1
00:00:07,829 --> 00:00:04,309
earth's brothers are mars venus and

2
00:00:10,310 --> 00:00:07,839
mercury and their history informs our

3
00:00:12,150 --> 00:00:10,320
understanding of our own planet and its

4
00:00:14,470 --> 00:00:12,160
history and its future

5
00:00:16,630 --> 00:00:14,480
and so we go to mercury which is the

6
00:00:18,390 --> 00:00:16,640
smallest planet the planet closest to

7
00:00:20,550 --> 00:00:18,400
the sun the planet made out of the

8
00:00:22,950 --> 00:00:20,560
densest materials the planet

9
00:00:25,029 --> 00:00:22,960
subjected to the most extreme radiation

10
00:00:27,910 --> 00:00:25,039
and energetic particles from the sun

11
00:00:30,390 --> 00:00:27,920
because the processes that built mercury

12
00:00:32,389 --> 00:00:30,400
the processes that have governed how

13
00:00:36,709 --> 00:00:32,399

mercury evolves are the same processes

14
00:00:39,830 --> 00:00:38,229
it's the distance from the planet that's

15
00:00:41,590 --> 00:00:39,840
the most critical and we've been

16
00:00:44,950 --> 00:00:41,600
watching that distance get smaller and

17
00:00:46,790 --> 00:00:44,960
smaller in our trajectory projections

18
00:00:49,190 --> 00:00:46,800
as a result of all the maneuvers that

19
00:00:51,270 --> 00:00:49,200
have gone on before all of the solar

20
00:00:53,430 --> 00:00:51,280
sailing that we've accomplished so far

21
00:00:55,350 --> 00:00:53,440
so we are on target

22
00:00:58,069 --> 00:00:55,360
and we're now awaiting

23
00:01:00,470 --> 00:00:58,079
the propulsive event that will put us

24
00:01:02,950 --> 00:01:00,480
into orbit around mercury and make

25
00:01:07,350 --> 00:01:02,960
messenger the first spacecraft to orbit

26
00:01:11,190 --> 00:01:09,190
messenger has been

27
00:01:13,030 --> 00:01:11,200
traveling to this point for more than

28
00:01:16,390 --> 00:01:13,040
six and a half years

29
00:01:19,270 --> 00:01:16,400
we have flown by mercury three times

30
00:01:21,429 --> 00:01:19,280
and we're now approaching the point uh

31
00:01:23,670 --> 00:01:21,439
the most critical point in the mission

32
00:01:27,990 --> 00:01:23,680
when we fire our propulsion system to go

33
00:01:31,990 --> 00:01:30,469
we have been honing the trajectory as

34
00:01:34,149 --> 00:01:32,000
we've been flying

35
00:01:36,550 --> 00:01:34,159
just as we did for each of the mercury

36
00:01:38,630 --> 00:01:36,560
flybys the guidance and control and

37
00:01:40,950 --> 00:01:38,640
navigation teams have been using a

38
00:01:42,149 --> 00:01:40,960

process known as solar sailing

39
00:01:43,990 --> 00:01:42,159
where they

40
00:01:46,389 --> 00:01:44,000
can change the orientation of the

41
00:01:48,469 --> 00:01:46,399
spacecraft a small amount they can tilt

42
00:01:51,270 --> 00:01:48,479
the solar arrays relative to one another

43
00:01:53,670 --> 00:01:51,280
by a small amount and use sunlight

44
00:01:56,950 --> 00:01:53,680
the radiation pressure from the sun

45
00:01:59,670 --> 00:01:56,960
like the wind on the sails of a sailboat

46
00:02:04,709 --> 00:01:59,680
to make fine changes in the trajectory

47
00:02:09,430 --> 00:02:07,990
after we achieve orbit around mercury

48
00:02:11,270 --> 00:02:09,440
there'll be a commissioning phase

49
00:02:13,670 --> 00:02:11,280
there'll be a period

50
00:02:15,750 --> 00:02:13,680
almost three weeks long where we

51
00:02:18,150 --> 00:02:15,760
carefully check out every subsystem on

52
00:02:19,830 --> 00:02:18,160
the spacecraft we carefully check out

53
00:02:21,510 --> 00:02:19,840
every instrument on the spacecraft to

54
00:02:23,350 --> 00:02:21,520
make sure that they're functioning to

55
00:02:25,430 --> 00:02:23,360
make sure that in the thermal

56
00:02:27,910 --> 00:02:25,440
environment of mercury orbit that

57
00:02:32,949 --> 00:02:27,920
everything's behaving as expected

58
00:02:37,509 --> 00:02:35,030
one of the mysteries now a 20 year old

59
00:02:39,830 --> 00:02:37,519
mystery that we hope to solve uh with

60
00:02:41,589 --> 00:02:39,840
messenger is is the rice on mercury the

61
00:02:42,630 --> 00:02:41,599
planet closest to the sun the planet

62
00:02:44,470 --> 00:02:42,640
with one of

63
00:02:46,150 --> 00:02:44,480

the hottest surface temperatures and and

64
00:02:48,790 --> 00:02:46,160
the most extreme variation in

65
00:02:51,830 --> 00:02:48,800
temperature between day and night could

66
00:02:54,309 --> 00:02:51,840
ice be permanently deposited in cold