

0.1 SROI Definition

0.1.1 General Constraints

0.1.2 SROI Rules

- There must be 3 SROIs each orbit
- The start time of SROI1 must be at least 00:31:00 after (above) L=6 on the outbound leg
- The end time of SROI3 must be at least 00:02:00 before (above) L=6 on the inbound leg
- There must be at least 00:35:00 between the stop of any SROI and the start of another.
- In order to ensure at least one FPI calibration per orbit, one of the following two statements must be true:
 - Start time of SROI1 must be at least 02:15:00 after (above) L=6 on the outbound leg, or
 - End time of SROI3 must be at least 01:45:00 before (above) L=6 on the inbound leg

To the extent possible, try to have the leg that is closest to local noon or local midnight reach to lower L-shell (i.e., the FPI cal would occur on the orbit leg that is further from local noon (or local midnight)).

Note that sometimes the equatorial orbit plots appear to have SROIs extending inward of L = 6. That is mainly a projection effect, because the orbits are at increasing inclination.

Otherwise, the changing distances are due to the optimization of SROIs to target the nominal magnetopause and model neutral sheet (also the bow shock, conjunctions with other missions, avoidance of eclipses, etc).

In addition, the POC adds the following:

- FPI Calibrations will be scheduled on either outbound/inbound leg, or both, based on time available (time between SROI and L6)
SROI definitions are created so that there will be an FPI calibration on at least one leg, and POC confirms this when receiving/processing them.
POC screens ATS products to make sure that the ASPOC Current Sweep calibration does not overlap the FPI Calibration, we do not have a constraint against ASPOC being in Active during an FPI Calibration

0.1.3 Q&A

Why must we have three SROI?

- Three reasons, (1) ability to switch instrument modes during a single orbit (e.g, magnetosphere vs solar wind particle energy sweep tables), (2) minimize FPI runtime, and (3) cost and risk management. SOC planning tools for the many instrument modes/calibrations/operations are continuously being updated as instruments age; it is a cost to reconfigure the planning tools between phases and, depending on the point of view, a safety risk as well.

Can FPI run one spectrometer pair in FS on one or more spacecraft as a runtime savings?

- Yes, however this would require a full FPI RTS update similar to that just being completed for the extended mission reconfiguration; this required \$35k to the SOC, ~the same \$\$ at FPI, and ~9 months to implement. This has not been implemented.

Can FPI run one spacecraft, rather than all four during FS as a runtime savings?

- Yes, this would require (moderate to significant?) updates to the SOC planning tools and ~3-6 months to implement. This has not been implemented.