AIA and HMI E/PO Report
Ed DeLuca & Deborah Scherrer
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Last month’s report focused on the AIA E/PO programs at Montana State University. This month’s will focus on the Challenger Learning Center partnership being undertaken at the Harvard-Smithsonian Astrophysical Observatory as part of the AIA education and public outreach program.

AIA Challenger Learning Center Partnership at SAO

The High Energy Astrophysics Division (HEAD) and the Science Education Department (SED) at the Smithsonian Astrophysical Observatory (SAO) are partnering with the Christa McAuliffe CLC (MCLC; see http://www.christa.org/main_page.htm) at Framingham (MA) State College to design a Sun-Earth mission scenario for use in NASA’s Challenger Learning Center (CLC) simulators. Collectively CLCs annually host more than 500,000 upper elementary and middle school students and more than 20,000 classroom teachers. Most CLCs also provide programs for general audiences. The Challenger Center for Space Science Education (CCSSE) in Alexandria, VA, and the Astronauts Memorial Foundation (AMF) at the Kennedy Space Center (KSC), a strong supporter of our E/PO program, will be assisting in our dissemination effort by making information about the CLC simulation experience available nationally to its constituents.

The CLC Model

The CLCs offer students an opportunity to participate in an space-flight scenario, or simulated mission experience. There are currently only four scenarios available at the CLCs – thematically centered on the Moon, Mars, a comet, or the Earth. Each scenario includes classroom materials for use by the students both before and after the visit. Prior to the actual visit, the students, working in teams, are given mission assignments. There are eight areas of responsibility, including navigation, communication, life support, medical, and more. When students arrive at a CLC they convene in a mission briefing room where procedures are reviewed and instructions provided. After the briefing half of the students move to the mission control room, with the other half going into the spacecraft room. Midway through the simulation the two groups change rooms, providing a full experience for each student. Once the simulation scenario begins, students become engaged in a range of activities, all related to the mission objective – this might include sending a probe to intercept a comet, or establishing a space station on Mars or the Moon. The activities have a science embedded within. Participating in a mission takes between two to two and a half hours.

The New Sun-Earth Scenario

The LWS program and the SDO mission provide the perfect context for a new scenario, both in terms of the solar science that can be made age-appropriate for participating
students as well as the cross-curricular societal implications of an active Sun. The new scenario will focus on the Sun, space weather, and solar impacts on the Earth environment. In addition to highlighting the solar science behind the SDO mission, we will be integrating findings from the Sun-Earth Connection Education Forum (SECEF) into the scenario as well, with a special emphasis on utilizing the Forum’s Student Observation Network.

The Sun-Earth scenario will be the first of the CLC missions to specifically address student space science misconceptions in a real world simulation. We envision a simulation that brings into focus students’ misconceptions about the composition of the Sun, travel time for solar radiation or high energy particles to reach the Earth, the distance, size, and scale of the Sun-Earth system, space weather and Earth’s shielding features, and the like. Both the nature of the SDO mission and the data to be returned provide multiple points of entry to contrast the student misconceptions with the models or views of scientists. We will also integrate an engineering design process into the simulation.

The scenario can also have multiple objectives. For example, one permutation might involve sending a probe to the vicinity of the Sun. Another might involve choices about when, if, and under what conditions, a spacecraft should be sent beyond the Earth’s magnetosphere. All of this can be played out with the changing space weather as a backdrop. Students will be expected to keep a logbook in advance of their CLC visits, downloading the daily web-based space weather reports, SON, or SDO data once the satellite is functioning, knowing even as they begin the scenario that some real life situations could well become a part of their simulation experience.

**Schedule**

We began the early development of the scenario in the fall of 2004, with the expectation it will be available for piloting by March 2006. We plan to complete the pilot and revision phase in December 2006. The scenario will be in place in CLCs across the nation by early 2007, about a year and a half ahead of the launch of SDO. Because staff members from CLCs across the nation are eagerly requesting new simulations with strong science content, we anticipate that up to 400,000 students annually will experience the Sun-Earth scenario for at least the first five years of its availability.

This will be the first scenario developed by an individual CLC and not the CCSSE. Once the infrastructure for the design and development of the scenario is in place at MCLC, it can become the basis for NASA-wide utilization, since we will then be in position to create, or assist others in creating, new simulations for other NASA forums and/or other NASA missions or programs.