

IMPACT Conjunction and Sidelobe Operations

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Outline

- Instrument Power States in Sidelobes and Conjunction Periods
- SSR requirements
- First sidelobe telemetry
- Second sidelobe telemetry
- Science to be done during this period

Instrument Power States

- Both sidelobes
 - Powered on
 - IDPU/MAG
 - SEP
 - MAG heater
 - SWEA survival heater
 - Powered off
 - SWEA/STE-D
- Superior Conjunction
 - IMPACT powered off but MAG heater and survival heaters powered on

SSR Requirements

- Store IMPACT beacon (ApID 270, 1 packet/minute)
- Total bitrate of 36.3bps
- Total volume of ~1.03 Gbits, ~24% of available 4.294 Gbits SSR space for science (dumped after we return to normal operations)
- Maybe add some margin in case we don't get back to operations on schedule.
- Just one partition needed.

First Sidelobe Telemetry

- At a minimum for monitoring instrument health and safety we need housekeeping (ApID200-203, 240-241, average total housekeeping bitrate 76.2bps) and beacon (ApID270, 36.3bps). Beacon is also being written to the recorder.
- In addition, we would like to send some real time science from MAG (ApID208, normally 414bps @ 8 samples/sec) and SEP (ApID244-268, normally 1.3kbps). We can reduce the bitrate by averaging, decimation, and excluding some ApIDs. Tell us what bitrate we can get and we will configure the instrument accordingly.
- It would be good to get an allocated bitrate soon so we can divide it amongst the instruments and build and test the corresponding instrument configuration commands.

Second Sidelobe Telemetry

- Again, at a minimum for monitoring instrument health and safety we need housekeeping (ApID200-203, 240-241, average total housekeeping bitrate 76.2bps) and beacon (ApID270, 36.3bps). Beacon is also being written to the recorder.
- We anticipate reducing science by lowering MAG time resolution and decimating and eliminating other science packet types.
- Again, we need to know soon what our allocation will be so we can test the configuration.

Candidate IMPACT Bitrates

- White is normal rates, Green are some candidate Sidelobe 1 cases, Blue are some candidate sidelobe 2 cases.

Mode	Beacon	IDPU HKP	SEP HKP	MAG	HET	LET	SIT	SEPT	Total bps
Normal	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	8 SPS, 415bps	Rates & Events 6/minute, 218bps	Rates & Events 16/minute, 580bps	Rates & Events 12/minute, 435bps	SEPT-E & NS 2/minute, 72bps	1828
Proposed Sidelobe 1	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	4 SPS, 207bps	Rates 1/minute, 36bps	Rates 6/minute, 218bps	Rates 1/minute, 36bps	SEPT-E only, 1/minute, 36bps	643
Enhanced Sidelobe 1A	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	8 SPS, 415bps	Rates 1/minute, 36bps	Rates 6/minute, 218bps	Rates & Events 3/minute 109bps	SEPT-E&NS, 2/minute, 72bps	960
Proposed Sidelobe 2	1/minute, 36bps	1/3 minute, 12bps	1/3 minute, 12bps	1 SPS, 52bps	Rates 1/3 minute, 12bps	Rates 6/10 minutes, 22bps	Rates 1/5 minute, 7bps	SEPT-E only, 1/5minute, 7bps	161
Enhanced Sidelobe 2A	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	2 SPS, 104bps	Rates 1/3 minute, 12bps	Rates 6/10 minutes, 22bps	Rates 1/5 minute, 7bps	SEPT-E only, 1/5minute, 7bps	261
Enhanced Sidelobe 2B	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	2 SPS, 104bps	Rates 1 minute, 36bps	Rates 6/5 minutes, 44bps	Rates 1/2 minute, 18bps	SEPT-E only, 1/2minute, 18bps	329
Enhanced Sidelobe 2C	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	2 SPS, 104bps	Rates 1 minute, 36bps	Rates 6/2 minutes, 109bps	Rates 1 minute, 36bps	SEPT-E only, 1/minute, 36bps	431
Proposed Sidelobe 2D	1/minute, 36bps	1/minute, 36bps	1/minute, 36bps	4 SPS, 207bps	Rates 1/minute, 36bps	Rates 6/minute, 218bps	Rates 1/minute, 36bps	SEPT-E only, 1/minute, 36bps	643

IMPACT Sidelobe Period Science

Main Goal: To recover some of the heliosphere-wide space weather in-situ observational coverage (mainly MAG and SEP) originally intended for Far-side Science and planetary mission science support during the unforeseen period of reduced operations.

Priorities:

1. Record beacon MAG and SEP data on SSR throughout all sidelobe periods to provide continuous coverage of conditions on the farside (excepting periods of superior conjunction when IMPACT will be off).
2. Real time telemetry of HK and beacon data to monitor instrument health and obtain snapshots of farside space weather once/day
3. Additional MAG and SEP data as possible within the realtime contacts

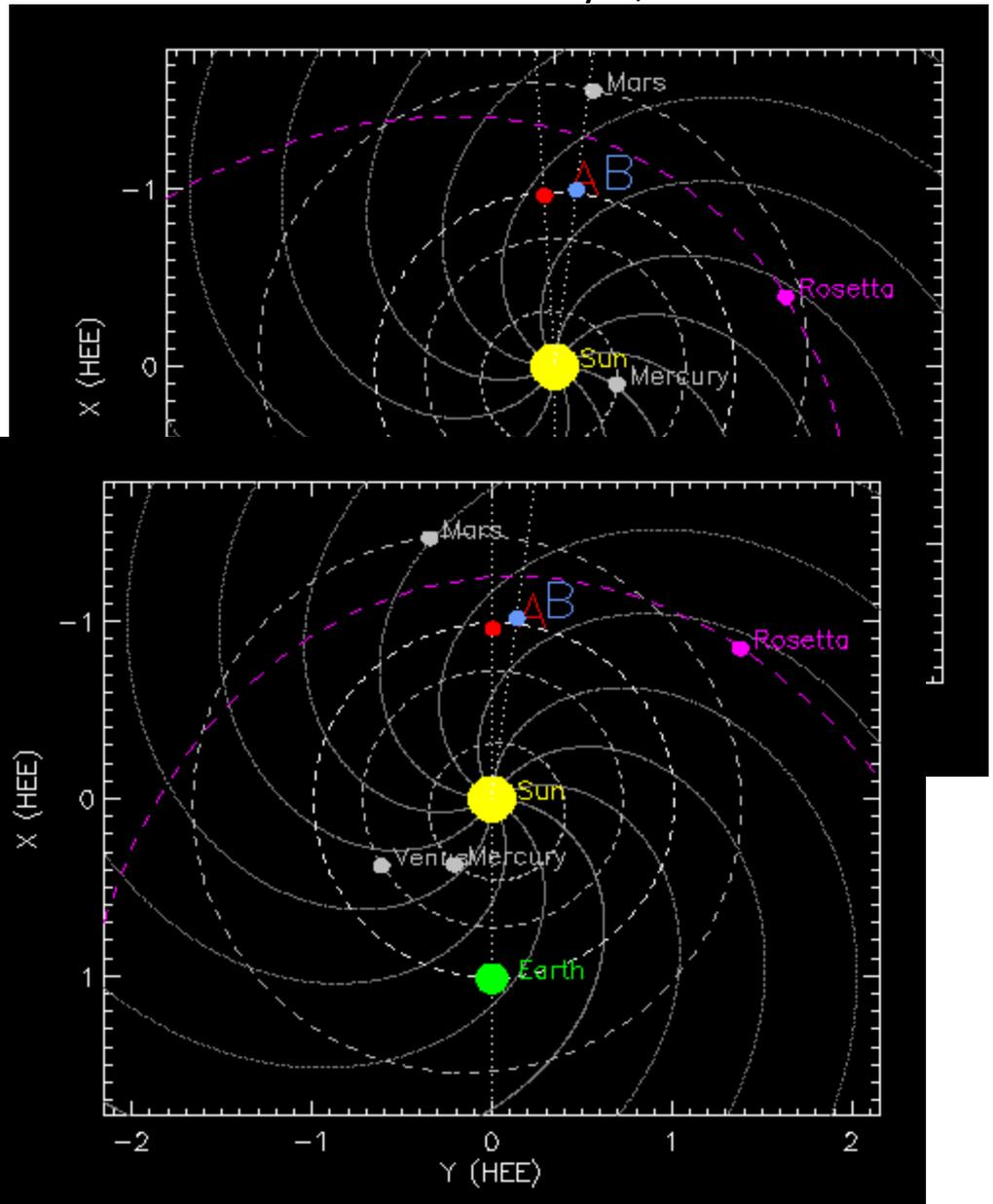
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July 1, 2015

Some farside science details:

-MAVEN will be at mid-prime-mission in mid-2015, and will rely on STEREO for approaching space weather event information (realtime) and later for retrospective event studies (SSR Beacon data).

-Rosetta will be approaching perihelion and will be observing the cometary response to solar wind conditions, including IMF sector boundary crossings and ICMEs



May 15, 2015 'where' plot

Farside science with sidelobe and SSR IMPACT data (continued)

- Further SEP event longitudinal spread information (the topic of an LWS Science Focus) will be obtained**
- Trends in interplanetary magnetic field, ICME and SEP events in this unusual solar cycle will be tracked as solar activity declines (often considered a phase during which major CMEs occur)**
- In-situ support for SWAVES, PLASTIC and SECCHI science observations**
- In-situ support for farside space weather data users (eg. NOAA SWPC, NASA GSFC)**

Note on IMPACT use of extra sidelobe real-time data volume:

- >> Allows for more detailed and more continuous IMPACT health checks during the sidelobe periods
- >> Allows for more real-time space weather data coverage for uses in forecasts and planetary mission needs
- >> Allows us to obtain a more substantial sampling of the sidelobe period-especially in the event the SSR beacon data cannot, for some reason, be retrieved