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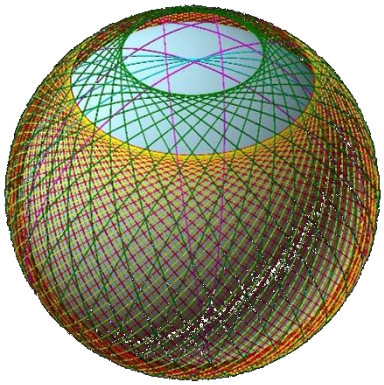
MINISTRY OF EDUCATION,
YOUTH AND SPORTS

ESF II project of the University of West Bohemia in Pilsen, reg. number: CZ.02.2.69/0.0/0.0/18_056/0013239

Materials for lessons – subject KEI/KT

Lesson 1 – Introduction to space technologies

Abstract – In the introductory lesson of the course you will be acquainted with the basic terminology. We will classify spacecrafts according to the purpose of use, method of use, weight and we will introduce a number of interesting cases in individual categories. After the lesson, you will already know the meaning of words such as lander, orbiter, impactor and penetrator for the designation of types of spacecrafts and what the terms like Earth observation, space observation or flyby mission mean. We will also introduce the mechanisms by which spacecrafts are mounted in a rocket and then released into space (separation system, payload adapter, deployer / dispenser). Next, we will discuss the advantages and disadvantages of using different types of orbits, from low altitude orbits to geostationary and geosynchronous, and how the parameters of these orbits affect the availability of the provided services. We will explain this with the example of the built megaconstellation of Starlink satellites for high-speed, low-latency Internet access or with the extended Iridium constellation for satellite mobile telephony and the IoT services.



Other recommended sources of information

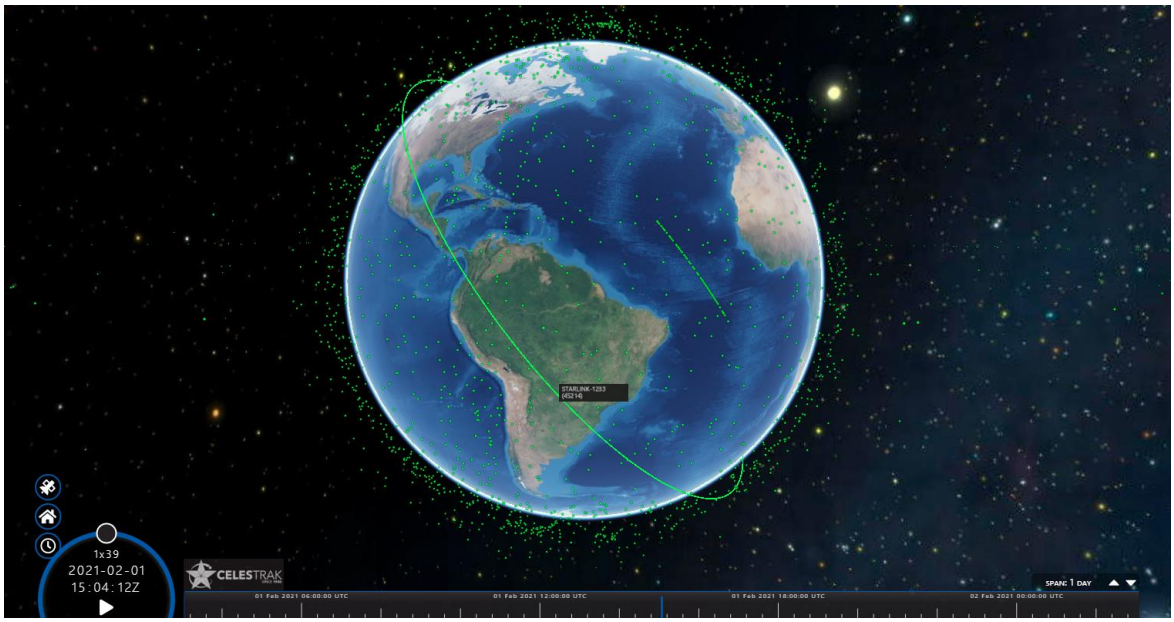
- Webpage Solar system exploration from NASA – The page contains links to NASA projects that are or have been involved in solar system research. The page also includes a very interesting online book "Basics of space flight" or access to raw images from space probes.

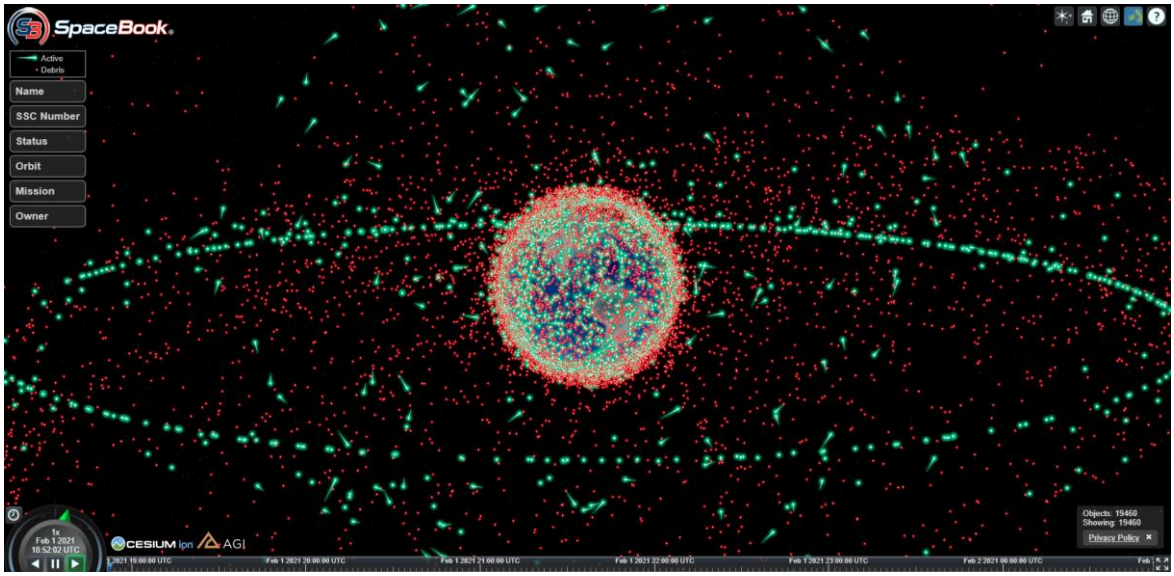


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- Webpage Celestrak – On these pages you will find the so-called two-line element files, which contain the parameters of the orbits of not only satellites, but all detected objects (debris from collisions, residual of rocket bodies). From these parameters, programs like GPredict calculate the position of satellites and predict times of passes over individual places on Earth. The Celestrak website also allows you to visualize satellite orbits from individual files in the AGI Cesium environment historically back in time and forward into the future directly using this icon 🌐. In some visualizations (eg. AGI Spacebook) it is possible to turn on filters and choose, for example, only functional satellites or conversely, all detected objects (attention - the application will be significantly slowed down due to their number) and thus observe the problem of overcrowding low Earth's orbits.





- Website NASA and ESA with description of basic orbits – on these pages you will find a description and properties of the most frequently used orbits, how to achieve them, maintain them and examples of their use.

