

PLASTIC Status Report to the STEREO SWG

18 Dec 2004 SSL UCB

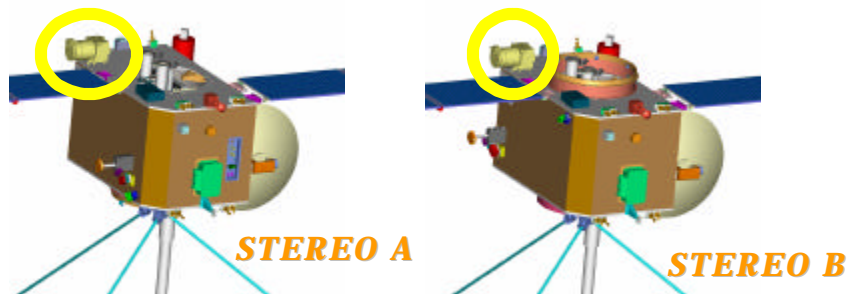
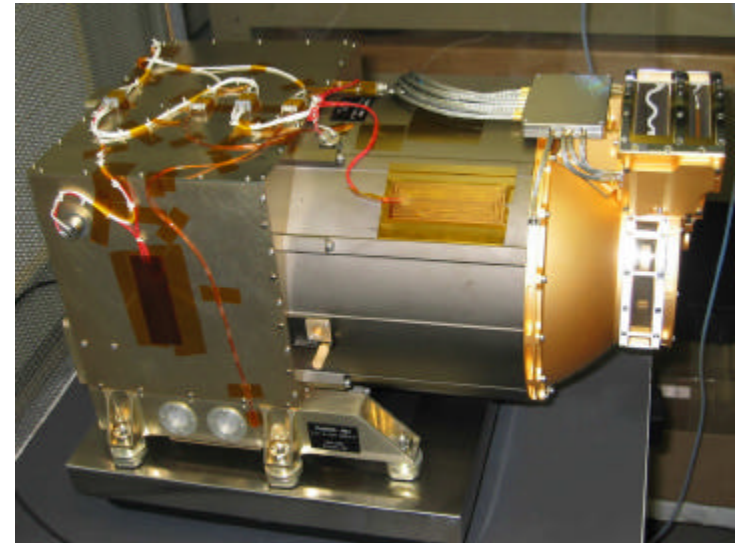
UNH: A.B. Galvin (PI), E. Moebius (Lead CoI), L.
Kistler, M. Popecki, J. Quinn, M. Lee, C.
Farrugia, S. Turco IM

UBern: L. Blush (Lead CoI), P. Bochsler, P. Wurz

U Kiel: R. F. Wimmer-Schweingruber (Lead CoI)

MPE: B. Klecker (Lead CoI)

NASA/GSFC: B. Thompson (Lead CoI)



PLASTIC FM1

PLASTIC SUBSYSTEMS



Entrance System (UBern)

Time of Flight Chamber (UNH, UBern, MPE)

Electronics Box (UNH, MPE, UKiel, UCB)
(Power supplies, Digital electronics, Analog electronics)

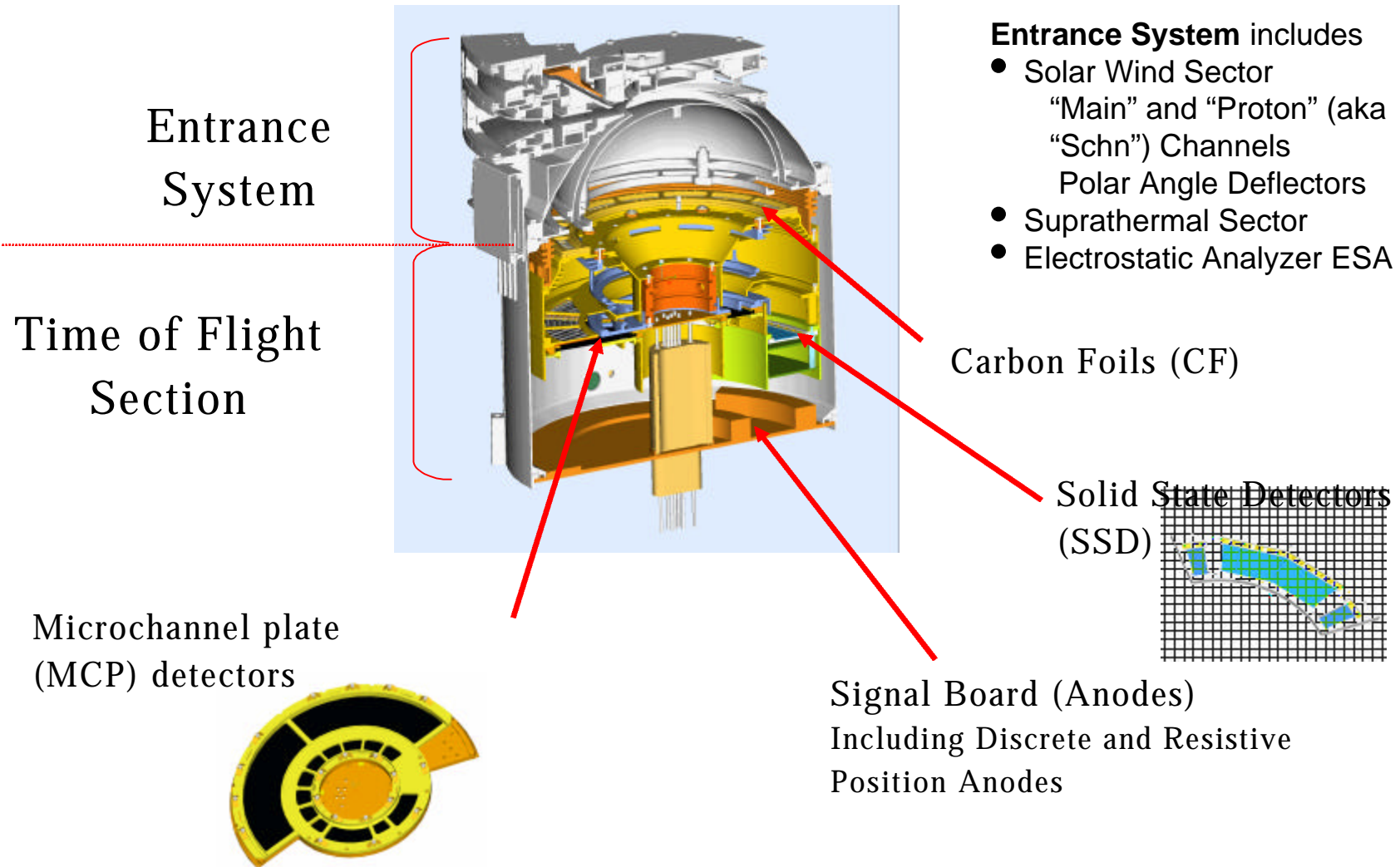
Power Supplies include:

LVC (provided by UCB/IMPACT)

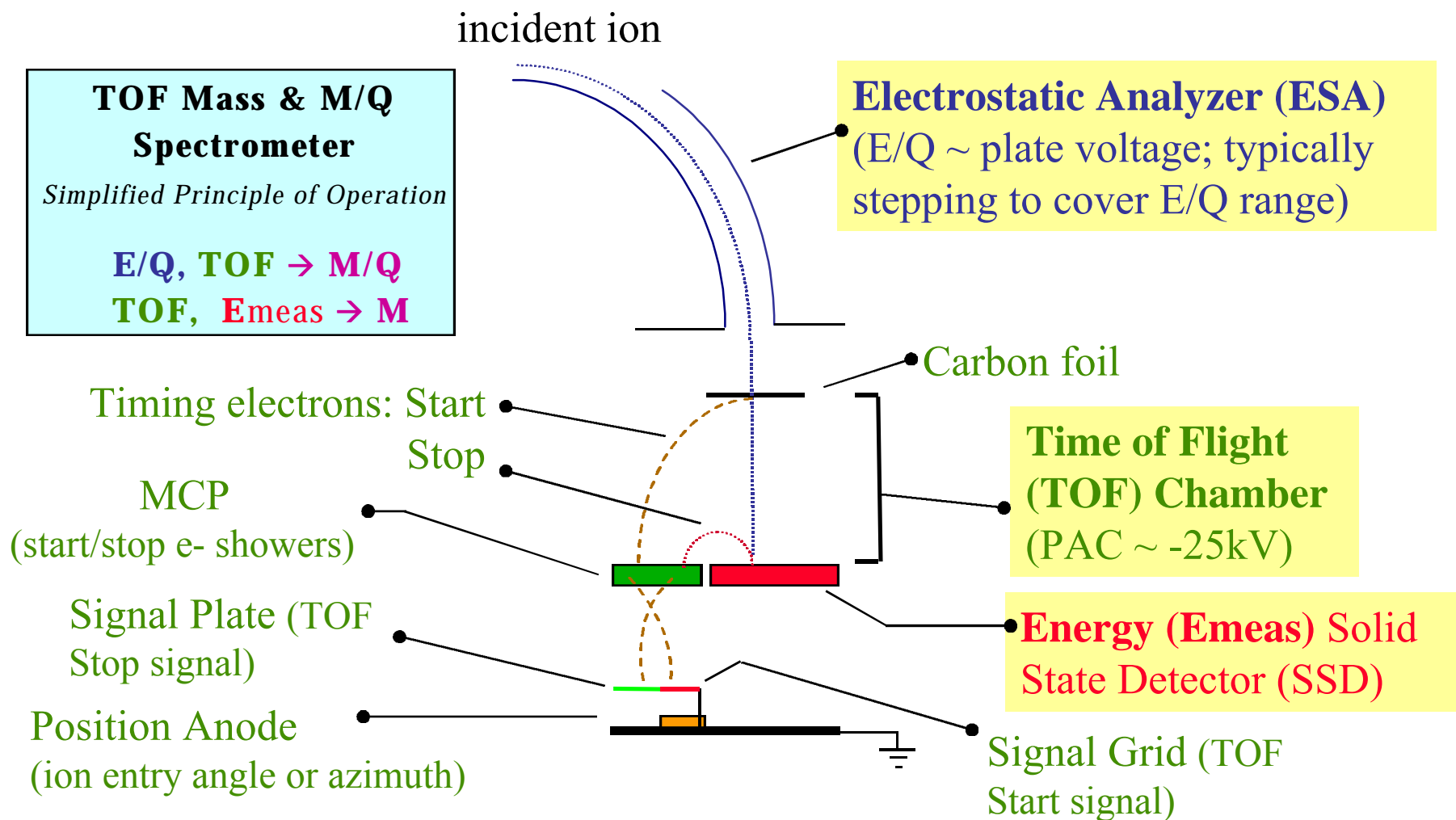
TOF HV (-25kV PAC, MCP, SSD)

Sweeps for Entrance System (ESA, DEFL1, DEFL2, Schannel)

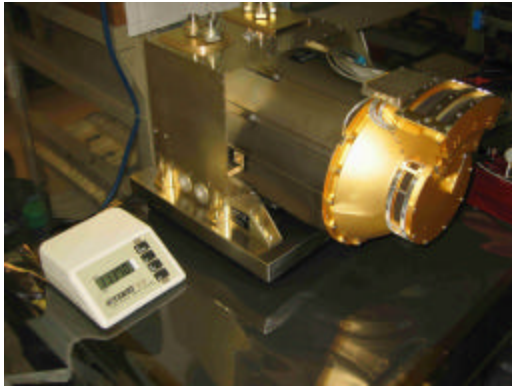
Internal View of PLASTIC



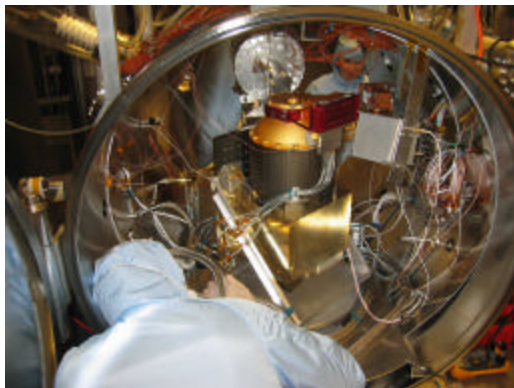
BASIC PRINCIPLE OF OPERATION FOR SPECIES DETERMINATION



PLASTIC FM1 Status Overview

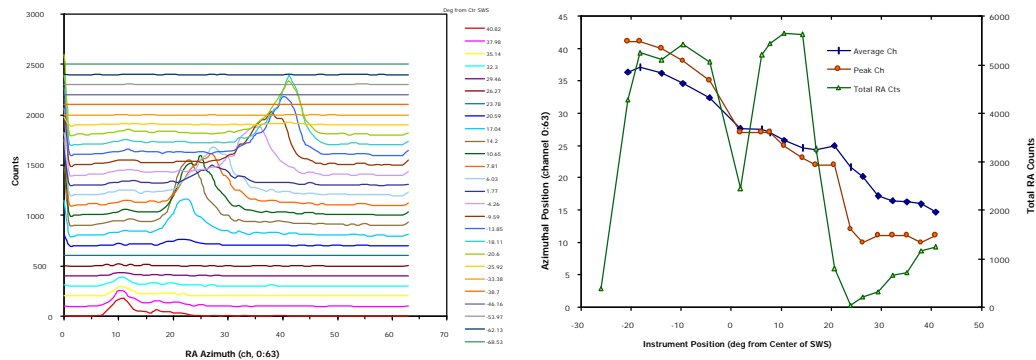


Birth of FM1



Ion Gun Chamber at UNH

- Instrument initial integration completed
 - Initial ion gun tests at UNH
- Established basic performance for Main Channel and Suprathermal Sections (including TOF, SSD, Discrete and RA Position)



Azimuthal Positioning in Solar Wind Sector by resistive anode

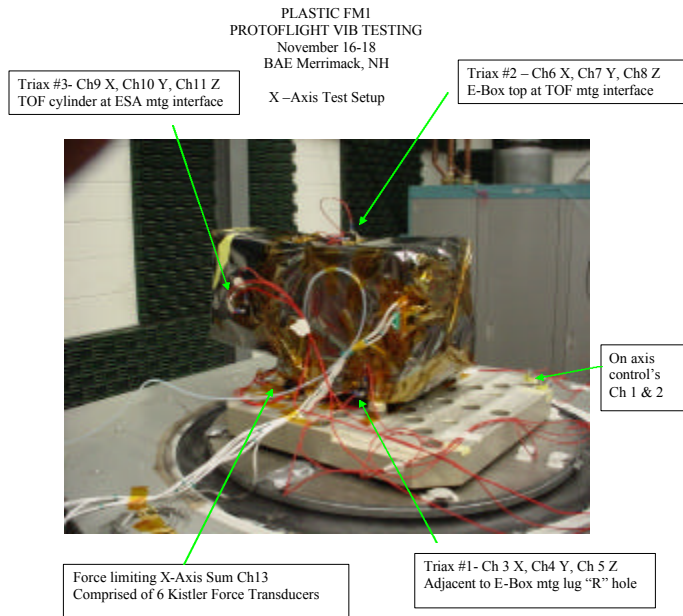
and discovered some problems:

ESA power supply failure (optocoupler)

Small problems on FPGA coding

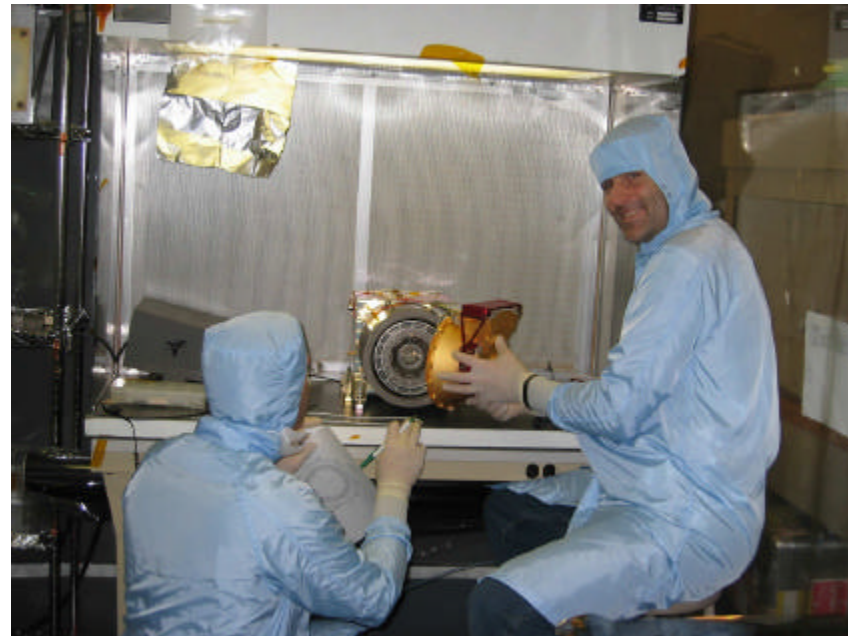
- IPER held at UNH

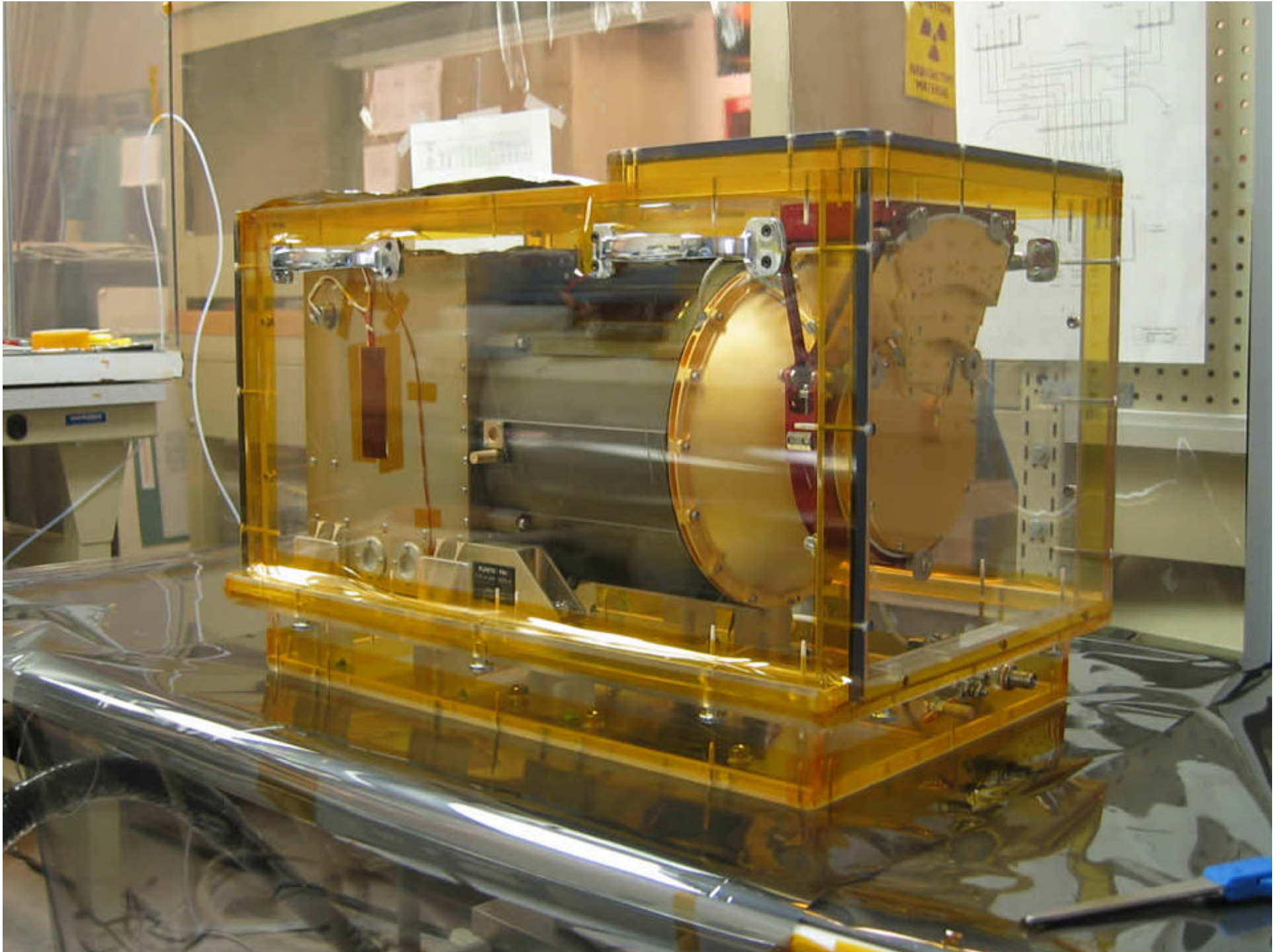
PLASTIC FM1 Status Overview



- FM1 Vibration tests at BAE completed
- Instrument post-vib test and inspection completed

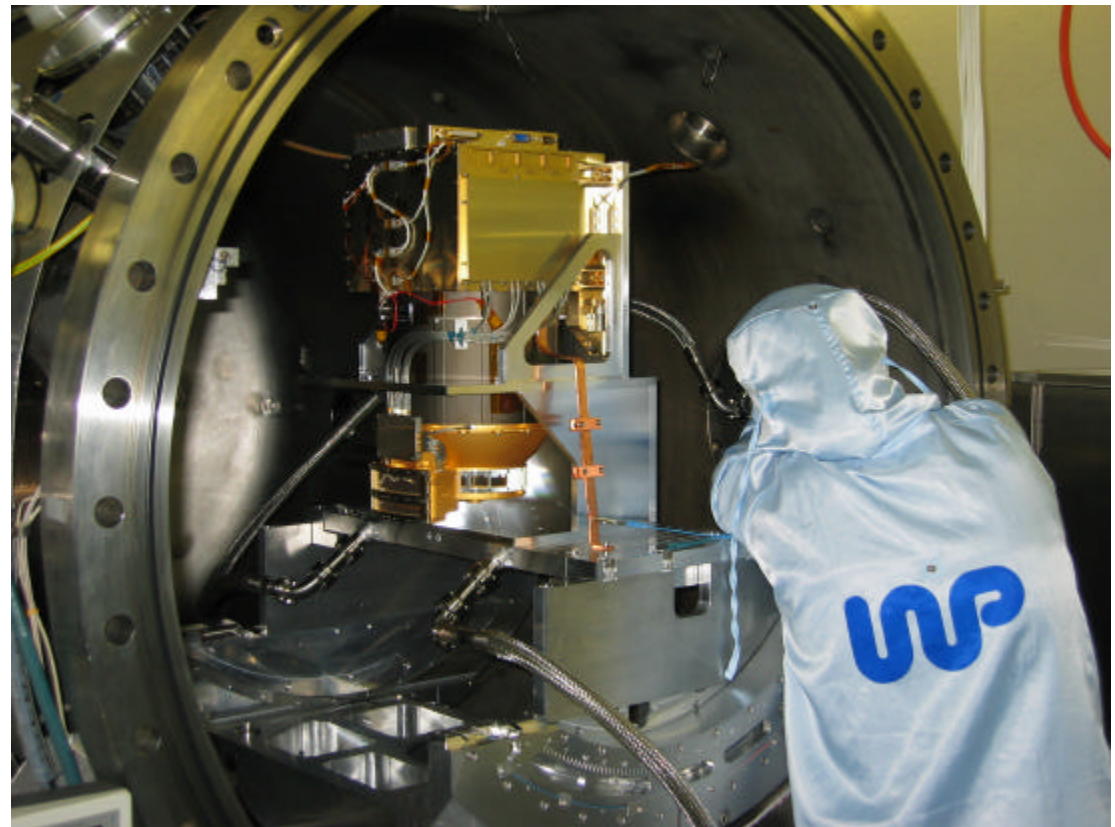
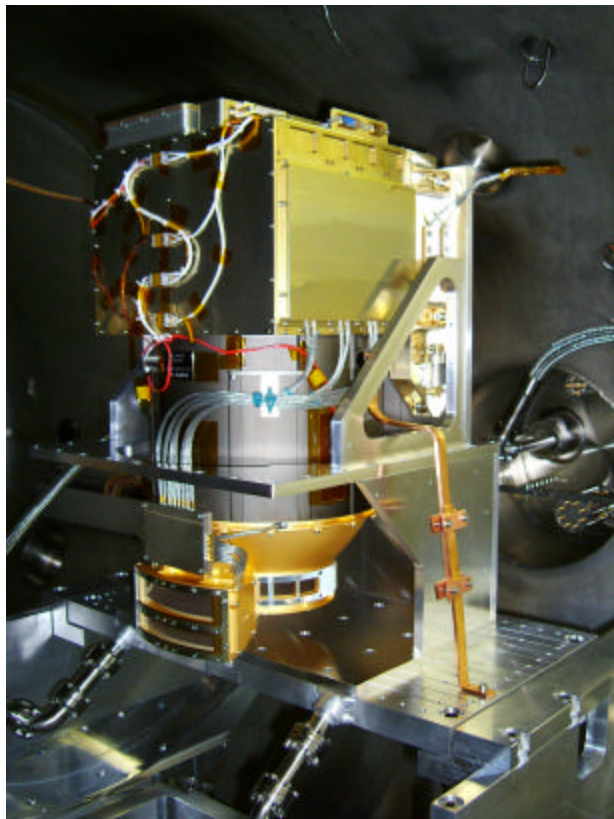
- Carbon foils (3.5 microgram/cm²) survival were primary concern. Full success story →





PLASTIC FM1 Calibration

At the University of Bern CASYMS Facility



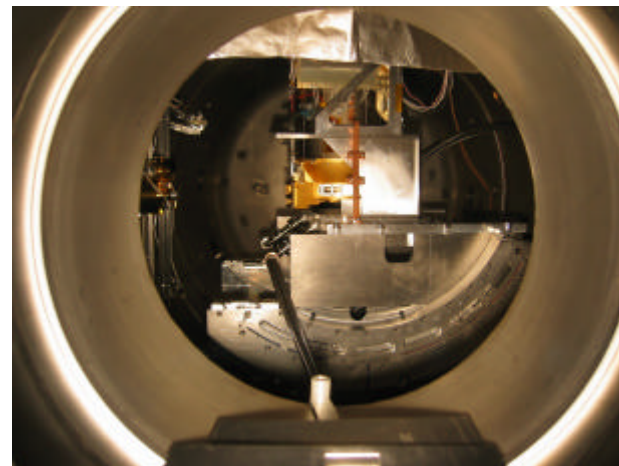
CASYMS Facility at University of Bern

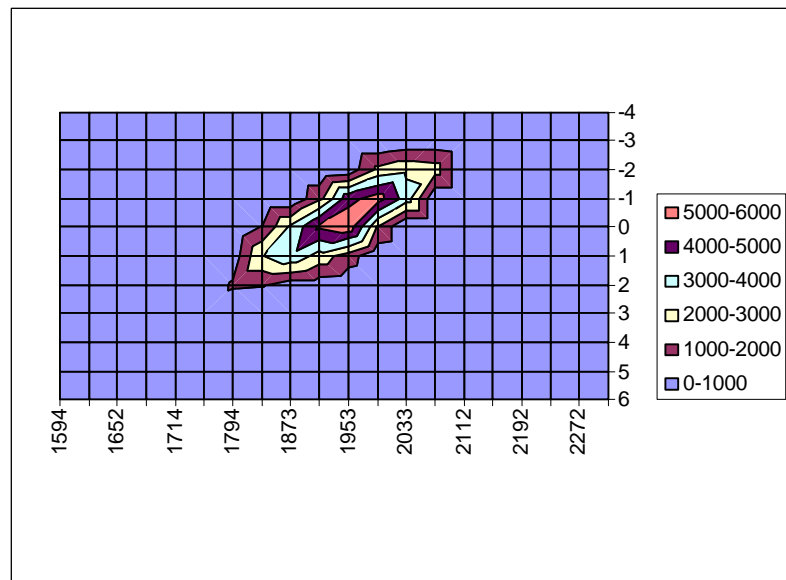
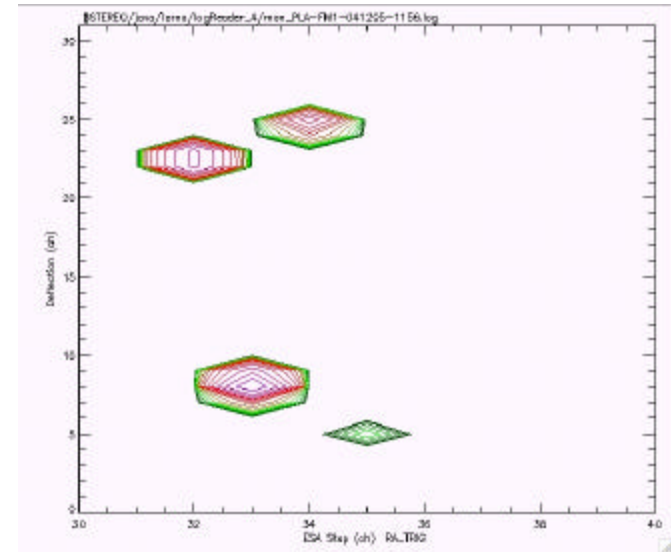
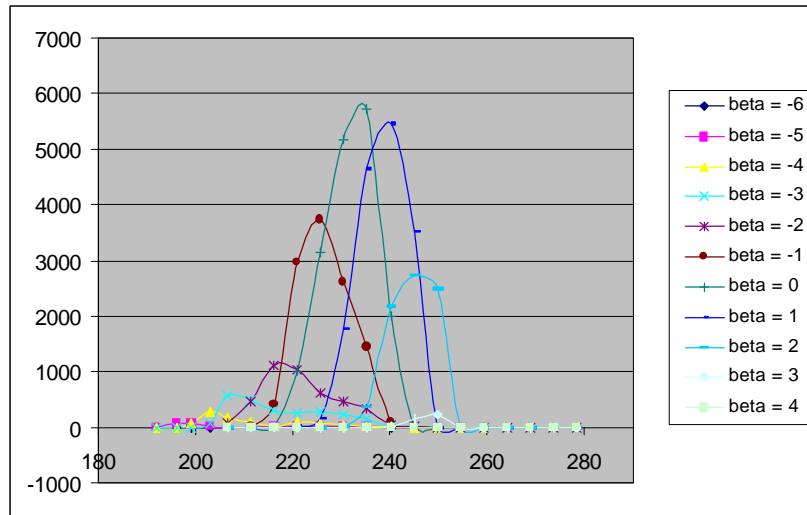


- Energy range: $\sim 10\text{eV/e} - 60\text{keV/e}$
- Beam size: $10 \times 10 \text{ cm}^2$
- Ions from gas sources (H, He, Ne, Ar, ...)
- Charge states: $1+, 2+, \dots$
- Motion: α - β -z table, additional θ table available
- Modest cooling table available ($\sim 0^\circ\text{C}$, $\sim 10 \text{ W}$)
- Clean room, Class 100

FM1 Tests Ongoing at Bern (Solar Wind Sector)

- Deflection test - tipping instrument to known elevation angles and sweeping the deflectors on the Main and S channels with at selected energies
- ESA E/Q and Angle response (“fish”) scans at selected energies and species
- MCP efficiency for selected MCP bias, species, energies, PAC
- Energy (SSD) data for selected E/Q and species
- Test of ESA and DEFL sweeping in Main Channel
- Test of ESA and DEFL sweeping in Proton Channel
- Extended operation at -20 kV PAC, plan gradual increase
- Test of Main/Proton Chn switching (w/o IDPU) during sweeping
- Limited azimuthal scans
- Test of tables (SWEEP, RA, Classification)





Preliminary (onsite) processing
FM1 calibration at UBern

(courtesy Reto Karrer and
Mark Popecki)

FM1 Status Summary

Done

Integration

UNH ion gun tests for functionality/performance

IPER

Vibration

Ongoing

Solar Wind Sector Calibration at UBern

Proton Channel performance tests

TOF resolution, MCP efficiencies
(possible threshold change)

Table adjustment and retest

Other sectors if time permits

IDPU s/w 2.6 testing at UNH/UCB

Still to do

IDPU s/w 3.0 development and validation

TV/TB, EMC

Mass and Magnetic Properties

Replacement of SSD part

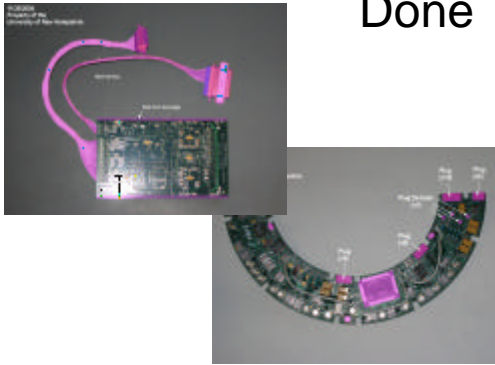
Refurbishment of LVC

Retest

Deliver

FM2 Status Summary

Done



Entrance System Assembly
TOF Chamber Assembly
TOF PS Coated and Re-assembly
Digital Boards and SSD Electronics Boards Coated
SSD ACTEL and ASIC selected and installed
SSDs and MCPs selected and installed in frames
Fit checks

Ongoing



TOF PS vacuum testing (was at -24 kV this week)
Digital Electronics reassembly and retest
SWEEPs PS boards reassembly after coating,
finish burn in

Still to do

Instrument level Integration and initial tests
(January)
Everything Else (January-March)

Outstanding Issues

General Cost Increases and Schedule Erosion

NASA requested change of venue for TV/TB tests



Testing planned at UBern facility to save (US) costs and FM1 schedule.

Bern facility meets all PLASTIC requirements.

Project wants testing done at GSFC:

Increase costs to UNH will be on order of 50+ K\$

Start of testing will be delayed by about 2 weeks

Slight schedule erosion to FM2

Proposal for cost increase needs to be written, submitted (January earliest), would need approval prior to test commencement

IDPU PLASTIC S/W Development and Validation

Running late

FM1 calibration at CASYMS may be limited to solar wind sector
due to schedule constraints

Recent EPO Activities

Christa McAuliffe Planetarium has premiered the new show “Breathing Space”, which included funding from STP. Show highlights climate and space weather changes on Earth, by showing how other planets with and without magnetospheres, atmospheres, are affected by solar events and solar changes. Geared for youth: Two teenagers skate boarding through the solar system to get material for a homework assignment.

CMP “Stellar Fridays” for teens at the Planetarium. Also “Spacetacular Saturday” in May - over 600 attended this past year.

Project SMART, summer science institute at UNH for teens. Poster presented by student at this AGU.