



The Hungarian to Orbit (HUNOR) Astronaut Programme and its relevance to the space dosimetry community

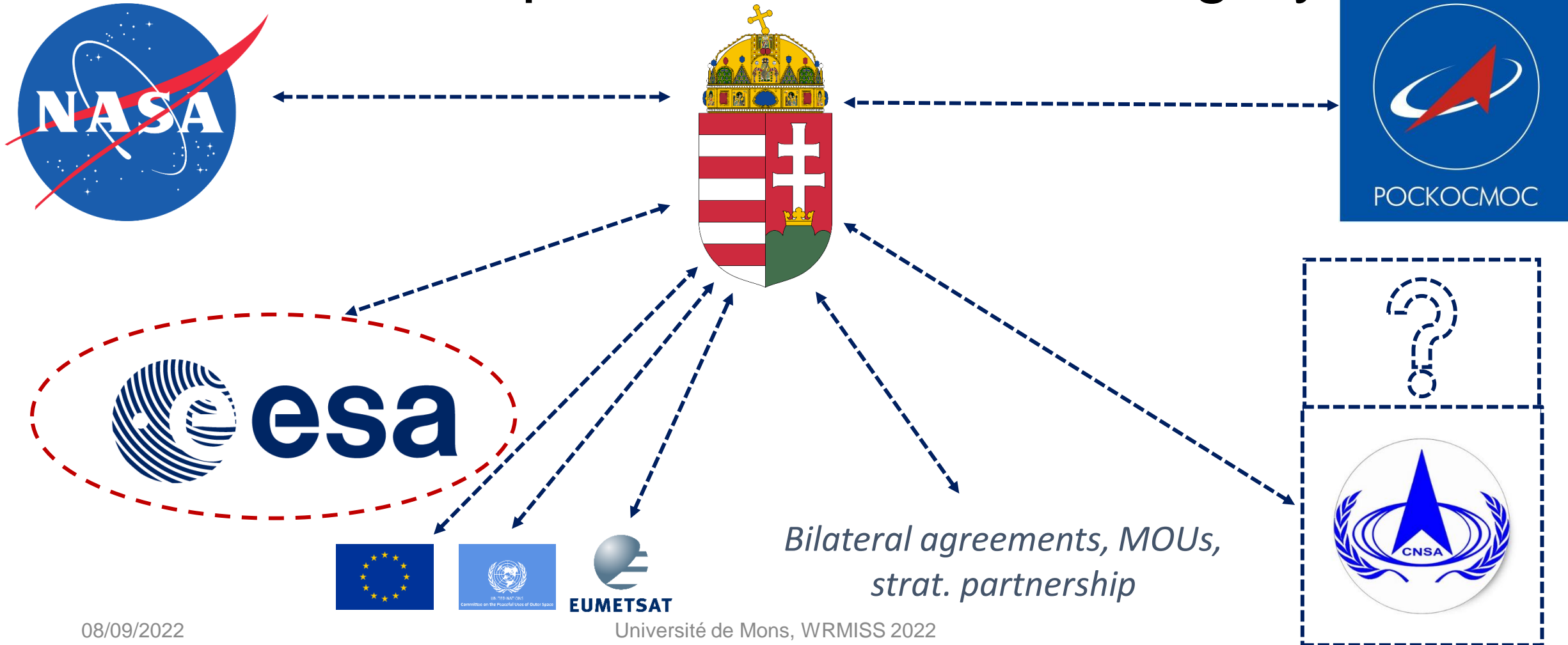
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International Space Relations of Hungary





Bilateral agreements, MOUs on space coop.

- **AXIOM Space**
- United Arab Emirates' Mohammed Bin Rashid Space Centre (**MBRSC**)
- Visegrad Group V4 (**Czech Republic, Poland**, Hungary, Slovakia)
- **Thales Alenia Space**
- Egyptian Space Agency
- Ministry of Economic Affairs and Employment of Finland
- South African National Space Agency



Bilateral agreements, MOUs on space coop.

- **Virgin Galactic Holding**
- Ministry of Science, Technology and Higher Education of Portugal
- **CNES**, France
- **Ministry of Science, Technology and Space of Israel**
- Singapore Space and Technology Association
- Ministry of Industry and Technology of Turkey
- Ministry of Science, Technology and Innovation of Brazil



Hungary's Space Strategy ([download](#)) and HUNOR

- In the short term strategic action plan:
 - Measure No. 2.1.4: Launch of flagship projects (**Hungarian research astronaut mission**, individual satellite programme, expansion of capacity of ground receiving stations, Radiation Effects Testing Laboratory)
- The goal of Hungarian to Orbit program (HUNOR) launched by the Hungarian Ministry of Foreign Affairs and Trade is to enable world-class Hungarian scientific experiments and tests to be carried out at the International Space Station through the participation of a Hungarian astronaut, scheduled for 2024.
- Agreement with AXIOM Space, 30-day mission to ISS in 2024



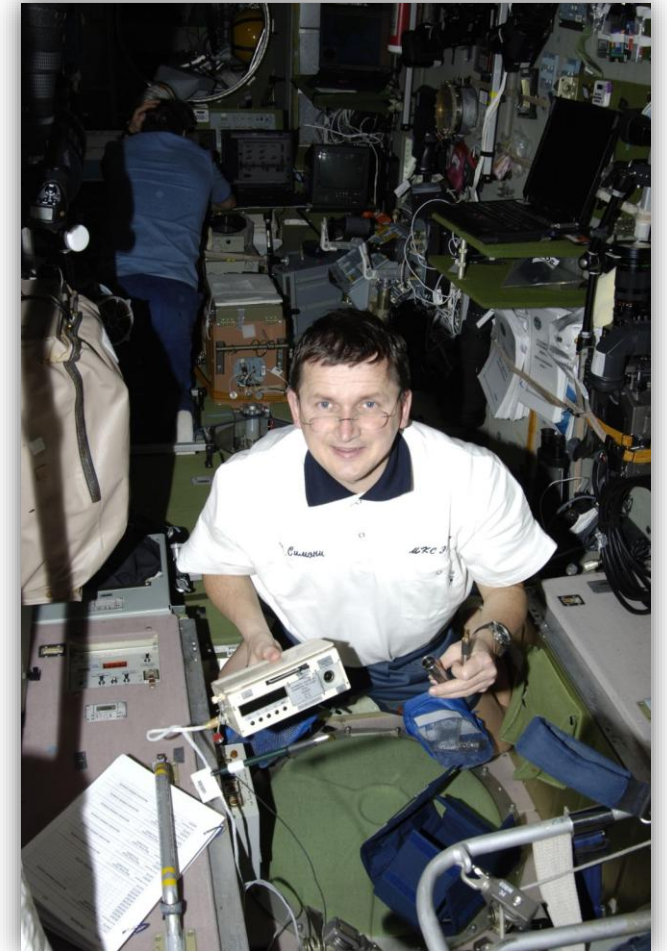
1st Hungarian cosmonaut

- First Hungarian cosmonauts trained for flight:
 - Bertalan Farkas
 - Béla Magyari
- Intercosmos programme
- **Flight of B. Farkas in 1980 to Salyut-6**
- Hungary became the 7th nation to have an astronaut in space
- **Debut of Pille**
- Birth of many Hungarian space research groups



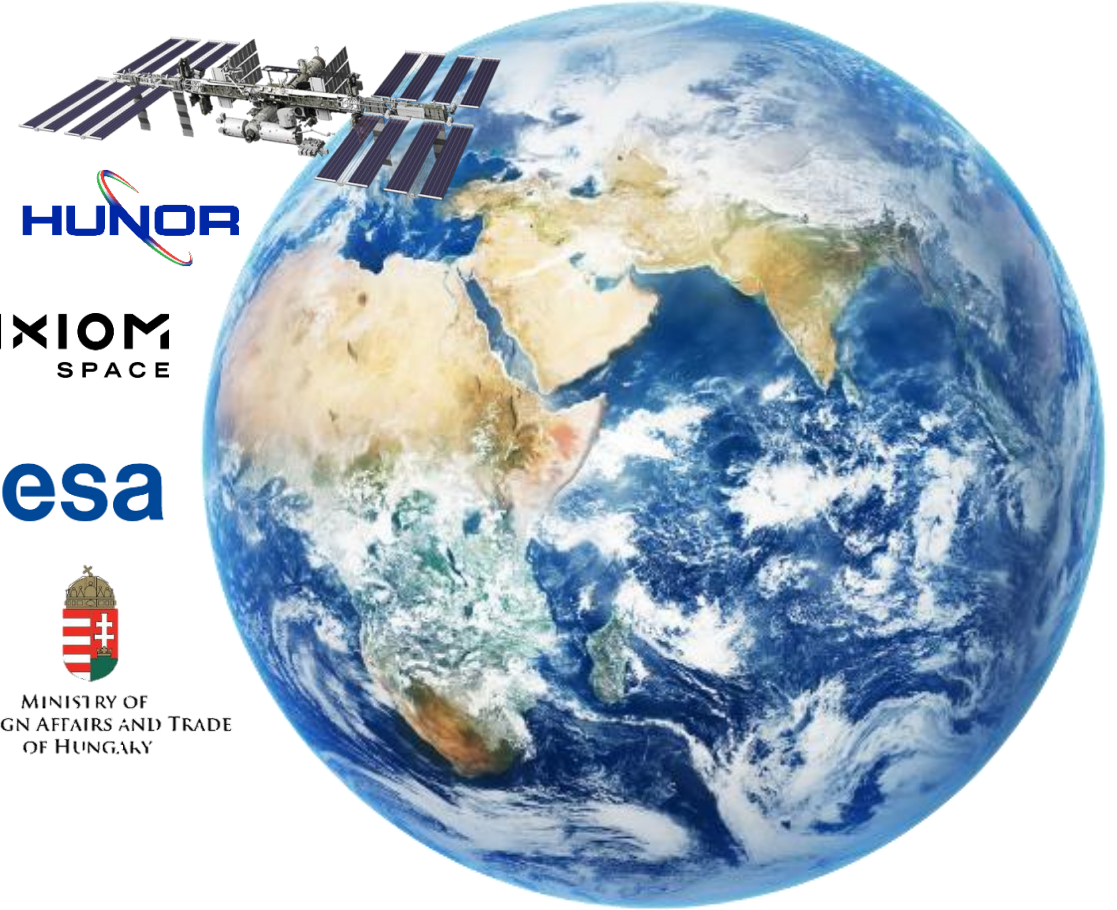


Spaceflight participant Charles Simonyi





HUNOR – Hungarian to Orbit



MINISTRY OF
FOREIGN AFFAIRS AND TRADE
OF HUNGARY

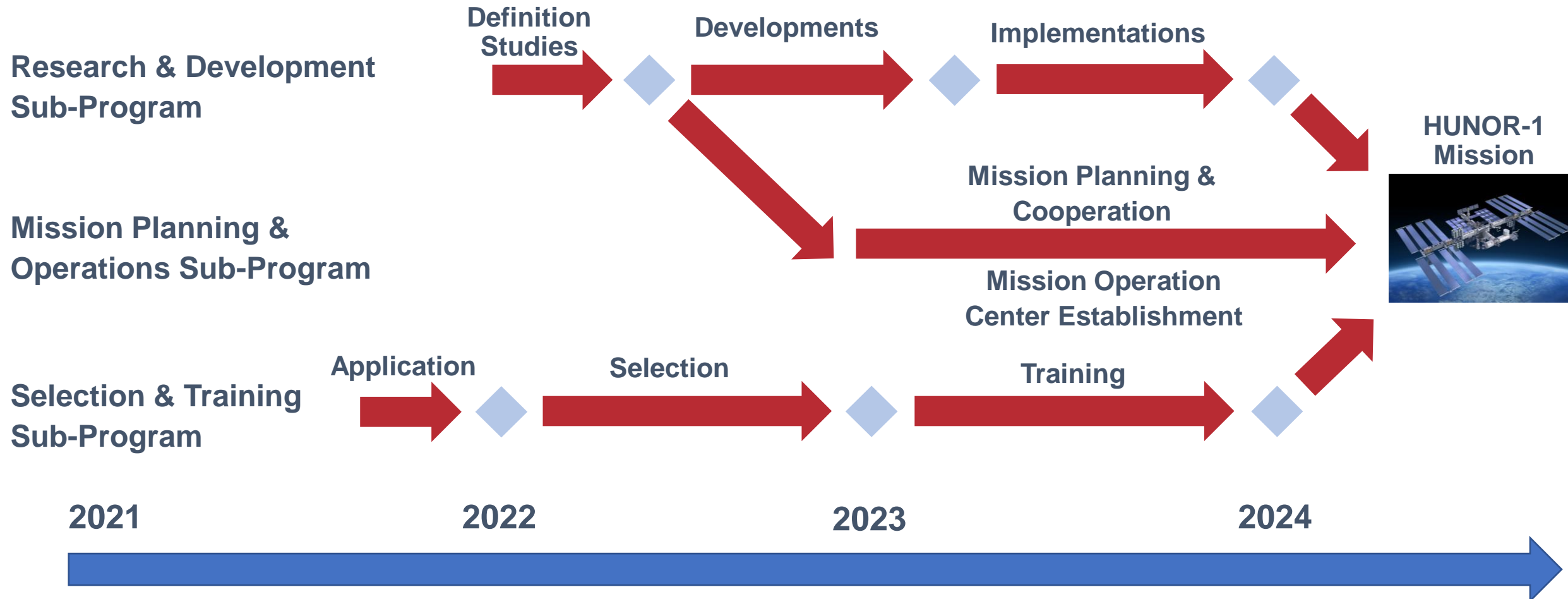


HUNOR Sub-Programmes



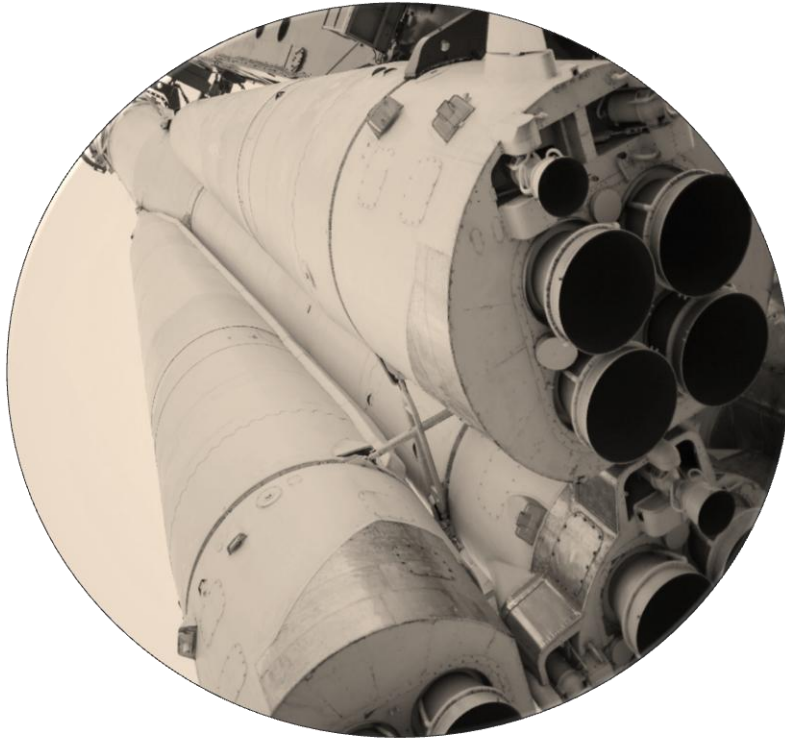


HUNOR timeline





Targeted R&D fields



SPACE RADIATION AND DOSIMETRY

MATERIAL SCIENCE AND TECHNOLOGY

SPACE LIFE SCIENCES AND SPACE MEDICINE

SPACE NUTRITION

TELECOMMUNICATION TECHNOLOGIES

EDUCATION AND SCIENTIFIC OUTREACH



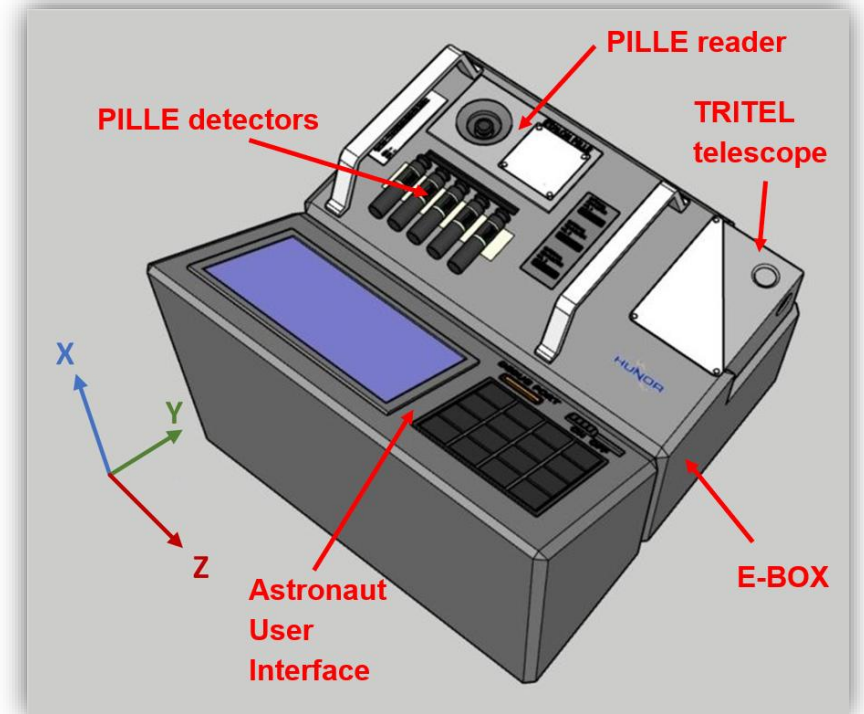
R&D projects

- 8 pre-selected proposals/projects
 - Feasibility Review of the Definition Study phase is ongoing
 - Space Dosimetry projects: TRIPIL, PSDS by REMRED Ltd.
 - Space Dosimetry support by EK for AGE project lead by MATMOD Ltd.
- Open Call proposals
 - Three categories: HUNOR-DEV, HUNOR-LAB, HUNOR-X
 - Proposals under evaluation
 - Under evaluation
- Ongoing discussions with the European Exploration Envelope Programme, E3P office of ESA
- + possibility of joint experiments, use of remaining astronaut time (hunor@ek-cer.hu)



TRIPIL

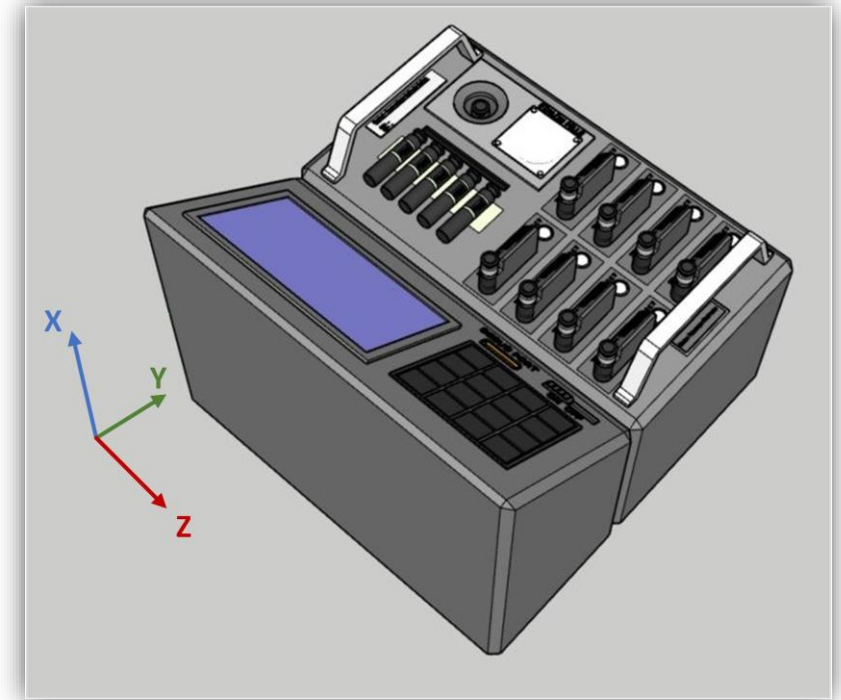
- TRITEL/PILLE (TRIPIL) Combined Space Dosimetry System
- Prime: REMRED Ltd. (remred.space)





PSDS

- Personal Space Dosimeter System
- Wearable dosimeter units (active)
- Intercomparison with Pille dosimeters





AGE

- Aging and Extended Space Exposure Experiments Outside the International Space Station (AGE) mission is to collect samples from various scientific area and expose them to LEO environment before returning them to Earth for post-flight investigations.
- On the MISSE platform (Aegis Aerospace)
- EK provides passive detector packages of TL + CR39 (fitting the sample holders)



Acknowledgement

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Centre for
Energy Research



SPACE
Research Department



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