SNS • SORCE News Source

Monthly Newsletter

March 2001

Meetings

The Pegasus Rocket review will be held in Chandler, Arizona, April 3-4, 2001.

The SORCE Mission Operations Review will be held at LASP, Boulder, CO April 23-24, 2001.

SORCE is planning a Science Team Meeting July 9, 10, 11 2001 at the Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, Colorado.

SORCE scientists hope to present papers or attend the following summer 2001 meetings:

Workshop on the Evolving Sun and its Influence on Planetary Environments June 2001 Granada, Spain.

International Solar Cycle Studies 2001-Solar Variability, Climate and Spaceweather June 2001 Longmont, Colorado

IAGA Session on Solar Variability August 2001 Hanoi, Vietnam

SORCE March 2001 Project Summary

SORCE remains on schedule and within budget. No mission descopes are required at this time. Late delivery of key spacecraft components has resulted in build and testing schedule revision, and to date, there has been no unfixable impact to the program, but instrument integration slack has been depleted. Remanufacture of the spacecraft bench and late delivery of Alenia transceiver have impacted the spacecraft schedule. Additional testing facilities have been arranged at Ball Aerospace and additional test equipment has been purchased by LASP to facilitate project completion. A science support position has been offered as well. Dr. Doug Rabin (GSFC Division 682) has been appointed Deputy Project Scientist for SORCE. The SORCE ATBD will be resubmitted in March after revision and updating.

SORCE Mininum Science Criteria has been defined:

- Achieve orbit and complete on-orbit check out for the SORCE spacecraft and instruments.
- Capture and document daily values of Total
- Solar Irradiance (TSI) and Spectral Solar Irradiance (SSI) for a duration of at least 18 months (>95% complete data record)
- Produce calibrated and fully validated measurements of TSI with:
  - Absolute accuracy of 300 ppm (3s)
  - Precision and long-term relative accuracy of about 30 ppm/yr.
- Produce the first spectral solar irradiance dataset covering the complete solar spectrum, 120 to 2000 nm (~95% of TSI), with:
- In conjunction with ESDIS, capture, archive and distribute to the scientific community the TSI and SSI data products.

TIM Shuttle Flight Science Objectives

- Show that 100 ppm (1s) accuracy can be achieved with an instrument taken to space and returned for (re)characteriazation.
- Direct comparison of TIM and SOLCON
- Refine TIM characterization and operation procedures

TIM Status

TIM is 90% complete with a few areas of work remaining. Kinematic mounts, EMI filter brackets and adjustment and test of door mechanisms are mechanical areas of continued work, and additional grounding is required in the electrical area. Software learning curves have been overcome and progress is smooth. Improved performance has been achieved in the ability to change program parameters. There are diverse and ongoing housekeeping tasks to be done, but overall progress on TIM is excellent. First light was seen on March 29.

SIM Status

SIM is making rapid strides in flight build. SIM passed vacuum/pressure test. The vacuum test was stopped at pressure of 1.1x10-6 torr. RGA analysis showed most of the partial pressure was due to residual water vapor. SIM held 1.2 atmospheres for 72 hours. SIM focal plane detectors are assembled, tested and mounted in the flight case and alignment and focus are underway. The flight drives for the Fèry Prism drive have been assembled and characterized, and flight electronic boards are ready for fabrication. The prism drive operation and photodiodes are completely under DSP control, and lab spectra are being acquired. The mechanical fabrication of the calibrator system is complete, and assembly is underway. The flight beamsplitter has been delivered and the flight build of the periscope has begun. ESR characterization is 75% complete, but the SIM ESR DSP code still needs test. SIM slit width calibrations are complete, slit height is being analyzed and slit throughput calibrations are underway.

SOLSTICE Status

SOLSTICE is 90% complete. Instrument mechanical, optical, grating drive, and detector end-to-end testing is complete and instrument performance meets or exceeds requirements on the bench! A hardware fringe counter for the grating drive has been integrated into the DSP code and tested. The grating drive will now keep position after any external disturbance. Alignment stability tests are underway as well as preenvironmental test tasks. The cover/bench rework is complete but still must undergo test. Other loose ends such detector head noise quantitative assessment still must be pursued. The SOLSTICE A unit went to SURF on March 26, was successfully

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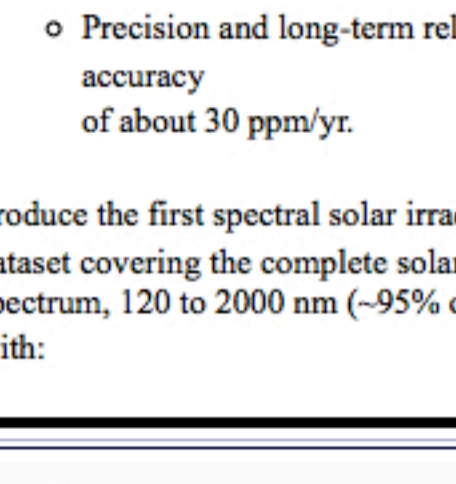
installed on beam line II and started calibration on March 29.

XPS Status

The XPS is essentially 100% complete. Additional environmental and EMI-EMC testing has been completed and previous PFR's (problem failure report) items have been successfully resolved. A picture is worth a thousand words, so...



XPS Assembly
Mass: 2.25 kg
Power: 3.4 W
Size: 18.7 cm x 17.6 cm x 15.6 cm

SORCE Data System Status

Most long term database code is now written and being tested, capabilities to utilize command and telemetry database are being added. Ancillary services development continues, spacecraft orbit services are 95% complete, interpolation, integration, spline algorithms and operators to propagate uncertainties have been added to the math utilities, and the astronomy library is still 90% complete. Spacecraft attitude server multimission design pattern and code is in place and generic attitude processing algorithms are implemented. Attitude telemetry information from Orbital has been received and is now being examined. When orbit services are complete, SORCE specific attitude software development will begin. General science algorithms have seen progress in wavelength determination/ calibration and aperture area calibration. SOLSTICE science processing development has been made in dark correction, dead time correction, responsivity calibration access and responsivity determination algorithm. Monthly telecons with ESDIS are ongoing, the next scheduled for April 19. A schedule to drive development and testing of interfaces between ESDIS and SORCE is underway.

Microprocessor Unit & Flight Software Status MU Status

The flight MU is 33% complete. The MU PCI I/O board SSI command FPGA design has been fully tested as well as the telemetry design. The flight board is out for assembly and the completed board should be in house by early April. Fabrication of the GCI flight PCB has started at SEAKR, an outside vendor, with most work complete on SOLSTICE. SIM and TIM boards have just begun.

MU Flight Software

PCI I/O hardware integration is complete in the PCI target, SRAM and EEPROM, GCI command and GCI telemetry. A/D converter build is underway. GCI software driver and 1553 software driver and sequencing engine are complete. The XPS control task in complete, the TIM control task begun. Additional staff has been added for the SOLSTICE and SIM control tasks. Two additional CTSIMS should arrive any day and they will increase testing capabilities.

Spacecraft Systems

SORCE staff will visit the Chandler, Arizona Pegasus rocket facility April 4-5. Particular interest will be focused on payload models, fit check, and stage 3 camera mountings and camera operation. A new southerly launch trajectory has been chosen for SORCE. The casualty expectation is considered almost nil and ground asset availability requirements have been met with the incorporation of a U.S. Navy ground station in Overberg, South Africa. All SORCE mass models have been delivered to Orbital. Integration and test preparations include the delivery and fabrication of mechanical and electrical ground support equipment such as: Flotron stand, delivery of cradle materials, frame for rack mount equipment, finished cable designs, uninterruptable power supply and meters. Preliminary FMEA's (failure modes and effects analysis) have been delivered for SOLSTICE, SIM, TIM, MU and XPS. FMEA reviews and redlines are in process. Power, mass, memory and bandwidth margins continue to be in good shape.

Orbital News

Orbital completed the instrument bench doubler repair analysis and briefed GSFC, but since the bench must be entirely rebuilt due to substandard composite material present in the original bench, the study will only be utilized for future trouble shooting. The SORCE "gyroless" study is complete and a stop work order for FOG (fiber optic gyro) production is in process. The Solar Cell CDR (critical design review) was completed with Spectrolab, and there are no outstanding issues resulting from the review. Flight cards for the PRE (power system) have been received and 25 more are expected before the end of March. Additional test equipment dedicated to the SORCE project was delivered to Orbital and some work has been outsourced to improve the schedule. Overtime has also been scheduled. The late delivery of the Alenia transceiver has caused workarounds, and Alenia management will be visiting Orbital April 4, and the issue will be addressed, again. FSS (fine sun sensor) light cell board assembly is complete and awaiting engineering model shock test. APE EDU late delivery due to a lingering FPGA problem has been addressed with the addition of extra design staff.

Information Submission:

Each month SNS will present mission progress, highlights, and news. If you have any information to distribute to the SORCE Team, contact Kathy.Lozier@lasp.colorado.edu, and we will include it in the next month's issue of SNS.