



SORCE September 2001 Project

Summary

THE EOS SORCE mission is scheduled for a launch date of July 31, 2002. LASP is currently under contract with NASA GSFC for all the phase C/D/E activities to accomplish the SORCE mission (excluding launch vehicle procurement, which NASA is providing within the cost cap). Orbital Sciences Corporation is under contract with LASP to provide the S/C bus, S/C systems integration and test, and launch services interface and launch support. The launch vehicle has been procured through NASA. A Pegasus, launched in campaign mode, from KSC, is on schedule.

Overall, the SORCE Program is still on schedule, but schedule slips may be imminent due to the replacement, and retesting of diodes and power converters on the SORCE GCIs (generic channel interfaces) and the SORCE instruments. No descopes are required at this time. SORCE managers and engineers attended the SORCE Delta Gyro Review at Goddard Space Flight Center October 1st and 2nd, 2001. SORCE is pleased with the outcome of the review, as SORCE has the "go ahead" to fly in a "gyroless" mode.

Progress made on the SORCE program at LASP during the month of September 2001 includes the completion of the SURF calibration for SOLSTICE A and the completion of the SOLSTICE And TIM Thermal Cycle. The SOLSTICE B was successfully shaken on October 1st and 2nd. The MU (microprocessor unit) bugs continue to be ironed out. Parallel testing efforts for the SORCE instruments have proceeded in a remarkably smooth manner. This is due to the combination of LASP's upgraded class 10000 clean room facilities, the improved and enlarged MOBI thermovac tank, commendable scheduling efforts, and the professional, innovative, and dedicated efforts of the SORCE scientists, engineers and students. The nearly complete instruments can be viewed through the clean room windows, and the work is impressive. Also see our web site, <http://lasp.colorado.edu/sorce/index.htm> for more information and illustration.

SORCE Red Team activities continue to evolve, and the final detail of the Red Team agreement between SORCE/NASA/Orbital and the Aerospace Corporation are underway. As always, SORCE schedules are monitored on a daily basis to meet the varying needs of the SORCE program. While slack continues to dissipate, new solutions to difficulties are created daily and incorporated into the agenda for SORCE.

The top concerns for SORCE include: 1) Diminishing slack in the instrument integration schedule, 2) Late flight MU delivery resulting in late test of flight software, 3) Reduction of slack for SIM characterization and calibration, 4) Replacement of diodes and Interpoint power converters on the SORCE GCIs and instruments, 5) Decreasing contingency funds. Rescheduling, additional personnel, double shifting, efforts to expedite parts, and rebudgeting have addressed these concerns.

Orbital News

Progress has been good at Orbital Sciences Corporation, manufacturer of the SORCE spacecraft bus. Orbital has verified the full core avionics path and has sent commands from MAESTRO through the CEU and APE to the PRE and has received appropriate telemetry during the process. Orbital also successfully completed the crossstrapping risk mitigation test and the hardware interface verification between the 2 CEUs, (central electronic unit) and the APE (attitude power electronics). Orbital has received both flight star trackers and has received the software update for the EDU(engineering development unit) tracker. The EDU tracker has been tested on the Flat Sat (flat satellite). In addition, Orbital has loaded the flight software build 3.0 to the bus to match the Flat Sat. Three of the four RWA's (reaction wheel assemblies) have been integrated to the bus. Orbital has also completed bench test (actuation) and integration of the solar array pin pullers. In addition, Orbital attended the Xcvt TRR (transceiver test readiness review). Subsequently, one unit had a vibration failure: rework and retest have both been successfully completed, and both units are currently in thermal vacuum test. Orbital has added staff to the I&T (integration and test), Flat Sat and SE (systems engineering) teams, and the development of the BPT (bus performance test) is underway. Planning and scheduling for double shifting begins the first of October 2001.

SORCE Science News

In July, SORCE received news that NASA was going to "turn off" UARS. This decision would have had major negative impact on the SORCE science, and would have severely compromised the relation of the SORCE ultraviolet irradiance to the time period of UARS. If UARS were discontinued the following effects would take place.

- 1) The long - term record of ozone and ozone change would not have the required continuous and long-term record of solar forcing.



2) The peak level of the present solar cycle 23 would likely not be recorded, just as the peak of solar cycle 22 and solar cycle 21 were missed - no complete observations through the maximum of a solar cycle exist

3) Loss of instrument and data validation. The validation of the UARS SOLSTICE data and the evaluation of the performance of that instrument would have been greatly improved by overlap with the SORCE SOLSTICE.

During the month of September, SORCE received some positive signs that UARS may be continued - albeit at a reduced level. It is still conceivable that a "full-up" comparison of the SORCE SOLSTICE and UARS SOLSTICE will be realized! LASP and SORCE were pleased to hear of the possibility of more UARS SOLSTICE data, as it would be a great benefit to the study of solar science.

The SORCE Science Team has been trying to work toward a schedule of at least two Science Team Meetings per year. We had anticipated this increased level of activity beginning this year, but trying to work around the highly volatile project schedules has been challenging. Although we had been planning our next meeting to concentrate on instrument calibration and characterization, and to hold the meeting in conjunction with the NEWRAD meeting the end of October, we now find it necessary to change these plans. The NEWRAD meeting has been postponed until the spring of 2002, and since the SORCE instrument activities are still intense and highly variable, we wish to delay the calibration/characterization meeting until after the beginning of the new year. In fact the rescheduled time may well coincide with the delivery of the Instrument Module to Orbital now expected in January. We will announce the agenda and location of this meeting as soon as plans are formulated. At about the same time we will schedule our next full scale Science Team Meeting which will concentrate on the science - solar, atmosphere, and climate. Please contact Greg Kopp, a SORCE TIM scientist, 303-735-0934 (phone) or email Greg.Kopp@lasp.colorado.edu if you have any questions or need information.

SORCE Science Operations

An initial release of the instrument planning and scheduling system - known as OASIS-PS, was made on August 31. This preliminary release marks the completion of all generic user interface and scheduling capabilities, instrument-specific schedulers, planning data product formats, and limited instrument memory management capability. In general, development is ahead of schedule and the next major release is scheduled for the end of December 2001, marking the conclusion of development activities and the completion of all remaining requirements. Telemetry data ingest and access capability development is proceeding on schedule with the operations readiness of the instrument module.

Database tables and ingest software are in place to receive raw packet data, as well as analog and discrete telemetry items. Science packet database tables have been defined and are in the process of being implemented. The TCAD (telemetry checking and display) software that is used routinely for other satellite operations at LASP is now in place and ready to support analysis of instrument data. Science packet data extraction routines are now produced automatically as a product of the C&T database translators, much like the OASIS-CC (real-time operations system) database is kept in sync with the C&T database contents. The science packet data extraction routines have been tested with actual instrument data. The telemetry data access software design is complete and implementation is nearing completion.

We are nearing completion of the SOLSTICE instrument processing algorithms, such that data from the UARS SOLSTICE instrument can be processed as validation of the SORCE data processing system, and testing is expected to begin soon. Prototype SOLSTICE Level 3 and Level 2 algorithms are now implemented and nearly ready for testing, as are most of the level 1B calibration algorithms. Some common TIM and SIM algorithms are completed, and other TIM-specific irradiance generation algorithms are now being designed. In the coming weeks, regular meetings will begin with the TIM instrument scientists to formulate and discuss science algorithms.

The science data system software is now being rebuilt automatically on a nightly basis; all released code is checked out of CM (configuration management), compiled and executed. Software documentation for all modules is also regenerated into HTML pages

The SORCE command and telemetry database design was improved in the last month to permit a more streamlined representation of the SORCE telemetry system. This modification optimizes the definition of telemetry packets and telemetry items in the database, reducing the number of unique telemetry definitions and the size of the command and telemetry handbook. These modifications have also permitted the machine generation of routines to extract telemetry data from packets, a capability that has now been integrated into the C&T (command and telemetry) translators and serves as the basis for the science telemetry ingest software.

Upcoming Meetings: SORCE Scientists and Engineers plan to present papers and attend the following meetings:

- MIWKG KSC, Florida October 23, 2001
- AGU, San Francisco, CA December 2001
- SORCE Calibration Workshop
Gaithersburg, MD January 2002
- NEWRAD at NIST, Gaithersburg, MD
delayed to Spring 2002