Czech Space Activities Focussed on Human Spaceflight

Michal Václavík
Czech Space Office

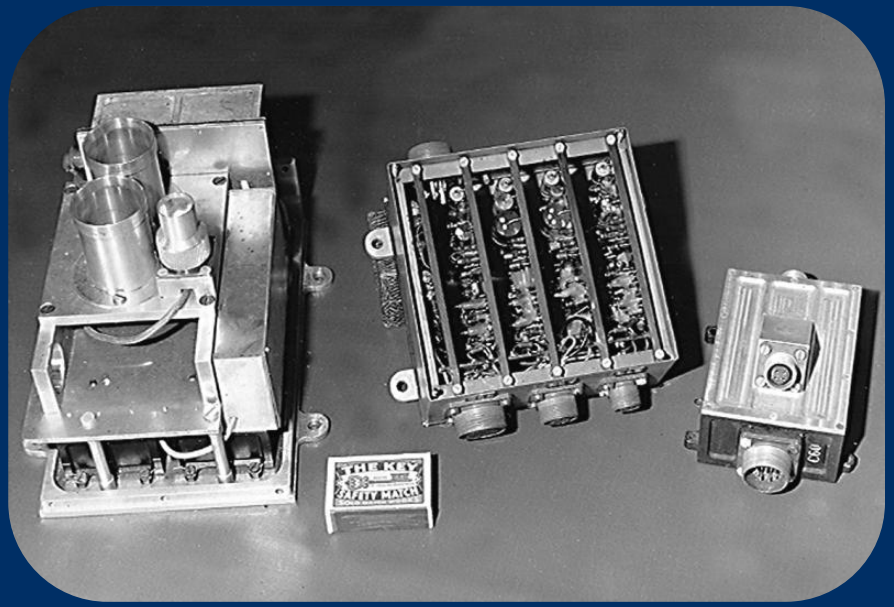
About the Czech Republic

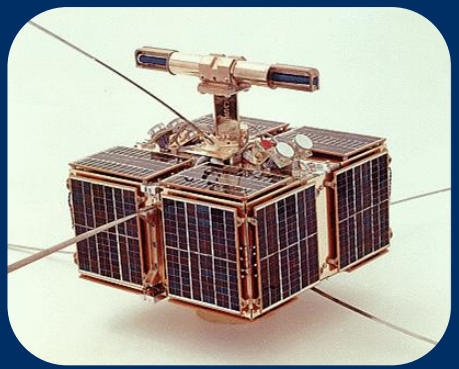
- Population ~10.5 mil.
- GDP 25 600 USD

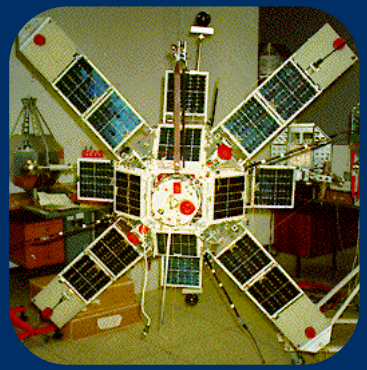
History of Czech space activities (1)

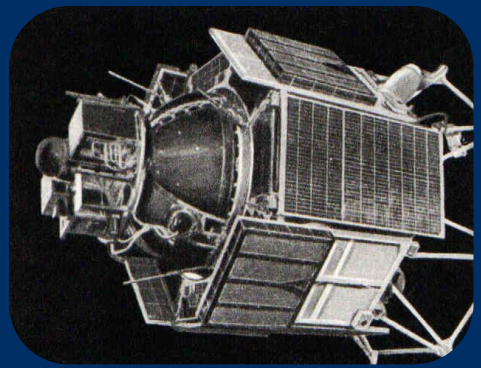
- Several dozens of Czech instruments and systems were carried into the space since 1969. Intercosmos 1, launched on 14 October 1969, was the first satellite carrying devices developed in the former Czechoslovakia.

- Furthermore six Czech satellites were launched between 1978 and 2003.



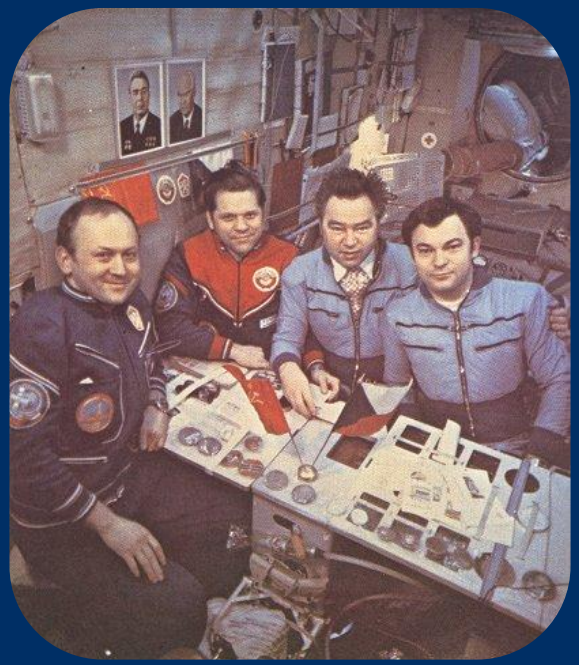


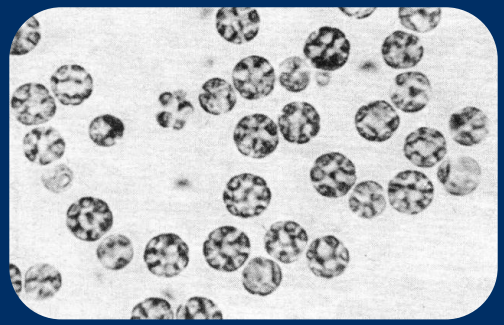




History of Czech space activities (2)

- In 1978, the first Czech cosmonaut Vladimír Remek spent 6 days onboard of the Salyut 6. He carried out six biological, physiological, psychological, astronomical and material experiments prepared by Czechoslovakian scientists.





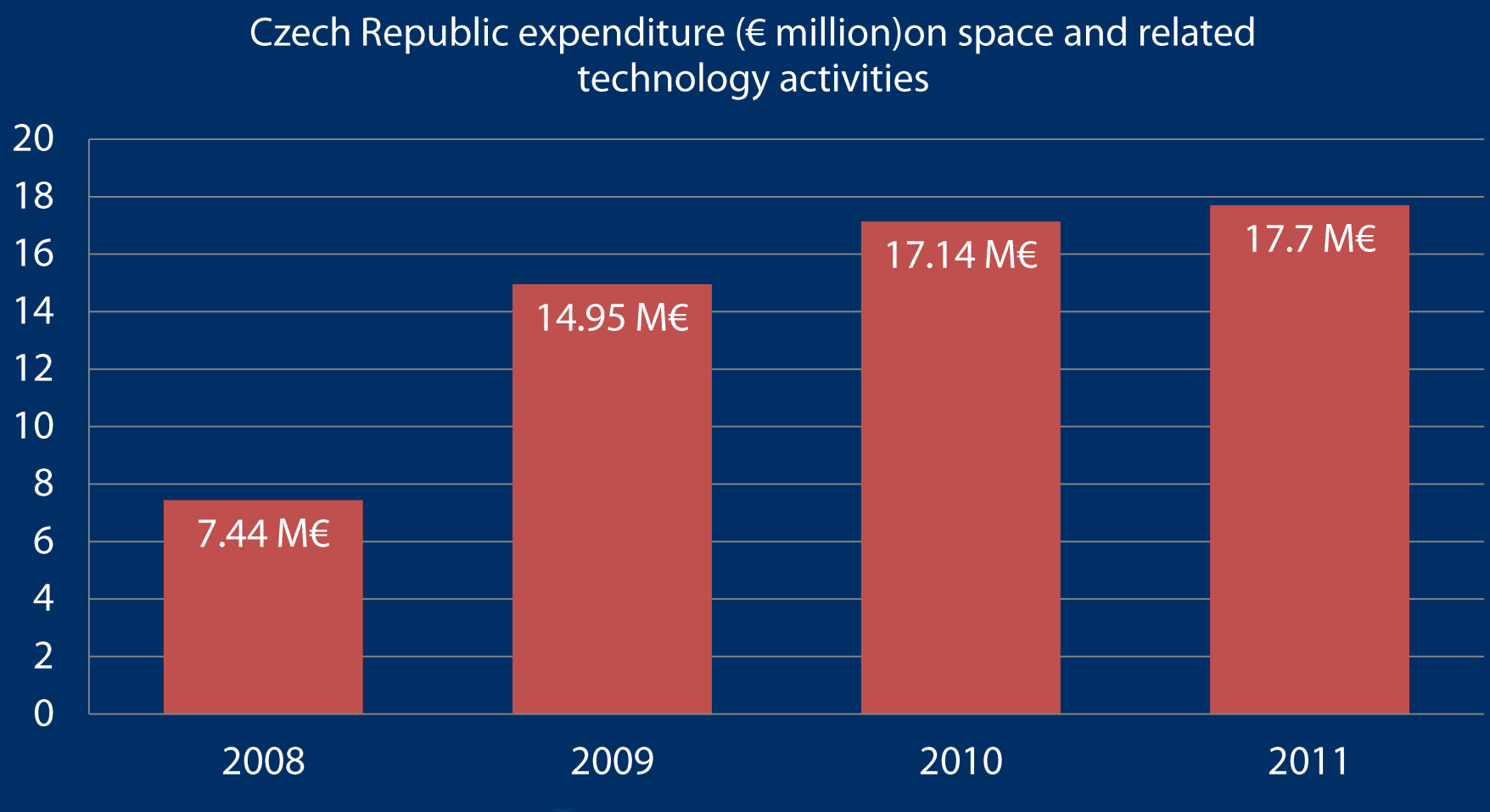
CZECH SPACE OFFICE

National institutions involved in space

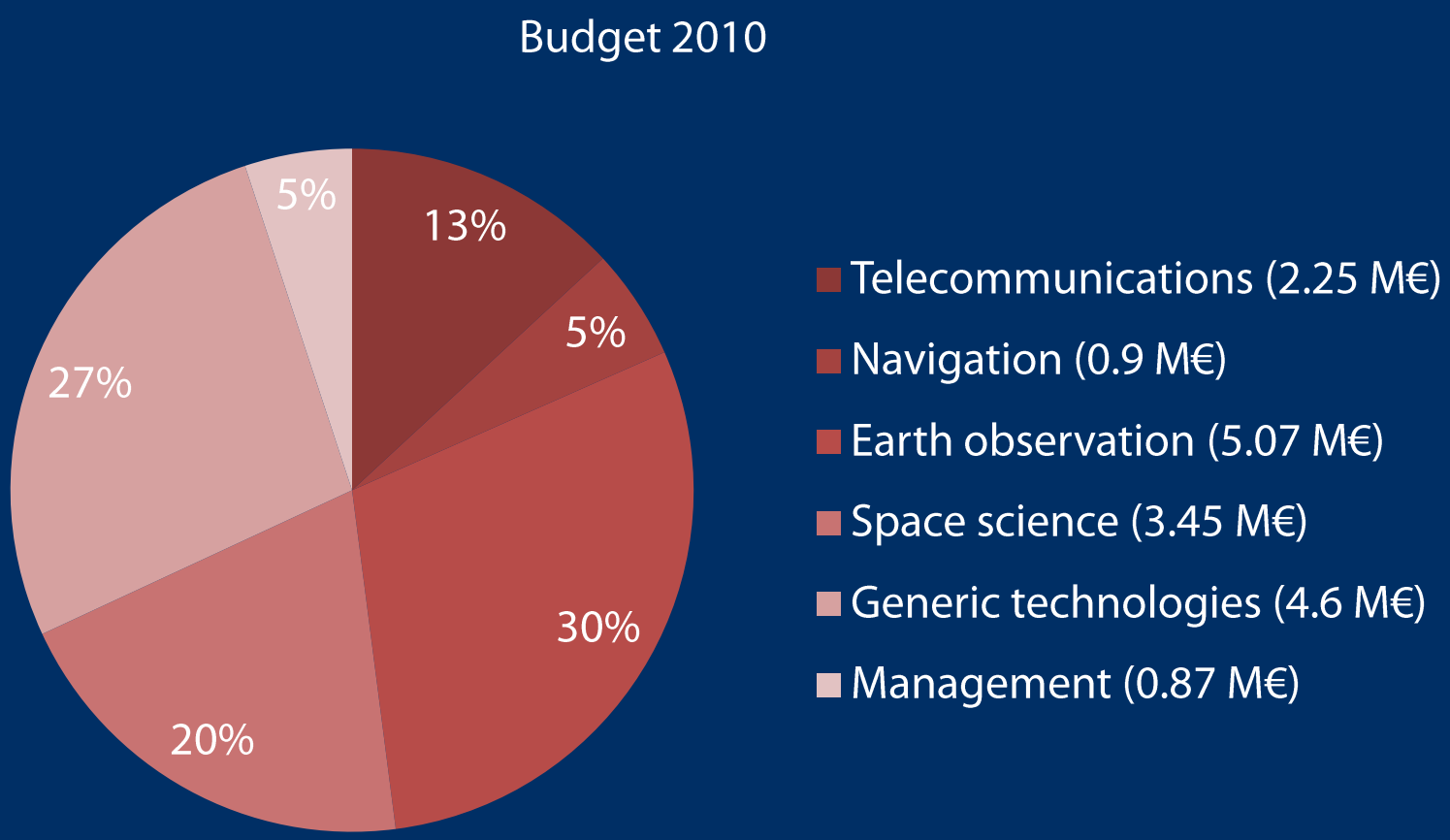
- Ministry of Transport
  - GNSS, Galileo, cooperation with ESA
- Ministry of Education, Youth and Sports
  - R&D related to space, funding of ESA programmes
- Ministry of Environment
  - EUMETSAT, GEO, GEOSS, GMES
- Ministry of Industry and Trade
  - Industry and space applications
- Ministry of Foreign Affairs
  - COPUOS and international agreements
- Parliament
  - Subcommittee for Aviation and Space in Committee for Economics
- Czech Space Office
  - National information and advisory centre for space activities

CZECH SPACE OFFICE

Expenditure summary (1)

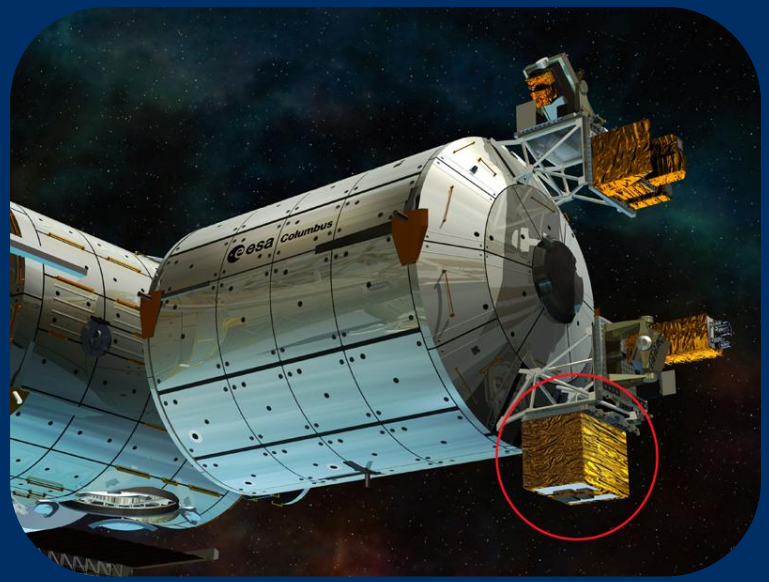


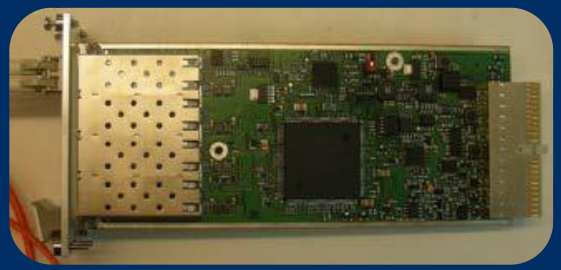
Expenditure summary (2)

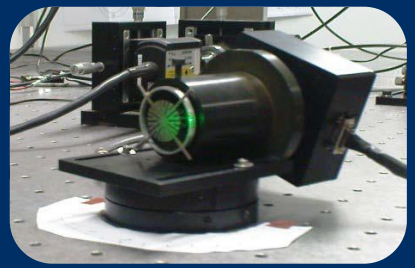


European Laser Timing (1)

- Project European Laser Timing is a dedicated optical link for time synchronization of ACES (Atomic Clock Ensemble in Space) – atomic clock module for ISS with ground stations.
- The on-board hardware for ELT consists of a corner cube retro-reflector, a single-photon avalanche diode (SPAD), and an event timer board connected to the ACES time scale.







European Laser Timing (2)

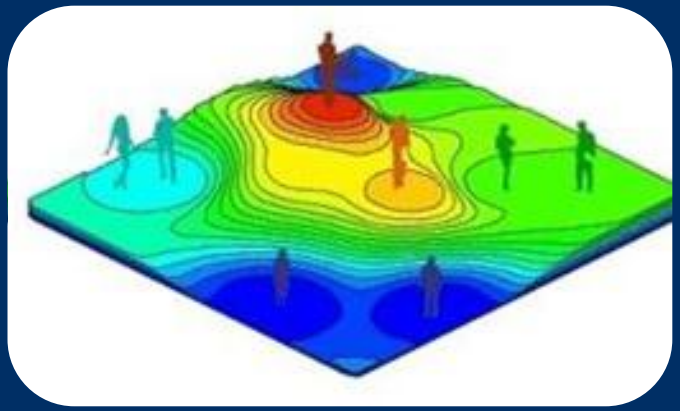
- Czech consortium is responsible for design, manufacture and test of optical and electrical part of space segment.

- Precision ~ 10 ps
- Accuracy < 50 ps

- Historically the first and most successful Laser Time Transfer realization was an experimental part of Chinese navigation system Beidou (Compass-M1, Compass-IGSO1 and Compass-IGSO3 satellites)

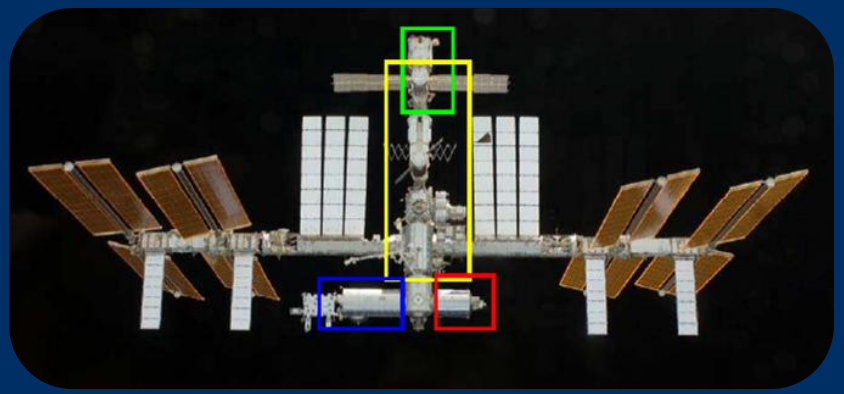
Mars 500 (1)

- Czech participation in Mars 500 project consists of three research experiments:
  - to explore the dynamics of relationships in a small social group (the crew of a simulation flight), to analyze ongoing relationship situations within the crew and predict possible disruptions of their cohabitation, in order to provide proposals for preventing the possibilities of failing in critical life situations by sociomapping method,
  - to explore the changes in perception and memory related to long-term isolation (stability of cognitive functions under extraordinary situations),
  - to examine the sources of human endurance in critical life situations.



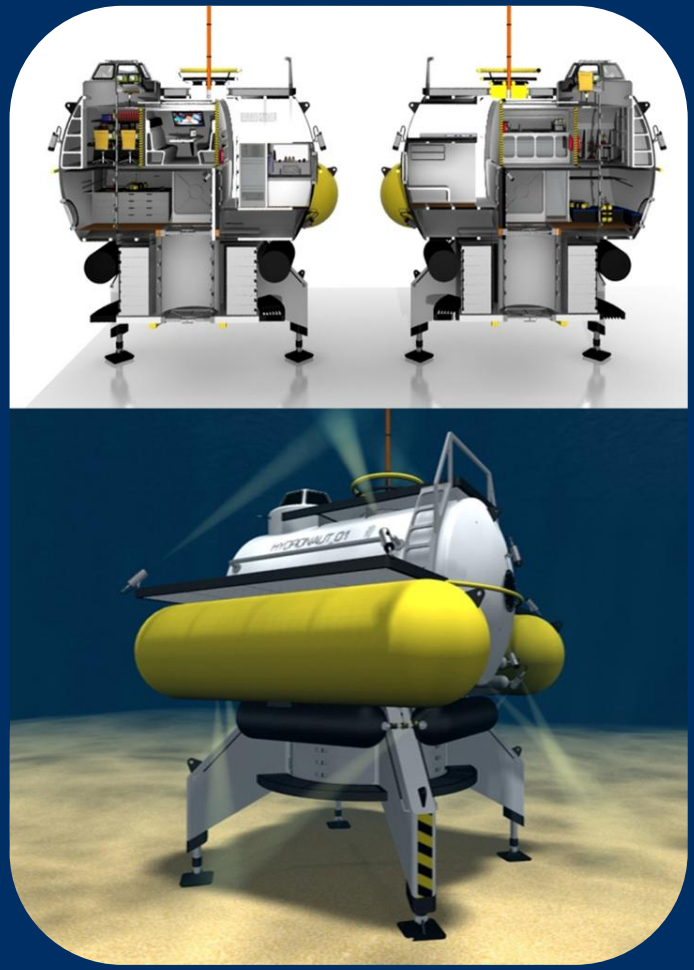
DOSIS-3D

- The main objective of DOSIS-3D experiment is the determination of the radiation field parameters absorbed dose and dose equivalent inside the ISS with various active and passive radiation detector devices, aiming for a concise three dimensional dose distribution map of all the segments of the ISS.
- Czech Co-I provides nuclear track etch detectors and thermoluminescence detectors for the passive detector packages exposed inside the European part of the ISS. It will perform the data analysis in terms of absorbed dose, LET spectra and dose equivalent.



Future activities

- Planned experiments:
  - Metabolic and cardio-vascular demands and effects of in-flight exercise countermeasures,
  - Effects of different exercise intensities and modes on kinetics of gas-exchange and cardio-vascular system.
- Other medical, material, sociological and biological experiments will be implemented after 2013.
- Development of ground-based infrastructure (parabolic flights, underwater station) for supporting manned spaceflight.



CZECH SPACE OFFICE

Thank you for your attention

Michal Václavík
vaclavik@czechspace.cz
Mob.: +420 731 682 435

Czech Space Office
Prvniho pluku 17
18600, Praha 8,
Czech Republic
Tel.: +420 224 918 288
http://www.czechspace.cz