



Future European Dosimetry Activities using Columbus

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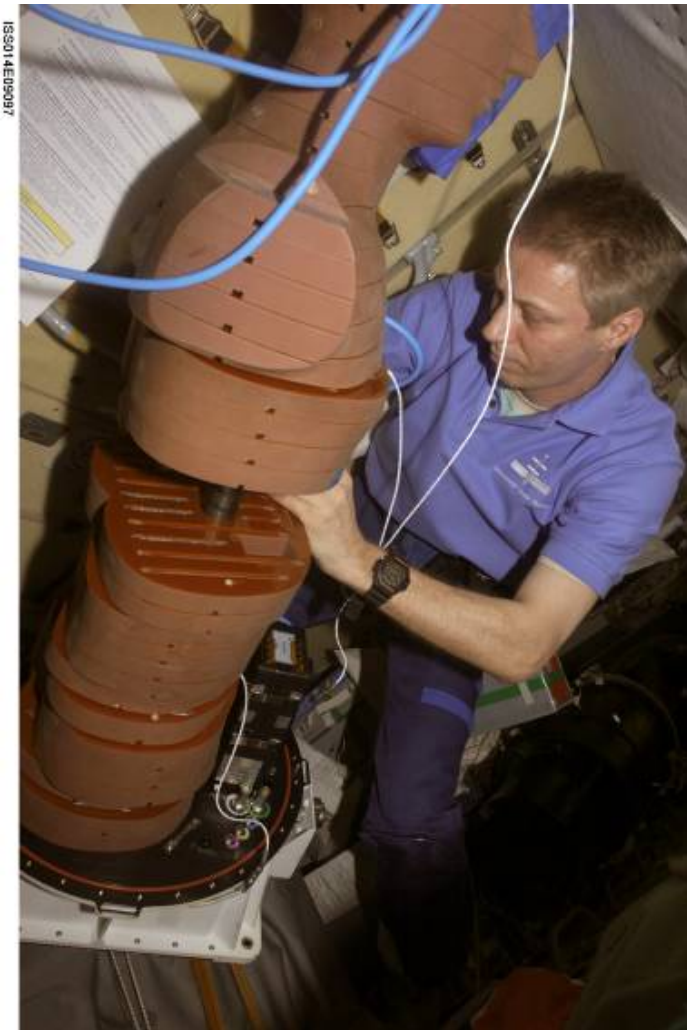
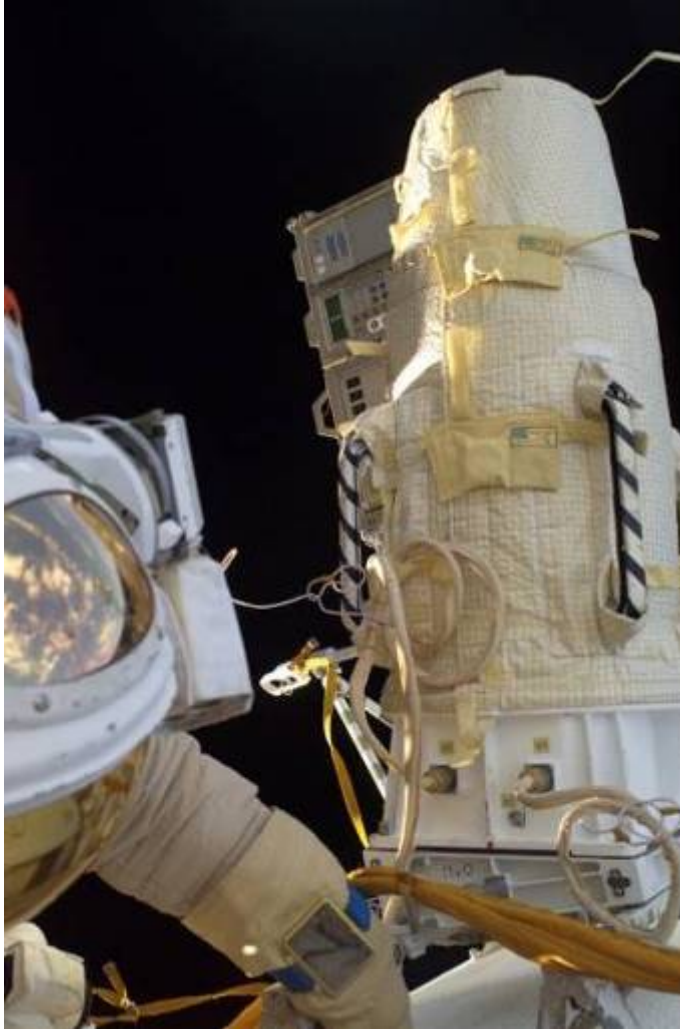
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Selected Experiments

- **MATROSHKA**
- **ALTCRISS (Alteino)**
- **DOSIS**
- **ALTEA Shield**
- **DOBIES**
- **TRITEL**
- **Liulin**

MATROSHKA



The MATROSHKA Facility – Radiation detectors



Thermoluminescence detectors (TLDs) and Nuclear Track Etch detectors, Scintillator/Silicon detectors, silicon telescope, tissue equivalent proportional counter (TEPC)

ALTCRISS

- Long term monitoring inside ISS using Alteino
- Selected by ESA in the Life Science AO
- Intercomparison with other detectors in the framework of MATROSHKA II
- Currently 6 month mission: 3 locations with and without shielding (Polyethylene shielding only on top of Alteino detector – 5g/cm²)
- Various dosimeters: Napoli + DLR
- Comparison with ground data & simulations



DOSIS

➤ Dosimetry inside Columbus

- Dosimetric mapping inside Columbus using passive radiation detectors
- Dosimetric mapping inside Columbus using active radiation monitors
- Dosimetric measurements inside the European Physiology Module (EPM) by use of passive and active devices

➤ Dosimetry outside Columbus

- Dosimetric mapping inside EXPOSE – EuTEF (EXPOSE – R) with passive systems only

DOSIS (Experiment Definition)

- 2 **DOSTEL** dosimeters powered by EPM
- **TLD-PILLE** reader with 10 dosimeter bulbs (**already on ISS**) powered by EPM or Columbus
- **ALTEINO** (Altea silicon detector telescope) (**already on ISS (RUS)**), transfer to Columbus required
- **NTDP** (Passive detector packages) (3 in EPM) and up to 10 distributed at different locations inside the Columbus module (together with PILLE)
- *1-2 personal neutron dosimeters, powered by rechargeable battery (commercially available)*
- Optional 1 **TEPC** (**already on ISS**) temporarily in Columbus, data to be provided by NASA

Dosemeter Equipment of DOSIS



Passive Detector Boxes



TLD Reader PILLE



Detector Telescope DOSTEL



Alteino



Neutrondosemeter

Active radiation measurement devices onboard the ISS US contribution



Tissue Equivalent
Proportional Counter
(TEPC)

DOSIS (EPM)

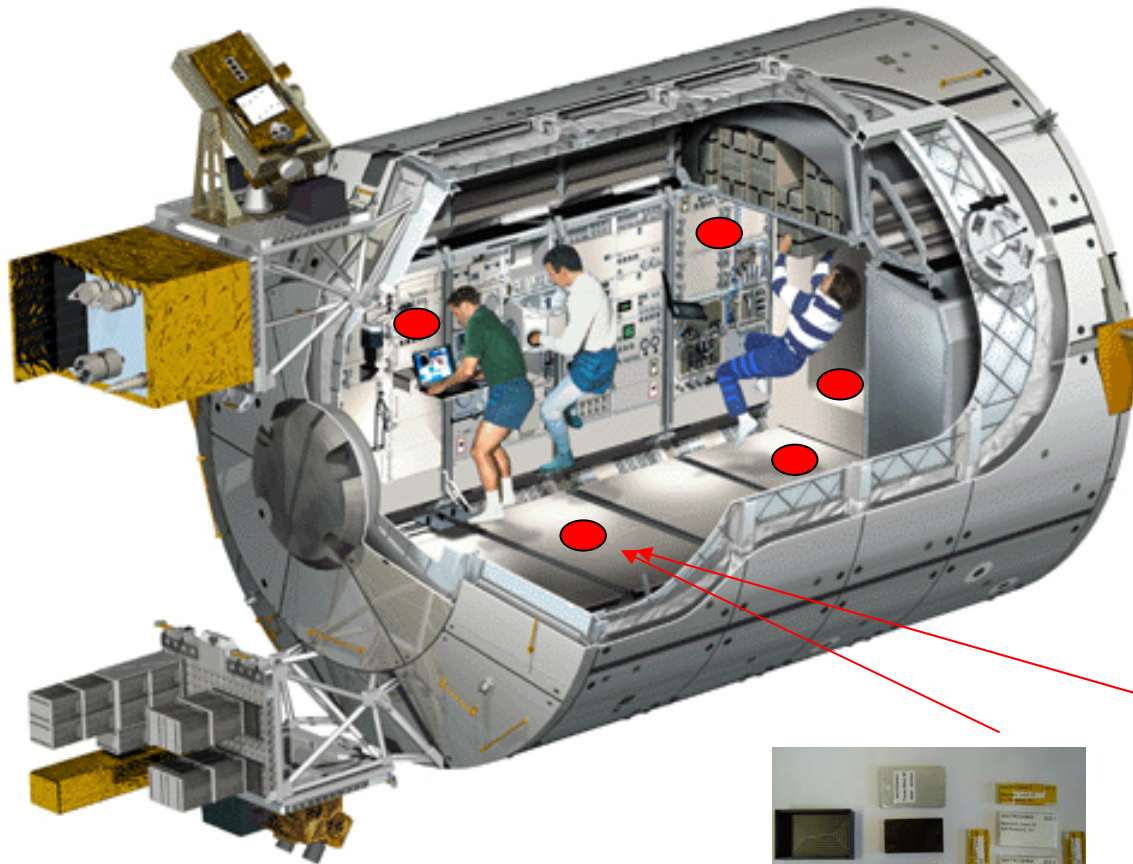


2 Dostels and up to three NTDP packages inside the EPM Standard Active Container

→ DOSTEL data transfer and download (TBD)

→ Exchange of NTDP packages every 6 month

DOSIS (passive detector locations)



10 NTDP packages / PILLE detectors inside Columbus

→ Exchange of NTDP packages every 6 months

→ Read out of PILLE detectors every 10 days

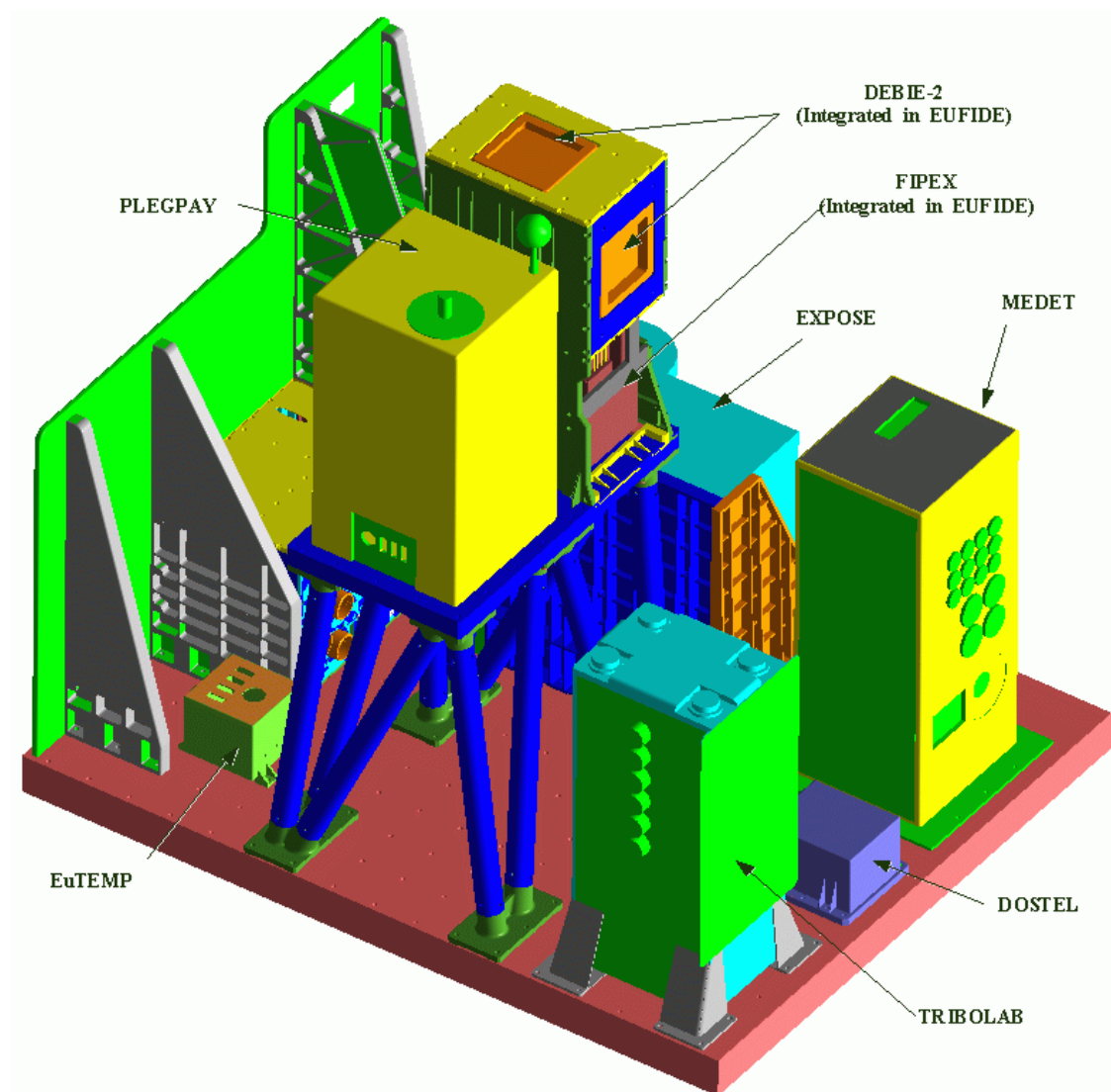


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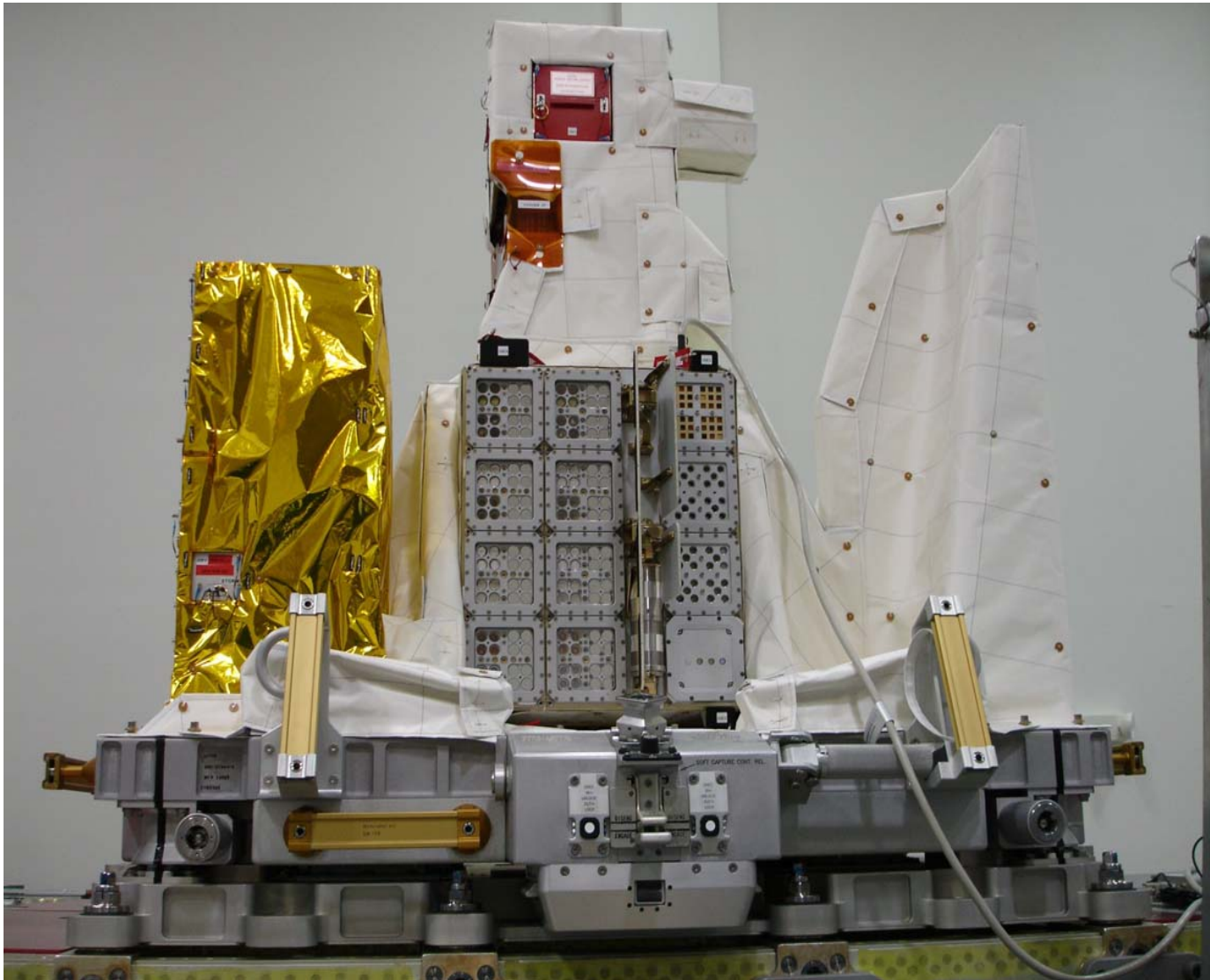
DOSIS (International Contribution)

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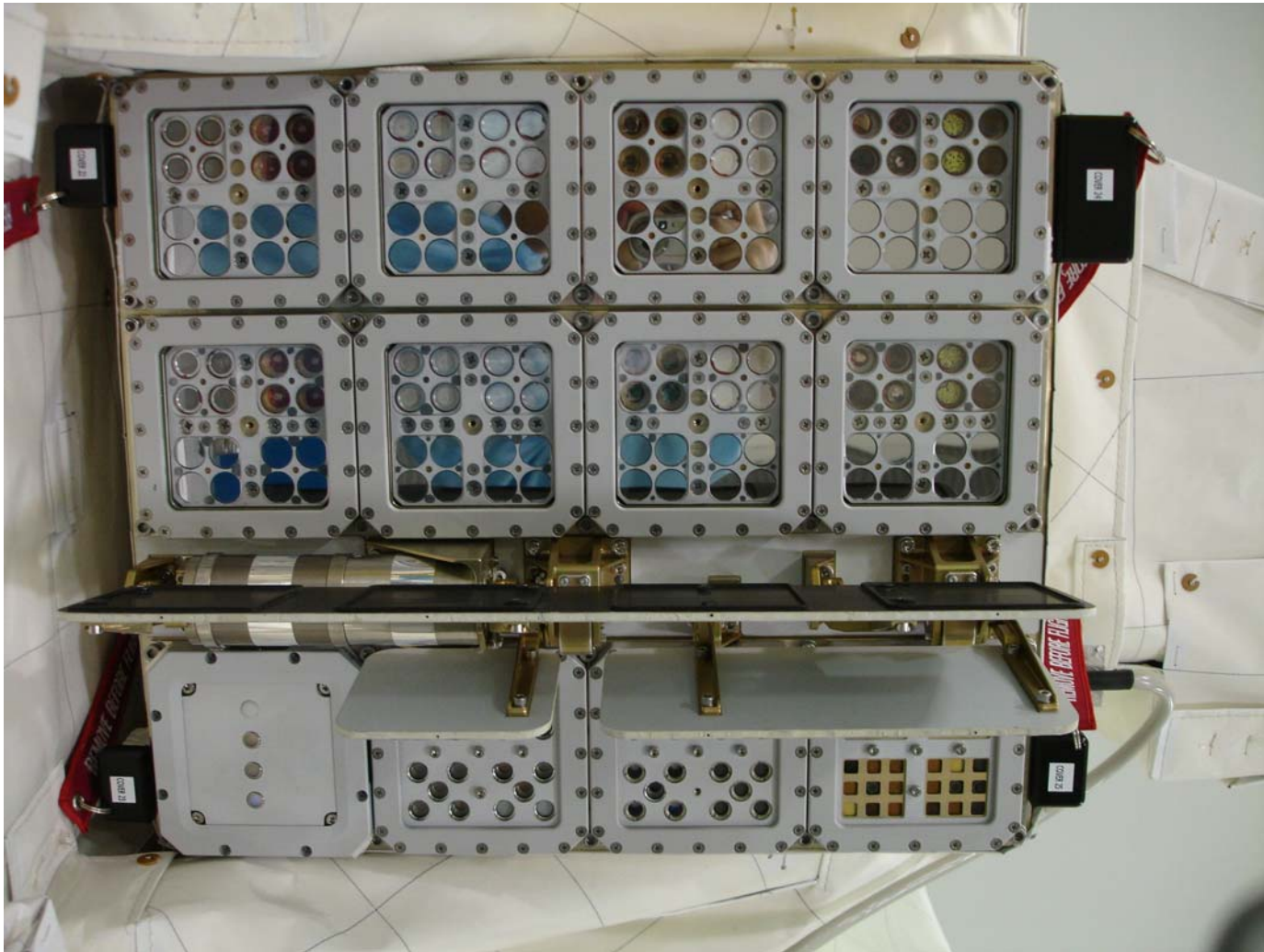
DOSIS inside Expose and DOSTEL on EuTEF



EuTEF Facility



DOSIS / Expose-EuTEF



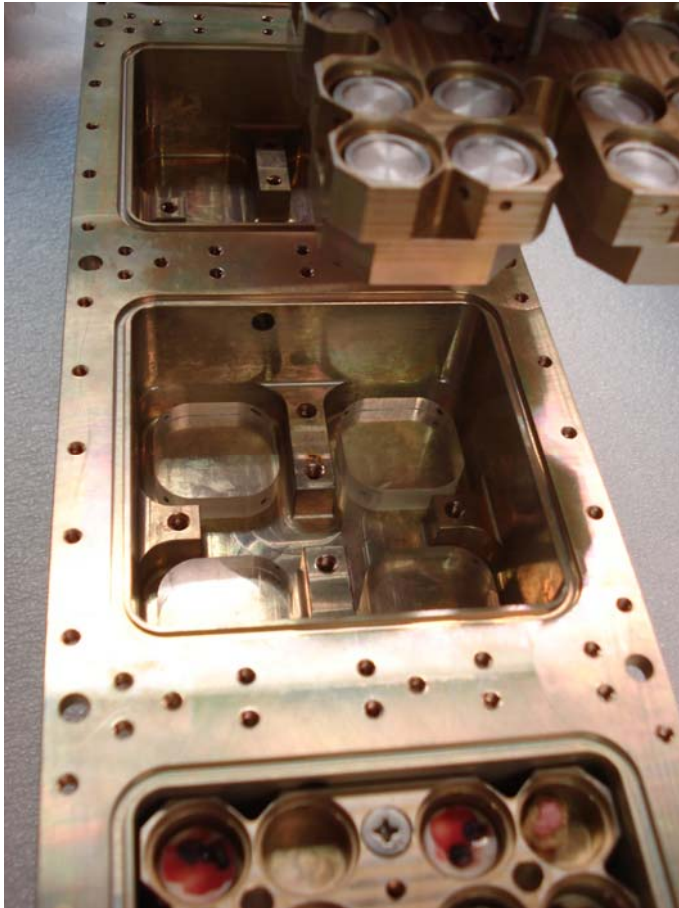


DOSIS / Expose-EuTEF

- Passive Dosimetry in the Expose-EuTEF facility for the determination of the radiation environment at the location of the biological samples
- 32 TLD / OSL – CR-39 packages as “Dark Control”
- 32 “Depth Dose Stacks” for the depth dose measurements

cooperation with : DOBIES

DOSIS (ISLRA-2004-167) / Expose-EuTEF

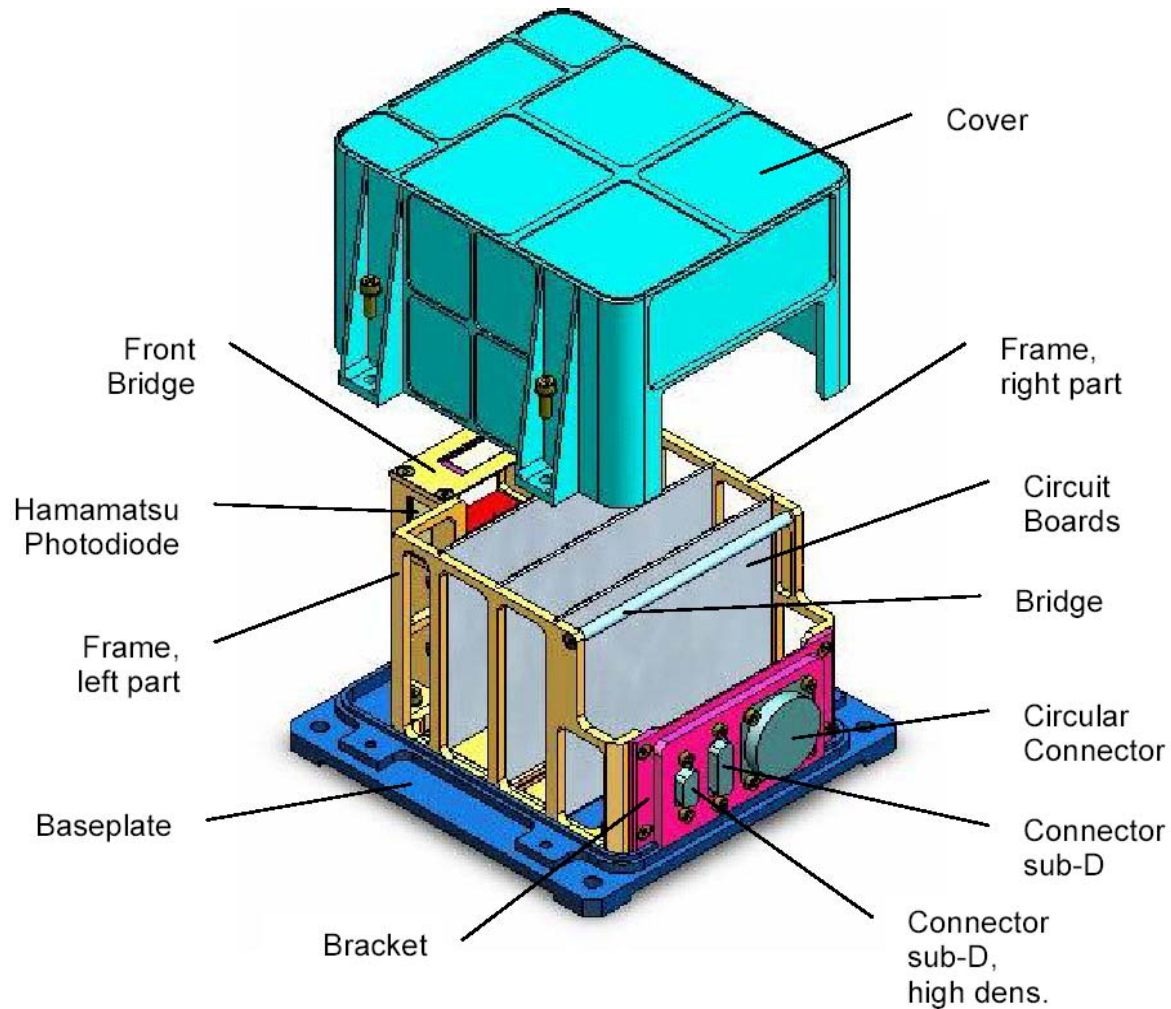


DOSIS (ISLRA-2004-167) / Expose-EuTEF

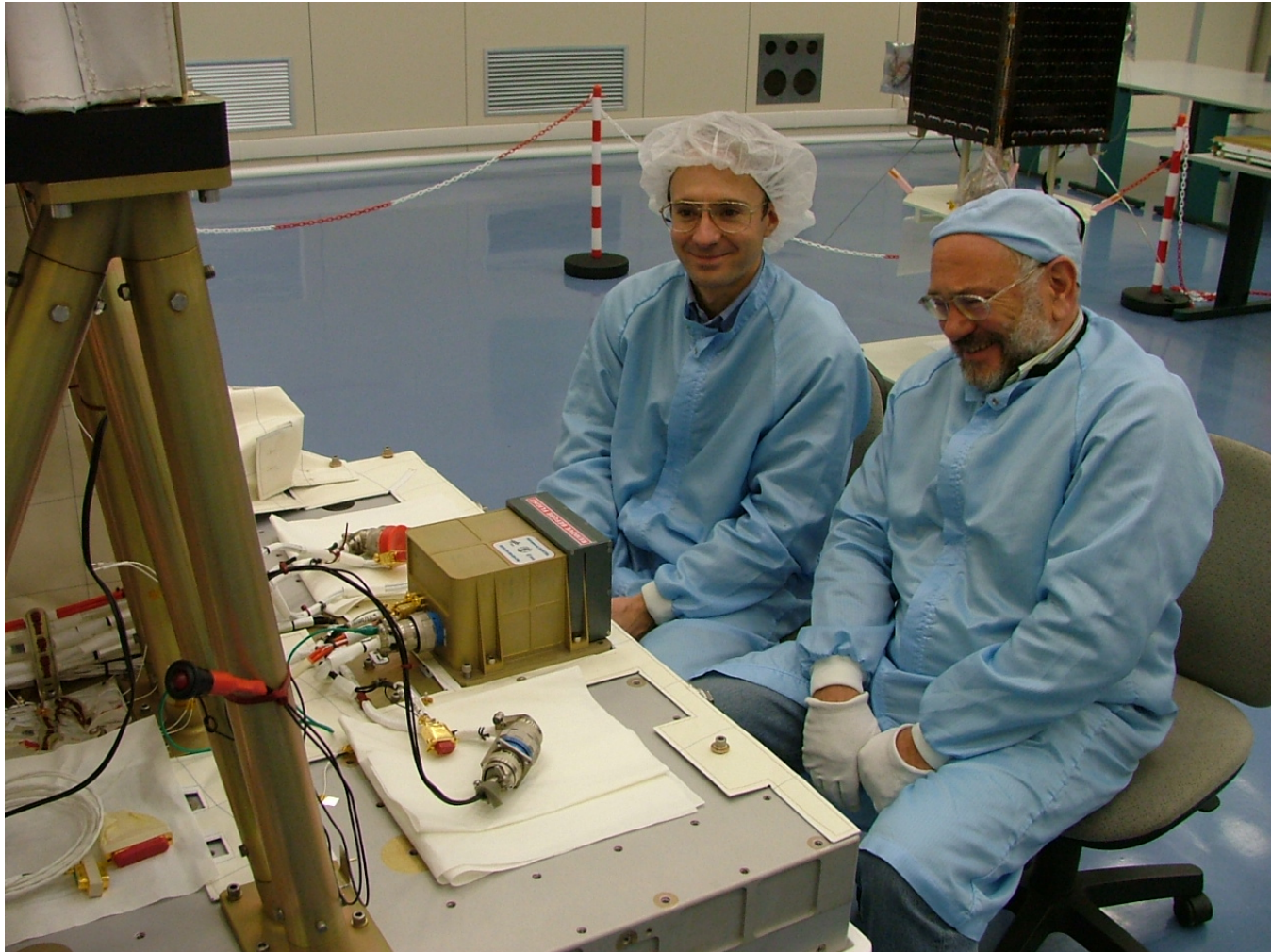


Depth dose TLD stack

Advanced DOSTEL on EuTEF



Advanced DOSTEL during Interface Test



ESA Dosimetry Planning

	Inc15	Inc16	Inc17	Inc18	Inc19	Inc20
	Apr07-Oct07	Oct07-Apr08	Apr08-Oct08	Oct08-Apr09	Apr09-Oct09	Oct09-Apr10
ALTCRISS	SM & FGB 6	FGB & COL 3	COL 3			
ALTEA-SHIELD			US-Lab Reserve	US-Lab 2	US-Lab 2	US-Lab 2
MATROSHKA-2B	SM [4]	SM [4]				
MATROSHKA-2C TBC		SM External [8]	SM External 0	SM External [8]		
DOSIS DOS/NTDP			COL: EPM 0,5	COL: EPM 0,5	COL: EPM	COL: EPM
DOSIS TLD			COL: Pille Reserve	COL: Pille Reserve	COL: Pille Reserve	COL: Pille Reserve
DOBIES	RS 0	RS 0	RS 0,5	RS 0	COL 0,5	
TRITEL					COL 0,5	COL 0,5
LIULIN-5E				SM 1	SM 1	
DOSIS / DOBIES External		COL: EXPOSE 0	COL: EXPOSE 0	COL: EXPOSE 0	COL: EXPOSE 0	

Total crew time	6	3	4	3,5	4	2,5
Crew time available	6	3	2	2	2	4

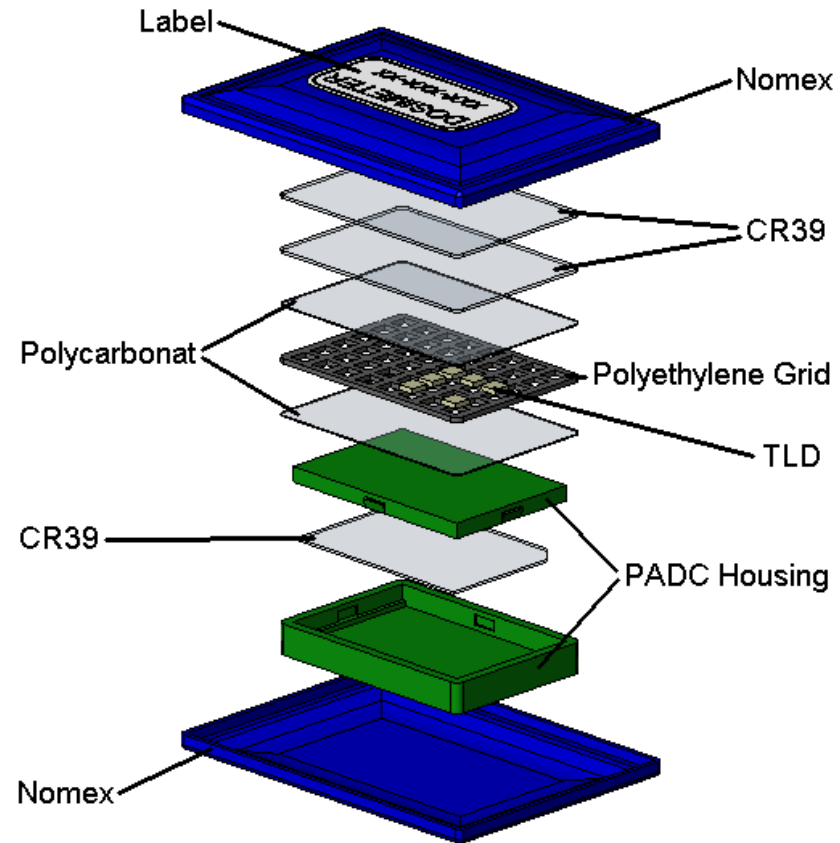
Operational Dosimetry

- **EuCPD (European Crew Personal Dosemeter (STS-121 and STS 116))**
- **EuCPAD (European Crew Personal Active Dosemeters for Astronauts)**
Study Group: DLR, PTB, ARC, RADOS, Tyndall

EuCPD

European Crew Personal Dosemeter

- 48 x TLD's
- 2 x CR-39
- 1 x PADC



Crew Personal Dosemeters



Passive radiation measurement devices onboard the ISS (personal dosimeters)



ISS013E67495

Christer Fuglesang and Thomas Reiter with the EuCPD



S116E06402



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in der Helmholtz-Gemeinschaft

12th WRMISS, Stillwater, Sept 10-12, 2007,

EuCPD

European Crew Personal Dosemeter



Starting with STS-121 ... STS-116...

Thank you very much
for your attention !

