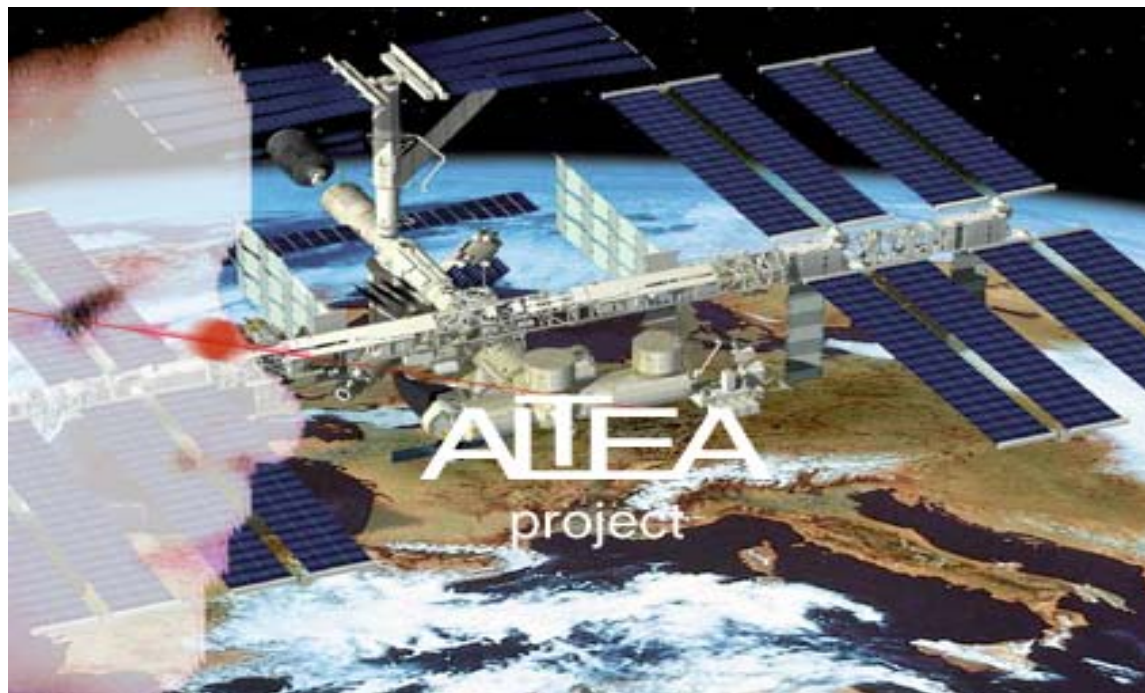


ALTEA: latest results and comparisons with other instruments

narici@roma2.infn.it

L. Narici, M. Casolino, L. Di Fino, C. M. Larosa, P. Picozza, A. Rinaldi, V. Zaconte

Department of Physics, University of Roma & INFN, Tor Vergata





ALTEA international team

Dept. di Physics, Univ. of Rome "Tor Vergata" and INFN Sect. Roma2 , Roma

Dept of Physics, Univ. of Pavia, Pavia

Dept of Physics, Univ. of Milan, Milan

DISM-Univ. of Genoa, Genoa

L.N.F. - INFN, Frascati (Rome)

CERN - INFN

Dept. of Physics, Univ. e Sect. INFN of Trieste, Perugia, Firenze

Dept. of Sc. and Chemical Tec., Univ. of Rome "Tor Vergata"

Dept. of STB - Univ. of L'Aquila, L'Aquila

GSI - Biophysik, Darmstadt, Germany

Royal Institute of Technology, Stockholm, Sweden

Chalmers University of Technology, Sweden

Institute for BioMedical Problems, Moscow, Russia.

Russian Space Corporation "Energia" by name Korolev, Korolev, Moscow region, Russia

Moscow State Engineering Physics Institute, Moscow, Russia

Johnson Space Center, NASA, Houston

TX, USA

Brookhaven National Laboratory, NY,

USA

Lawrence Berkeley National Laboratory,

CA, USA

Cole Eye institute, The Cleveland Clinic,

Cleveland, OH, USA

Wyle Laboratories, TX, USA

Eril Research, CA, USA

JAERI, Japan

Altamura F

Avdeev S.

Ball S.

Ballarini F.

Battistoni G.

Belli F.

Bencardino R.

Bengin V.

Benton E.

Bidoli V.

Bisti S.

Boezio M.

Bonvicini W.

Brunetti V.

Carlson P.

Carozzo S.

Casolino M.

Castellini G.

Ciccotelli A.

Cingolani G.

Cotronei V.

Cucinotta F.

De Martino A.

DePascale M.P.

Di Fino L.

Ferrari A.

Fuglesang C.

Furano G.

Galper A.

Gianelli G.

Khodarovich A.

Korotkov M.G.

Iwase H.

La Tessa C.

Larosa M.

Lee K.

Licoccia S.

Maccarone R.

Mancusi D.

Marchetti M.

Mazzenga G.

Miller J.

Morino V.

Morselli A.

Narici L.

Negri B.

Notaro G.

Ottolenghi A.

Paci M.

Peachey N.S.

Petrov V.P.

Picozza P.

Popov A.

Reali E.

Ricci M.

Rinaldi A.

Romagnoli P.

Russo M.

Ruggieri D.

Salnitski V.P.

Sannita W.G.

Sato T.

Schardt D.

Semones E.

Shavers M.

Shevchenko O.I.

Shurshakov V.A

Sihver L.

Sparvoli R.

Spillantini P.

Trukhanov K.A.

Vacchi A.

Vavilov N.

Vazquez M.

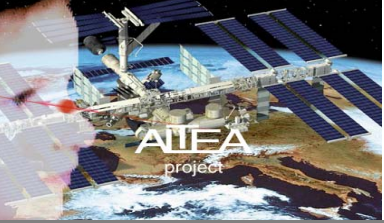
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Zaconte V.

Zampa N.

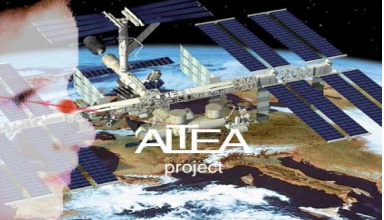
Zapp N.

+ others joining in



ALTEA major goals

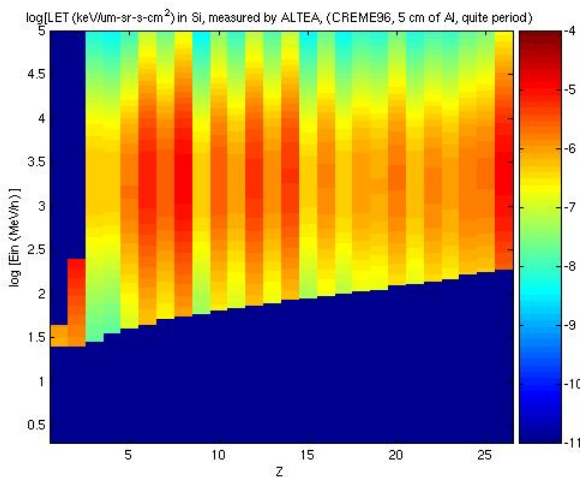
- measure radiation environment in the ISS during quiet and SPE periods
- study interaction between ionizing radiation and CNS (starting with Light Flashes phenomenon)



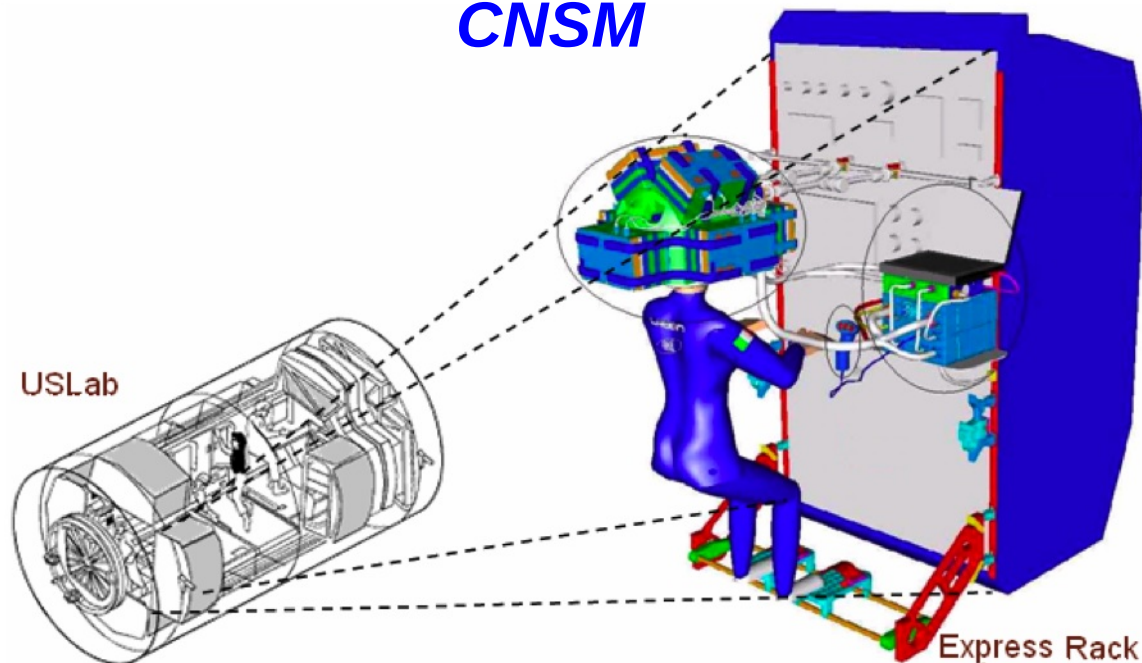
ALTEA modalities

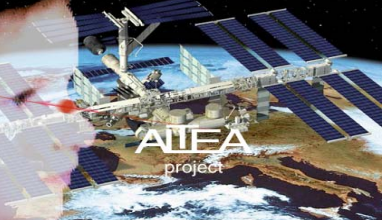


DOSI

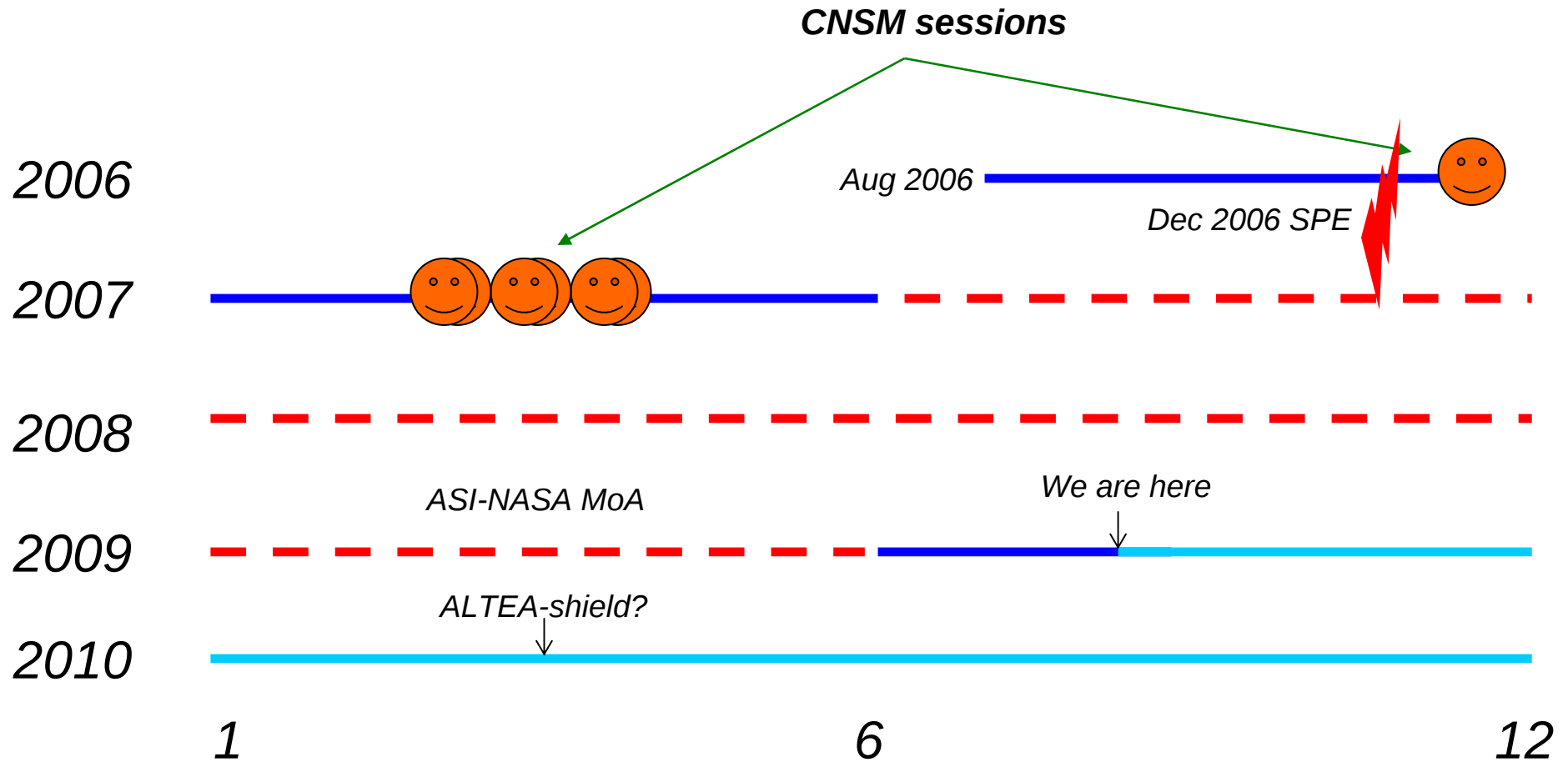


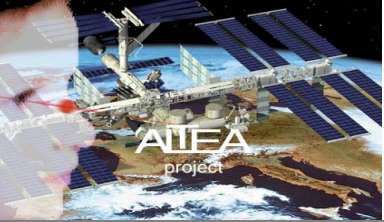
CNSM



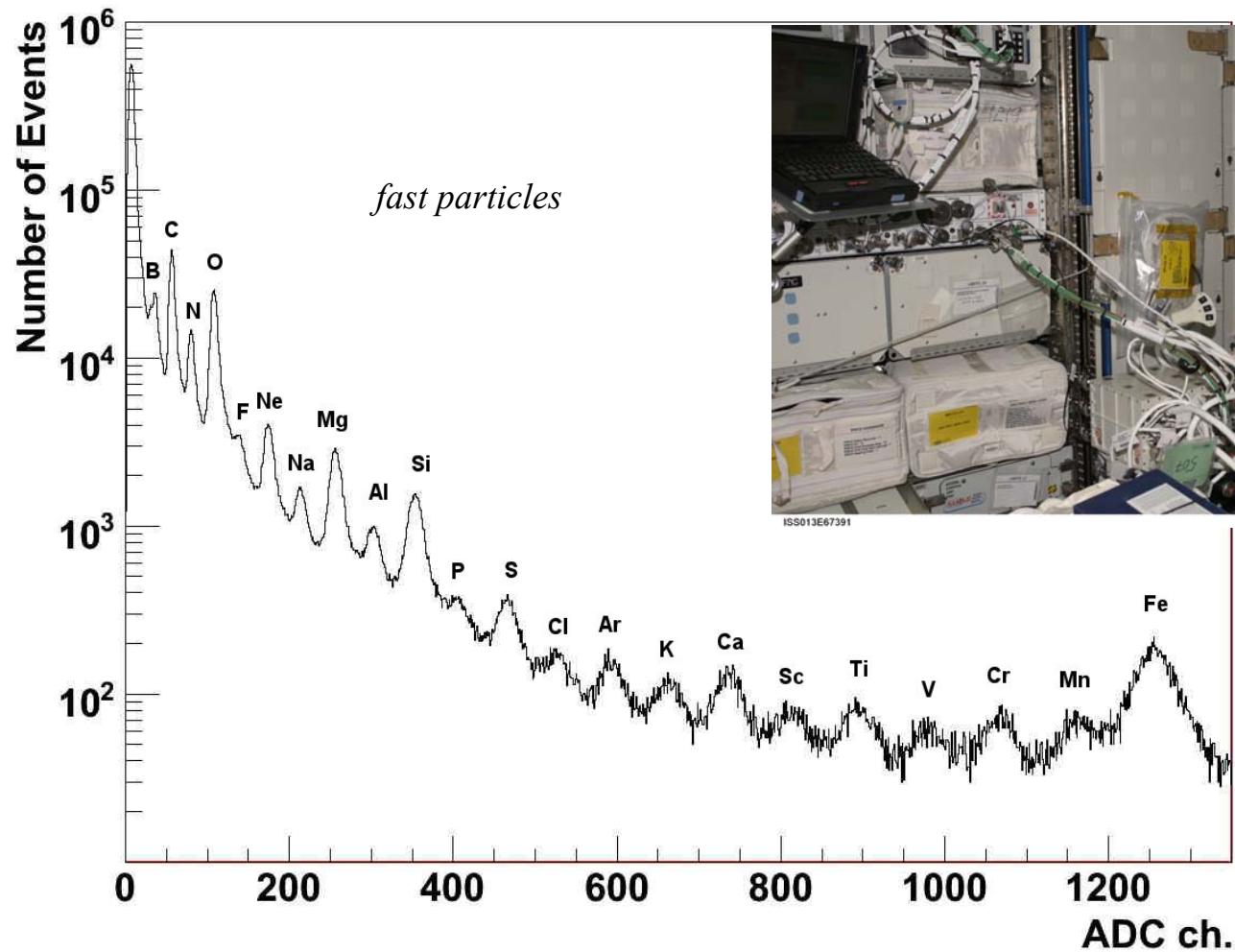


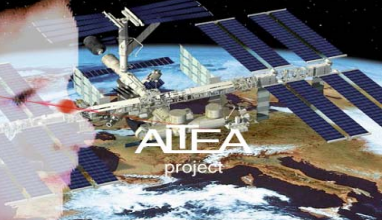
ALTEA up periods





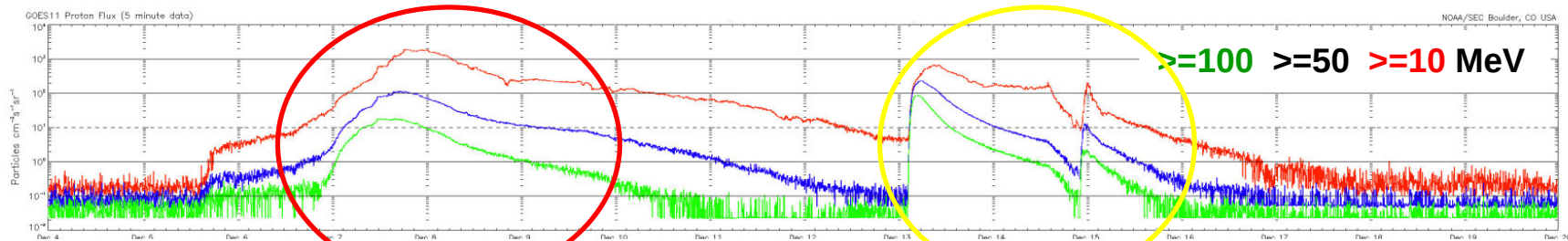
ALTEA: 2006 radiation spectrum



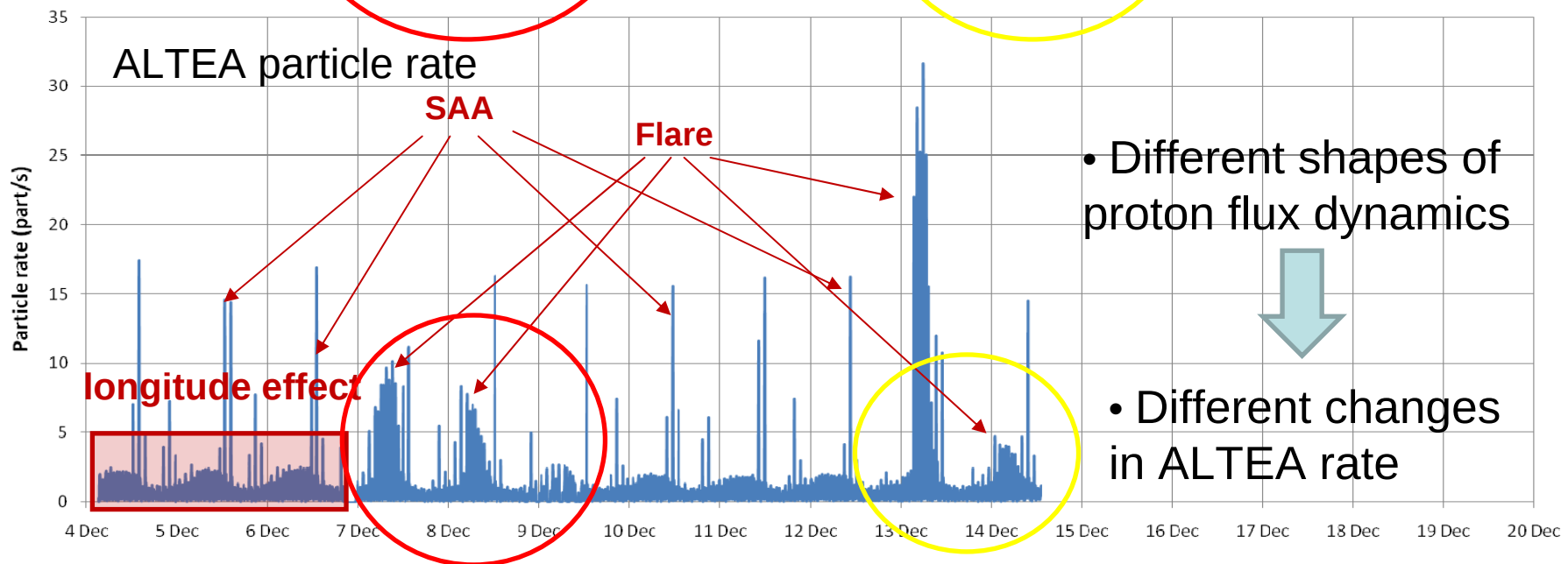


ALTEA SPE (Dec 2006)

GOES proton flux

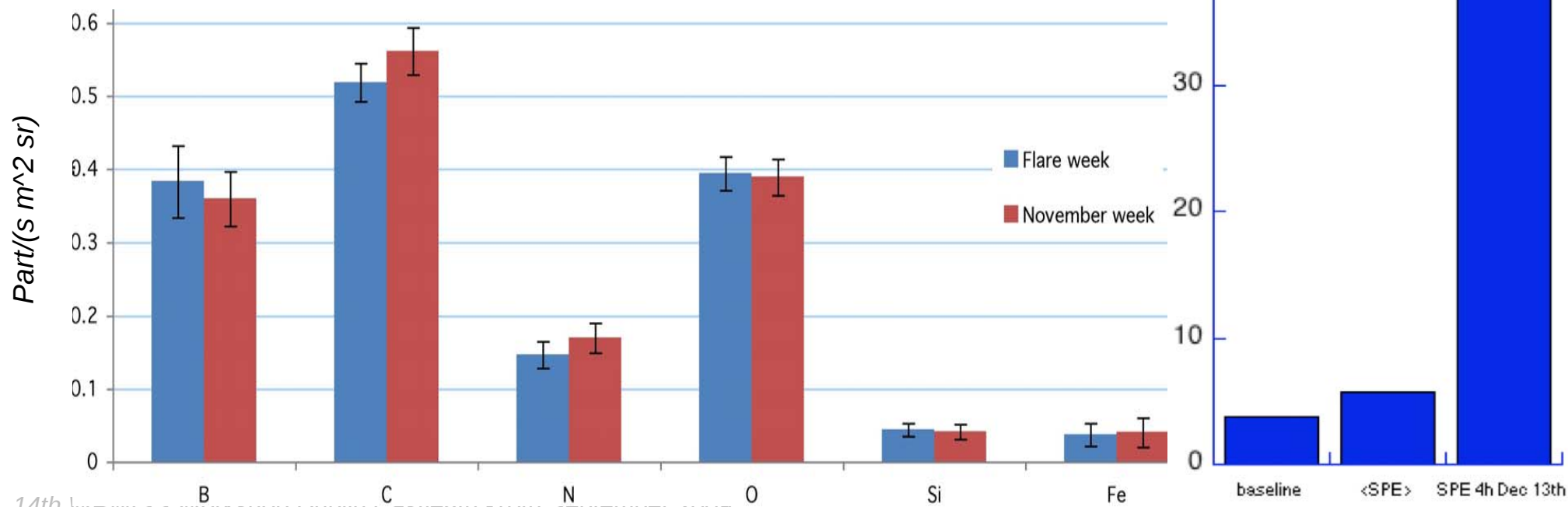
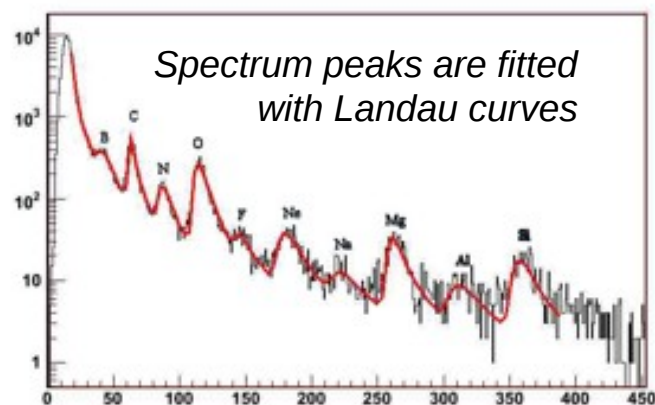


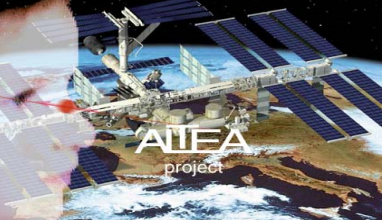
ALTEA particle rate



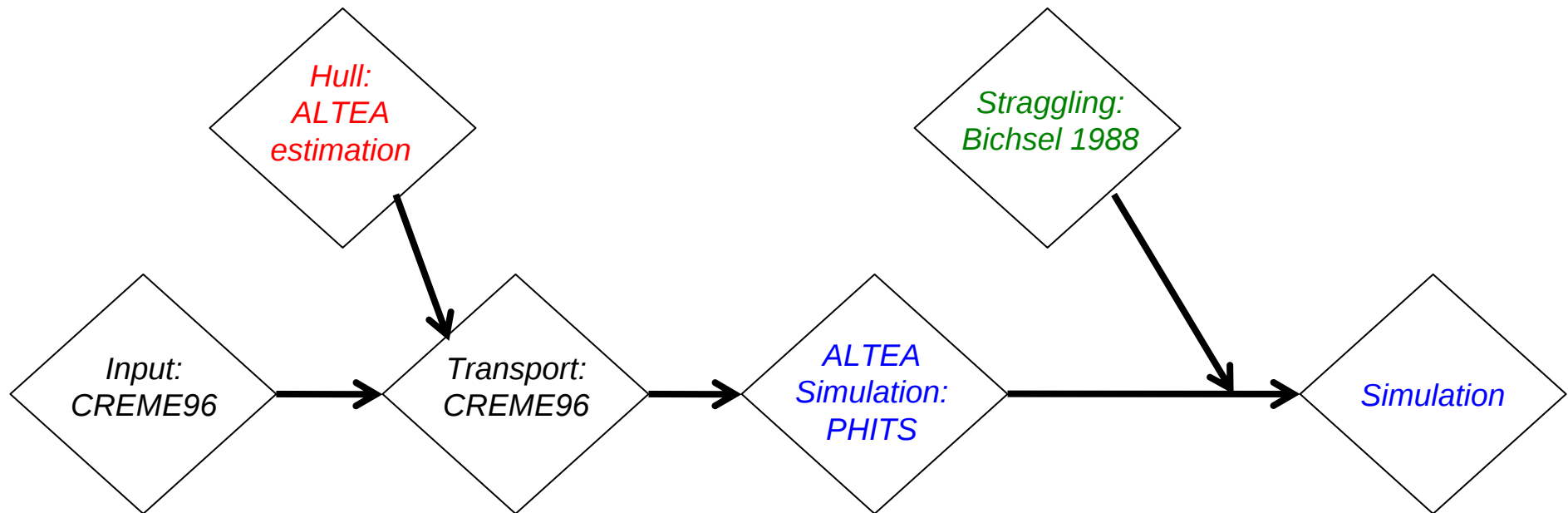


ALTEA SPE (Dec 2006) - 2





ALTEA simulation



ALTEA
Nuclear Transport Model
measurements

for User

1. R
2. S
3. relating material:
4. Shield thickness: IM

Best fit for Specify si

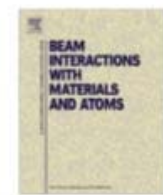
Hull thickness
≈ 5 cm (Al)

Contents lists available at ScienceDirect

Nuclear Instruments and Methods in Physics Research B

ELSEVIER

journal homepage: www.elsevier.com/locate/nimb



ICE

Estimate of the space station shielding thickness at a USLab site using ALTEA measurements and fragmentation cross sections

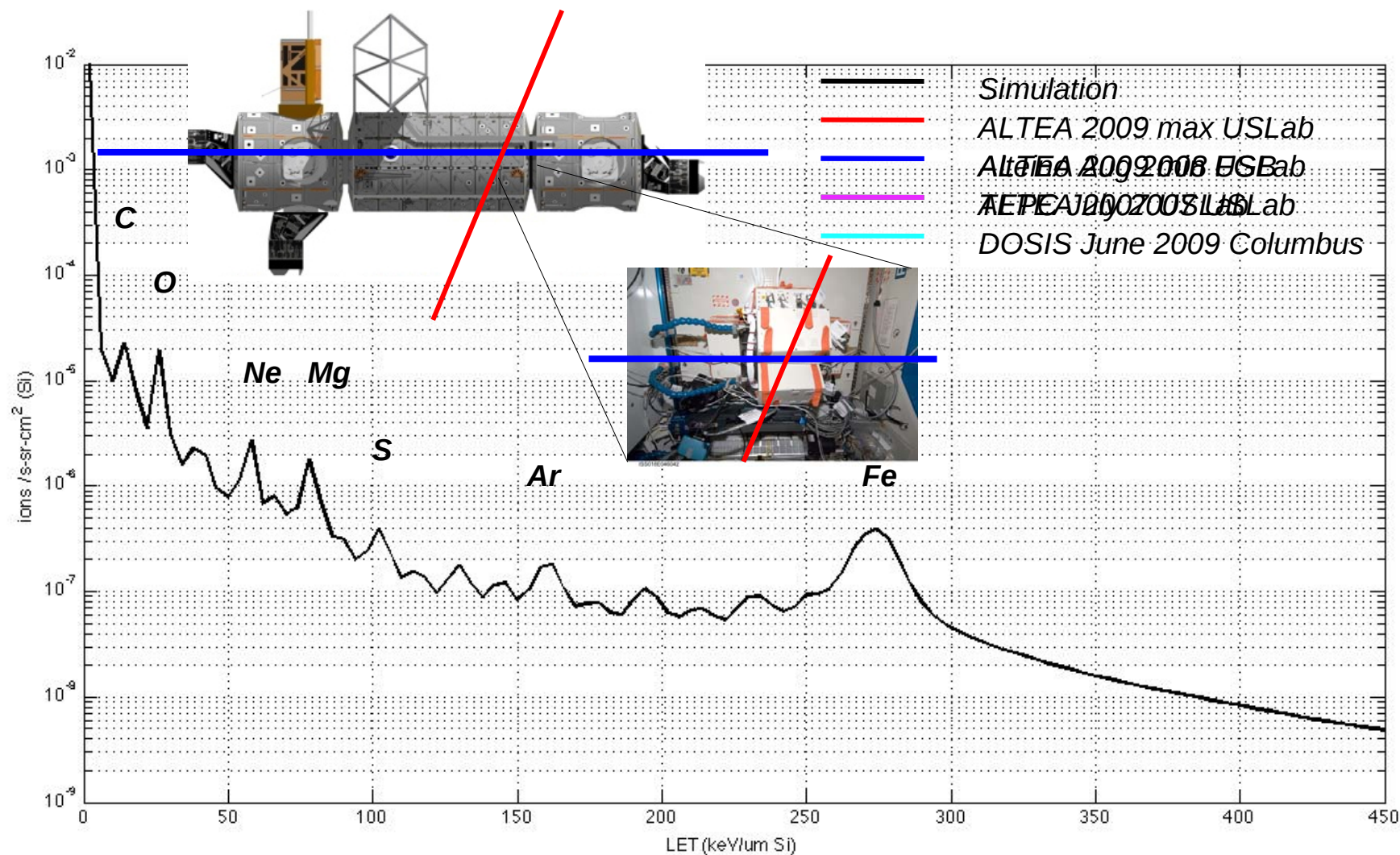
C. La Tessa, L. Di Fino, M. Larosa, L. Narici *, P. Picozza, V. Zaconte

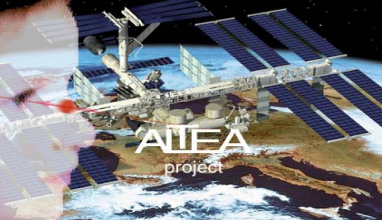
Department of Physics, University of Rome Tor Vergata and INFN, Via della Ricerca Scientifica 1, 00133 Rome, Italy



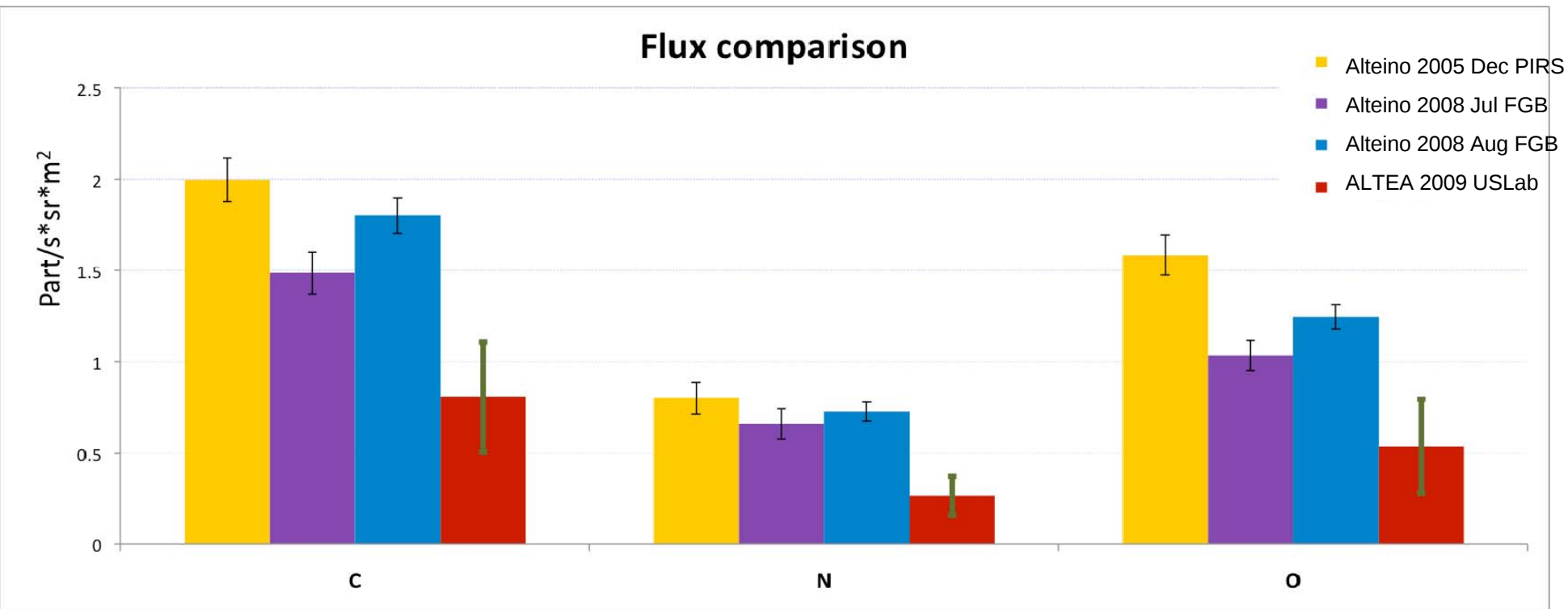
ALTEA LET comparison

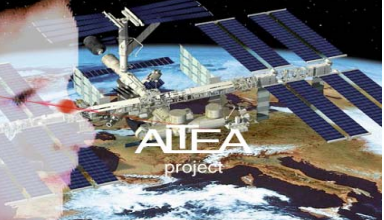
Thanks to
 Thomas Berger (DLR)
 Soenke Burmeister (Kiel Univ.)
 Kerry Lee, Eddie Semones (NASA)



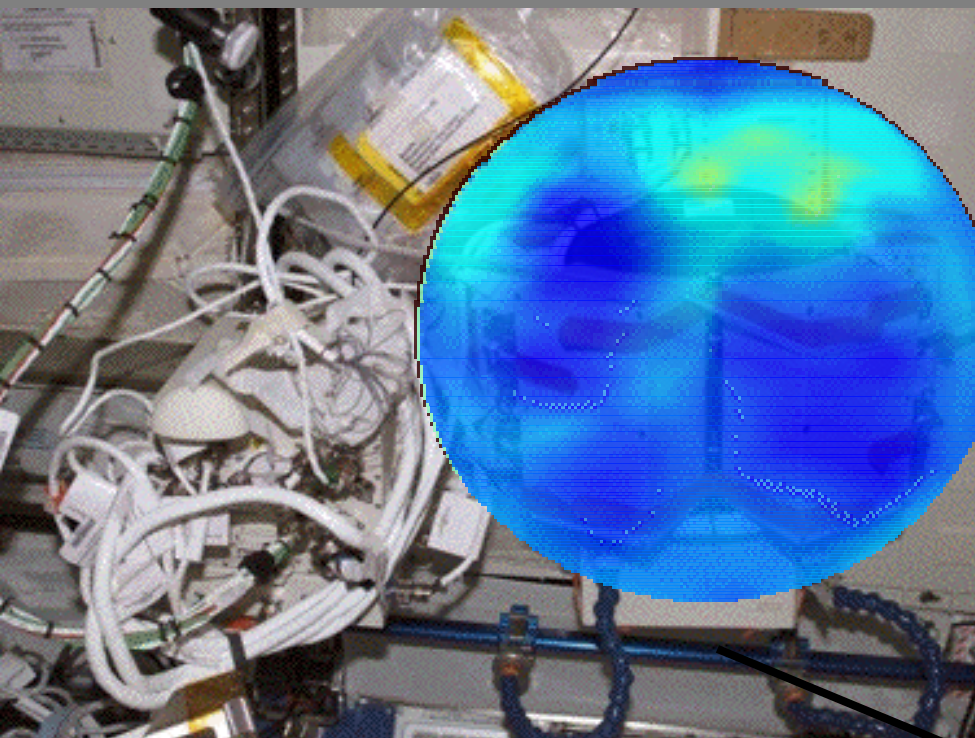


ALTEA – Alteino C N O

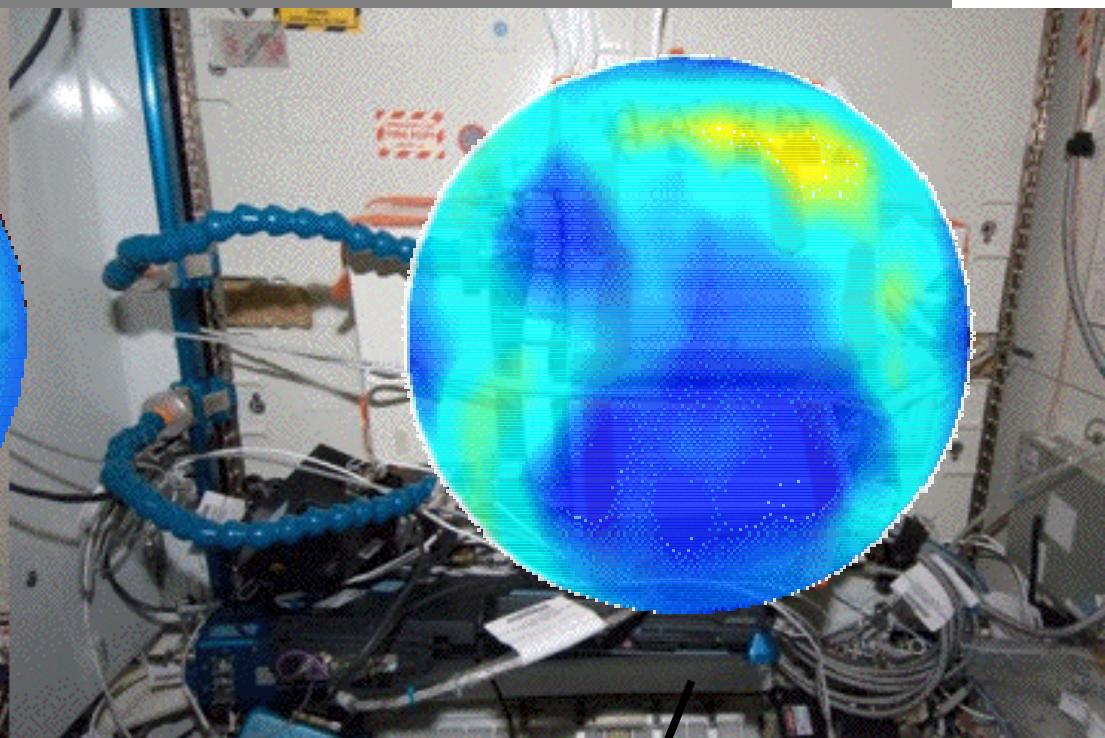




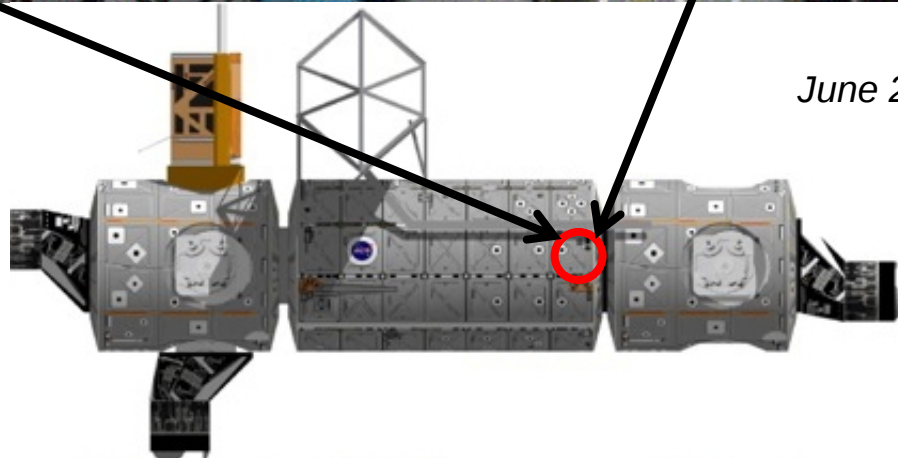
ALTEA angular distribution

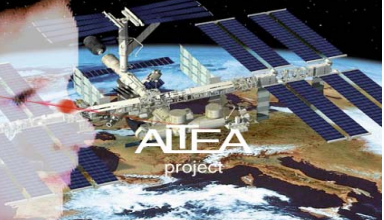


Nov 2007 (second week)

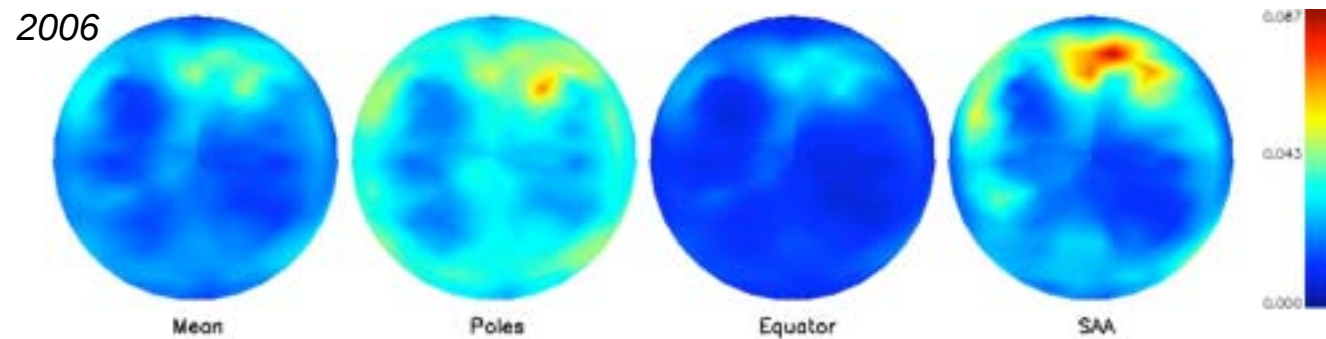


June 2009

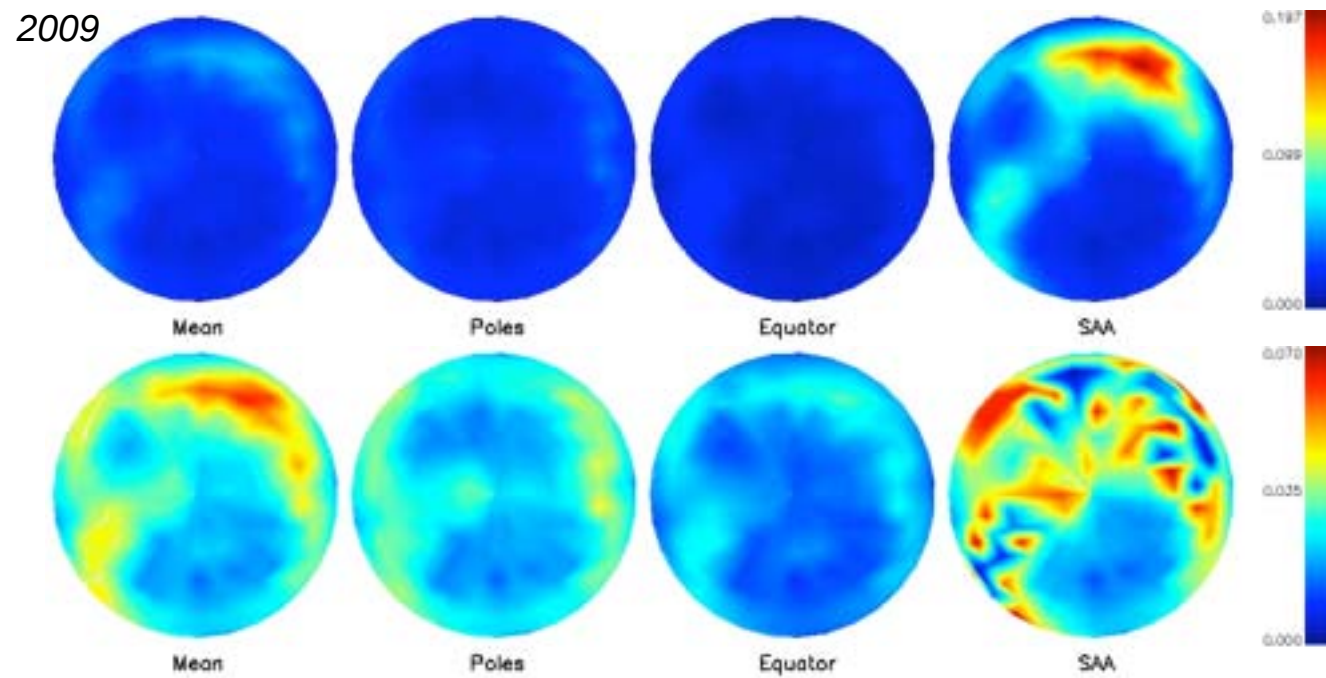




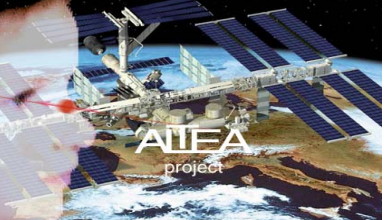
ALTEA angular distribution - 2



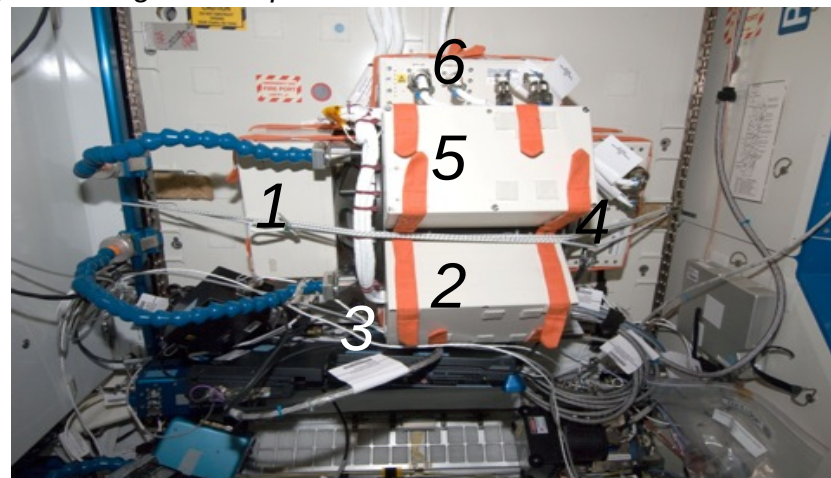
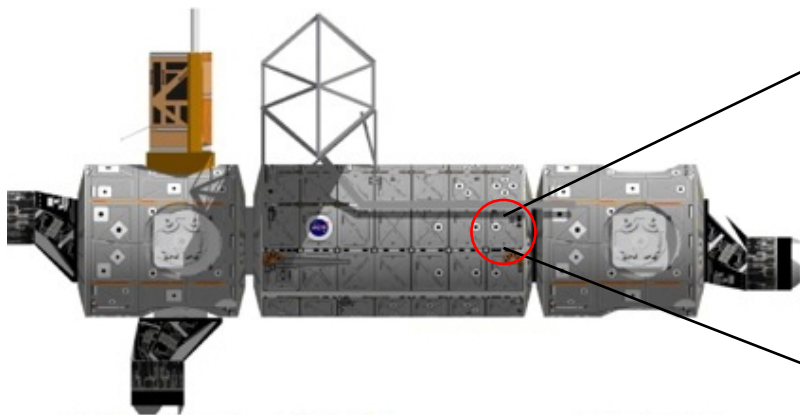
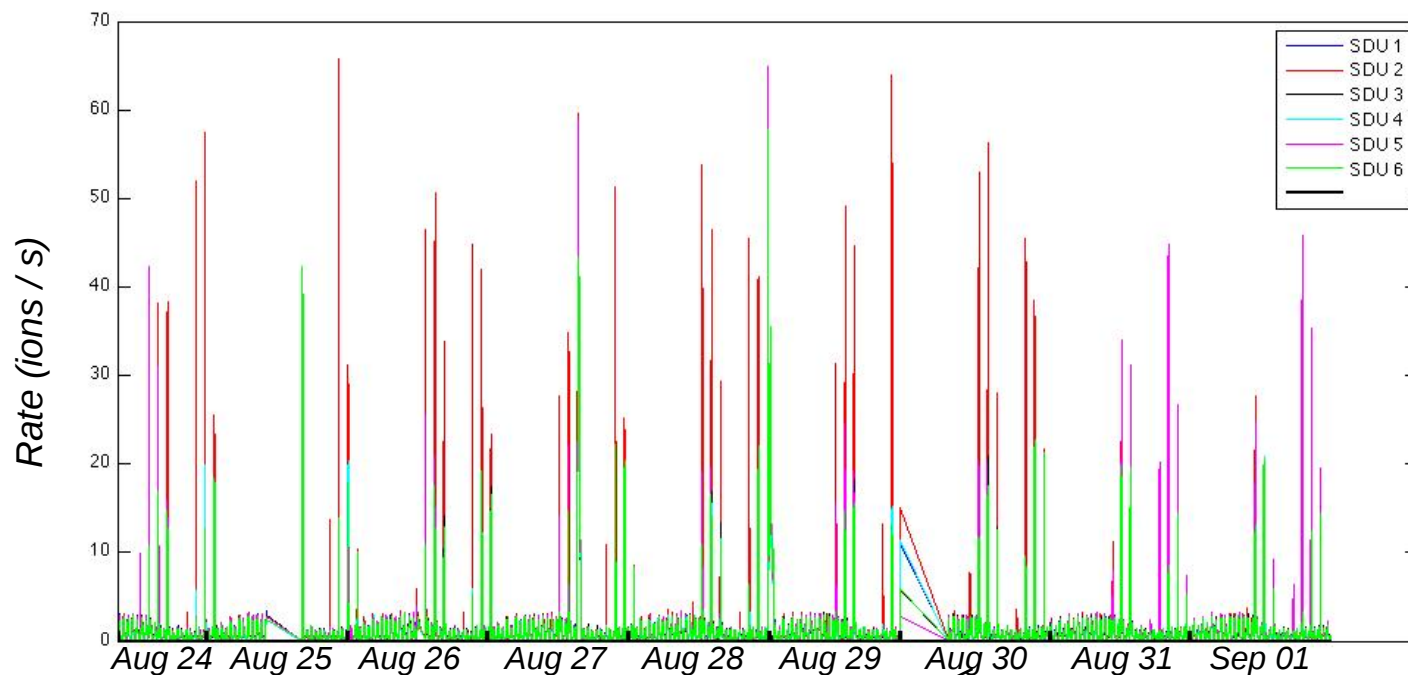
2006 time frame
(~7 days):
GMT306-312

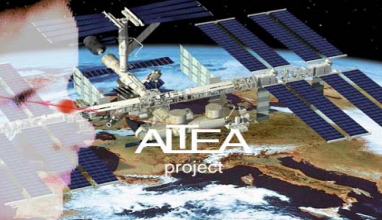


2009 time frame
(~52 days):
GMT152-163;
GMT163-169;
GMT181-185;
GMT205-222;
GMT222-229;
GMT231-233

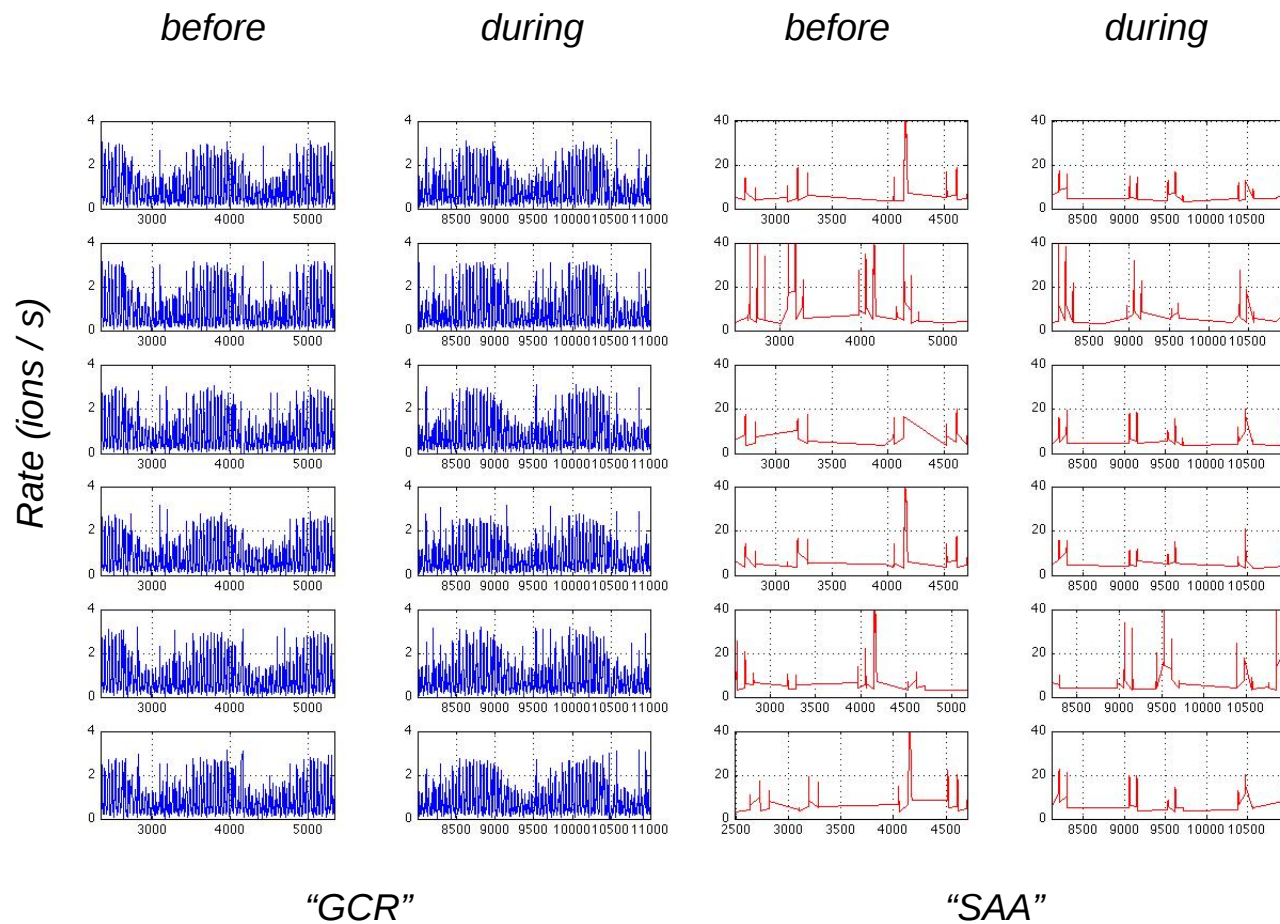


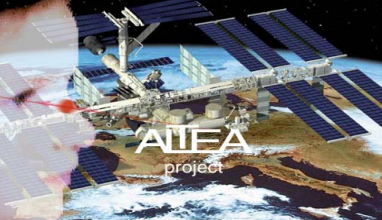
ALTEA – Shuttle docking 1



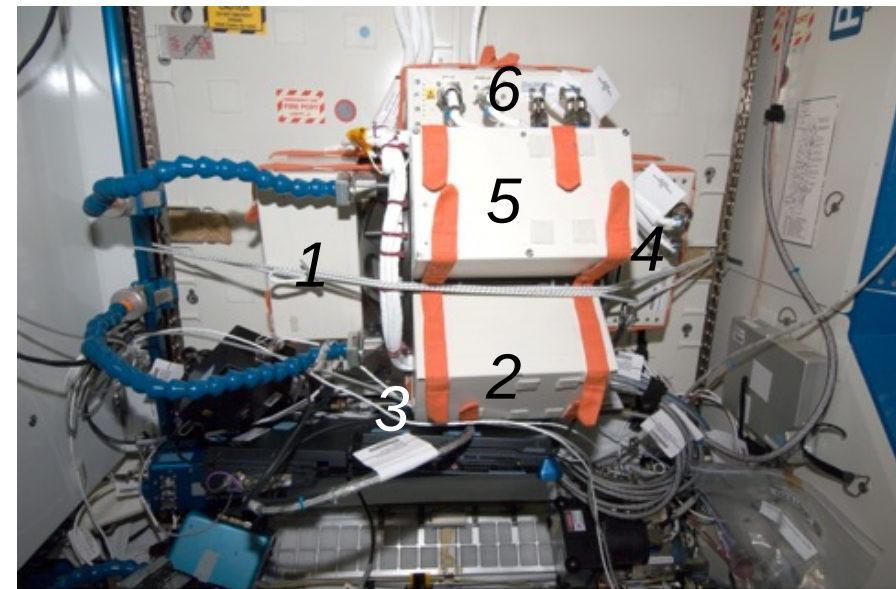
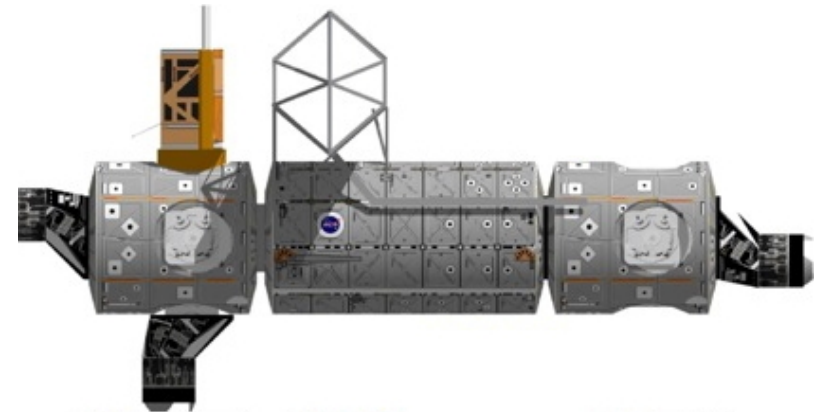
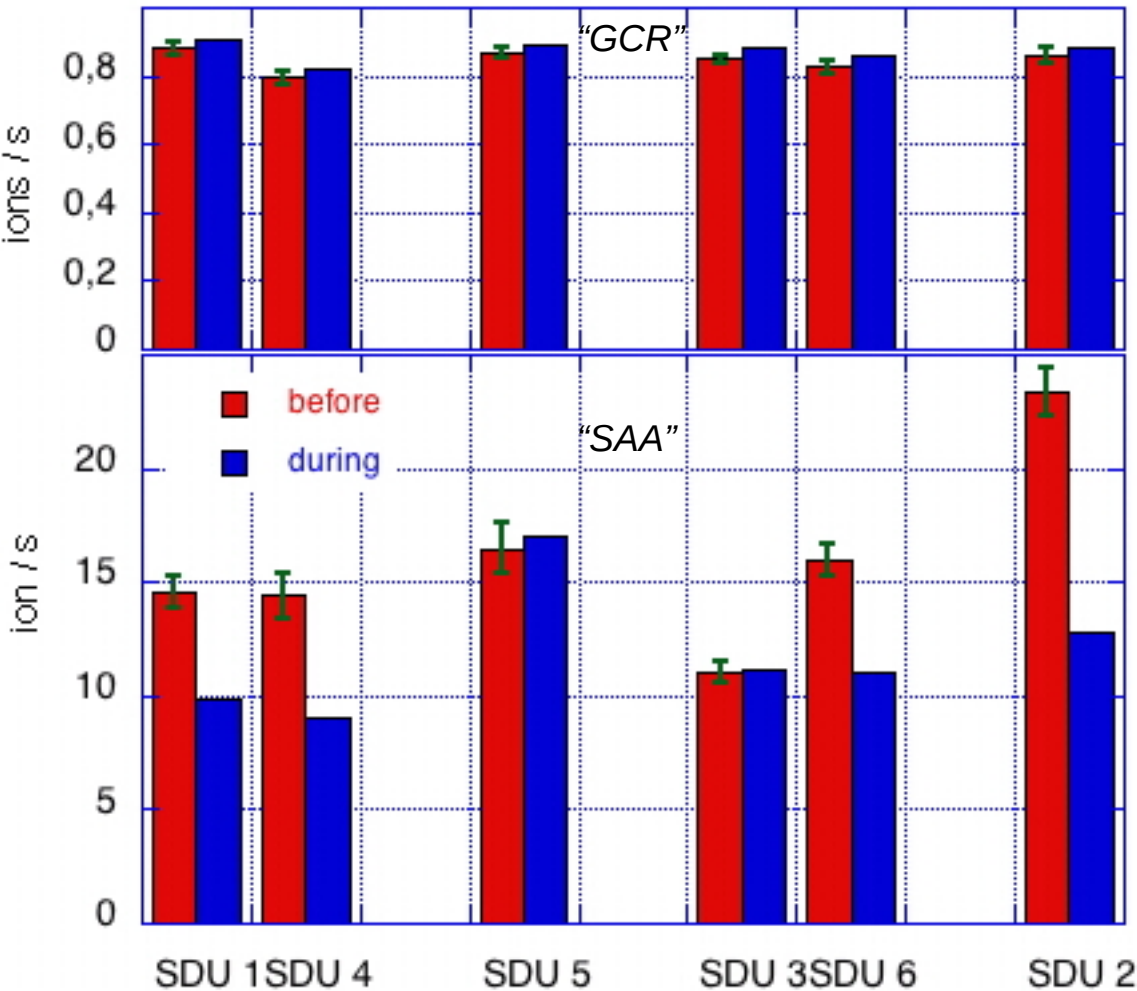


ALTEA – Shuttle docking 2

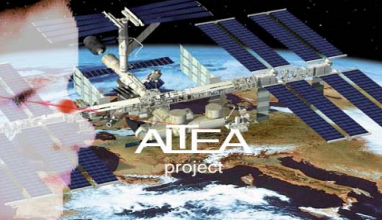




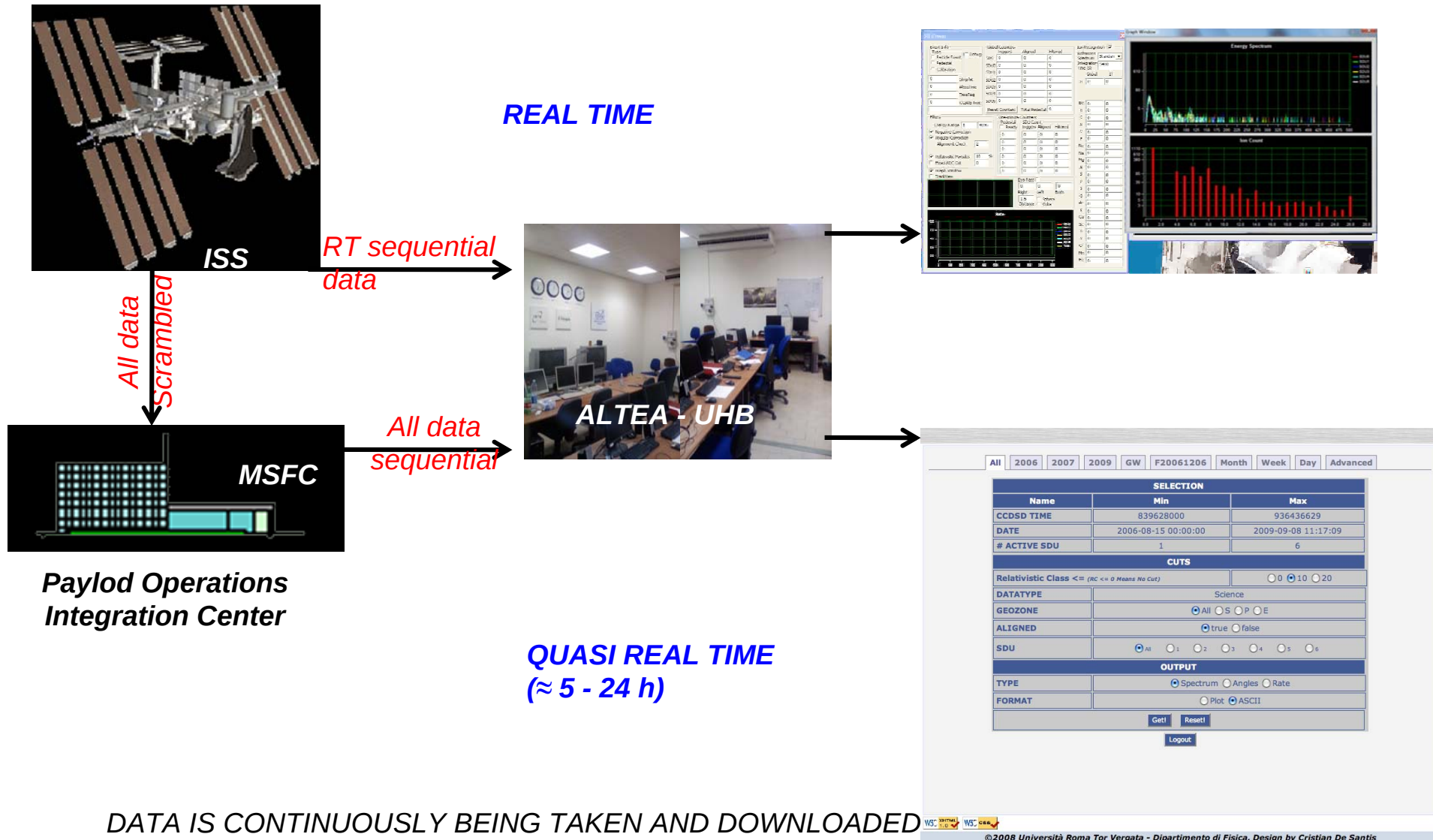
ALTEA – Shuttle docking 3

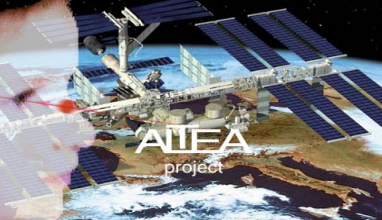


ISS018E046042



ALTEA Real Time





From the QRT: ALTEA - DB

All
2006
2007
2009
GW
F20061206
Month
Week
Day
Advanced

SELECTION		
Name	Min	Max
☐ CCDSO TIME		
☒ DATE		
# ACTIVE SDU	1	6

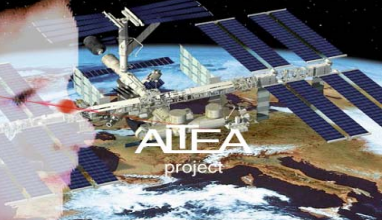
CUTS	
Relativistic Class $\leq$ (RC $\leq$ 0 Means No Cut)	10
DATATYPE	☒ Science ☒ Calibration
GEOZONE	☒ S ☒ P ☒ E
ALIGNED	☒ true ☐ false
SDU	☐ AND ☒ OR ☒ 1 ☒ 2 ☒ 3 ☒ 4 ☒ 5 ☒ 6

OUTPUT	
Filename	result.out
TYPE	☒ Spectrum ☐ Angles ☐ Rate
FORMAT	☒ Plot ☐ ASCII

Search!
Clear

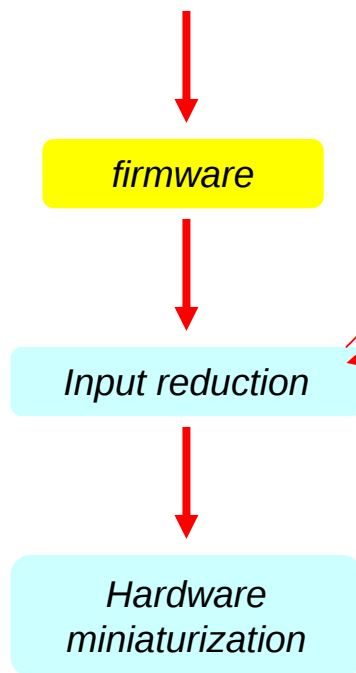
Logout

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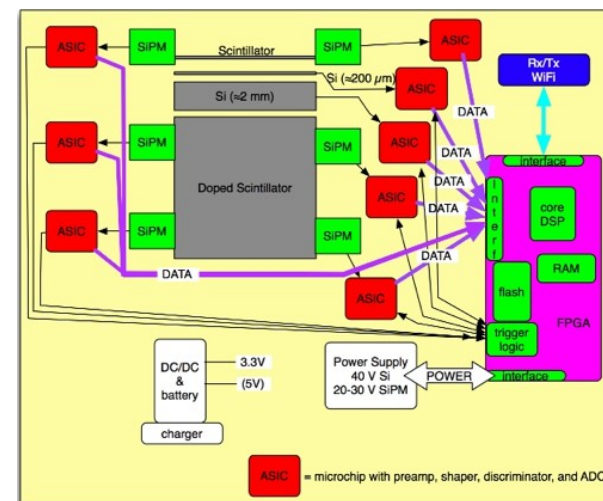
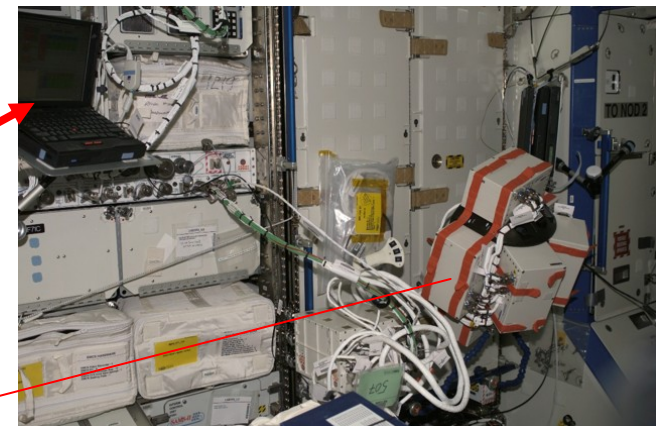
From the RT: AMORE (& LORE)

Alarming **MO**onitor for **R**adiation **E**nvironment



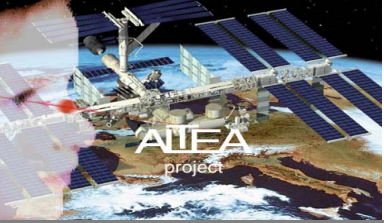
+ alarming capability

+ LET(t)
to risk
conversion
tables



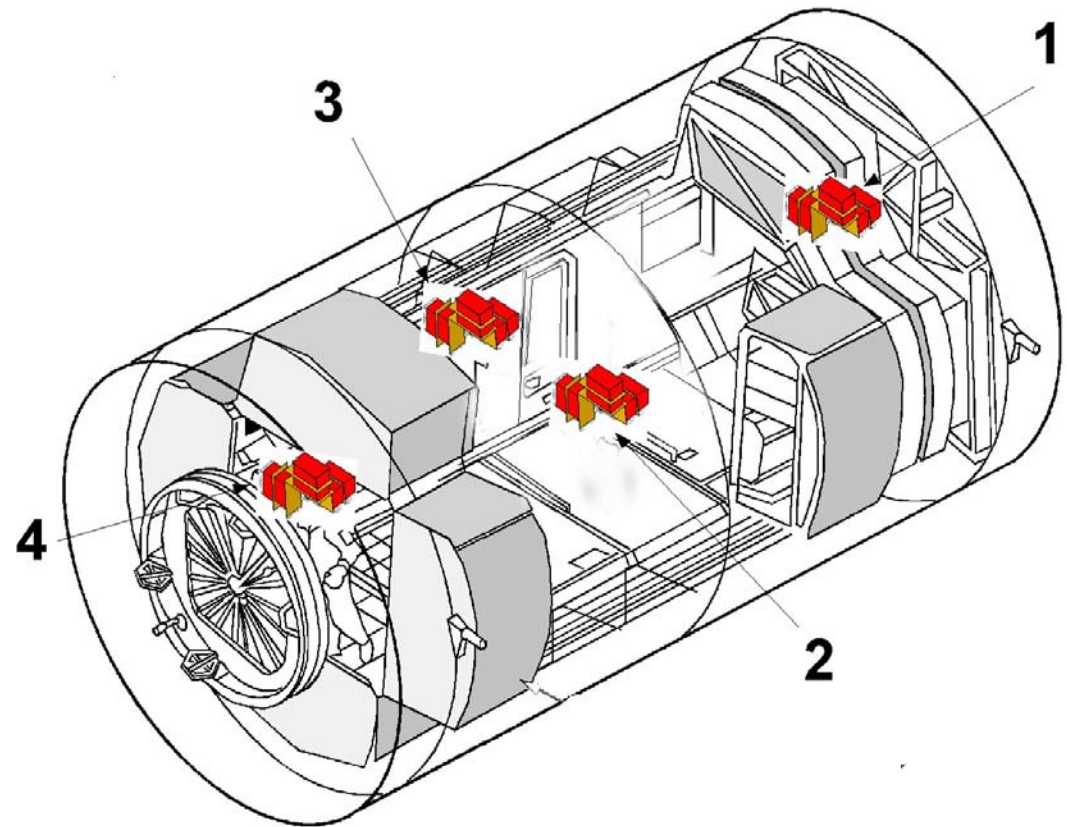
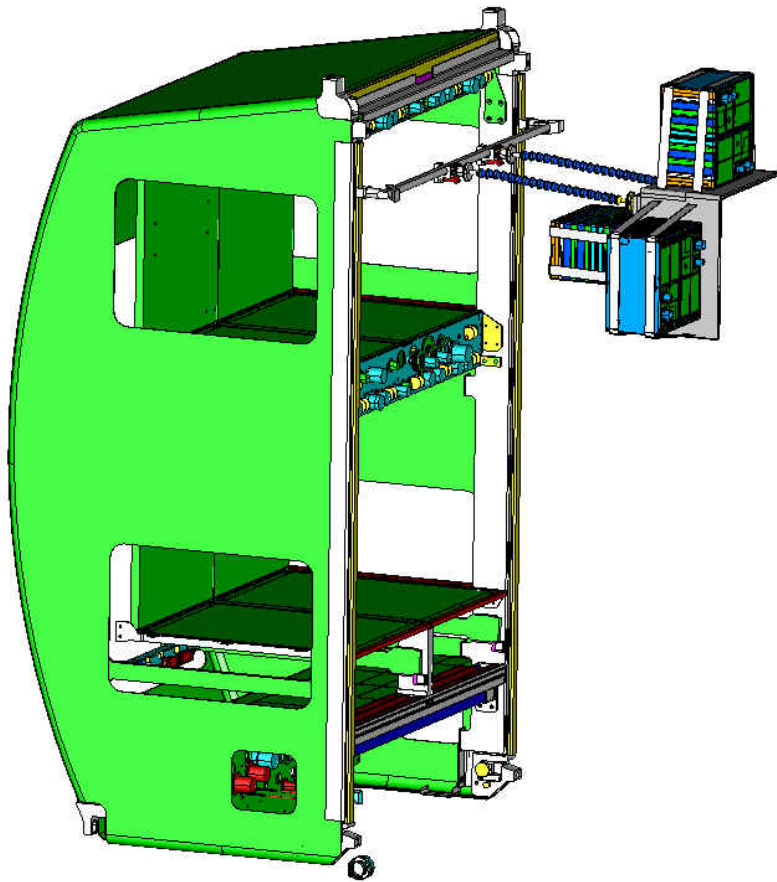
Lightweight **O**bservatory for **R**adiation **E**nvironment

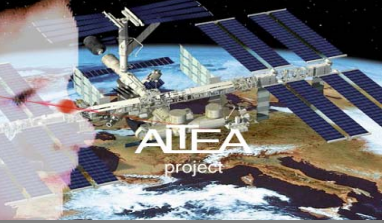
: a personal active alarming and upgradable dosimeter



ALTEA-shield (survey) ... 2010 ..?

.. a different (and flexible) detectors holder for a 3D survey





Thank you for your attention