Telemetry Constraints during Early Operations

- The STEREO telemetry rate is restricted during the phasing orbits due to S/C RF interference with each other, and RF power flux density limitations on terrestrial XB systems.
- During this period, instrument commissioning and science activities are strongly desired, but secondary to S/C checkout and observatory formation activities.
- Information on instrument telemetry rates are needed by Sept. 3rd, 2004 for SIM #2.

STEREO DSN Track Coverage – First Three Weeks

November 2005						
Mon	**Tue**	**Wed**	**Thr**	**Fri**	**Sat**	**Sun**
	1 305	2 306	3 307	4 308	5 309	6 310
7 311	8 312	9 313	10 314	11 315	12 316	13 317
14 318	15 **319** 1	16 **320** 2	17 **321** 3	18 **322** 4	19 **323** 5	20 **324** 6
21 **325** 7	22 **326** 8	23 **327** 9	24 **328** 10	25 **329** 11	26 **330** 12	27 **331** 13
28 **332** 14	29 **333** 15	30 **334** 16	Dec 1 **335**	Dec 2 **336**	Dec 3 **337**	Dec 4 **338**

= Continuous track coverage

= 8 hour track/day

= 3 hour track/day

- **Week 1:** 30 kbps, 24 hrs, 21 kbps available
- **Week 2:** 30 kbps, 8 hrs, 9 kbps available R/T, 220 Mbits/day.
- **Week 3:** 96 kbps, 3 hrs, 30 kbps available R/T, 220 Mbits/day (to 1st lunar swingby).
- Data rates include both R/T and SSR. These must be balanced together.

Early Operations Considerations

- The constraints on telemetry are: power (during Δv burns), 1553 bus schedule, DSN schedule, EA mode checkouts (instruments must be off), and increased HK (+etc.) telemetry as each instrument is turned on.
- No instrument commissioning activities will be conducted ± 18 hours of a maneuver.
- The telemetry rates can be changed by modifying the Downlink Format Descriptors (DFD). However, this is not a simple process, and APL needs to know the desired rates ***well in advance*** to construct a valid DFD. For each phasing orbit track, the MOC needs to know the rates by **Sept. 3rd, 2004.**

Possible Scenarios for Early Operations

1. Data is taken at a constant rate for both R/T and out-of-contact periods. Most of the downlink capabilities during the R/T passes are devoted to dumping data from the SSR.
2. Data is taken at a reduced rate during the out-of-contact periods, and at a much higher rate during the R/T passes. Most of the data rate is used for commissioning activities, and the rest for dumping the SSR.
3. Same as #2, except that the SSR is dumped first, and then all of the downlink is opened for R/T use. The data rate is higher, but the time for commissioning is reduced.
4. Different instruments might be given higher R/T telemetry allocations on a day-by-day basis.

Questions

- Which of the previous scenarios (1-3) is preferred?
- Should some instruments have priority on specific days?
- How much telemetry is needed during the out-of-contact periods?
- How much telemetry is needed during the R/T passes? Does this vary on a day-by-day basis?
- Propose that each instrument provide a draft telemetry budget by Jan 30th, to get the process started.
- Each instrument team should designate a contact person for working out these issues.

Answers so far - IMPACT

- Needs 108 bps for housekeeping and beacon telemetry.
- Wants nominal rate of 3200 bps during R/T passes. May be able to reduce to ~2000 bps before SEP power-on (week 3), but planned to use that telemetry for boom suite diagnostics.
- Anticipates that instrument puts out normal bitrate, and S/C decides what to record based on APID.
- Would like priority when boom is deployed (week 2)
- Cases:

Minimum:	108bps+1 hour @3200bps	20 Mbits/day
Week 1:	24 hrs/day @3200 bps	276 Mbits/day
Week 2:	108bps+8 hours @3200bps	101 Mbits/day
Week 3:	108bps+3 hours @3200bps	44 Mbits/day

Answers so far - SECCHI

- Most commissioning activities after heliocentric orbit insertion.
- Need reduced HK (~26-35 Mbits/day) when powered on, plus:
  - 1 partial-field image/day from each telescope (26 Mbits/day)
  - 1-sec averages of guide telescope data (16.6 Mbits/day)
  - 10 sec of guide telescope data at 50 kHz (32 Mbits/day)
- Total of 101-110 Mbits/day. Can reduce to 80 Mbits/day by doing activities once every two days.
- All commissioning activities carried out in real time. Need to see response in R/T before continuing.
- Prefer scenario #2.
- Instruments should be given priority according to the scheduled activities. SECCHI would like priority during mechanism functional testing.