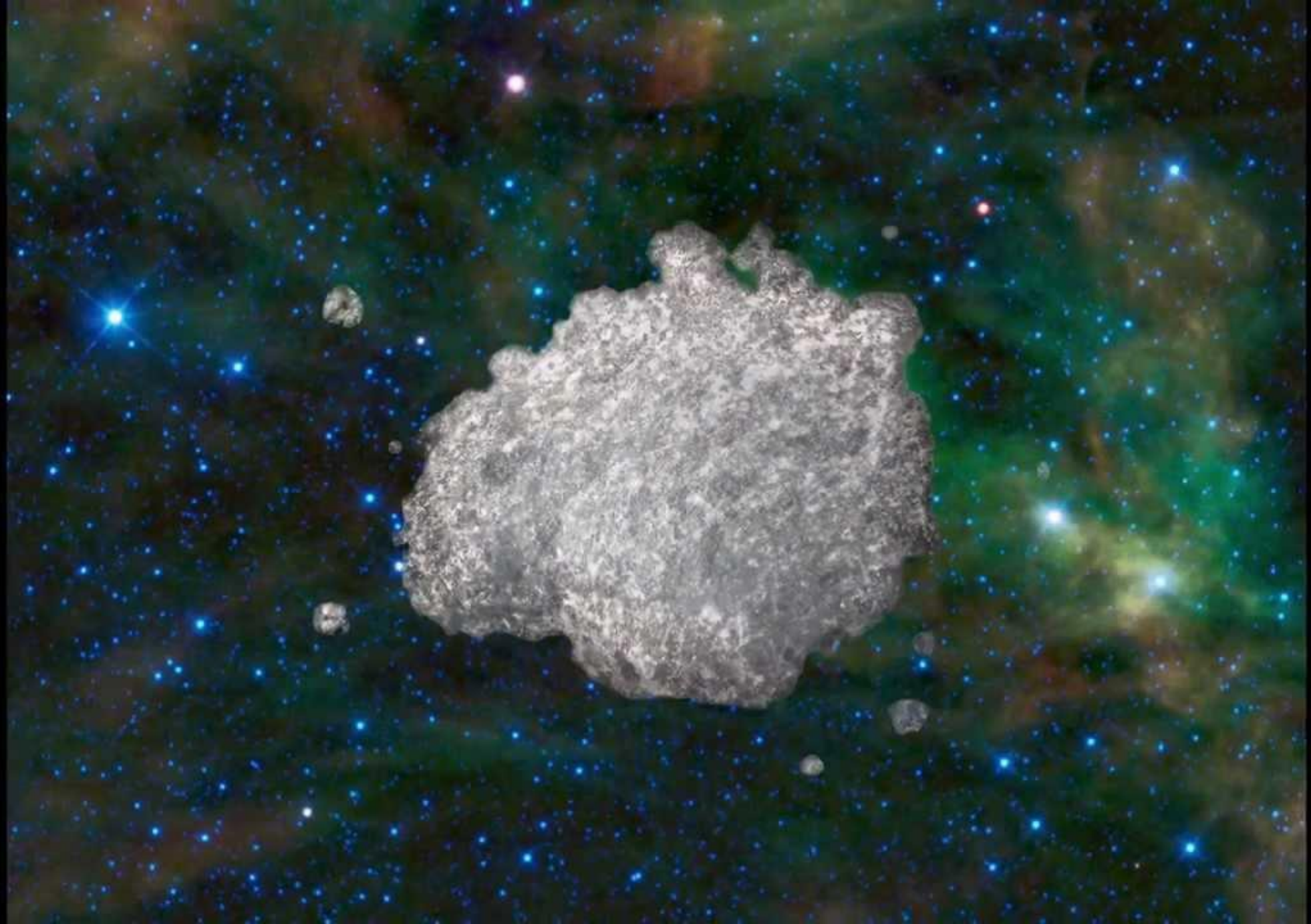

1
00:00:00,000 --> 00:00:01,000
(Music)

2
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Bruce Banerdt: InSight isn't just a Mars mission, it's really a mission to the terrestrial planet interior.

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Mars is kinda the Goldilocks planet. It's not too big; it's not too small; it's just right.

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If it was too big, it would have retained a lot of activity and erased all the evidence

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00:00:15,000 --> 00:00:17,000
that we're looking for.

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If it was too small it never would have undergone the same processes that formed the Earth,

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and so it's really just right.

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Susanne Smrekar: Mars will give us this insight into early planet formation

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00:00:27,000 --> 00:00:29,000
and early planetary processes.

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Banerdt: Understanding the details of the structure of the interior of Mars will allow us to address

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00:00:34,000 --> 00:00:39,000
questions of planetary formation that we've only had been able to guess at before.

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Smrekar: We are missing cold, hard data, and this is what this mission will provide.

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Banerdt: The InSight mission is a geophysical mission to Mars.

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00:00:48,000 --> 00:00:53,000
It's going to go to Mars and take it's vital signs. It's gonna take it's hearbeat,

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00:00:53,000 --> 00:00:55,000
the seismic activity of the planet.

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Tom Hoffman: So we're going to be doing that using a seismometer, a very high-precision seismometer,

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00:01:00,000 --> 00:01:03,000
using techniques that have been well developed on Earth

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00:01:03,000 --> 00:01:07,000
to get the understanding of the crust, mantle, and core,

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00:01:07,000 --> 00:01:09,000
and sort of the relationship between those.

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00:01:09,000 --> 00:01:12,000
Banerdt: It's going to take it's temperature by measuring the thermal gradient of the surface

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00:01:12,000 --> 00:01:14,000
which tells how much heat is coming out.

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00:01:14,000 --> 00:01:17,000
Hoffman: We also have a heat flow probe. We call it HP Cubed.

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00:01:17,000 --> 00:01:20,000
And what that does is going to basically take the temperature of Mars,

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00:01:20,000 --> 00:01:24,000
and from that it will be able to understand what the thermal flux is

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00:01:24,000 --> 00:01:26,000
over the course of a full Martian year.

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00:01:26,000 --> 00:01:31,000
Banerdt: And it's going to sort of measure it's reflexes by looking at how the rotation wobbles

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00:01:31,000 --> 00:01:34,000
with the tiled effects of the sun.

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00:01:34,000 --> 00:01:37,000
Hoffman: Our final experiment is called Rise.

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and that's going to be looking at basically the wobble of Mars

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00:01:41,000 --> 00:01:47,000
to help understand what the core size may be and the composition.

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00:01:47,000 --> 00:01:50,000
Stu Spath: The Lockheed Martin flight system, our role is to build the aeroshell,

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00:01:50,000 --> 00:01:53,000
the cruise stage and the lander.

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00:01:53,000 --> 00:01:56,000
All three of those have extremely high heritage from Phoenix.

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00:01:56,000 --> 00:02:05,000
Announcer: 80 meters, 50 meters, standing by for touchdown. Touchdown signal detected. (Cheers)

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00:02:05,000 --> 00:02:09,000
Stacy Weinstein-Weiss: It's an advantage for us to use heritage designs

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00:02:09,000 --> 00:02:12,000
because we're familiar with them; we've tested them;

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00:02:12,000 --> 00:02:16,000
we've qualified them; they've worked successfully on the surface of Mars.

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00:02:16,000 --> 00:02:19,000

We have a really big head start.

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00:02:19,000 --> 00:02:24,000
Smrekar: A lot of things have come together to make it possible to learn, you know, a great deal

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00:02:24,000 --> 00:02:26,000
about the interior of Mars from a seismometer.

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00:02:26,000 --> 00:02:31,000
Hoffman: So we have CNES that's building our seismometer that's been under development for many, many ye

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00:02:31,000 --> 00:02:34,000
Ken Hurst: What it does is it just sits on the surface of Mars

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00:02:34,000 --> 00:02:40,000
and it's like a stethoscope, it listens to what's going on inside Mars.

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00:02:40,000 --> 00:02:48,000
Hoffman: On the HP Cubed instrument, we've have that being delivered to us from DLR.

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00:02:48,000 --> 00:02:52,000
That also has been under development for many years.

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00:02:52,000 --> 00:02:55,000
Troy Hudson: And what this probe does is it penetrates into the subsurface,

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00:02:55,000 --> 00:03:03,000
up to five meters. On it's way, it measures the thermal conductivity.

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00:03:03,000 --> 00:03:07,000
Spath: A basic mantra of our flight system design is low risk,

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00:03:07,000 --> 00:03:10,000
and with that is low cost risk.

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00:03:10,000 --> 00:03:14,000
Weinstein-Weiss: We've been to Mars before with the JPL - Lockheed Martin team.

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00:03:14,000 --> 00:03:17,000
We've been to the surface of Mars before successfully with Phoenix.

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00:03:17,000 --> 00:03:20,000
We know how to operate the arm.

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00:03:20,000 --> 00:03:23,000
The surface operations are much, much simpler than Phoenix,

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00:03:23,000 --> 00:03:27,000
and we're putting two instruments on the surface, and then we're leaving them there

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00:03:27,000 --> 00:03:34,000
with no ground in the loop interaction; repetitive, weekly up link - down link sessions.

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00:03:34,000 --> 00:03:36,000
We are just made to do this mission.

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00:03:36,000 --> 00:03:40,000
Spath: The heritage for InSight extends way past just the flight system and the hardware.

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00:03:40,000 --> 00:03:46,000
It extends to the personnel, the processes, the tools that we've developed, and so forth.

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00:03:46,000 --> 00:03:50,000
Smrekar: With one spacecraft on a Discovery budget we're really going to be able to

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00:03:50,000 --> 00:03:53,000
do the science that for the last 20 years we thought would cost

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00:03:53,000 --> 00:03:57,000
at least a billion to a billion and a half dollars and require three or four spacecraft.

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00:03:57,000 --> 00:04:00,000
Weinstein-Weiss: And we have very robust margins built in to Insight;

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00:04:00,000 --> 00:04:05,000

A 50 percent margin on our instrument deployment timeline.

64
00:04:05,000 --> 00:04:09,000
We have 50 percent margin on our science data collection.

65
00:04:09,000 --> 00:04:12,000
We have 500 percent margin on our daily data volume.

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00:04:12,000 --> 00:04:15,000
We're in good shape.

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00:04:15,000 --> 00:04:18,000
Smrekar: Well, I think this mission is going to generate a lot of excitement.

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00:04:18,000 --> 00:04:21,000
We're already connecting to the public through Twitter, Facebook, and on the web.

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00:04:21,000 --> 00:04:25,000
We're going to be working with educators to put Mars quake data in the hands of the kids

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00:04:25,000 --> 00:04:28,000
to actually work with it as part of their Earth science curriculum

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00:04:28,000 --> 00:04:32,000
and get an angle on planetary science at the same time.

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00:04:32,000 --> 00:04:36,000
Spath: We've got the right expertise and knowledge to run this mission.

73
00:04:36,000 --> 00:04:38,000
Weinstein-Weiss: We're going to be ready for launch in 2016.

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00:04:38,000 --> 00:04:43,000
Smrekar: Within six months we'll be landing on the planet and immediately bringing back our science.