**Pluto’s Mysteries – A-ROLL**

**Suggested webcopy:** European scientists are learning more about Pluto’s mysteries from NASA’s New Horizons mission, even as the spacecraft continues its summer hibernation. Data sent back from the spacecraft reveals a dynamic planet filled with unusual features that are helping scientists understand this unusually dynamic and icy world.

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

**A-ROLL STARTS: 10:00:10**

**10:00:00**

**[ESA STING]**

**10:00:10**

**[PLUTO STILL IMAGES. CREDIT: NASA/Johns Hopkins University Applied Physics Laboratory/SwRI]**

The blue haze of Pluto’s atmosphere – possibly a hydrocarbon smog – seen from 200,000 kilometres away by NASA’s departing New Horizons spacecraft. A few years ago, the dwarf planet Pluto and its five known moons were just small dots in the outer reaches of our Solar System. That changed after New Horizons’ six-month flyby ended in July 2015.

**10:00:38**

**[ANIMATION NEW HORIZONS MISSION. CREDIT: NASA]**

The spacecraft spent 16 months sending its data back to Earth and scientists and non-scientists alike have been enthralled by what it has revealed.

**10:00:49**

**[INSET CLIP: Elliot SEFTON-NASH, Planetary scientist, ESA]**

*“If you go in closer to the surface you can see this type of really diverse terrain. So you have the very bright region, these are flat plains. We’re not entirely sure how they formed yet but there’s a couple of leading theories. There’s a huge range of mountains. There’s all kinds of different aged surfaces. Some of them have lots of craters. Some of them have very few, which means they’re younger. If you look in a lot of detail at some of the mountainous regions, you can see that actually they’re a few kilometres high but they’re made of water ice. On Pluto it’s so cold that water ice is the hardest thing. It’s more like rock and so the stuff that forms the softer material is actually nitrogen ice.”*

**10:01:27**

**[GVS EUROPEAN SCIENTISTS ON A FROZEN LAKE]**

Water ice on Earth is close to zero degrees but on Pluto it’s minus 230 degrees Celsius.

**10:01:37**

**[ANIMATION AND STILLS. CREDIT: NASA/JHUAPLA/SwRI]**

And there’s a glacier of nitrogen ice, called Sputnik Planitia, thought to be under a

million years old. This is young by planetary standards and no one knows yet how it formed or is renewed. The planet’s diverse composition also contains methane, carbon dioxide and volatile substances that readily vaporize from a liquid to a gas or change from a solid to a gas.

**10:02:00**

**[INSET CLIP: ELLIOT SEFTON-NASH, Planetary scientist, ESA]**

*“One of really fascinating things is some of the surface colouration you can see in these images actually shows that there are these compounds called tholins, which are a combination of elements but they’re related to prebiotic molecules, so they’re kind of relevant to prebiotic chemistry. And I think the fact that they have able to form on planetary surfaces very far out in the Solar System, at very cold temperatures really has implications for a lot of places. If you can imagine for star systems outside our own, where the star may be dim and the planets are quite far away, it’s interesting to know that there are molecules that could be involved in supplying biotic material to processes that may, one day, lead to life, or be involved in life or something like that, that they’re actually forming way out in the Solar System where no one really expected.”*

**10:02:54**

**[PLUTO IMAGES AND GVS SEFTON-NASH AT HIS DESK]**

Pluto is not like anything ever seen before. But the 6 gigabytes of New Horizons images and scientific measurements are giving scientists scientific mysteries to unravel for years to come.

**10:03:08**

**[ENDS]**

**B-ROLL**

**10:03:08**

**ELLIOT SEFTON-NASH, PLANETARY SCIENTIST, ESA**

**[ENGLISH]**

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*“Ok, so we’ve got some images of the Pluto system. This is Pluto and its five moons. You can see that actually it’s very diverse because we didn’t know very much about Pluto until relatively recently.”*

**10:05:15**

**ELLIOT SEFTON-NASH, PLANETARY SCIENTIST, ESA**

**ON BEACH AT KATWIJK, NETHERLANDS**

**[ENGLISH]**

*"One of the important things you should understand about Pluto is the real scale of it compared to the rest of the solar system. So we've come to the beach in order to convey that scale and distance. So if I draw the Sun as a 30 cm circle, then we have to walk about 35 steps this way in order to draw the Earth in the same type of scale. So we’re walking the equivalent of 150 million kilometres, which we call one astronomical unit. Normally Pluto orbits at about 40 astronomical units from the Sun but it’s actually quite an elliptical orbit so it changes between about 30 and 50 astronomical units. But back to the Earth.*

*So the Sun is over there, at 30 centimetres, which means the Earth should be about here, about 3 millimetres. Something like this. If we were to draw Pluto in the same scale, it should be 0.3 millimetres, and it should be 1 km down the beach. So I'm going to draw it.*

*Now obviously I can't draw something that's 0.3 millimetres, so I have to draw Pluto a bit bigger. If this is Pluto, then its largest moon is Charon, which is about half its size. But Pluto has four other moons, Styx, Nix, Kerberos, and Hydra. So there's a lot going on around the Pluto system, it's not just a cold, dead icy rock."*

**10:06:52**

**ELLIOT SEFTON-NASH, PLANETARY SCIENTIST, ESA**

set up shots, interior at estec

Set up shots in a corridor at ESA’s European Space Research and Technology Centre in The Netherlands, and also in Elliot Sefton-Nash’s office.

**10:08:00**

**NEW HORIZONS ANIMATIONS**

Animation for New Horizons mission (credit: NASA) plus animation using images of Pluto and its largest moon, Charon. Credit for images: Johns Hopkins/University Applied Physics Laboratory/South Western Research Institute (credit: NASA/JHUAPL/SwRI)

**10:09:02**

**ENDS**