**THE HUNT FOR EXOPLANETS – A-ROLL**

**Suggested web intro:** There are over 3000 confirmed planets outside our Solar System. In 2018 these exoplanets will come under further scrutiny when the CHEOPS (CHaracterising ExoPlanet Satellite) mission launches from the European spaceport in French Guiana. The CHEOPS space telescope, a joint mission between ESA and the University of Bern in Switzerland, will measure the transits of known exoplanets and, together with the ESPRESSO instrument at the University of Geneva, help identify other Earth-like planets in our Solar System.

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

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

**10:00:00**

**[ESA STING]**

**[CHEOPS IN LABORATORY]**

Vibration tests of a new ESA space telescope, called CHEOPS, are preparing it for launch from the European spaceport in French Guiana in 2018.

**10:00:21**

**[PLANET STAR TRANSIT ANIMATION. CREDIT: ESA]**

This joint mission, between ESA and Switzerland, will be the first dedicated to searching and measuring the size of known planets outside our Solar System – exoplanets – as they orbit and transit their parent star.

**10:00:38**

**[VERY LARGE TELESCOPE (VLT) TIMELAPSE, CHILE]**

That data will then be paired with ground observations from the European Southern Observatory’s VLT Telescope in Chile to seek out rocky planets like Earth.

10:00:48

**[DAVID EHRENREICH, CHEOPS MISSION SCIENTIST, ESA]**

“*Une des plus grandes questions c'est de savoir s'il y a des planetes qui rassemblent à la terre. Donc à savoir des planetes relativement petites, solides, constinué de roches principalement et qui soit ni trop loin, ni trop pret de son etoile pour que la temperature à sa surface soit jusqu'il faut pour que l'eau puisse y etre liquide."*

ENGLISH V/O: “One of the biggest questions is whether there are planets that resemble Earth. So that’s to say relatively small, solid planets, mainly composed of rocks, which are neither too far nor too close to their star so that the temperature on its surface is sufficient for water to be liquid.*"*

**10:01:15**

**[GAS PLANET AND STAR ANIMATION. CREDIT: ESA]**

The first exoplanet ever discovered was like a hot Jupiter - a giant gas planet orbiting close to its star. It was discovered in 1995…

**10:01:26**

**[INTERIOR GVS OBSERVATORY OF GENEVA]**

… by this man, Michel Mayor seen here talking to scientists at the Observatory of Geneva. It was here that scientists developed a method of determining the mass of exoplanets by how it affects the movement of its star.

**10:01:42**

**[EXT. UNIVERSITY OF BERN GVS]**

Switzerland leads a consortium of countries from the University of Bern and is responsible for both the mission and science operations centres…

10:01:50

**[ESPRESSO INSTRUMENT CLEAN ROOM GVS]**

**…** and the instrument assembly. One instrument is a spectrograph known as ESPRESSO.

**10:01:57**

**[INSET CLIP: FRANCESCO PEPE, ESPRESSO PRINCIPAL INVESTIGATOR, UNIVERSITY OF GENEVA]**

*“Bienvenue dans la salle blanche de l'observatoire de Geneve, qui abrite en ce moment meme le spectograph Espresso. Espresso c'est tout ca, tout ce que vous voyez la, avec l'instrument qui se trouve à l'interieur de cette cuve à vide. Elle arrive la lumiere ici à travers cette appareil, ell est collecté, envoyer dans une fibre optique miniscule, qui fait l'epaisseur d'un cheveux, cette fibre optique amene la lumiere ici, jusquà dans le spectograph, et dans cette spectograph la on va prendre la lumiere, on va l'àtaler dans toutes ses couleurs - c'est le fonction meme du spectographe, pour analyser ces spectres et determiner la vitesse des àtoiles. C'est avec cette instrument la qu'on va chercher les planetes comme notre terre, et pour faire ca il faut la meilleur precision possible. C'est vraiment le spectographe qu'on sait faire le mieux aujourd'hui, c'est le Ferrari des spectographs, et c'est avec ca qu'on va chercher les Terres habitables, on espere."*

ENGLISH V/O: "Welcome to the clean room at the Observatory of Geneva, which is home at the moment to the ESPRESSO spectrograph. ESPRESSO is everything you can see there, with the instrument inside this vacuum chamber. The light comes through here, through this device, it's collected, and sent into a tiny optical fibre, the width of a human hair. This optical fibre takes the light here, up to the spectrograph, and there we take the light and we spread it out into its different colours - that's what a spectrograph does - in order to analyse the spectrum and determine the speed of the stars. It's really the best spectrograph we can make today, it's the Ferrari of spectrographs, and it's with that that we'll search for habitable Earth-like planets.....we hope!"

**10:02:49**

[EXOPLANET ANIMATION. CREDIT: ESA/NASA/HUBBLE]

From hot Jupiters to frozen ice-planets, our Milky Way is a potential home to over a billion exoplanets, with billions more across the universe. The hunt is on to find them. And as result of ESPRESSO and the CHEOPS mission, exoplanet research will advance and the exciting possibility of discovering other Earth like planets will increase.

**10:03:16**

**B-ROLL**

**10:03:16**

**Soundbite: David Ehrenreich, Cheops Mission Scientist, University of Geneva [French]**

“Une exoplanète est une planète qui tourne autour d'une autre étoile que le soleil. Et depuis 20 ans maintenant on en détecte autour de presque toutes les étoiles dans la galaxie. Et ce qui est vraiment frappant c'est la diversité incroyable de mondes qu'il y a ailleurs dans l’univers."

An exoplanet is a planet that revolves around another star than the Sun. And for 20 years now it is detected around almost all the stars in the galaxy. And what is truly striking is the diversity of world that exists elsewhere in the universe.

“Une des plus grandes questions c'est de savoir s'il y a des planètes qui ressemblent à la terre. Donc à savoir une planète relativement petite, solide, constituée de roches principalement, et qui soit ni trop loin, ni trop près de son étoile pour que la température à sa surface soit juste ce qu'il faut pour que l'eau puisse y être liquide.”

One of the biggest questions is whether there are planets that resemble Earth. So that is to say relatively small, solid planets, mainly composed of rocks, which is neither too far nor too close to its star so that the temperature on its surface is sufficient for water to be liquid.

“Alors on peut observer directement des exoplanètes, c’est à dire prendre une photo de la planète, seulement pour des planètes qui sont très grosses, comme Jupiter ou même plus grosse, qui sont loin de leur étoile, parce que on est ébloui par l’étoile – donc pour des planètes comme la terre qui sont relativement proches du soleil on ne pourrait pas faire une image directe, et puis surtout pour les planètes qui sont jeunes.”

One can observe exoplanets directly, it means to take a photo of the exoplanets, only for planets that are very large, like Jupiter or even bigger, that are far from their star, because one is dazzled by the stars - for example For a planet like the earth that are relatively close to the sun one could not make a direct image, and then especially for planets that are young.

**10:04:41**

**David Ehrenreich and Michel Mayor setup shots**

Set up shots at the Observatory of Geneva with another European scientist.

**10:05:59**

**ESPRESSO instrument in clean room**

**The ESPRESSO instrument (**Echelle SPectrograph for Rocky Exoplanet and Stable Spectroscopic) at the University of Geneva. We can hear David Ehrenreich’s voice.

**10:10:37**

**EXOPLANET ANIMATIONS**

Animation showing an exoplanet - a planet outside our Solar System - orbiting its parent star.

Animation showing a hot gas giant exoplanet, smaller rockier exoplanets and an Earth-like exoplanet.

**10:12:01**

**ENDS**