**Knowledge of the Sun (RH FINAL)**

ESA’s mission to the Sun, Solar Orbiter, is due for launch on an Atlas V 411 from Cape Canaveral, Florida later this month (February 2020 – see ESA social media and website for updates on launch date/time).

Equipped with a suite of ten instruments, Solar Orbiter will capture the first images of the Sun’s poles and make detailed observations of solar activity. Its specially designed heatshield is capable of enduring temperatures of more than 500°C.

Solar Orbiter is a space mission of international collaboration between ESA and NASA and is building on the legacy of previous missions, which have transformed our understanding of our nearest star.

This A and B roll makes use of ESA archive to trace the past recent history of ESA’s past missions to the Sun.

The B roll contains new clean room footage showing the early stages of integration of Solar Orbiter into the upper stage of the Atlas V launcher.

B-roll also contains newly re-digitised ESA archive.

**A-roll**

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| **Pictures** | **Script** |
| 10:00:10  Sun close-up beauty images (NASA) | The Sun: A four and a half billion-year-old nuclear fusion reactor at the heart of our Solar System.  This glowing ball of plasma with a core temperature of 15 million degrees Celsius is a yellow dwarf star…in cosmic terms it’s nothing special.  *[Facts source:* [*https://www.esa.int/Science\_Exploration/Space\_Science/Cluster/The\_Sun*](https://www.esa.int/Science_Exploration/Space_Science/Cluster/The_Sun)  *And*  [*https://solarsystem.nasa.gov/solar-system/sun/in-depth/*](https://solarsystem.nasa.gov/solar-system/sun/in-depth/)*]* |
| 10:00:30  Into Sun/Earth images (from ISS – ESA/NASA) | But for us on Earth, the Sun is vital.  It holds the planets in their orbits…  …and provides heat, light and the energy for life. |
| 10:00:38  Ulysses launch (Shuttle 1990)  10:00:56  Solar wind and heliosphere animation | ESA’s first mission to the Sun, Ulysses, was launched from Space Shuttle Discovery in October 1990.  A joint mission with NASA, it was the first spacecraft to fly over the Sun’s poles.  Ulysses investigated the solar wind – the stream of charged particles emitted by the Sun. It envelops the Solar System in a bubble known as the heliosphere.  The mission discovered that the solar wind weakened over time and that the Sun’s magnetic field reverses every 11 years. |
| 10:01:13  SOHO launch (Atlas II-AS Cape Canaveral 1995) | One of the longest and most successful scientific missions of all time, SOHO, was launched in 1995…and it’s still going strong. |
| 10:01:28  Soho images | SOHO has given us a new insight into the Sun’s structure and interior – monitoring the output of solar radiation and providing the first images of the star’s turbulent outer shell. |
| 10:01:51  Violent solar activity close-ups | SOHO has also transformed space weather forecasting – helping us to monitor violent solar activity from flares and coronal mass ejections.  A major space weather event has the potential to damage satellites, communications and power grids on the ground. |

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| 10:02:04  Cluster clean room | Another mission that is helping us better understand the relationship between the Sun and the Earth is ESA’s Cluster. |
| 10:02:13  Cluster animations | Flying in formation, and in orbit for almost 20 years, the four cluster satellites are giving us a three-dimensional view of the Earth's magnetic environment, and its interaction with the solar wind. |
| 10:02:24  Solar Orbiter clean room shots  Available from: <https://www.esa.int/esatv/Videos/2019/10/Solar_Orbiter> | Now it’s the turn of Solar Obiter. With its advanced suite of scientific instruments, it will build on the work of these past ESA missions. |
| 10:02:34  **César García, Solar Orbiter Project Manager, ESA** | *Our scientists have designed this mission so that they improve significantly their knowledge of the solar winds and what drives the solar winds and as well what creates and generates the solar cycles.* |
| 10:02:47  Solar images (NASA)  10:02:54  Into Earth from space images | The eventual aim [of all these missions] is to not only better understand our nearest star…but also predict its behaviour…  Knowledge that will help protect all of us back here on Earth. |

**B-ROLL**

10:03:06:21

**César García, Solar Orbiter Project Manager, ESA**

Soundbites in English

*It carries many instruments. And every of the instruments is top class, is world class. And one of the key features of solar orbiter is not only that it will carry 10 instruments. It's also that the 10 instruments will be working in unison and they will be communicating with each other. So that when one of them detects a specific fixed feature of interest, it will trigger flags so that the other instruments can also either point in that direction or change their operating mode to take the maximum benefit for that specific feature.*

*Our scientists have designed this mission so that they improve significantly their knowledge of the solar wind and what drives the solar wind and as well what creates and generates the solar cycles. And eventually with this information, they will be able to improve the knowledge and the models of how the sun works and hopefully also to be able to predict behaviour, which will be a big asset [with] respect to protecting what we have on the ground, but also to protect our astronauts or our space assets once we go in deeper into the solar system.*

10:04:27:14

**César García, Solar Orbiter Project Manager, ESA**

Soundbites in Spanish

10:06:03:20

**Solar Orbiter integration with the launcher, January 2020**

Newly released clean room footage (filmed Jan 2020) showing the beginning of the process of integration of Solar Orbiter into the upper stage of the Atlas 5.

10:09:23:24

**Solar images – Solar Dynamics Observatory (Credit: NASA)**

10:13:51:12

**Earth from the ISS**

10:15:23:22

**Ulysses launch on Shuttle Discovery 1990 (4:3)**

10:16:02:16

**Ulysses animation (4:3)**

10:17:01:24

**SOHO launch 1995 (4:3)**

10:17:28:22

**Images from SOHO (4:3)**

10:18:26:09

**Cluster in the clean room during testing (4:3)**

10:20:14:21

**Cluster animations (4:3)**

**10:21:02:24**

**End B-roll**

**10:21:07:03**

**End**