



1
00:00:16,310 --> 00:00:04,250

Music

2
00:00:16,330 --> 00:00:20,390

The course of geomagnetic activity disturbances caused by

3
00:00:20,410 --> 00:00:24,390

flares on the sun, by big blobs of plasma coming out from the

4
00:00:24,410 --> 00:00:28,400

sun towards the Earth. The Earth's magnetic field is battered and shaken.

5
00:00:28,420 --> 00:00:32,400

Some of that energy is captured in the earth's magnetic field and through a

6
00:00:32,420 --> 00:00:36,420

variety of processes that energy, energizes particles in the

7
00:00:36,440 --> 00:00:40,600

Earth's radiation belts, up to energies that are hazardous to

8
00:00:40,620 --> 00:00:44,620

spacecraft and astronauts. The Radiation Belt Storm Probes

9
00:00:44,640 --> 00:00:48,800

mission, is NASA's mission to study the Earth's Van Allen Radiation

10
00:00:48,820 --> 00:00:52,830

Belts. Two invisible regions of highly charged

11
00:00:52,850 --> 00:00:56,850

particles in space that surround the Earth. Each of the two

12
00:00:56,870 --> 00:01:00,860

RBSP spacecraft carries five instrument suites and a

13
00:01:00,880 --> 00:01:04,860

total of eight instruments, the two spacecraft are identical.

14

00:01:04,880 --> 00:01:08,880

The region of space that we're talking about where the Radiation Belt Storm

15

00:01:08,900 --> 00:01:12,890

Probe spacecraft will go, is one that's occupied by communication

16

00:01:12,910 --> 00:01:16,900

spacecraft, by weather spacecraft, by all sorts of spacecraft that you use

17

00:01:16,920 --> 00:01:20,930

on a daily basis.

18

00:01:20,950 --> 00:01:24,940

There are two Van Allen Radiation Belts. The one closer to Earth about,

19

00:01:24,960 --> 00:01:28,950

1,000 miles up, above the Earth's equator contains highly

20

00:01:28,970 --> 00:01:32,960

charged protons that are trapped there for years and years.

21

00:01:32,980 --> 00:01:37,000

The further out radiation belt, the outer radiation belt,

22

00:01:37,020 --> 00:01:41,190

at about a twelfth of a distance to the moon, contains a mixture of energetic

23

00:01:41,210 --> 00:01:45,240

electrons and energetic ions. Both of them are hazardous but hazardous in

24

00:01:45,260 --> 00:01:49,280

different ways and at different times. They're always changing waxing

25

00:01:49,300 --> 00:01:53,480

waning, increasing and decreasing in strength, we don't understand

26
00:01:53,500 --> 00:01:57,490
why. The goals of the Radiation Belt Storm

27
00:01:57,510 --> 00:02:01,500
Probes mission are to determine where the charged particles in the Earth's

28
00:02:01,520 --> 00:02:05,520
radiation belts come from, how they get energized, and how they're

29
00:02:05,540 --> 00:02:09,610
lost into space. The first use for the data

30
00:02:09,630 --> 00:02:13,620
from the mission will be by scientists who attempt to understand the physical processes

31
00:02:13,640 --> 00:02:17,710
that are occurring in the radiation belts. They'll use those data to develop

32
00:02:17,730 --> 00:02:21,730
models for space weather in the Earth's environment, the hazardous features that

33
00:02:21,750 --> 00:02:25,770
surround us. However the data can also be used by engineers

34
00:02:25,790 --> 00:02:29,790
to better design spacecraft. For example if you know how much radiation

35
00:02:29,810 --> 00:02:33,820
is out there, you know how thick to shield your spacecraft with walls

36
00:02:33,840 --> 00:02:37,850
of metal. The Earth's radiation belts pose a hazard to

37
00:02:37,870 --> 00:02:41,880
astronauts, a hazard because radiation, prolonged exposure to radiation

38
00:02:41,900 --> 00:02:45,930

can cause cancer. What we want to do is understand

39

00:02:45,950 --> 00:02:49,940

just how much radiation is out there, and just where it is and we can

40

00:02:49,960 --> 00:02:53,950

warn astronauts when to be inside and outside their spacecraft.

41

00:02:53,970 --> 00:02:57,960

The RBSP spacecraft are focused on the dynamic

42

00:02:57,980 --> 00:03:02,050

radiation belts in the Earth's inner magnetosphere, they're the only

43

00:03:02,070 --> 00:03:06,060

spacecraft that focus on those. Consequently they're a critical component

44

00:03:06,080 --> 00:03:10,100

in the series of phenomenon that link the Sun to the Earth.

45

00:03:10,120 --> 00:03:14,130

music