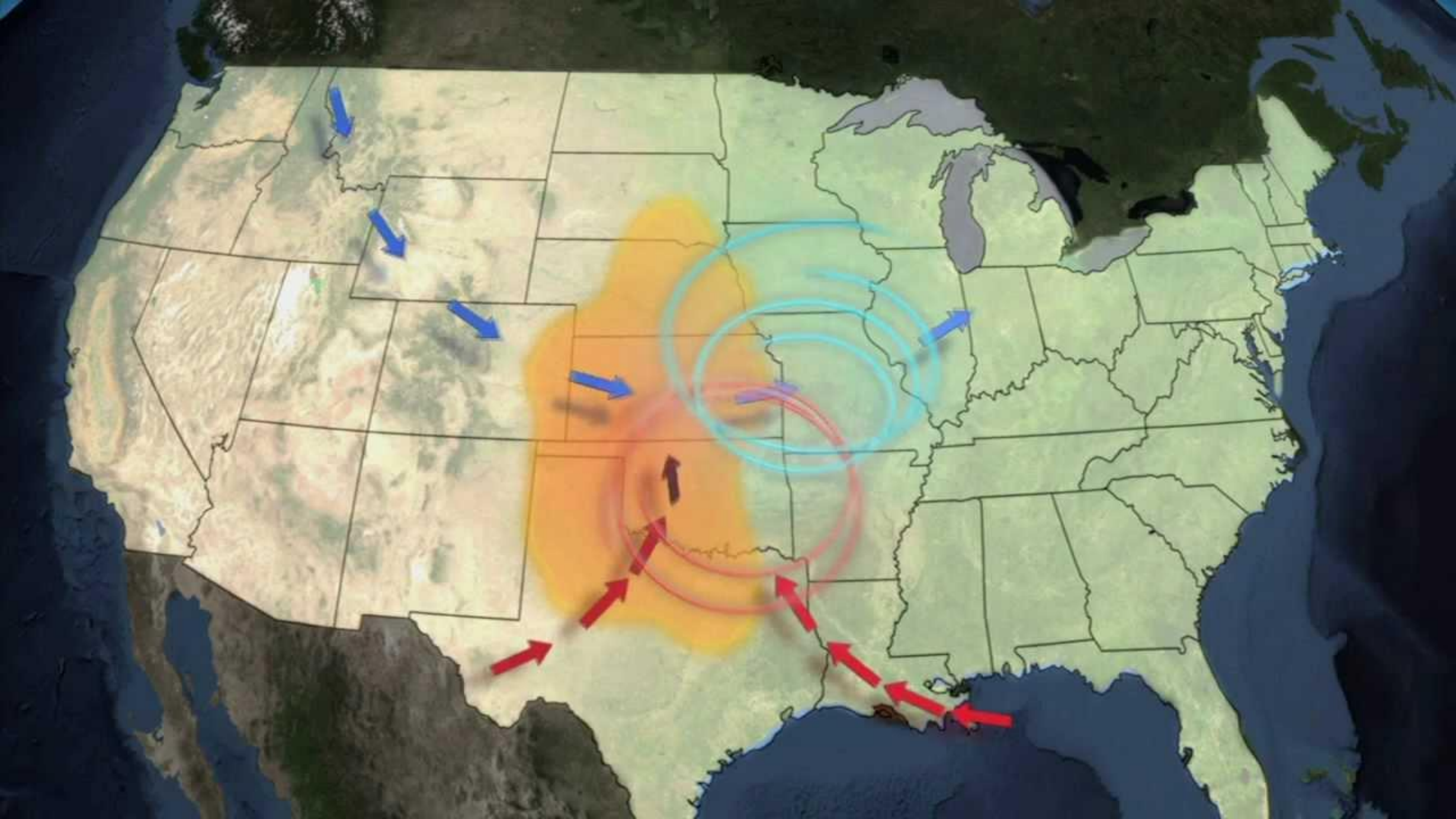

1
00:00:08,030 --> 00:00:04,020
Music

2
00:00:08,050 --> 00:00:12,090
Tim Samaras: Since I was a kid, I've always been interested in storms. As an

3
00:00:12,110 --> 00:00:16,100
engineer I try to understand how things work. So, I actually

4
00:00:16,120 --> 00:00:20,110
built and designed a device to measure the weather, basically,

5
00:00:20,130 --> 00:00:24,110
on the inside of a tornado.

6
00:00:24,130 --> 00:00:28,130
The United States on average gets about

7
00:00:28,150 --> 00:00:32,140
1200 tornadoes per year. And the reason is, is because of its unique

8
00:00:32,160 --> 00:00:36,140
geographic location. You got the Gulf of Mexico off

9
00:00:36,160 --> 00:00:40,150
to the South, and theses storm systems as they pass through draw

10
00:00:40,170 --> 00:00:44,360
this Golf moisture as water vapor and comes right up through the Midwest. And

11
00:00:44,380 --> 00:00:48,360
spring time generally reflects a very, what we call a very active jet stream

12
00:00:48,380 --> 00:00:52,570
and it brings us a very powerful winds that

13
00:00:52,590 --> 00:00:56,610

just comes right across the Midwest. That combination allows

14
00:00:56,630 --> 00:01:00,610
these big storm systems to develop and of course wind shear is a very powerful ingredient

15
00:01:00,630 --> 00:01:04,610
for a tornado. The ingredients for a tornado

16
00:01:04,630 --> 00:01:08,620
obviously are quite complex but some of the basics are,

17
00:01:08,640 --> 00:01:12,720
you have to have moisture, you have to have lift and then the

18
00:01:12,740 --> 00:01:16,780
other most important ingredient is what they call wind shear. And

19
00:01:16,800 --> 00:01:20,960
shear creates these big horizontal rolls in the atmosphere.

20
00:01:20,980 --> 00:01:24,980
And then when a thunderstorm forms underneath it, it actually tips these

21
00:01:25,000 --> 00:01:28,990
horizontal rolls in a vertical position to where a thunderstorm forms

22
00:01:29,010 --> 00:01:33,000
over them, you have the whole thunderstorm rotating. Those final

23
00:01:33,020 --> 00:01:37,000
processes are what we're trying to study.

24
00:01:37,020 --> 00:01:41,000
What's bringing the rotation finally all the way to the ground and that's

25
00:01:41,020 --> 00:01:45,010
really one of the biggest mysteries of tornado formation.

26
00:01:45,030 --> 00:01:49,020
You know its very difficult to forecast where a tornadoes going to be. When we're actually in

27
00:01:49,040 --> 00:01:53,060
the field, waiting for thunderstorms to develop, we use what they call visible

28
00:01:53,080 --> 00:01:57,060
satellite imagery. This is basically a picture from space, showing

29
00:01:57,080 --> 00:02:01,100
the best areas, what we call instability, and that's how and where

30
00:02:01,120 --> 00:02:05,210
we are able to target these storms that are developing.

31
00:02:05,230 --> 00:02:09,210
Ground-based radar can't even see these storms develop, but satellite can.

32
00:02:09,230 --> 00:02:13,410
Satellites also detect what we call boundaries.

33
00:02:13,430 --> 00:02:17,480
These boundaries, left over from old thunderstorms, become the

34
00:02:17,500 --> 00:02:21,510
focus of new thunderstorms during the day and actually enhance

35
00:02:21,530 --> 00:02:25,690
the tornado potential. Visible satellite technology allows us to

36
00:02:25,710 --> 00:02:29,770
identify this, which otherwise would be going totally

37
00:02:29,790 --> 00:02:33,820
unnoticed and undetected. One of the biggest

38
00:02:33,840 --> 00:02:37,870

things that I would love to see in future satellite technology is the

39
00:02:37,890 --> 00:02:41,900
ability to actually see lightning within the cloud tops. All the

40
00:02:41,920 --> 00:02:45,900
vertical motion and so forth greatly enhances the ability to create lightening.

41
00:02:45,920 --> 00:02:49,900
This lightning mapping will actually show frequency. If the storm is

42
00:02:49,920 --> 00:02:53,910
becoming severe, the lightning frequency increases and thus being

43
00:02:53,930 --> 00:02:57,910
able to do an early detection of whether or not that storm is severe or not.

44
00:02:57,930 --> 00:03:01,950
Music

45
00:03:01,970 --> 00:03:05,980
If we knew more

46
00:03:06,000 --> 00:03:09,980
about tornado genesis and structure and we're able to stretch that warning out to twenty or

47
00:03:10,000 --> 00:03:14,100
twenty five minutes, right now the average time is about fifteen minutes or so,

48
00:03:14,120 --> 00:03:18,100
that gives people more time to prepare and seek shelter.

49
00:03:18,120 --> 00:03:22,110
Without the GOES satellite we would be back in the dark ages of the mid to early