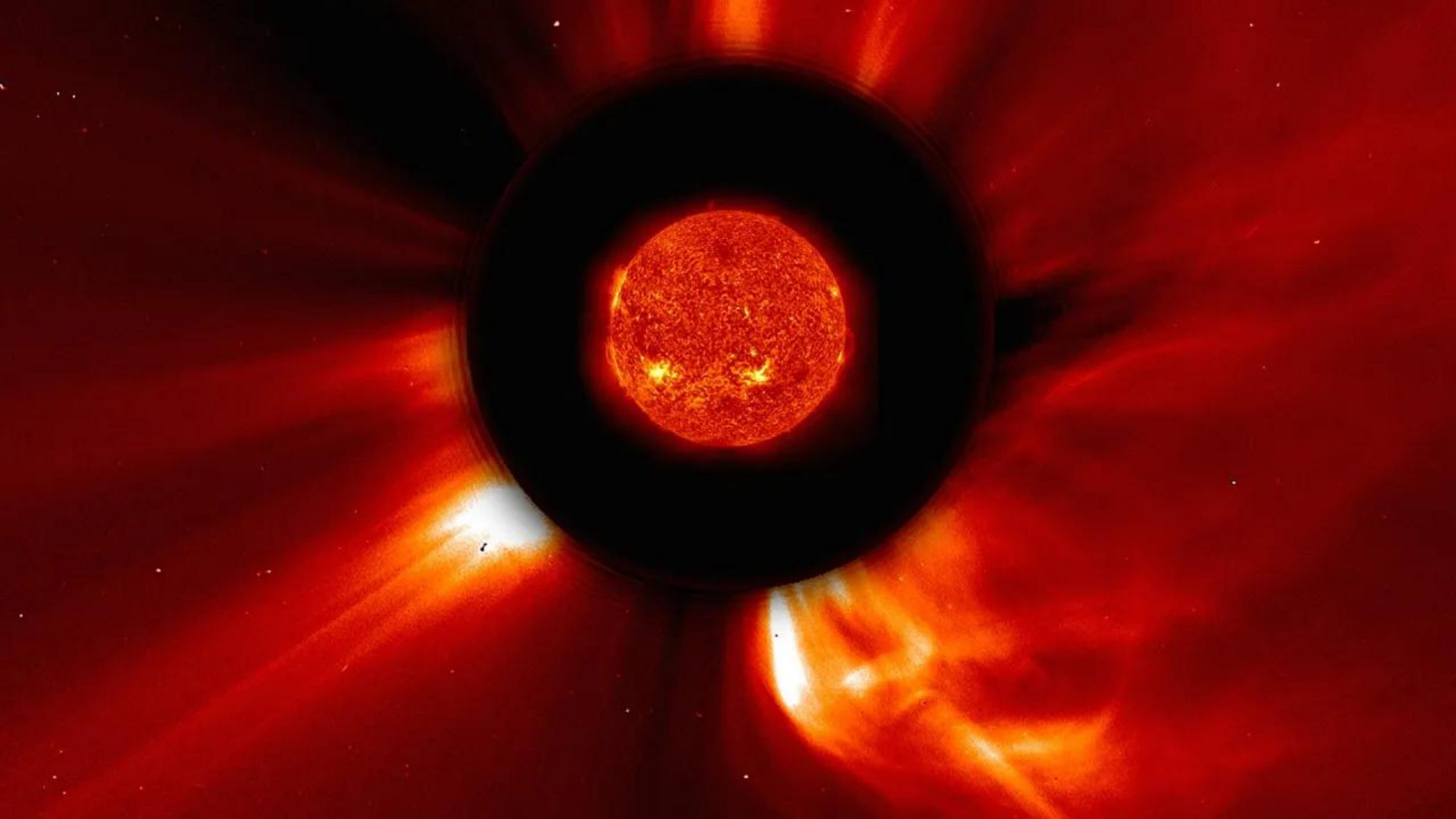

1
00:00:17,430 --> 00:00:14,950
at 2 50 universal time on july 23 2012

2
00:00:21,670 --> 00:00:17,440
the sun unleashed an incredibly powerful

3
00:00:24,390 --> 00:00:21,680
coronal mass ejection or cme

4
00:00:26,550 --> 00:00:24,400
a cme is a huge cloud of plasma that

5
00:00:28,950 --> 00:00:26,560
bursts out of the sun's atmosphere and

6
00:00:31,349 --> 00:00:28,960
is held together with magnetic fields

7
00:00:33,910 --> 00:00:31,359
an average cme travels at about 1

8
00:00:36,389 --> 00:00:33,920
million miles per hour and weighs around

9
00:00:38,869 --> 00:00:36,399
2 trillion tons

10
00:00:42,470 --> 00:00:38,879
on this particular monday however the

11
00:00:44,150 --> 00:00:42,480
sun unleashed a perfect storm of plasma

12
00:00:46,549 --> 00:00:44,160
thanks to nasa's far-ranging

13
00:00:49,510 --> 00:00:46,559

heliophysics fleet we have an excellent

14
00:00:51,750 --> 00:00:49,520
picture of the event

15
00:00:54,150 --> 00:00:51,760
the incredibly high resolution view of

16
00:00:57,110 --> 00:00:54,160
the sun provided by nasa's solar

17
00:00:59,189 --> 00:00:57,120
dynamics observatory or sdo revealed the

18
00:01:00,869 --> 00:00:59,199
beginning of the eruption in several

19
00:01:04,549 --> 00:01:00,879
different wavelengths of ultraviolet

20
00:01:09,670 --> 00:01:07,190
nasa's twin stereo spacecraft orbiting

21
00:01:11,510 --> 00:01:09,680
the sun ahead and behind earth

22
00:01:17,190 --> 00:01:11,520
gave a similar view from alternate

23
00:01:21,270 --> 00:01:19,190
the stereo satellites also carry

24
00:01:23,670 --> 00:01:21,280
coronagraphs which block the bright

25
00:01:27,350 --> 00:01:23,680
solar disk to make the fainter extended

26
00:01:30,149 --> 00:01:27,360
solar atmosphere or corona visible

27
00:01:33,350 --> 00:01:30,159
as a result they were able to image the

28
00:01:35,590 --> 00:01:33,360
actual cme as it left the sun

29
00:01:38,830 --> 00:01:35,600
the cme headed in the direction of the

30
00:01:43,590 --> 00:01:38,840
stereo a spacecraft at an astonishing

31
00:01:49,350 --> 00:01:46,630
as the cme arrived at stereo a

32
00:01:52,149 --> 00:01:49,360
the coronagraph and stereo's wider field

33
00:01:54,310 --> 00:01:52,159
heliospheric imagers were pummeled by

34
00:01:56,789 --> 00:01:54,320
high energy particles which appear like

35
00:01:59,350 --> 00:01:56,799
snow in the imagery

36
00:02:02,310 --> 00:01:59,360
the joint esa and nasa solar and

37
00:02:05,510 --> 00:02:02,320
heliospheric observatory or soho that

38
00:02:07,990 --> 00:02:05,520

has been observing the sun since 1995

39
00:02:10,150 --> 00:02:08,000
captured footage of the cme in both of

40
00:02:13,430 --> 00:02:10,160
its coronagraphs which overlap their

41
00:02:17,910 --> 00:02:15,910
all of these data allow computer models

42
00:02:20,390 --> 00:02:17,920
to reconstruct the full shape and

43
00:02:22,630 --> 00:02:20,400
expansion of the cme

44
00:02:25,110 --> 00:02:22,640
the main event is preceded by a few

45
00:02:26,949 --> 00:02:25,120
smaller cmes one of which was earth

46
00:02:29,430 --> 00:02:26,959
directed

47
00:02:33,270 --> 00:02:29,440
it is immediately clear how much larger

48
00:02:36,470 --> 00:02:33,280
and faster the july 23rd cme was as it

49
00:02:38,869 --> 00:02:36,480
blasted towards stereo a

50
00:02:41,350 --> 00:02:38,879
nasa's fleet of heliophysics spacecraft

51
00:02:43,190 --> 00:02:41,360
watching the sun from all sides improves