

## Semiannual Project and Activity Review July through December 2012

Lewis Longmont Laboratory, Longmont, Colorado  
Plishner Radio Astronomy and Space Sciences Center, Haswell, Colorado

The DSES is a unique organization. We are the proud owners of an 18m dish antenna in Haswell, Colorado, on which much progress toward commissioned operation has been made. We have members with interests in many aspects of space exploration, instrumentation, systems, and related sciences, some of which are represented on our new website. Most importantly, we are dedicated to the success of the DSES so we can enjoy our individual scientific and technological pursuits.



Figure 1: Plishner dish, Haswell, with new jackscrew boots. Photo courtesy of Don Lewis, 2012.

Simon Shupp, DSES webmaster, has produced an outstanding functional DSES website ([DSES.org](http://DSES.org)). He took input from many of us, along with page prototypes from both Jeff Lichtman and Don Lewis, and constructed a representative gateway to the world. Included is active member communication capabilities for project updates, activity reports, and announcements. If you haven't already, take a tour.

The Kiowa County DSES members Delores Eikenberg, Rod Johnson, and Blake and Paul Stoker, with the help of Wayne Green, Gail and Michael Lowe, and Horace Martin, all orchestrated a DSES presence at the Eads Maine Street Bash and the Kiowa County Fair. Many Southeast Colorado residents visited the DSES booths, and provided support, and in some cases, became new members. These events were rewarding collaborations with Kiowa County representatives.

Paul Berge and Peter Goldman went to the Plishner site in October to test the hardware and firmware that Peter built, along with the modified COSMOS antenna motion controller (from a CU engineering student project with Dennis Akos). Paul prepared the dish for operation with Peter's system so all was ready for temporary installation. After connecting the various components to the two motor controllers and to the absolute encoders, with just a minor glitch or two, the tests were successful. The dish was moved at various speeds in both axes simultaneously while reading the Az and El positions with the encoders. COSMOS worked well in manual mode, allowing specific Az and El angles tracking motion. Peter is working on final packaging and versioning, and further tests are anticipated for the summer of 2013.



Figure 2: Peter in the Plishner dish, Haswell, with his prototype motion control components preparing for testing. Photo courtesy of Don Lewis, 2012.

Several of our members including Paul Berge, Adam Glazer, Don Lewis, Michael Lowe, Blake and Paul Stoker, and others, have given the Plishner site quite a facelift. The bunker generally is inhabitable, solar power with generator supplement supplies the electric, and the dish can be operated manually. A significant milestone was the installation of protective boots on the elevation jackscrews (see Figure 1).

Rodney Howe, Jamie Riggs, Simon Shupp, and Blake Stoker are testing the operation of a

Stanford University Sudden Ionospheric Disturbance (SID) system that is pushing data to our website ([SID data](#)). These data are available to all our members. This effort will be expanded with instructional material for use with educational institutions.

Rodney Howe, Don Lewis, and Jamie Riggs are developing a 10.7cm antenna and receiver for solar monitoring. Paul Berge has contributed a feed horn, and Don is working on the dish mounting system. Rodney has been collecting data with an existing system so he can understand the details of pointing, calibration, data transfer, and data analysis. Interestingly, the Solar Flux Units (SFU) extracted from the 10.7cm wavelength data are closely related to sunspot numbers. See [SFU](#) for further details.

Jamie Riggs is using American Association of Variable Star Observers (AAVSO) sunspot count data, supplied by Rodney Howe, to derive sunspot numbers (as apposed to counts) using modern statistical analysis. The modern statistics are not dependent upon classical statistical analytical methods used by other reporting agencies. The modern method results in sunspot numbers that are unbiased and have minimum variance. See [Sunspots](#) for detailed descriptions.

DSES members attended conferences, gave presentations on DSES activities, and published papers. Jamie Riggs gave a presentation on *Mars Crater Spatial Point Pattern Modeling* to the University of Northern Colorado Applied Statistics and Research Methods Department in Greeley, Colorado (November 28, 2012).

### **DSES Organizational Opportunities**

The DSES is an organization of amateur radio operators, astronomers, scientists, radio hobbyists and plain old "big equipment" nuts. Whether you like to help with organization and management, work on a keyboard, try to pull in the weak signals, want to try your hand at digital signal processing or just wonder "what is out there" and you want to see for yourself, the DSES has a place for you.

We still need your help.

The DSES wants to renew its relationship with its members and bring in some new ones as well. In addition to dish improvement projects, we are always looking for projects that use the capabilities of the dish such as radio astronomy, Earth-Moon-Earth (EME), satellite ground station uses, etc. Do you have something you think we should be adding to our abilities? Come and re-join us! Membership for a full voting member is \$50/year and for an associate, non-voting member is \$20/year.

Thanks to all who have joined or renewed!

Thank you for your interest in the Deep Space Exploration Society!

For further information you can send email to the board members at [inquire@dses.org](mailto:inquire@dses.org) or see our website at [www.dses.org](http://www.dses.org). Our newsletter and activity reports are available on this website.