



1  
00:00:13,310 --> 00:00:10,780  
imagine you work for the MMS mission

2  
00:00:15,680 --> 00:00:13,320  
your goal is to measure how the sun's

3  
00:00:18,170 --> 00:00:15,690  
and Earth's magnetic fields connect and

4  
00:00:19,700 --> 00:00:18,180  
disconnect explosively transferring

5  
00:00:23,660 --> 00:00:19,710  
energy from one to the other

6  
00:00:26,269 --> 00:00:23,670  
we call this magnetic reconnection we

7  
00:00:28,189 --> 00:00:26,279  
want to get a 3d observation of magnetic

8  
00:00:30,169 --> 00:00:28,199  
reconnection to do this you'll need

9  
00:00:32,630 --> 00:00:30,179  
measurements at four different points a

10  
00:00:35,120 --> 00:00:32,640  
single base point and one additional

11  
00:00:36,950 --> 00:00:35,130  
point for each dimension this means you

12  
00:00:40,639 --> 00:00:36,960  
have to build not one but four

13  
00:00:43,400 --> 00:00:40,649

spacecraft and you'll need to pack each

14

00:00:44,810 --> 00:00:43,410

one with 25 instruments you'll need to

15

00:00:46,970 --> 00:00:44,820

arrange them so that they are not

16

00:00:48,830 --> 00:00:46,980

blocking each other and so that the

17

00:00:53,209 --> 00:00:48,840

magnetometers are held safely away from

18

00:00:55,670 --> 00:00:53,219

the spacecraft's body but wait you only

19

00:00:59,119 --> 00:00:55,680

have four years to build test and launch

20

00:01:01,369 --> 00:00:59,129

all of them it typically takes four

21

00:01:03,529 --> 00:01:01,379

years to build just one so you won't be

22

00:01:07,880 --> 00:01:03,539

able to build them one at a time you'll

23

00:01:09,950 --> 00:01:07,890

have to work on them concurrently you'll

24

00:01:11,690 --> 00:01:09,960

need a team to help you do that they

25

00:01:13,670 --> 00:01:11,700

will need space to work so you'll have

26

00:01:15,499 --> 00:01:13,680

to build a cleanroom and you'll have to

27

00:01:17,270 --> 00:01:15,509

keep all of your people paper and tools

28

00:01:19,820 --> 00:01:17,280

organized because you'll have to wrap

29

00:01:21,590 --> 00:01:19,830

four sets of wires and prepare four sets

30

00:01:23,120 --> 00:01:21,600

of flight hardware and do four sets of

31

00:01:24,499 --> 00:01:23,130

tests and make sure that everyone is

32

00:01:28,880 --> 00:01:24,509

working on the right project at the