



1
00:00:08,120 --> 00:00:04,070

<>

2
00:00:08,120 --> 00:00:12,150

Those changes in the Sun we see here at the Earth as well.

3
00:00:12,150 --> 00:00:16,180

We call those effects here at the Earth "Space Weather." The Living With

4
00:00:16,180 --> 00:00:20,190

a Star program was developed at NASA to bring together all the people

5
00:00:20,190 --> 00:00:24,260

who study space weather. The Solar Dynamics Observatory is the first

6
00:00:24,260 --> 00:00:28,320

mission of NASA's Living With a Star program. It's designed to study the Sun

7
00:00:28,320 --> 00:00:32,350

--the root of space weather. SDO has a couple of improvements.

8
00:00:32,350 --> 00:00:36,370

The easiest one to think about is that we have better cameras. We take a camera

9
00:00:36,370 --> 00:00:40,380

that's twice as big as the best one in space, and we fly a whole bunch

10
00:00:40,380 --> 00:00:44,430

of them on a satellite. Our cameras are 4K by 4K

11
00:00:44,430 --> 00:00:48,480

pixels, so that's about 16 million pixels sitting on each camera.

12
00:00:48,480 --> 00:00:52,510

We can see images of the full disk of the Sun. To see the whole sun

13
00:00:52,510 --> 00:00:56,530

in high resolution is better than seeing just a little bit of the Sun in high

14

00:00:56,530 --> 00:01:00,550

resolution. If we look at a little bit of the sun, and we see something happen,

15

00:01:00,550 --> 00:01:04,630

every once in a while, we'll see that something came in from the side. So you're

16

00:01:04,630 --> 00:01:08,680

sitting there watching it and you say, "Ooh, that's cool! That's what I wanted to study! How did that happen?"

17

00:01:08,680 --> 00:01:12,710

Why did that happen?" So, you widen out. So now you see what you wanted to see,

18

00:01:12,710 --> 00:01:16,760

and you see that wave come in. But the most important thing is that we're gonna take pictures

19

00:01:16,760 --> 00:01:20,790

very frequently. The best we've done so far were full disk images of the sun

20

00:01:20,790 --> 00:01:24,850

is every three minutes. And we're gonna take 'em every ten seconds. That's a lot

21

00:01:24,850 --> 00:01:28,910

faster, and we'll be able to see things that happen on the Sun very quickly

22

00:01:28,910 --> 00:01:32,950

that right now we skip, we just--we miss. It's like we look at the tops of

23

00:01:32,950 --> 00:01:36,970

the mountains and we miss the valleys in between. SDO will also study

24

00:01:36,970 --> 00:01:41,000

the amount of energy the Sun puts off in extreme ultraviolet wavelengths.

25

00:01:41,000 --> 00:01:45,060

These are very short wavelengths that get absorbed very high up in our atmosphere

26

00:01:45,060 --> 00:01:49,110

--causes the atmosphere to heat, expand, and bring satellites

27

00:01:49,110 --> 00:01:53,140

out of orbit. Previous missions have looked at the extreme ultraviolet irradiance

28

00:01:53,140 --> 00:01:57,160

every...90 minutes. We're gonna look at it every ten seconds.

29

00:01:57,160 --> 00:02:01,200

And we're gonna see a lot of new stuff, and we're gonna learn a lot.

30

00:02:01,200 --> 00:02:05,210

The magnetic field is also looked at. We know that this is

31

00:02:05,210 --> 00:02:09,270

important because we've never understood the direction of the magnetic

32

00:02:09,270 --> 00:02:13,300

field before. And that's part of our research--is to figure out what's happening to the magnetic

33

00:02:13,300 --> 00:02:17,350

field of the Sun, and by knowing its direction, that gives us another piece of information

34

00:02:17,350 --> 00:02:21,380

to understand where it comes from and how it gets converted into solar activity.

35

00:02:21,380 --> 00:02:25,400

The instruments on SDO are designed

36

00:02:25,400 --> 00:02:29,470

to work together. One measures magnetic field, one measures what the magnetic

37

00:02:29,470 --> 00:02:33,510

field does, and one measures what we see that affects us here at the

38

00:02:33,510 --> 00:02:37,550

Earth. SDO would like to be able to predict space weather so that we

39

00:02:37,550 --> 00:02:41,570

can look at the Sun, know something's going to happen, and call people

40

00:02:41,570 --> 00:02:45,590

up and let them know. <>