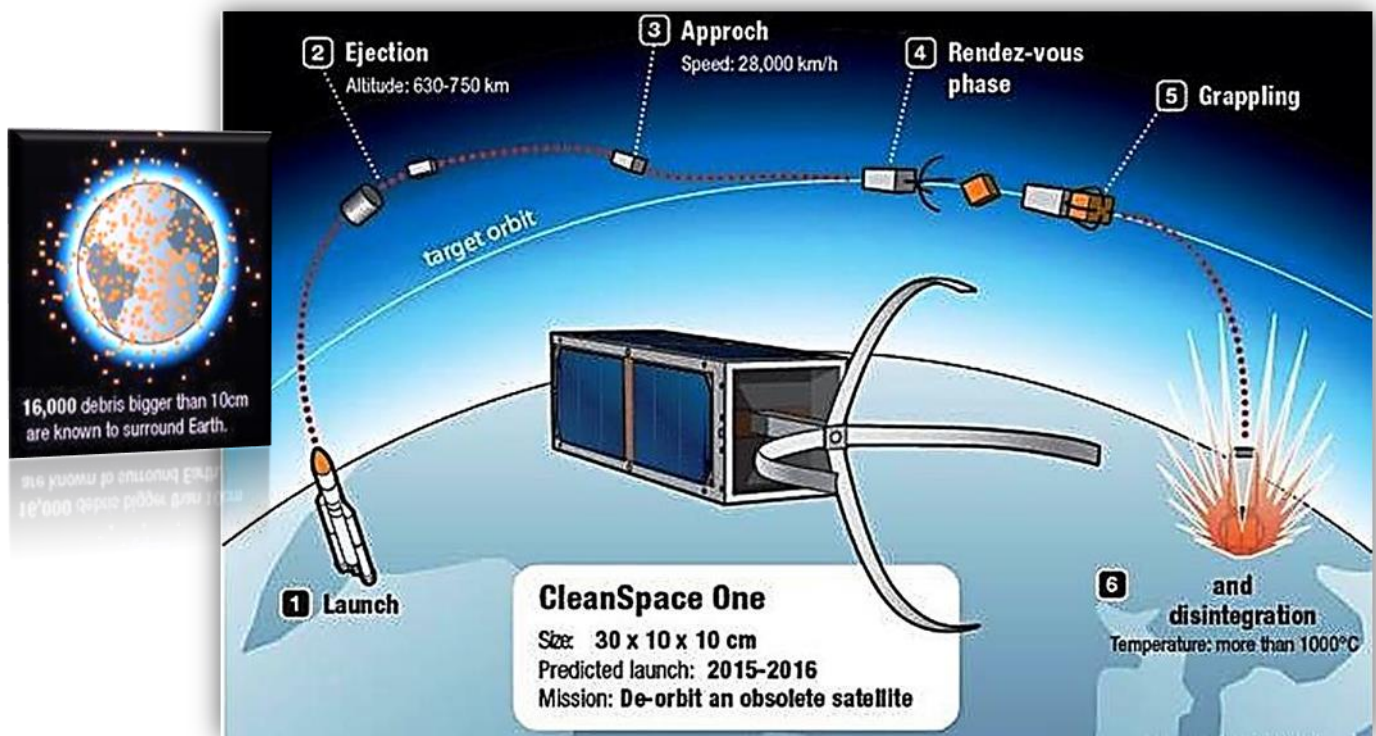


EXAMEN : BACCALAUREAT GENERAL	
EPREUVE : Evaluation spécifique de langue section européenne	
PHYSIQUE-CHIMIE en langue ANGLAISE	Sujet N°4 (ES/L)

Cleaning up Earth's orbit : A Swiss satellite to tackle space debris



The proliferation of debris orbiting the Earth is an increasingly pressing problem for spacecraft. To combat this menace, the Swiss Space Center at EPFL is announcing today the launch of CleanSpace One, a project to develop and build the first installment of a family of satellites specially designed to clean up space debris.

16,000 objects larger than 10 cm in diameter and hundreds of millions of smaller particles are ripping around the Earth at speeds of several kilometers per second. From the beginning of the Space Age, Earth's periphery has been increasingly encumbered by all kinds of debris, primarily concentrated in Low Earth Orbit (less than 2000 km in altitude, where the International Space Station is orbiting) or Geostationary Orbit (35,786 km in altitude). Many of these objects are spent rocket stages or satellites that have broken up in orbit. If they collide with another orbiting object, say a functioning satellite, they can cause massive damage, or even destroy it. After its launch, the cleanup satellite will have to adjust its trajectory in order to match its target's orbital plane. When it gets within range of its target, which will be traveling at 28,000 km/h at an altitude of 630-750 km, CleanSpace One will grab it. Finally, once it's coupled with the satellite, CleanSpace One will "de-orbit" the unwanted satellite by heading back into the Earth's atmosphere, where the two satellites will burn upon re-entry.

Source: <http://actu.epfl.ch/news/cleaning-up-earth-s-orbit-a-swiss-satellite-to-tac/>

Answer the following question by using the docs below and the video « CleaSpaceOne ».

QUESTIONS:

- 1) Present and comment on this document.
- 2) What are satellite used for ? What is the name of the first artificial satellite ?
- 3) When has Earth's periphery been starting to be encumbered by debris ? For which reasons ?
- 4) Give different origins of space debris. Why do we have to destroy them ?
- 5) How can CleanSpace One de-orbit a debris ? (describe all the steps)
- 6) In which way the proliferation of debris orbiting the Earth can be compared with the global warming ?