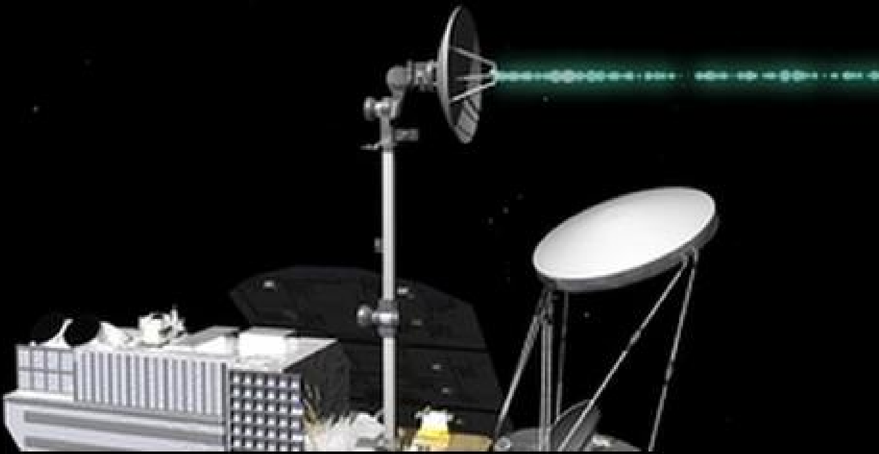

1
00:00:00,050 --> 00:00:04,090
[data sounds]

2
00:00:04,110 --> 00:00:08,150
The GPM mission is a sophisticated

3
00:00:08,170 --> 00:00:12,190
network of satellites, covering the entire globe in less than three hours,

4
00:00:12,210 --> 00:00:16,230
giving us an unprecedented picture of precipitation,

5
00:00:16,250 --> 00:00:20,270
from rain to falling snow, hurricanes to monsoons,

6
00:00:20,290 --> 00:00:24,310
droughts and floods. So how do we get all of that information

7
00:00:24,330 --> 00:00:28,340
out of this? The short answer: Tons of data

8
00:00:28,360 --> 00:00:32,350
from all over.

9
00:00:32,370 --> 00:00:36,360
As GPM takes snapshots at precipitation,

10
00:00:36,380 --> 00:00:40,400
like in a major storm, the data gathered is transmitted

11
00:00:40,420 --> 00:00:44,420
to a network of satellites called TDRSS.

12
00:00:44,440 --> 00:00:48,440
Erich Stocker: The important thing to recognize is that the GPM satellite does not

13
00:00:48,460 --> 00:00:52,470

talk directly to the Earth; it talks to the communications satellite

14
00:00:52,490 --> 00:00:56,520
which is known as TDRSS. And the TDRSS satellites

15
00:00:56,540 --> 00:01:00,550
talk to a ground station, which is at White Sands, New Mexico,

16
00:01:00,570 --> 00:01:04,570
and that's a very effective way to get

17
00:01:04,590 --> 00:01:08,580
continuous data, which cannot be gotten otherwise, unless you do

18
00:01:08,600 --> 00:01:12,680
direct broadcast and have many, many ground stations, which isn't

19
00:01:12,700 --> 00:01:16,740
as effective as going through the TDRSS system.

20
00:01:16,760 --> 00:01:20,890
The White Sands Ground Station then sends information about the health and

21
00:01:20,910 --> 00:01:24,940
geolocation of the GPM Core satellite to the hub of all

22
00:01:24,960 --> 00:01:29,020
of this activity, the Missions Operations Center, located at NASA's

23
00:01:29,040 --> 00:01:33,080
Goddard Space Flight Center. The raw data streams

24
00:01:33,100 --> 00:01:37,190
into Goddard's Precipitation Processing System, or PPS.

25
00:01:37,210 --> 00:01:41,220
The data from the radar is routed through GPM's partner,

26
00:01:41,240 --> 00:01:45,250
the Japan Aerospace Exploration Agency, for initial processing

27
00:01:45,270 --> 00:01:49,270
and then is sent back to the PPS.
George Huffman: The data that come down from

28
00:01:49,290 --> 00:01:53,410
the satellite are actually not precipitation. They're in the form of radiances,

29
00:01:53,430 --> 00:01:57,510
in the case of the microwave instruments, or reflectivities, in the case

30
00:01:57,530 --> 00:02:01,650
of the radar. The computer codes I've been talking about--the algorithms--

31
00:02:01,670 --> 00:02:05,700
are the way we get from numbers

32
00:02:05,720 --> 00:02:09,750
that nobody including me can directly interpret to the thing we care about,

33
00:02:09,770 --> 00:02:13,790
which is precipitation.
The GPM mission is not just the Core

34
00:02:13,810 --> 00:02:17,840
spacecraft, but also a constellation of existing satellites

35
00:02:17,860 --> 00:02:21,890
from partners around the world. Each constellation member may have its own

36
00:02:21,910 --> 00:02:25,910
unique scientific objectives, but they all contribute data to the PPS

37
00:02:25,930 --> 00:02:29,940
in order to develop global precipitation products.

38
00:02:29,960 --> 00:02:33,950
Erich Stocker: The Precipitation Processing System gets data from the satellite and

39
00:02:33,970 --> 00:02:38,000
various other sources and creates the science products

40
00:02:38,020 --> 00:02:42,050
that are going to be used for both applications purposes, that is

41
00:02:42,070 --> 00:02:46,060
societal benefits, and scientific research.
The PPS then produces

42
00:02:46,080 --> 00:02:50,110
a suite of data products, including both instrument specific and

43
00:02:50,130 --> 00:02:54,150
merged data, unifying the data gathered by the international

44
00:02:54,170 --> 00:02:58,170
partner satellites that make up the GPM constellation.

45
00:02:58,190 --> 00:03:02,210
George Huffman: You could compare this to making soup. We have

46
00:03:02,230 --> 00:03:06,240
carrots, and we have onions, and we have potatoes.

47
00:03:06,260 --> 00:03:10,250
They're all vegetables. And so you have to wash them, peel them,

48
00:03:10,270 --> 00:03:14,300
take out the bad spots. That's a really important step, you don't want your soup to

49
00:03:14,320 --> 00:03:18,360
taste bad. When you get done, of course, you have to taste test it to make sure the

50

00:03:18,380 --> 00:03:22,410
seasoning right, and then you have to serve it. And so each of those steps

51
00:03:22,430 --> 00:03:26,460
in a mathematical sense, is what we have to do in order to take all the

52
00:03:26,480 --> 00:03:30,490
diverse sources of information and end up with a unified product

53
00:03:30,510 --> 00:03:34,550
which the user finds to be useful.
These precipitation

54
00:03:34,570 --> 00:03:38,580
products will be useful in many societal applications, like

55
00:03:38,600 --> 00:03:42,610
hydrologic modeling, mapping potential natural disasters,

56
00:03:42,630 --> 00:03:46,630
agricultural modeling, weather prediction,

57
00:03:46,650 --> 00:03:50,680
and climate research.
Erich Stocker: As we improve the precipitation

58
00:03:50,700 --> 00:03:54,690
retrievals that form the basis for these merged products

59
00:03:54,710 --> 00:03:58,710
that will get better and better, and we'll be seeing actual satellite data