**Cheops: Europe’s Exoplanet Mission**

**WEBCOPY**

ESA’s first mission dedicated to investigating planets outside our solar system is scheduled for launch on a Soyuz rocket from the European spaceport in French Guiana on 17 December 2019.

Cheops – Characterising ExOPlanet Satellite – will study known exoplanets that are orbiting bright stars. The aim is to obtain detailed information about these planets to find out more about their composition and internal structure.

The mission is a partnership between ESA and Switzerland with additional contributions from Austria, Belgium, France, Germany, Hungary, Italy, Portugal, Spain, Sweden and the UK.

**A-ROLL**

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| **Picture** | **Script** |
| 10:00:10  CHEOPS in Airbus Defence and Space cleanroom (filmed early 2019) | This is Cheops, a specialist satellite with a single instrument: a powerful camera – or photometer. It will record the light from stars orbited by known exoplanets.  Cheops is designed to investigate what these planets are like… |
| 10:00:27  Kate Isaak, Project Scientist, ESA | *We’ll be focusing on smaller planets, so Earth-sized to Neptune-sized planets which have been found by other missions, such as Kepler, to be very abundant around other stars, Sunlike stars, something which is not so much the case in our own solar system. So, it’s a big question: what are these smaller planets and what are they made of?* |
| 10:00:50  Animation of planet passing in front of a star (ESA) | Cheops will do this by measuring the variation in light caused when an exoplanet passes in front of its host star. |
| 10:00:58  Nicola Rando, Project Manager, ESA | *Cheops* *is about taking the next step in investigating planets beyond our Solar System and in particularly aims at providing a reliable and accurate measurement of the size of the planets and from there being able to derive their density and therefore their composition.* |
| 10:01:22  Animation of CHEOPS in orbit (ESA) | The space telescope will orbit some 700 kilometers above the Earth, with its camera always pointing towards the night side. This will limit the effects of any stray light disturbing its measurements.  Cheops is a relatively low cost and low risk mission, since all its elements have already been proven in flight.  Nevertheless, building a satellite to obtain precise measurements of light from alien stars has been a complex technical challenge. |
| 10:01:51  Nicola Rando, Project Manager, ESA  (with cutaways of the sunshield) | *The instrument was designed to be able to perform accurately over long periods of time and the satellite was designed around the instrument to guarantee these stable conditions [as an example, stable thermal conditions.]*  *As you can see the satellite has a sunshield, protecting the instrument from the direct Sun illumination and this is very important to allow the proper thermal stabilization of the detector inside the instrument.* |
| 10:02:24  Exoplanet animations and artist impressions (ESA) | So far, more than 4000 exoplanets have been discovered by telescopes on Earth and in space …with the number rising almost every week.  Cheops will give us an insight into the nature of these planets …and even whether some of them have the potential for life. |
| 10:02:42  Clean room shots (ESA) | In doing so, this small satellite will help us take the next step in answering a fundamental question about the Universe – are we alone? |

**B-ROLL**

**10:02:56**

**Kate Isaak, Project Scientist, ESA**

Soundbites (English)

*“We’re a so-called follow up mission and with Cheops we will know where to point and when to point and by where I mean we know our targets. They’re bright stars which are known to host the type of planets we want to observe and we will know when these planets transit, that is when the planets move across the disc of the star and we can measure the changes in the output of the star, the measured output of the star, in order to measure the size of the planet. We’ll be focusing on smaller planets, so Earth-sized to Neptune-sized planets which have been found by other missions, such as Kepler, to be very abundant around other stars, sunlike stars, something which is not so much the case in our own Solar System. So it’s a big question, what are these smaller planets and what are they made of? And with Cheops that is what we’re aiming to discover.”*

***“****By combining the mass that we have from existing measurements made on ground with the sizes that we will get from Cheops we’re able to determine the density, the mean density of this planet. Is it very high density? So more along the lines of rock or iron or is it more low density, sort of puffy, along the lines of gas?”*

*“To date there are almost 4000 exoplanets which are known and have been confirmed and of all these none has been found to be like ours. There are many different types of planets, with very many different types of orbits, for example something called a hot Jupiter - a big gassy Jupiter-like planet as we have in our own Solar System but very close to the Sun, so with an orbital period of 2 or 3 days. So it goes the whole way round the Sun in what takes the Earth a year a few days for this large planet. So the temperatures are 3, 4, 5, 6000 Kelvin so much hotter than we have on Earth and a lot hotter than one would like to have in one were living on that planet.”*

*“Cheops will definitely make a difference. We will be able to study these smaller planets, these Earth to Neptune sized planets and start to determine what they are actually made of and by knowing what they’re made of, their composition, starting to put constraints on their structure, studying large samples of these planets we will be able to start to pin down their structure, their formation and their evolution history.”*

*“Cheops is a European mission, an ESA mission. It’s led by Switzerland with ten other member states making contributions. Contributions to the instrument, so to the payload, the instrument that will make the measurements but also to the centres which will operate the satellite and also analyse the data that we will get down from the satellite.”*

*“No, we will not be able to see the little green men waving. That’s something for a future mission but we will be taking the first steps towards looking for these planets that are mostly like to be able to host life.”*

**10:06:25**

**Nicola Rando, Project Manager, ESA**

Soundbites (English)

*“Cheops stands for* Characterising ExOPlanet Satellite*. It’s a mission dedicated to the characterisation of exoplanets which have been already detected on the ground or from space with other missions and other techniques. But really Cheops is about taking the next step in investigating planets beyond our Solar System and in particular aims at providing a reliable and accurate measurement of the size of the planets and from there being able to derive their density and therefore their composition.”*

*“We are using a very special camera, a sophisticated camera, and we are measuring the light, the quantity of light which is originated by a star outside the Solar System and how this quantity of light varies when a planet, an exoplanet, is transiting in front of it. This is the measurement technique used then to derive the size and therefore the density of the planet.”*

*“It’s not easy and the instrument was designed to be able to perform accurately over long periods of time and the satellite was designed around the instrument to guarantee these stable conditions, as an example, stable thermal conditions. As you can see the satellite has a sunshield, protecting the instrument from the direct sun illumination and this is very important to allow the proper thermal stabilisation of the detector inside the instrument.”*

**10:08:36**

**Nicola Rando, Project Manager, ESA**

Soundbites (Italian)

An explanation of the Cheops mission.

Characterising the composition of exoplanets.

Why Cheops is a technical challenge

**10:10:52**

**Cheops in a clean room, Airbus Defence and Space**

Filmed early 2019, Airbus Defence and Space, Madrid

**10:15:20**

**Exoplanets animation**

Various animated artist impressions of exoplanets (ESA and ESO)