999 --> 00:19:50,319

truly thought there was a conspiracy that threatened the lives of millions and

233

00:19:50,929 --> 00:19:52,879

You were taking it really seriously

234

00:19:52,879 --> 00:19:57,189

Surely you would have the energy to go, you know collaborate with some people and do some real research

235

00:19:57,409 --> 00:20:03,069

which doesn't mean looking at the sky and taking date pictures of things that more or less but same as any oth

236

00:20:03,169 --> 00:20:03,679

actually

237

00:20:03,679 --> 00:20:09,848

you know going to do some digging in the places where people are purported to be doing this and seeing if the

238

00:20:09,849 --> 00:20:12,189

Concealing things making inconsistent statements, you know

239

00:20:12,190 --> 00:20:16,059

They there's lots of digging you could do you could obviously talk to people you could

240

00:20:16,369 --> 00:20:20,649

Go poke around our offices and look for concealed things that there wouldn't be hurt you

241

00:20:20,649 --> 00:20:27,998

And and I don't think I've never had any sense that there's interest in the Cantrell's community and actually trying

242

00:20:28,489 --> 00:20:33,879

Yeah, it's fascinating because like you say universities are very open. You can just basically walk into

243

00:20:34,940 --> 00:20:38,200

Universities and go and talk to people. I mean it's so it's so much clearer

244

00:20:38,200 --> 00:20:44,529

There's almost impossible to keep things secret universities. I think one of the ways I find the chemtrail, you know

245

00:20:45,289 --> 00:20:47,289

when I try to talk to people about why

246

00:20:47,869 --> 00:20:54,009

It's implausible that there actually is large-scale use of chemtrails. It's I don't say the people government is good

247

00:20:54,009 --> 00:20:58,598

You should trust us or academics for good. You can trust us. I assume you should start from position of no trust

248

00:20:59,149 --> 00:21:03,819

But what you should assume is that individual people have a strong motivation to speak out

249

00:21:04,099 --> 00:21:04,599

so

250

00:21:04,599 --> 00:21:10,209

You know if there really were chemtrails and there really were as many cam trails as people say there have to

251

00:21:10,519 --> 00:21:11,779

involving

252

00:21:11,779 --> 00:21:13,669

thousands tens of thousands of people who were like

253

00:21:13,669 --> 00:21:17,498

loading equipment and those people would all be I mean a few of them would be the

254

00:21:17,960 --> 00:21:22,779

masters of the universe but most time would just be regular American citizens who would be highly

255

00:21:23,149 --> 00:21:27,039

Incented to tell if they believed that government was doing something nefarious

256

00:21:27,979 --> 00:21:32,769

and of course, you know the argument would be will they be you know, the the the the the

257

00:21:33,440 --> 00:21:41,050

Government has security resources that would put a bullet in their head if they did but we know from history that

258

00:21:41,050 --> 00:21:46,089

It's extraordinarily hard to keep secrets in governments in open societies even close ones. I mean after all

259

00:21:46,610 --> 00:21:51,939

in World War two in the most important secret we had which was the

260

00:21:52,250 --> 00:21:55,929

specific design of the implosion lenses of the plutonium device

261

00:21:56,510 --> 00:22:01,030

The Russians had the sketches of the design before the test

262

00:22:02,390 --> 00:22:05,319

you just don't keep secrets very well you can have

263

00:22:06,050 --> 00:22:11,109

secrets they can keep the operational secret of exactly when the bitline rate is gonna happen, but you

264

00:22:11,809 --> 00:22:15,939

Governments just can't keep big secrets like this. And so I think people I

265

00:22:16,730 --> 00:22:21,099

feel like I just try to put myself in the mind of people who think this because

266

00:22:21,650 --> 00:22:23,739

It's not that you trust the government

267

00:22:23,740 --> 00:22:27,849

But it's that you trust regular people to tell and you can see how badly government leaks

268

00:22:28,040 --> 00:22:34,059

So how could it be that? There was this giant conspiracy wouldn't involve. I mean all idea that kind of except lik

269

00:22:34,059 --> 00:22:36,819

It's just silly if there was a conspiracy it certainly wouldn't involve people like me

270

00:22:36,820 --> 00:22:40,059

It would involve people in secret, you know NSA style government rooms

271

00:22:40,610 --> 00:22:42,080

I'm I'm

272

00:22:42,080 --> 00:22:47,590

Totally terrible at keeping secrets and I operated in a public environment. But if there were a conspiracy

273

00:22:48,800 --> 00:22:54,099

it would have to be really big to have that many airplanes and it would have to have a huge amount of conceal

274

00:22:55,490 --> 00:22:57,490

There have to be signs

275

00:22:58,280 --> 00:23:02,949

Especially police say that if they were doing it, perhaps they're also fooling you David Keith and

276
00:23:03,710 --> 00:23:06,130
They're going around you and there's this kind of parallel

277
00:23:07,400 --> 00:23:12,639
Industry somehow the military side doing it now. Is it is it at all conceivable?

278
00:23:12,640 --> 00:23:14,640
There could be some kind of underground

279
00:23:14,720 --> 00:23:20,110
operation doing it that you are not aware of and the other people in the geoengineering research community are

280
00:23:21,800 --> 00:23:24,309
A priori just say it's conceivable because it's too easy

281
00:23:25,429 --> 00:23:29,289
But then that's the point is ok. Let's say it's happening there needs to be a reason

282
00:23:29,510 --> 00:23:33,729
So again, why do American citizens keep secrets when they believe the garbage matter?

283
00:23:33,730 --> 00:23:37,540
He's acting for a reasonable purpose and they believe is a good reason so

284
00:23:37,540 --> 00:23:43,629
you know the SEAL team in the bin Laden raid were told not to tell and they had every reason to trust their superiors

285
00:23:43,630 --> 00:23:48,369
The military chain of command did not tell because there's a coherent purpose we get it that we wanted to capture

286
00:23:50,330 --> 00:23:54,970
Or same for other military secrets, but in this case first of all

287
00:23:54,970 --> 00:23:59,259
you've got the fact that there isn't an obvious purpose that makes any sense and

288
00:23:59,629 --> 00:24:03,309

That it's not a thing that that there seems a good reason for government secrecy

289

00:24:03,309 --> 00:24:05,829

So it would actually be hard to compel people not to tell

290

00:24:05,960 --> 00:24:09,819

And you've got the fact that it would have to be gigantic because if it really is that many airplanes

291

00:24:15,069 --> 00:24:11,110

all of which

292

00:24:15,259 --> 00:24:19,029

huge number of people involved and they'd have to be all concealing and

293

00:24:19,730 --> 00:24:21,730

I think I

294

00:24:22,129 --> 00:24:24,129

think I mean, obviously

295

00:24:25,070 --> 00:24:28,149

It's not that I I don't believe the government. Sometimes do awful things

296

00:24:28,489 --> 00:24:32,979

Um, so I I do believe our government sometimes act badly and do awful things

297

00:24:33,080 --> 00:24:36,879

but I believe there's basically no record ever of a

298

00:24:37,549 --> 00:24:42,278

Long sustained for decades awful thing that were you involved

299

00:24:42,279 --> 00:24:47,709

You know tens of thousands of people that made no obvious sense which governments were people to keep s

300

00:24:47,710 --> 00:24:51,340

I think it's just there's the the number of cases like that is an empty set

301

00:24:52,429 --> 00:24:59,408

Yeah, in some ways you're getting into the almost like a flutter of territory in terms of how ridiculous the the idea

302

00:24:59,409 --> 00:25:01,129

is but

303

00:25:01,129 --> 00:25:06,488

at far off flat earth that is better as I think I think I guess it would take more I

304

00:25:07,609 --> 00:25:11,499

Mean, I think it's it's right up there with faking the moon landings for sure

305

00:25:11,720 --> 00:25:12,499

Yeah

306

00:25:12,499 --> 00:25:17,618

and some ways faking the moon landing seems easier to believe because now it's kind of lost in history and you

307

00:25:17,619 --> 00:25:22,059

Many people who are directly there, but for this, you know for this to be real

308

00:25:22,059 --> 00:25:25,599

I think so many people just aren't thinking about it if there were that many airplanes

309

00:25:25,600 --> 00:25:29,469

I'm looking up with this guy. Now, there aren't actually any contrasts. But if there were that many airplanes doing

310

00:25:31,460 --> 00:25:37,480

Those airplanes have to get loaded with materials there has to be that high chain and this is in a pretty open so

311

00:25:37,480 --> 00:25:40,899

I don't understand how people think this

312

00:25:41,570 --> 00:25:43,899

Except I mean except for the obvious that people

313

00:25:44,450 --> 00:25:47,139

like to feel like they're in on a secret they like

314

00:25:47,299 --> 00:25:54,309

there's lots of reasons why people like conspiracies and I think that the answer is people like conspiracies and

315

00:25:54,409 --> 00:25:58,508

Motivated to try and figure them out. Otherwise, they wouldn't be conspiracy believers

316

00:25:58,940 --> 00:26:03,580

Yeah, I think a lot of people feel like they're like saving the world in a way they feel that they are

317

00:26:04,400 --> 00:26:09,519

Either I feel like that like they're doing the right thing because they're convinced that that you know

318

00:26:09,520 --> 00:26:12,849

They have the the facts on their at their side

319

00:26:12,850 --> 00:26:17,890

But of course they don't but because they're so strongly motivated is very very difficult to get things across to th

320

00:26:18,020 --> 00:26:21,189

Like there's some practical things you can do like you you

321

00:26:21,830 --> 00:26:27,429

You're working on various theoretical forms of geoengineering. What would they actually look like?

322

00:26:28,460 --> 00:26:30,670

If they were so Lloyd. Yeah. Goodbye

323

00:26:31,820 --> 00:26:34,900

Let's work our way up. So if you're talking marine cloud brightening

324

00:26:36,290 --> 00:26:38,589

You know, the classic idea has always been these ships

325

00:26:38,590 --> 00:26:43,870

I think it's actually not clear whether ships or low-flying aircraft would end up being better

326

00:26:44,870 --> 00:26:46,400

but it would be

327

00:26:46,400 --> 00:26:53,469

either low-flying aircraft that are flying a kind of kilometer altitude and frequently dipping down the water to pick

328

00:26:53,690 --> 00:26:57,730

water bomber style, you know firefighting water bomber style or it would be

329

00:26:58,309 --> 00:27:00,579

Ships, you know that we're making big

330

00:27:01,580 --> 00:27:07,030

Faint hazy clouds of this sea salt aerosol and they need to be very specific ships with obvious

331

00:27:07,130 --> 00:27:09,790

Labels and you know wouldn't be hard to tell they were there

332

00:27:10,820 --> 00:27:13,299

um and again remember

333

00:27:14,090 --> 00:27:21,189

There's independent third-party knowledge of where basically all ships are now from the know. I like this is and

334

00:27:21,190 --> 00:27:25,059

So at this point it's almost impossible for governments to lie about it

335

00:27:25,549 --> 00:27:29,349

because the satellite the independent parties know where things are and

336

00:27:30,799 --> 00:27:37,599

likewise of course for aircraft because their craft are on a cars and other systems anyway, so that would be for

337

00:27:38,120 --> 00:27:44,799

Cirrus thinning. I'm going up an altitude for Cirrus sitting. I think we really don't know so well, but my guess is it

338

00:27:45,380 --> 00:27:47,380

small remotely piloted aircraft

339

00:27:47,809 --> 00:27:52,539

Bigger than a little photo drone, but you know maybe things with a wingspan of a few meters

340

00:27:53,150 --> 00:27:56,469

Because they lost material really tiny and they be you know

341

00:27:57,140 --> 00:28:01,299

Flying in some kind of grid like way and maybe I would guess

342

00:28:01,580 --> 00:28:05,350

Kind of invisible from the ground or invisible without really special

343

00:28:06,049 --> 00:28:07,340

equipment

344

00:28:07,340 --> 00:28:09,340

they'd have to have

345

00:28:10,640 --> 00:28:16,150

Transponders they have to be visible in air traffic controls to be safe and they have to be places where they were

346

00:28:16,630 --> 00:28:20,680

But they wouldn't leave a visible trail. No, no business involved at all. Four four

347

00:28:21,500 --> 00:28:23,500

four serious thinning and

348

00:28:23,510 --> 00:28:31,479

and they'd be very small aircraft and then for stratospheric aerosol, which is you know, I think most researchers

349

00:28:32,180 --> 00:28:33,710

plausible

350

00:28:33,710 --> 00:28:40,360

Large-scale method of solar to be sharing you'd have aircraft flying in the stratosphere and may be releasing

351

00:28:41,390 --> 00:28:43,749

either a gas so₂ or

352

00:28:44,600 --> 00:28:47,620

or h₂ so₄ aerosols or

353

00:28:48,590 --> 00:28:53,230

or some kind of solid aerosols like calcium carbonate or whatever it was and

354

00:28:54,710 --> 00:28:56,410

Those would be first of all

355

00:28:56,410 --> 00:29:03,129

They'd be obviously look pretty different from other aircraft because they flying twice as high so it's difficult to s

356

00:29:03,130 --> 00:29:03,640

Just look at it

357

00:29:03,640 --> 00:29:05,570

If you see if I help add to their crowd

358

00:29:05,570 --> 00:29:12,220

They wouldn't make anything that look like regular contrails because they're up there in the warm stratosphere

359

00:29:12,380 --> 00:29:15,550

So basically if you're seeing a contrail like that, it's not the stratosphere

360

00:29:16,850 --> 00:29:22,390

Stratosphere I guess I've never really done the calculations. I think in some of those things like releasing so₂ g

361

00:29:22,390 --> 00:29:25,810

there'd be no visible trail at all in other things like

362

00:29:26,330 --> 00:29:33,069

A solid aerosols ratio. So for I guess there would be but I've never tried to calculate how visible it would be

363

00:29:33,530 --> 00:29:37,569

But it sure as heck would not look like a contrail or a persisting government

364
00:29:37,820 --> 00:29:40,900
Especially that the contrails that be it's so funny actually

365
00:29:40,900 --> 00:29:46,660
I've never thought about this the thing that the conspiracy theorists most think are evidence. The conspiracy is

366
00:29:46,660 --> 00:29:51,040
It's not true because because what what they really seem to think is really weird are

367
00:29:51,290 --> 00:29:56,199
persistent contrails that have these long like if there's a linear feature with the contrail they have these

368
00:29:56,540 --> 00:29:58,540
stripes that come out sideways and this weird

369
00:29:58,550 --> 00:30:04,239
Shearing and we of course understand lots about what that is that the mechanisms the persistent contrails form

370
00:30:04,630 --> 00:30:06,969
none of them operate that way the stratosphere so

371
00:30:07,880 --> 00:30:15,099
Stratospheric older children wouldn't look at all like that. That's very true. Because you just get just turbulent m

372
00:30:15,920 --> 00:30:17,570
defects

373
00:30:17,570 --> 00:30:22,480
Aerodynamic effects doesn't mix turbulently except. Yeah, it looks quite different initially

374
00:30:22,480 --> 00:30:26,709
we're actually doing computational fluid dynamics simulations right now so we could actually

375
00:30:27,260 --> 00:30:32,170
Like this year I suppose haven't thought about that. It might be kind of a fun paper. We could emulate what the

376

00:30:32,810 --> 00:30:38,529

Look of a stratospheric aerosol release would be I've never done it

377

00:30:39,950 --> 00:30:41,450

It wouldn't be that hard

378

00:30:41,450 --> 00:30:46,179

It'd be kind of fun and I'm confident it would look completely different from persistent contrails

379

00:30:46,700 --> 00:30:48,969

That would be very interesting because I think you know

380

00:30:48,970 --> 00:30:53,740

It's a valid point in irregardless because people are gonna be concerned about what if these planes gonna look

381

00:30:54,350 --> 00:31:01,690

Yagna, they didn't believe in the the Kentrell theory clear that the planes would would look different from comm

382

00:31:01,690 --> 00:31:05,019

Ratio wings that is longer thinner wing, right? So if you've ever seen the

383

00:31:05,540 --> 00:31:11,229

ER to u2 aircraft, for example, they'd you know, like a bigger version of that basically

384

00:31:11,230 --> 00:31:14,710

You know presumably with a couple edge ins but but long thin wings

385

00:31:16,310 --> 00:31:19,450

So would it be safe to say I'd to make the statement that

386

00:31:20,030 --> 00:31:25,090

Nothing has ever been sprayed out of a plane in furtherance of geoengineering deliberately

387

00:31:29,570 --> 00:31:31,570

Mean for research

388

00:31:31,820 --> 00:31:39,159

So we met this there is a published paper by said Russian group that did release the helicopter them from a he

389

00:31:39,160 --> 00:31:41,410

Yeah, I don't know of something

390

00:31:42,950 --> 00:31:44,240

Well

391

00:31:44,240 --> 00:31:47,740

keep brushing Oh Ricky Loman at a

392

00:31:48,590 --> 00:31:53,019

Ricky Loman at ETH his I think released some aerosols from drones

393

00:31:53,750 --> 00:31:55,750

hmm

394

00:31:56,000 --> 00:31:58,690

And I don't know if the mCP exists

395

00:32:01,040 --> 00:32:07,930

Either I'm not quite sure I wouldn't want to absolutely say no cuz we write one case right so hardly any

396

00:32:08,390 --> 00:32:12,849

Basically, I just like one or two cases one or two cases ever. Yeah

397

00:32:13,040 --> 00:32:17,950

Yeah, cuz I want to be clear for people whether they know what the actual extent of the research is

398

00:32:17,980 --> 00:32:21,490

That's you you haven't really got to the stage of actually doing these

399

00:32:22,070 --> 00:32:23,450

experiments in the air

400

00:32:23,450 --> 00:32:23,950

No

401

00:32:23,950 --> 00:32:26,019

I mean we we are is you know as

402

00:32:26,360 --> 00:32:28,360

You and your some of your viewers will know

403

00:32:28,370 --> 00:32:32,920

I'm involved in something called the stress for a controlled perturbation experiment Frank quite just the lead an

404

00:32:33,110 --> 00:32:36,820

We you know expect to do engineering flights within about the next six months

405

00:32:36,820 --> 00:32:40,239

we don't know there's an advisory committee will be publicly announced in a few weeks and then

406

00:32:40,820 --> 00:32:43,509

we depend on that advisory community before we can fly but

407

00:32:44,280 --> 00:32:49,619

that thing would be a high-altitude balloon which would leave an invisible trail and the balloon would be

408

00:32:57,479 --> 00:32:51,760

not

409

00:32:57,820 --> 00:33:00,059

And how much would you actually be spraying a?

410

00:33:00,760 --> 00:33:04,950

Kilogram or sub material like total for the whole experiment once or twice

411

00:33:06,100 --> 00:33:08,610

Sorry, it's really yeah, you know almost almost nothing really

412

00:33:09,460 --> 00:33:13,259

No, we have calculated. I mean it turns out that regular

413

00:33:13,930 --> 00:33:15,930

aircraft commercial aircraft

414

00:33:16,450 --> 00:33:18,659

Release sulfur because there's sulfur in the aviation

415

00:33:19,000 --> 00:33:23,070

And you can calculate the percentage excess from the aviation fuel in the number of kilograms per hour

416

00:33:24,550 --> 00:33:29,909

Modern aircraft burns and you can calculate that the amount of sulfur that one of those just a conventional, you

417

00:33:30,670 --> 00:33:33,060

787 or whatever admits is, you know

418

00:33:34,480 --> 00:33:37,770

in a minute, it admits roughly as much Sulphurs our experiment would for example

419

00:33:37,770 --> 00:33:42,119

If we admit it's all four which we probably would do at some point, but wouldn't start with yeah

420

00:33:42,430 --> 00:33:47,669

So it's in a way that you could do geoengineering with planes at normal flight altitude

421

00:33:48,880 --> 00:33:49,990

um

422

00:33:49,990 --> 00:33:57,900

Well, Pete and backing on commercial traffic some how about so so normal planes do make contrails hmm and

423

00:33:57,900 --> 00:33:59,900

so I

424

00:34:00,430 --> 00:34:03,029

Think the short answer would be no

425

00:34:03,730 --> 00:34:05,880

None this mainstream gr

426

00:34:05,890 --> 00:34:10,919

Methods been discussed would make any sense for regular planes at regular file suits

427

00:34:11,380 --> 00:34:14,969

But there's a whole separate set of ideas, which is that

428

00:34:16,899 --> 00:34:24,059

High clouds can either be warming or heating depending on the time of day in location and so on so

429

00:34:26,649 --> 00:34:32,939

Sometimes contrails regular contrails can actually have a cooling effect because they can be pretty white

430

00:34:33,880 --> 00:34:40,349

And other times they can tend to have more of a warming effect and planes can to some extent control if they r

431

00:34:40,780 --> 00:34:47,219

McConnell formation depends on local relative humidity and so you can fly the airplanes through slightly differe

432

00:34:47,500 --> 00:34:50,580

some people Steve Barrett at MIT has suggested that

433

00:34:50,860 --> 00:34:56,189

It might be possible for just slightly adjust the flight tracks of airplanes not

434

00:34:56,800 --> 00:35:00,209

injecting anything differently airplanes themselves wouldn't change at all you've just

435

00:35:00,820 --> 00:35:02,130

slightly alter the flight track

436

00:35:02,130 --> 00:35:07,829

So you'd make them a little more likely to make contrails during the daytime when they have a cooling effect

437

00:35:08,020 --> 00:35:10,649

and a little less likely to make them in the

438

00:35:10,870 --> 00:35:16,049

Nighttime when they have a net warming effect because they have the infrared warming but there's no sunlight

439

00:35:16,390 --> 00:35:17,250

if you did

440

00:35:17,250 --> 00:35:18,400

it might actually

441

00:35:18,400 --> 00:35:24,240

provide a little bit of cooling that could you know offset some of the warming that the aviation history otherwise

442

00:35:24,340 --> 00:35:28,979

That's not a crazy idea. It turns out and there are people I think beginning to think about that

443

00:35:28,980 --> 00:35:33,179

So you tell I mean whether or not that's you're hearing as a matter of dispute

444

00:35:34,780 --> 00:35:37,620

Yet to my knowledge and if it was happening it wouldn't to be clear

445

00:35:38,230 --> 00:35:45,090

Involve any actual material any different than the aircraft now the same aircraft flying with the same engines, right

446

00:35:46,270 --> 00:35:48,840

Using different flight tracks. It's the exact same emissions

447

00:35:49,690 --> 00:35:51,780

Could could you do it by modulating?

448

00:35:51,780 --> 00:35:58,769

The fuel being used some people suggested that perhaps is the secret mixes of fuel where sometimes they make

449

00:35:58,840 --> 00:36:03,809

Contrails by changing the sulfur content of the fuel. I don't think it's no well. I'm not an expert

450

00:36:03,810 --> 00:36:08,580

So so this guy there are people who I mean there there are people who you know spend their lives studying co

451
00:36:08,580 --> 00:36:11,999
I'm not one of them. I think it's actually the salt of contact

452
00:36:12,000 --> 00:36:15,810
I don't think has anything to do with it or isn't very important

453
00:36:15,810 --> 00:36:19,499
But there is something that's important regarding whether or not you have cyclic

454
00:36:21,490 --> 00:36:24,149
Organic compounds or straight chains, basically

455
00:36:24,730 --> 00:36:29,730
Like benzene style compounds that have you know for those you have a basic chemistry that have ring

456
00:36:29,830 --> 00:36:32,549
structures compared to more straight train crunchers and and

457
00:36:33,460 --> 00:36:40,110
Biofuels versus fossil fuels have slightly different mixtures, and those things have different ice different contrail

458
00:36:40,110 --> 00:36:44,789
And so one of the questions is is Airlines are interested in biofuels. Do those

459
00:36:45,010 --> 00:36:50,909
Yeah, do those alter the conformation and there's some literature on that. I don't know the details so in

460
00:36:51,550 --> 00:36:53,080
principle I

461
00:36:53,080 --> 00:36:59,880
guess it's right that's switching between a biofuel mixture and a conventional aviation kerosene would slightly c

462
00:37:01,060 --> 00:37:06,330
no aircraft do that and I guess there's no real reason why they would

463
00:37:07,450 --> 00:37:09,340

Yes

464

00:37:09,340 --> 00:37:13,960

It's been suggested by, I don't know if you know, Jim Lee. He's a kind of a

465

00:37:13,960 --> 00:37:19,770

Chemtrails geoengineering researcher. He really tries to make that case that that is what's actually going on th

466

00:37:19,770 --> 00:37:27,719

Is this some kind of modification in fuels it's actually the early days of the chemtrail conspiracy theory started o

467

00:37:28,540 --> 00:37:32,310

But they thought that that the new types of military fuels that came in back then

468

00:37:32,860 --> 00:37:39,269

Were actually causing more contrails. So there's certain routes to this Kentrell theory. They go back to a fuel

469

00:37:40,330 --> 00:37:42,330

Makes sense, I think

470

00:37:42,820 --> 00:37:43,900

um

471

00:37:43,900 --> 00:37:46,680

But people routinely seem convinced that you know

472

00:37:46,680 --> 00:37:47,500

people people

473

00:37:47,500 --> 00:37:52,439

being part of this as people look up at the sky and see it filled with persistent contrails and say there's a lot mor

474

00:37:52,440 --> 00:37:59,399

There used to be and they're right because there's a lot more travel plans in did and and they're right to be piss

475

00:38:00,460 --> 00:38:01,810

um

476

00:38:01,810 --> 00:38:06,539

But it's pretty easy to tell by several different methods what those airplanes are

477

00:38:06,540 --> 00:38:12,749

I mean you can buy a good high quality telescope, and identify airplanes and you separately can look at you know

478

00:38:12,750 --> 00:38:15,510

all the different flight data services that show you what the

479

00:38:15,700 --> 00:38:19,800

exact aircraft number is in its track it so you can put all that together yourself and

480

00:38:20,800 --> 00:38:25,700

So it that's actually pretty hard to break because again, it's lots of independent providers

481

00:38:25,709 --> 00:38:30,160

so if you suppose there's some massive conspiracy and there's airplanes that aren't tracked like

482

00:38:32,020 --> 00:38:39,509

That that that's a giant conspiracy because air traffic control depends on people having transponders so and also

483

00:38:39,820 --> 00:38:41,590

independent now

484

00:38:41,590 --> 00:38:46,859

Data gathering on those transponders, so it's really hard to I mean you'd have to have a conspiracy

485

00:38:46,859 --> 00:38:50,069

It just was like a sort of mind-numbing Lee broad conspiracy

486

00:38:50,619 --> 00:38:52,619

Well, that's what they're saying

487

00:38:53,740 --> 00:38:57,540

But but does anybody really believe it there are no such things

488

00:38:57,540 --> 00:38:59,790

I think there are a lot of people who

489

00:39:00,190 --> 00:39:06,659

are conspiracy theorists genuinely do believe that these things are going on now and you try to talk them out of

490

00:39:06,660 --> 00:39:11,730

to explain to them like the the scale of the conspiracy and the practicality of it and they

491

00:39:12,190 --> 00:39:15,060

They just kind of explain these things away in their minds

492

00:39:16,270 --> 00:39:22,379

There must be a way in which it happened because we know that the government does evil things and therefore

493

00:39:22,380 --> 00:39:26,580

A way in the military as years ahead of us of Technology. So they they make these vague

494

00:39:27,940 --> 00:39:29,940

explanations for therefore the theories

495

00:39:30,790 --> 00:39:32,790

once I talk to you about

496

00:39:33,250 --> 00:39:36,569

the Arctic methane emergency group mmm because

497

00:39:38,290 --> 00:39:40,739

The conspiracy theorists the people who believed in chemtrails

498

00:39:41,020 --> 00:39:48,270

They point to the artic methane emergency group and they say here's a bunch of scientists and they're giving a

499

00:39:48,490 --> 00:39:54,629

that all the methane in the Arctic tundra is going to melt and it's going to be this this runaway event this

500

00:39:55,660 --> 00:39:57,660

this this thing that we can't come back from

501

00:39:59,470 --> 00:40:01,470

Do you think that

502

00:40:02,080 --> 00:40:08,190

The Arctic methane emergency groups warnings are valid on how would you can I characterize them?

503

00:40:09,730 --> 00:40:11,879

I'd characterize them as overstated

504

00:40:12,010 --> 00:40:17,909

So there certainly are legitimate concerns about both methane and co2 releases from?

505

00:40:18,340 --> 00:40:23,400

Arctic ecosystems as they warm up and to be clear those aren't like concerns on the side. Those are

506

00:40:24,070 --> 00:40:26,100

built into standard estimates about

507

00:40:26,920 --> 00:40:32,789

climate change they're built into the carbon cycle models that inform overall estimates of how the climate will w

508

00:40:33,790 --> 00:40:39,720

there are concerns that those standard models don't include enough knowledge about how much methane or

509

00:40:41,410 --> 00:40:45,720

Co2 will be released from melting permafrost, but there's know a lot of experiments which you know are

510

00:40:46,300 --> 00:40:52,110

interesting and some of them do seem to show that there may be the numbers bigger than we thought but I ha

511

00:40:52,420 --> 00:40:54,809

coherent set of arguments that shows this kind of

512

00:40:55,540 --> 00:40:56,590

massive

513

00:40:56,590 --> 00:40:58,420

runaway tipping point

514

00:40:58,420 --> 00:41:00,420

liiii I haven't

515

00:41:00,490 --> 00:41:02,400

That's not to say there isn't some argument like that

516

00:41:02,400 --> 00:41:07,049

but I haven't seen it and at least some of the people in that group I

517

00:41:07,660 --> 00:41:10,889

Forget but about almost a decade ago on the geoengineering

518

00:41:11,410 --> 00:41:12,910

Google Group I had a

519

00:41:12,910 --> 00:41:17,789

exchange with one of the leaders of that group who was very convinced that sea ice would be gone in a decade

520

00:41:17,790 --> 00:41:19,800

Think I offered a bet. I don't think we actually did it

521

00:41:19,800 --> 00:41:23,370

but of course the ice wasn't gone in a decade and I think the answer is

522

00:41:23,800 --> 00:41:27,030

Go back and look at how confident they were ten years ago and then evaluate

523

00:41:28,930 --> 00:41:33,869

Yeah, and I obviously didn't come to pass I mean they've become doomsaying for quite a while

524

00:41:35,670 --> 00:41:41,909

And summertime is absolutely going down it's going down. Yeah and some set of early models predicted

525

00:41:41,910 --> 00:41:45,990

It's very disturbing. But the idea that there's some massive threshold

526

00:41:47,109 --> 00:41:53,669

Doesn't seem to be there in the data. It's interesting. There is kind of like a little subset of the climate scientists

527

00:41:54,369 --> 00:41:59,759

This very strong concern it seems I mean, how would you characterize it in terms of like overall?

528

00:42:00,309 --> 00:42:03,989

Climate scientists. I think I think I mean like

529

00:42:05,230 --> 00:42:07,409

scientists are not divorced from politics and

530

00:42:08,079 --> 00:42:12,869

People many people in the climate science world certainly including me would like to see much more

531

00:42:13,119 --> 00:42:21,088

action to restrict emissions than there is now and so the climate science community will sometimes try five way

532

00:42:21,460 --> 00:42:26,879

Emphasize the risks and emphasized the need for urgent action, and I think talking about tipping points

533

00:42:26,880 --> 00:42:30,510

Which is a very kind of powerful image. I think not that useful scientifically

534

00:42:31,059 --> 00:42:36,599

they're talking about tipping points and talking about things like these methane runaways is a you know a good

535

00:42:36,910 --> 00:42:39,299

mitigate to - seems to be a good way to

536

00:42:39,609 --> 00:42:41,609

argue for the action and in fact almost

537

00:42:41,680 --> 00:42:45,480

Everybody who's involved in climate science agrees with which is that we ought to do more to cut emissions

538

00:42:46,270 --> 00:42:49,919

Yeah, so it's almost like they're just gonna be exaggerating

539

00:42:49,920 --> 00:42:54,990

I'm putting a focus on this one thing for good here way and oh, they actually wants to you know, take the action

540

00:42:55,270 --> 00:43:00,929

Yeah, and I won't take the actions - but I don't believe there's this such a simple argument through Arctic metha

541

00:43:02,650 --> 00:43:07,650

So, what do you think he's actually gonna happen with geoengineering over the next decades so I

542

00:43:08,559 --> 00:43:15,479

I mean, I have no idea. I really don't I think it's it's extraordinary hard to predict how

543

00:43:16,630 --> 00:43:21,660

social how new technologies like this will emerge or not and and so I

544

00:43:22,900 --> 00:43:29,339

do would say over the last year just even just a year or so the level of

545

00:43:31,780 --> 00:43:34,169

Interest in solar generation research in

546

00:43:35,020 --> 00:43:37,649

elite sort of thought leaders in

547

00:43:38,349 --> 00:43:42,239

climate policy and climate science is is increased pretty

548

00:43:43,059 --> 00:43:49,259

Dramatically so many more people in the big environmental groups or in government agencies. Who?

549

00:43:49,470 --> 00:43:55,949

About climate or in the kind of climate science world now seem to take serious idea that we should have a seri

550

00:43:56,380 --> 00:43:59,820

Real research program you're more than just a few little University groups

551

00:43:59,820 --> 00:44:05,519

Like it is now to understand more about these technologies and their risks and how they be governed not to sa

552

00:44:05,520 --> 00:44:11,280

There's some really thoughtful people who are great climate scientists and and activists who who believe there

553

00:44:11,280 --> 00:44:13,769

um plenty of people do but I'd say

554

00:44:14,380 --> 00:44:16,890

My view is that there's been a pretty strong

555

00:44:18,520 --> 00:44:22,560

Movement towards supportive research and I expect there will be

556

00:44:23,230 --> 00:44:26,159

substantially more research say five years from now than there is now

557

00:44:26,800 --> 00:44:28,800

so

558

00:44:29,140 --> 00:44:34,890

If I was going to guess I'd say there'd be many more national programs and the national programs would be yo

559

00:44:35,050 --> 00:44:36,270

They're not gonna be huge

560

00:44:36,270 --> 00:44:38,520

But I would expect to see you know

561

00:44:38,950 --> 00:44:45,510

Tens of millions of dollars a year for sure and and maybe hundred class what should still be, you know of order

562

00:44:46,030 --> 00:44:51,330

You know a few percent ten percent to a few percent of the amount and now spent for climate science

563

00:44:51,369 --> 00:44:57,749

So I think that's quite a plausible outcome. Then of course what happens next depends on the results that rese

564

00:44:58,330 --> 00:45:02,459

I think it's completely possible. That'll be research program and there will never be deployment

565

00:45:03,099 --> 00:45:04,630

I

566

00:45:04,630 --> 00:45:07,950

Think it's very hard to guess where there will be deployment. Um

567

00:45:09,550 --> 00:45:11,550

My you know

568

00:45:11,560 --> 00:45:17,369

Overall guess would be probably yes, but with very little confidence that I or anybody else is good at predicting

569

00:45:18,490 --> 00:45:20,380

do you have like a

570

00:45:20,380 --> 00:45:22,210

lower bound on

571

00:45:22,210 --> 00:45:24,210

When you think that you might happen?

572

00:45:25,510 --> 00:45:27,160

Well, that's what it is

573

00:45:27,160 --> 00:45:34,290

So because at least if you ask if you give my personal opinion would be the deployment that that we should do

574

00:45:35,740 --> 00:45:38,790

Experiments but experiments are all much too small to alter the climate

575

00:45:41,020 --> 00:45:48,899

Indoor experiments outdoor experiments the most of all modeling assessment etc. And then then if there were

576

00:45:49,480 --> 00:45:54,929

If some set of nations and obviously a big question is like what nations and how they decide and how other nations

577

00:45:55,900 --> 00:45:57,099

interact

578

00:45:57,099 --> 00:46:01,379

but but forgetting exactly how those decisions are made if you ask me as a

579

00:46:02,440 --> 00:46:08,040

Scientist, I would suggest I would suggest starting very slowly in start with with

580

00:46:08,559 --> 00:46:13,798

Deployments that were at the level of less than 1/10 of a watt per square meter of radiative forcing globally

581

00:46:14,109 --> 00:46:16,919

Which would still allow us to learn a lot about unexpected?

582

00:46:19,089 --> 00:46:23,879

Responses not responses to the climate itself but responses of stratospheric aerosol Zoar

583

00:46:24,819 --> 00:46:29,369

or if you're doing serious thinning or rain clouds in all those cases you learn a lot more about

584

00:46:30,339 --> 00:46:34,529

Efficacy and side-effects by doing that and and I think it makes sense to do that for like a decade

585

00:46:34,990 --> 00:46:39,599

So, you know, I think you could argue that it would make sense to begin doing something like that

586

00:46:39,640 --> 00:46:41,849

You know within less than two decades from now

587

00:46:43,359 --> 00:46:48,869

That would still be before there was large-scale deployment with the with the effects be measurable

588

00:46:48,869 --> 00:46:51,899

We keep doing it in such a small scale. Would you have to tell that it's working?

589

00:46:53,440 --> 00:46:57,179

Um you'd be able to well working is there's a multi-dimensional thing

590

00:46:57,180 --> 00:47:02,430

You would something the climate affects, but you would be able to see that say for stress for your carousels

591

00:47:02,950 --> 00:47:07,079

You'd absolutely be able to see the changes tries for your carousels

592

00:47:07,079 --> 00:47:11,519

You'd be able to measure the change when week already divorced the change in in in radiation

593

00:47:11,520 --> 00:47:15,179

You'd be able to measure some subsidiaries chemical effects. You'd be able to learn a lot

594

00:47:15,760 --> 00:47:18,089

But you wouldn't directly see the climate response

595

00:47:18,790 --> 00:47:26,159

Yeah, if someone was doing climate engineering now is with some kind of aerosol injection would we be able to

596

00:47:26,160 --> 00:47:28,160

That we could do. Um, I

597

00:47:30,819 --> 00:47:32,430

Think the big picture answers. Yes

598

00:47:32,430 --> 00:47:38,040

I mean it's interesting to kind of scratch your head and think about really weird corner cases that are conceivable

599

00:47:38,920 --> 00:47:39,510

You know

600

00:47:39,510 --> 00:47:44,699

There are there's now a whole series of independent independent meaning different nations different

601

00:47:45,190 --> 00:47:47,760

scientific authorities have lots of different instruments that measure

602

00:47:48,309 --> 00:47:51,298

Aerosols in different ways in the stratosphere and the troposphere etc

603

00:47:51,299 --> 00:47:54,719

And so and we measure both the amount of aerosols

604

00:47:54,720 --> 00:47:56,079

but then there are

605

00:47:56,079 --> 00:48:01,409

scientific experiments that measure the specific composition of aerosols that would then be very sensitively

606

00:48:01,569 --> 00:48:07,319

Detecting any kind of new strange unexpected aerosol. That was that was emitted, you know, so for example t

607

00:48:08,109 --> 00:48:11,639

measuring aerosol composition in both the stratosphere and the troposphere

608

00:48:11,859 --> 00:48:17,279

and they're matching that against models of what we think that composition should be from pollution sources a

609

00:48:17,650 --> 00:48:19,650

Substantial new source, you'd know it

610

00:48:19,869 --> 00:48:22,739

In the applications, so, you know

611

00:48:23,830 --> 00:48:25,240

Is it possible that?

612

00:48:25,240 --> 00:48:30,389

Some one aircraft has gone up and sprayed sulfur in the stratosphere just to say they could you can't rule that

613

00:48:30,390 --> 00:48:31,050

It's totally possible

614

00:48:31,050 --> 00:48:34,709

They never had it also presents no real risk and wouldn't really be doing anything for just one aircraft

615

00:48:35,050 --> 00:48:39,090

But I think what you can say is it's not happening at scale because we'd observe it, right

616

00:48:39,790 --> 00:48:41,790

Yes, very fascinating

617

00:48:42,040 --> 00:48:45,449

Well, I like to thank you very very much for this organization

618

00:48:45,450 --> 00:48:48,540

It's been very very interesting and I'm sure lots of other people will find it interesting

619

00:48:49,060 --> 00:48:54,989

Do you have anything else to add sir? Speak to the people who believe in chemtrails or questions about chemtrails

620

00:48:56,230 --> 00:49:02,849

Sure, I mean to speak to people who believe in chemtrails because there are people who clearly are really well informed

621

00:49:02,849 --> 00:49:06,779

they're living worried about that government lying to them and and I think

622

00:49:07,840 --> 00:49:14,939

I'd say focus on real problems. There are all sorts of things that governments are doing that need oversight that

623

00:49:15,490 --> 00:49:18,149

And that's true. I think whether you're on the left or right I

624

00:49:18,910 --> 00:49:23,220

Think in almost any political position you have we ought to be doing a better job on climate

625

00:49:23,220 --> 00:49:26,849

well, there's a big range of different people's views about what it better is and

626
00:49:30,099 --> 00:49:33,779
That you don't have to trust government well you should trust is

627
00:49:34,359 --> 00:49:37,229
Individuals, so so don't place your trust in government

628
00:49:37,240 --> 00:49:44,520
but but place your trust in individuals and if you really believe there's a conspiracy like chemtrails and you think

629
00:49:44,770 --> 00:49:47,639
What it would actually take in terms of supply chain to do it

630
00:49:47,640 --> 00:49:53,550
I think you can't avoid the fact that that you come up with the idea that there would be tens of thousands of people

631
00:49:53,550 --> 00:49:54,369
and

632
00:49:54,369 --> 00:49:58,079
What you're trusting is not the goodwill of the US government or any other government?

633
00:49:58,480 --> 00:50:06,359
What you're trusting is that it did if there's tens of thousands of your fellow citizens who potentially know a terrible

634
00:50:06,670 --> 00:50:09,540
A world where people have cell phones that he's in communication

635
00:50:10,060 --> 00:50:16,349
you just they're just not all gonna be secret and even if there's the idea that there's you know a threat of

636
00:50:16,720 --> 00:50:20,399
You know threat of their death by some agency that wants to keep a secret

637
00:50:20,619 --> 00:50:23,608
we know that people are willing to risk their lives to

638
00:50:24,220 --> 00:50:26,220

Do - to expose secrets?

639

00:50:31,980 --> 00:50:28,390

and

640

00:50:31,980 --> 00:50:34,679

Maybe you may or may not agree with but it's clear that people will do that

641

00:50:34,680 --> 00:50:40,889

And so the reason that you should not believe in this conspiracy theory is that it's just not plausible

642

00:50:41,170 --> 00:50:47,909

that tens of thousands of your fellow citizens would all do something that was either pointless or terrible and

643

00:50:48,760 --> 00:50:56,339

none of them would use easy tools at hand like cell phones or release of electronic records to tell and you know

644

00:50:56,340 --> 00:51:00,960

Look at the kind of information has been released. So we now you know through the various WikiLeaks things

645

00:51:00,960 --> 00:51:03,389

We have release of all sorts of top-secret

646

00:51:06,190 --> 00:51:08,279

Communications traffic from US intelligence

647

00:51:09,100 --> 00:51:12,329

gathering and and and diplomatic missions and

648

00:51:13,540 --> 00:51:20,190

I'm not defending or making any comment on whether or not those releases were a good thing, but the fact is p

649

00:51:20,770 --> 00:51:22,060

and

650

00:51:22,060 --> 00:51:26,730

You just it's just not plausible that that many people that with that many people involve

651

00:51:26,730 --> 00:51:30,329

You wouldn't have some of them who would do the right thing and therefore it's not happening

652

00:51:30,330 --> 00:51:34,410

and if that's not happening what I hope you who do believe in it will do is

653

00:51:34,810 --> 00:51:38,370

Think seriously about other useful things to do to help your community

654

00:51:38,410 --> 00:51:42,809

whatever way you like whether you're on the right or the left help a community live in a better world and

655

00:51:43,360 --> 00:51:50,339

Also, and this is more personal. I think there's a way in which spreading hateful language and hate on the Inter

656

00:51:50,820 --> 00:51:52,820

Yeah, I get I get absurdly

657

00:51:53,290 --> 00:51:57,390

you know over-the-top death threats anti-semitic ate the whole thing and

658

00:51:59,020 --> 00:52:04,500

This does not make the world a better place for anybody and there's no version in the world that I think any of u

659

00:52:04,500 --> 00:52:08,369

Really wants to live in that is made better by people spreading those kind of lies in hatred

660

00:52:09,010 --> 00:52:15,779

Just wonderful. Thank you completely agree with all of that and thank you very much again for this discussion.