

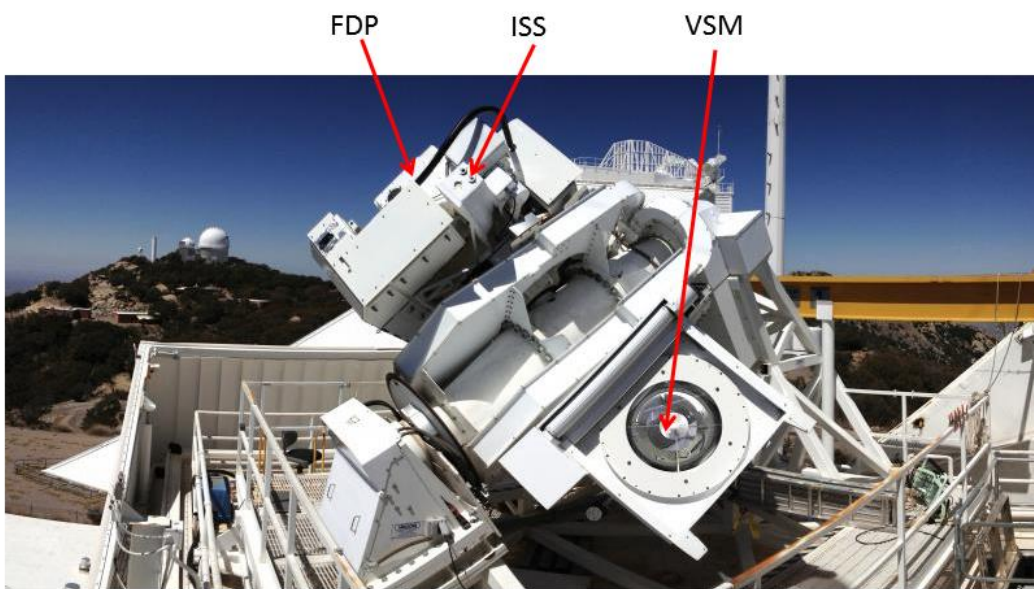
## Information package for potential SOLIS host institutions June 10, 2015

**SOLIS (Synoptic Optical Long-term Investigations of the Sun)** is an instrument package to obtain long-term solar observations funded by the National Science Foundation (NSF) and designed and built by the National Solar Observatory (NSO). It is currently located at the University of Arizona Agricultural Campus where NSO maintains a GONG engineering site.

SOLIS is composed of a single equatorial mount carrying three telescopes:

- the 50 cm [Vector Spectromagnetograph \(VSM\)](#),
- the 14 cm [Full-Disk Patrol \(FDP\)](#), and
- the 8 mm [Integrated Sunlight Spectrometer \(ISS\)](#).

### SOLIS instrumentation on Kitt Peak



In addition to the mount, the SOLIS installation includes a structure to house the ISS fiber-fed spectrograph, the instrument control computers and the mount drive electronics in a separate room or enclosure. The spectrograph needs to be in a thermally stable ( $\sim 0.1^\circ\text{C}$ ) environment. In installation also includes a shelter with a roll-off roof for the complete SOLIS instrument assembly, and a shed to house a UPS, chiller, and air compressor. These components can be seen in the document solisViews.

Weight of SOLIS mount and instrumentation package with walkways:  
24,544 pounds distributed on 4 mounting foot points.

Power requirements:

208V three phase for telescope motors and 110V for computers and instrumentation ( $\sim 370$  kWh/day)

*Operations:*

SOLIS is not automated, but can and will be operated remotely by NSO personnel. An operations manual has been drafted and is under review as additional NSO staff are trained. We expect that hosting SOLIS will be similar to hosting a GONG instrument in that local site support will only be needed for troubleshooting and possible component swapping under NSO instructions. NSO personnel will travel to the site if required.

*SOLIS Data Rates*

Terms: GB = gigabytes, MB = megabytes, mbps = megabits per second

Remote observing desktops: Currently these use around 4mbps and sometimes up to 8mbps to function responsively. These are usually only active during observing.

FDP: This depends strongly on the total amount of observing time, which historically varies significantly.

Total daytime data: 5GB to 8GB, with new VTF: 5.5GB to 8.5GB

Daytime data rates required: 4 obs/min  $\Rightarrow$  3mbps, with new VTF: up to 7 obs/min  $\Rightarrow$  5.25mbps

Total nighttime data: none required

VSM: Variances here are due to the number of area scans taken. Lately, 1 to 2 sets of twelve 8542l area scans are typical.

Total daytime data: 822MB to 933MB, with 8542v: 1133MB to 1244MB

Daytime data rates required: 5mbps to 7mbps (based on transferring 6302v in 5 minutes)

Total nighttime data: 77GB to 89.9GB, with 8542v: 91.6GB to 104.5GB

Nighttime transfer rates required: 22mbps to 25.6mbps, with 8542v: 26mbps to 29.7mbps  
(These are computed for an 8 hour nighttime transfer window)

ISS: Total daytime data: 54MB to 72MB

Daytime data rates required: 0.3mbps to 0.6mbps

Total nighttime data: none required

Totals: Daytime: 8 mbps + 5.25 mbps + 7 mbps + 0.6 mbps = 20.85 mbps X 1.3 = 27.1 mbps

Nighttime: 29.7 mbps X 1.3 = 38.6 mbps

Factor of 1.3 accounts for protocol and link overhead.

The pdf files are:

SOLIS General Assy-Ref (1.29.14).PDF: the SOLIS instrument package and mount

SOLIS Shelter Site Assy (1.8.14 Const. View).PDF: A stand-alone site installation with a roll-off roof, also showing a separate enclosure for the spectrograph, control computers and drive electronics

The images directory contains photos of SOLIS during its relocation from Kitt Peak to the Tucson Farm, along with views of the current shelter setup.