
Orbital
ATK
Orbital
Pegasus

1
00:00:00,590 --> 00:00:05,260
NARRATOR: Researchers will soon send a seven-foot-tall observatory on a mission to discover

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00:00:05,260 --> 00:00:11,000
some of the secrets behind the largest body in the solar system, the sun.

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00:00:11,000 --> 00:00:23,980
Music

4
00:00:23,980 --> 00:00:29,420
Scientists placed a renewed emphasis on the sun in recent years since it plays such a large role in

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00:00:29,420 --> 00:00:34,940
everything from determining our planet's climate to knocking out orbiting satellites and even taking

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00:00:34,940 --> 00:00:37,990
down power grids on Earth.

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00:00:37,990 --> 00:00:43,180
After launching into Earth orbit aboard a winged Pegasus rocket, NASA's IRIS spacecraft,

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00:00:43,180 --> 00:00:49,260
short for Interface Region Imaging Spectrograph, will stare at the sun with a steady eye concentrated

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00:00:49,260 --> 00:00:55,110
on the region between the sun's surface and its blazing atmosphere, or corona.

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00:00:55,110 --> 00:00:59,550
The region is called the chromosphere, and it is here that temperatures rise from

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00:00:59,550 --> 00:01:05,790
6,000 degrees Fahrenheit on the surface, to millions of degrees in the glowing corona.

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00:01:05,790 --> 00:01:11,280
Researchers don't know why that change occurs, but are betting IRIS will tell them.

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00:01:11,280 --> 00:01:17,040

Jim Hall, IRIS Mission Manager: I think the uniqueness of this mission and why it's important is that

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00:01:17,040 --> 00:01:22,170
the mission is looking at the sun, our only sun. We know a lot about the surface of the sun.

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00:01:22,170 --> 00:01:25,140
Massive temperature changes occur in this region.

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00:01:25,140 --> 00:01:30,440
Why? We don't understand this unique region of the atmosphere of the sun.

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00:01:30,440 --> 00:01:33,920
Adrian Daw, Deputy Project Scientist: IRIS will show the solar chromosphere in more detail than has

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00:01:33,920 --> 00:01:38,310
ever been observed before. My opinion is that we are bound to see something

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00:01:38,310 --> 00:01:40,880
we didn't expect to see.

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00:01:40,880 --> 00:01:45,040
NARRATOR: The sun often is thought of as little more than a giant nuclear furnace that sits at the

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00:01:45,040 --> 00:01:49,820
center of the solar system and warms our planet. But its effects on Earth are profound,

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00:01:49,820 --> 00:01:55,130
with its heat driving weather patterns and CMEs, commonly known as solar flares,

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00:01:55,130 --> 00:02:01,160
emitting blasts of radiation into space that threaten satellites and communications networks.

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00:02:01,160 --> 00:02:05,820
HALL: The sun affects our weather, the sun affects us in a lot of different ways.

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00:02:05,820 --> 00:02:10,750
NARRATOR: The IRIS spacecraft will study the sun in conjunction with other solar-sensing

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00:02:10,750 --> 00:02:16,560
spacecraft including NASA's Solar Dynamics Observatory, or SDO.

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00:02:16,560 --> 00:02:21,380
The main difference between the IRIS mission is that it looks at a tiny portion of the sun at a time,

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00:02:21,380 --> 00:02:23,990
not the whole disc.

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00:02:23,990 --> 00:02:29,170
HALL: It almost acts as a microscope for SDO's overall telescope.

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00:02:29,170 --> 00:02:34,960
It's going to look in closely and it's going to be looking at that specific region to see how the changes

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00:02:34,960 --> 00:02:39,040
in matter and energy occur in this region.

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00:02:39,040 --> 00:02:43,700
NARRATOR: Scientists designed the instrument to return specific data, but they also expect some

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00:02:43,700 --> 00:02:47,390
unexpected results from time to time, too.

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00:02:47,390 --> 00:02:54,870
DAW: The big surprises will come when we start to see the data. We know to some extent what we

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00:02:54,870 --> 00:02:58,790
hope to learn, types of observations will answer those questions,

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00:02:58,790 --> 00:03:03,730
but there's always that element of surprise.

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00:03:03,730 --> 00:03:08,100
NARRATOR: A Pegasus rocket built by Orbital Sciences has been employed to lift the observatory

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00:03:08,100 --> 00:03:14,060

into Earth orbit. The Pegasus, which with its wing and tail sections looks a lot like an airplane,

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00:03:14,060 --> 00:03:18,720
is the only launcher of NASA missions that drops from a converted airliner before igniting

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00:03:18,720 --> 00:03:21,240
its first stage engine.

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00:03:21,240 --> 00:03:26,590
Designed as an inexpensive alternative to launch small missions, Pegasus rockets have recorded

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00:03:26,590 --> 00:03:29,710
dozens of successful launches.

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00:03:29,710 --> 00:03:33,380
Tim Dunn, NASA Launch Director: The Pegasus launch system is unusual and unique in that you

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00:03:33,380 --> 00:03:42,080
have a mobile launch pad. Pegasus is dropped from the belly of an L-1011 aircraft at 40,000 feet

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00:03:42,080 --> 00:03:50,180
that's traveling downrange at over 500 mph. Pegasus launch system has the theoretical capability of

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00:03:50,180 --> 00:03:54,770
launching from any point on the surface of the Earth.

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00:03:54,770 --> 00:03:57,900
NARRATOR: Pegasus missions have begun from Cape Canaveral, Fla.,

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00:03:57,900 --> 00:04:00,120
Wallops Flight Facility in Virginia,

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00:04:00,120 --> 00:04:02,820
Vandenberg Air Force Base in California,

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00:04:02,820 --> 00:04:06,260
and Kwajeilein atoll in the Pacific Ocean.

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00:04:06,260 --> 00:04:11,030
Because the IRIS spacecraft will fly a path that takes it roughly over each of Earth's poles on each

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00:04:11,030 --> 00:04:16,970
orbit, the mission will launch from Vandenberg. The L-1011 will take off from Vandenberg and release

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00:04:16,970 --> 00:04:21,070
the rocket off the California coast heading south.

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00:04:21,070 --> 00:04:27,540
Dunn: What I'll remember most about the IRIS launch is what I remember from all my missions and

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00:04:27,540 --> 00:04:34,300
that's the people. I'm blessed with a terrific launch team, the NASA team members as well as

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00:04:34,300 --> 00:04:39,300
Orbital Sciences Corp and Lockheed Martin for both the launch vehicle and the spacecraft,

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00:04:39,300 --> 00:04:45,430
all terrifically talented and eager and excited to go launch IRIS.

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00:04:45,430 --> 00:04:49,220
DAW: I think the biggest surprise will come once the mission is launched and it starts to observe the

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00:04:49,220 --> 00:04:58,310
sun. We always try to map out what sort of events we're going to be targeting,

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00:04:58,310 --> 00:05:03,250
what sort of observations we will be to be making of those events to improve our understanding

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00:05:03,250 --> 00:05:06,580
of the solar atmosphere and space weather.