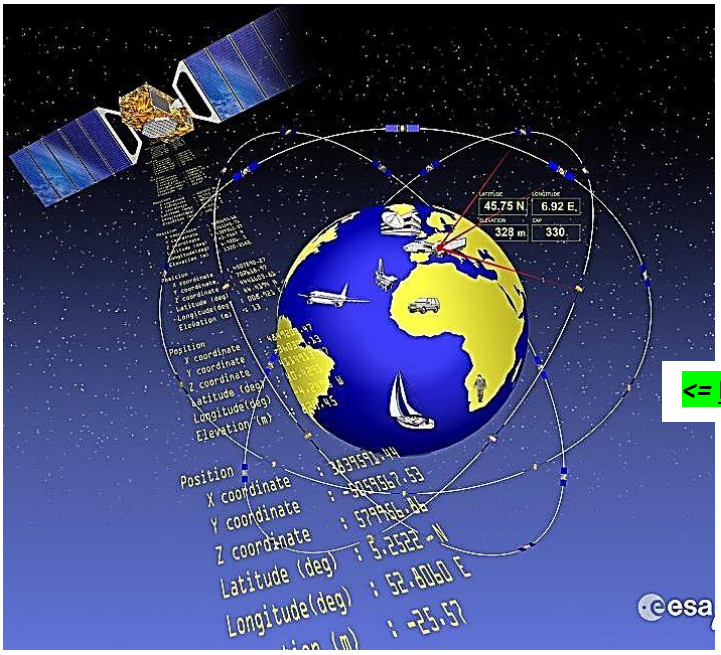
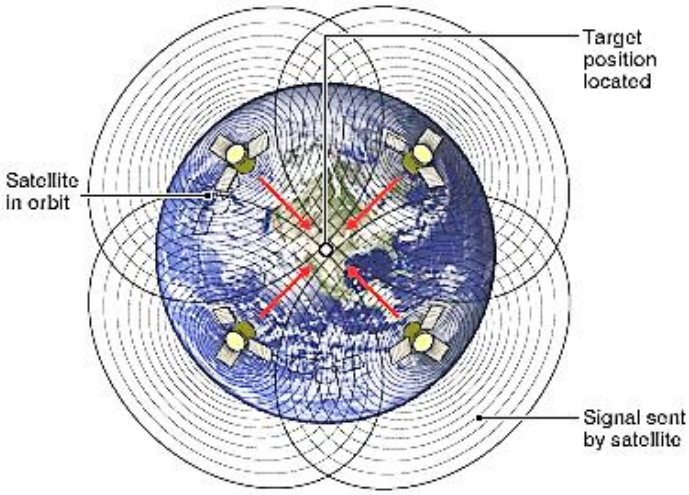
Sujet 2 GALILEO (European global positioning system)

Doc. 1: watch video1 "what is Galileo"





<= Doc. 2 => **How does Global Navigation Satellite (GNSS)**

GNSS determines a position by measuring the distances to a number of known locations.
In practice, a receiver captures radio signals sent from the satellites and convert them into distances.
A device will use data sent from at least four satellites to get the very best estimate of its position.

Galileo is Europe's own global navigation satellite system, providing a highly accurate, guaranteed global positioning service under civilian control. It is inter-operable with GPS and Glonass, the US and Russian global satellite navigation systems.

By offering dual frequencies as standard, Galileo is set to deliver real-time positioning accuracy down to the metre range. It will guarantee availability of the service under all but the most extreme circumstances and will inform users within seconds of any satellite failure, making it suitable for safety-critical applications such as guiding cars, running trains and landing aircraft. The fully deployed Galileo system consists of 30 satellites positioned in three circular orbit planes at 23 222 km altitude above the Earth.

The large number of satellites together with the carefully-optimised constellation design, plus the availability of the three active spare satellites, will ensure that the loss of one satellite should have no discernible effect on the user. Two Galileo Control Centres (GCC) have been implemented on European ground for the control of the satellites. The data provided by the satellites are sent to the GCC through a redundant communication network and used to synchronise the time signal of all satellites with the ground station clocks.

ESA (European Space Agency), june 2014

QUESTIONS:

1) Present and comment on this document.
2) What is a positioning system used for ? How accurate is it at the moment?
3) Watch video2 (0 -> 2'32) and explain the way a satellite system can find the position of a device.
4) Why do you think time signals from the satellites have to be synchronised?
5) Why is it so important for Europeans to develop their own GPS ?