

USING NEAR REAL-TIME MISSION DATA FOR EDUCATION AND PUBLIC OUTREACH: STRATEGIES FROM THE LIFE IN THE ATACAMA E/PO EFFORT. E. Myers¹, P. Coppin², M. Wagner³, K. Fischer¹, L. Lu¹, R. McCloskey², D. Seneker¹, N. Cabrol⁴, D. Wettergreen³, and A. Waggoner⁵, ¹Platform Digital, LLC, 414 South Craig Street #283, Pittsburgh, PA 15213, {eben, karl, luisa, david}@platformdigital.com, ²STUDIO for Creative Inquiry, Carnegie Mellon University, 4615 Forbes Ave. Suite #110, Pittsburgh, PA 15213, {coppin, ronmc}@cmu.edu, ³Robotics Institute, Carnegie Mellon University, 5000 Forbes Ave., Pittsburgh, PA 15213, {mwagner, dsw}@cmu.edu, ⁴NASA Ames SST, MS 245-3 Moffett Field, CA 94035-1000, ncabrol@mail.arc.nasa.gov, ⁵Molecular Biosensor and Imaging Center, Carnegie Mellon University, 4400 Fifth Ave., Pittsburgh, PA 15213, waggoner@andrew.cmu.edu.

Introduction: The EventScope educational telepresence project [1] has been involved with education and public outreach for a number of NASA-sponsored missions including the Mars Exploration Rovers, the Odyssey Mission [2], and the Life in the Atacama project [3]. However, during the second year of operations in the Atacama, a modified version of the EventScope public interface was used as the remote science operations interface. In addition, the EventScope lab hosted remote science operations. This intimate connection with the mission operations allowed the EventScope team to bring the experience of the mission to the public in near real-time. Playing to this strength, the lab developed strategies for releasing E/PO content as close to real-time as possible.

E/PO Components: The E/PO strategy for the Life in the Atacama 2004 mission revolved around a “media outlet” approach, releasing data as it became available through various channels: EventScope remote experience files (PSEs), an exhibit at the Adler Planetarium and Astronomy Museum, a series of talks given at the Carnegie Museum of Natural History, and the E/PO website.

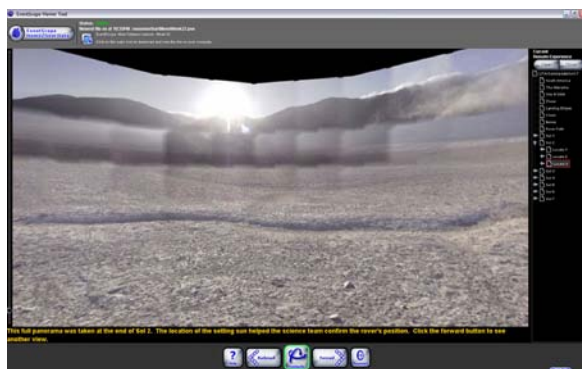


Figure 1: An EventScope Remote Experience File (PSE) showing a panoramic image from the first week of remote science operations.

EventScope Remote Experience Files (PSEs). EventScope PSEs were the core E/PO content for the

Life in the Atacama mission; all other EventScope E/PO activities either utilized or related to the PSEs in some way. These files, freely downloadable and viewable with the free EventScope software, use mission data, including orbital views of the science sites, panoramas (Fig. 1), microscopic images (Fig. 2) and other data, to recreate the experience of robotic exploration for viewers. Introductory PSEs described the mission, the robot, the desert, and the relationship of the Atacama to Mars. Daily Update PSEs detailed the day-to-day findings of the remote science team using actual mission data returned by the robot.

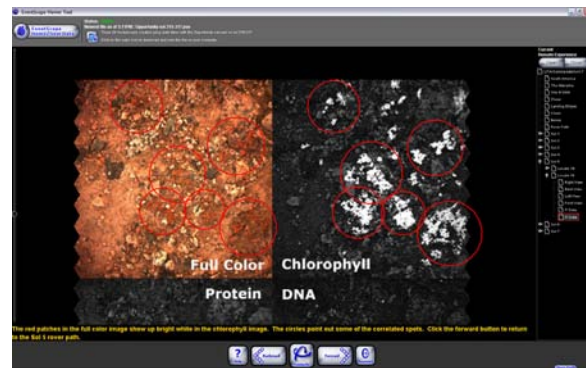


Figure 2: An EventScope PSE showing the results of a fluorescence imaging sample.

Adler Exhibit. At the Adler Planetarium and Astronomy Museum, EventScope PSEs were shown in immersive displays (Elumens VisionStations) with pared down versions of the EventScope public interface (Fig. 3). Content was updated as Daily Update PSEs were released. In addition, plasma displays nearby showed an introductory video along with an interactive piece about the rover and instruments.

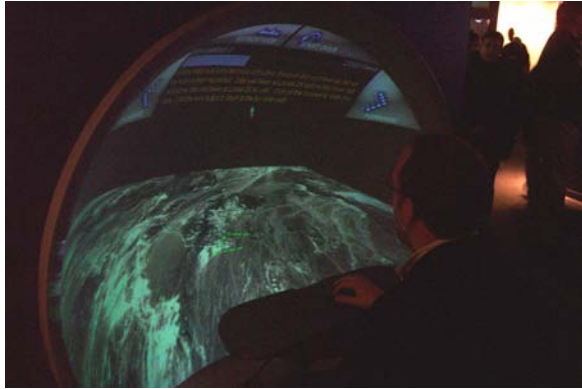


Figure 3: An Elumens VisionStation at the Adler Planetarium showing an orbital view of a science site.

Talks. Including EventScope PSEs as visual aides, these talks were given at the end of each week of remote science operations. Each talk covered the highlights of each week of operations. Though the talks were given at the Carnegie Museum of Natural History, they were also broadcast to the Adler via video conferencing where audiences of interested student groups could participate in the question and answer sessions.

E/PO Website. The EventScope Limits of Life in the Atacama Education and Public Outreach Website (<http://www.eventscope.org/atacama>) served as an outlet for news, field reports, photos, articles, and movies, as well as notifications of other content releases. One of the primary functions of the site was to alert the public to the availability of EventScope Remote Experience Files as they became available.

Observations: The E/PO goal for the mission was to explore the nature of life and robotic exploration in extreme environments using immersive, near real-time data from the mission. In practice, content releases were delayed somewhat by the production time required to translate raw science data into middle-school-level modules. By the end of remote science operations, data was being released in PSE form about 24-48 hours after it was received by the science team. Data processing was the main obstacle preventing faster release of data.

Having the E/PO team integrated with the remote science operations center was extremely beneficial in expediting the process of translating mission data into E/PO modules. The E/PO team could sit in on science meetings and ask questions of the scientists to get a good idea of which data were significant. In addition, the continuity of technology across the remote science interface and public interfaces made adapting data for public release much easier.

Future: Learning from this experience, the EventScope team will further integrate the operations interface and the public interfaces to minimize the data processing necessary. Data templates being developed for the science team will also aid the E/PO effort, clarifying data and formatting it for viewing. The E/PO team will continue to be part of remote science operations in order to soak up as much information as possible. With more experience and minimized data processing, the EventScope team should be able to reach its goal of daily E/PO content releases in near real-time, no more than a 24 hour lag. Finally, future work with teachers will ensure that near real-time mission content reaches the classroom in a timely and useful manner.

Conclusion: Although releasing E/PO content for a mission in near real-time is difficult, the initial positive response indicates that it is a worthwhile endeavor. Viewers are given a unique window into a current mission and experience the mission as it happens. Students, exploration enthusiasts, curious members of the public and even scientists can all share in a cutting edge view of a robotic life-seeking mission.

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References:

- [1] EventScope Project Website: <http://www.eventscope.org>. [2] Myers, E., Coppin, P., Wagner, M., Fischer, K., Lu, L., McCloskey, W. R., and Seneker, D. (2004) *InfoViz 2004*, Posters 35. [3] Limits of Life in the Atacama Project Website: <http://www.frc.ri.cmu.edu/atacama>.