**ROSETTA’S ONGOING SCIENCE**

**A-roll - FINAL**

**SUGGESTED WEB CUE:**  On 12 November 2014 Philae became the first spacecraft to land on a comet as part of the successful Rosetta mission to study comet 67P/Churyumov-Gerasimenko. Five years later, and after the mission’s official end in 2016, Rosetta is continuing to provide insights into the origins of our Solar System.

Rosetta’s instruments have already discovered that the comet contained oxygen, organic molecules, noble gases and ’heavy’ or deuterated water different to that found on Earth.

As scientists continue to analyse data from Rosetta’s instruments, including the ionised gas or plasma, the results are improving our understanding of comets. Mission data is also being delivered to an archive as a legacy and resource for the future.

Rosetta orbits the Sun every 6.5 years and will pass the Earth again, visible from ground-based telescopes, in 2021. ESA’s future Comet Interceptor mission will build on Rosetta’s success when it performs a flyby of a comet. But, unlike Rosetta, the comet will be new to our Solar System.

The film contains interviews with Charlotte Goetz, Research Fellow, ESA; Kathrin Altwegg, ROSINA instrument principal investigator, Rosetta/University of Bern; Colin Snodgrass, Comet Interceptor principal investigator.

**TAPE STARTS: 10:00:00**

**VT STARTS: 10:00:10**

10:00:10

[ROSETTA/PHILAE ANIMATION AND STILLS, CREDIT: ESA]

Five years after Philae landed on comet 67P, the Rosetta mission is the gift that keeps on giving. Scientists are still analysing data from its instruments and delivering data to an archive as a resource for the future. This includes data on comet 67P’s diverse landscape, coma and plasma - the ionised gas coming off the comet.

10:00:40

[INSET CLIP: CHARLOTTE GOETZ,

RESEARCH FELLOW, ESA]

[OUT OF VISION] “*Regarding the plasma we were very surprised* IN VISION] *how different comet 67P and its environment is from all the comets that we have visited before.*

10:00:46

[PLASMA ANIMATION, CREDIT: TECHNISCHE UNIVERSITÄT BRAUNSCHWEIG/DEUTSCHES ZENTRUM FÜR LUFT-UND RAUMFAHRT/ZUSE-INSTITUT BERLIN]

[OUT OF VISION] “*So basically what we are looking at with the plasma is an interaction between the solar wind, which is a magnetic field and charged particles, and the charged particles that are developing around the comet, right. So you start off with a neutral gas, you ionise it and these particles interact with the solar wind. From our previous experiences the number of particles was very high but with Rosetta it actually wasn’t. So I think [IN VISION] the biggest surprise was that basically a lot of our predictions were wrong. But this is good because then the data tells us maybe you’re missing something. You missed including this process in your models and now we’ve had time to include these processes in our models and improve our science that we get out of it and I think that was the most fun part as ell of doing the science with Rosetta.”*

10:01:48

[ANIMATIONS OF COMET 67P GAS/DUST; CREDIT R. MARSCHALL/UNIVERSITY OF BERN/INTERNATIONAL SPACE SCIENCE INSTITUTE/MULTI-INSTRUMENT ANALYSIS OF ROSETTA DATA]

The ROSINA instrument - a spectrometer for Ion and Neutral Analysis - examined the composition of the comet's atmosphere and ionosphere, and investigated the gasses coming off the comet. It discovered organic molecules and a complex form of carbon in a series of important findings.

10:02:12

[INSET CLIP: KATHRIN ALTWEGG

ROSINA INSTRUMENT, ROSETTA/UNIVERSITY OF BERN]

*[OUT OF VISION] “The first one was the deuterated water. [IN VISION] So we showed that the terrestrial water cannot come, at least the bulk of terrestrial water cannot have come from comets. Then certainly the oxygen, the O2, which was completely unexpected and which points to a primordial origin in pre-solar O2 and probably many other species as well…*

[ANIMATION CREDIT R. MARSCHALL/UNIVERSITY OF BERN/INTERNATIONAL SPACE SCIENCE INSTITUTE/MULTI-INSTRUMENT ANALYSIS OF ROSETTA DATA]

*[OUT OF VISION[ Then we have found the noble gases, especially xenon isotopes, which tell us that probably the terrestrial atmosphere got some cometary material [IN VISION] because the xenon in the comet and our atmosphere are similar, and from that we can calculate how many comets probably hit the Earth and how much organics were brought by comets to the Earth. And that’s a lot. It’s really a whole lot of organics, and this could have sparked life on Earth.”*

10:03:20

[ANIMATION COMET TRAJECTORY AND DUST TRAIL, CREDIT: R.SOJA/ESO/ESA/ISS/UNIVERSITY OF STUTTGARTY/AEROSPACERESEARCH.NET/SPACEENGINE/M.SOMMER]

Comet 67P orbits the Sun every six and a half years so it will be observed again, from Earth, in late 2021. And this led scientists to consider something new.

10:03:33

[INSET CLIP: COLIN SNODGRASS,

PRINCIPAL INVESTIGATOR, COMET INTERCEPTOR]

*“What this inspired us to think about is about how can we see an even more, how we can really get a pristine comet, how can we what a comet looks like before it meets the Sun and that’s led us to propose this new mission which we now have, Comet Interceptor, which is a different type of mission entirely from Rosetta. It is a fast flyby mission so we don’t orbit the comet, we don’t stay and follow it. We encounter a comet at high speed, fly past it and get all of the data we can in only a few hours.”*

10:04:08

[ANIMATION COMET 67 P, CREDIT: ESA; ANIMATION OUMUAMUA, CREDIT /HUBBLE, NASA, ESO, M. KORNMESSER]

Comet Interceptor will target a new comet that has never entered our Solar System before.

If the opportunity arises, it could also examine something like Oumuamua. Discovered in 2017, it is the first known interstellar object to have visited our Solar System. And so Rosetta’s ongoing legacy will inspire yet more scientific discoveries in the future.

10:04:32 [ESA STING]

10:04:38 [ENDS]