

Project Details

ROSES ID: NRA-03-OSS-01

Selection Year: 2004

Program Element: Independent Investigation: LWS

Project Title:

Data Environment: Data Mining and Visualization Server at Big Bear Solar Observatory

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Project Member(s):

- Varsik, John ; COI; Big Bear Solar Observatory
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- Sebastian, Donald ; Authorizing Official; New Jersey Institute of Technology

Summary:

We are seeking short-term (1 year) support from the Living with a Star Program (NRA-03-OSS-01-LWS) to enhance the data environment at Big Bear Solar Observatory (BBSO). We propose to acquire a TByte storage system with the capability of storing about two years of BBSO data on-line. A WWW server with multiple CPUs and fast data I/O provides access to the data bank and tools for data mining and visualization. The BBSO on-line data sets include: 2k x 2k pixel, 14-bit H-alpha full disk images at a 1-minute cadence, daily 1k x 1k pixel, 12-bit Ca II K and white-light full disk images, 512 x 512 pixel, 14-bit H-alpha and Ca II K filtergrams from the 25 cm vacuum refractor with a field-of-view (FOV) of 300 arcsec x 300 arcsec at a 1-minute cadence, 512 x 512 pixel digital vector magnetograms from the 25 cm vacuum refractor with a FOV of 300 arcsec x 300 arcsec at a 1-minute cadence for the longitudinal magnetic field component and 4-minute cadence for the full Stokes vector, and high-spatial resolution 1k x 1k pixel, 12-bit filtergrams with a 75 arcsec x 75 arcsec at a 1-minute cadence from the 65 cm vacuum reflector obtained with the real-time image reconstruction system. All data have an extended SoHO-style filename and header information, which reflect the BBSO instrument specific characteristics, e.g., high cadence data, calibration level, spectral scans, etc. Flat-field corrected data is stored in JPEG format for quick look analysis and the corresponding FITS data (raw data and higher level data products) can be retrieved through WWW interfaces or simple scripts. All data analysis software is readily available. Only data storage limitations prohibited us so far from making all data available, which will no longer be the case with the proposed system. In the future, we intend to make higher level data products available such as MPEG movies of user selected regions of interest in the H-alpha full disk images, daily differential rotation maps in H-alpha and residual flow maps, and high-spatial resolution MPEG movies and corresponding horizontal flow maps. BBSO data has been used in many multi-wavelength studies of solar activity in coordination with NASA's space-based observatory platforms. One illustrative example are the H-alpha full disk images used to provide context data and operational information to the Reuven Ramatay High Energy Solar Spectroscopic Imager (RHESSI). We expect that the new TerraByte storage system and the fast WWW server for data mining and visualization will enhance the scientific output of NASA space missions and provide a valuable resource for the solar and space physics communities in the context of the Living with a Star program.

Publication References:

Summary: "

Reference: Carsten Denker / New Jersey Institute of Technology-Data Environment: Data Mining and Visualization Server at Big Bear Solar Observatory

Summary: no summary

Reference: Yang, G.; Varsik, J. R.; Shumko, S.; Denker, C.; Choi, S.; Verdoni, A. P.; Wang, H.; (2006), The telescope control system of the New Solar Telescope at Big Bear Solar Observatory, Advanced Software and Control for Astronomy. Edited by Lewis, Hilton; Bridger, Alan. Proceedings of the SPIE, Volume 6274, id. 62741Y, doi: 10.1117/12.672402

Summary: no summary

Reference: Verdoni, A. P.; Denker, C.; Varsik, J. R.; Shumko, S.; Nenow, J.; Coulter, R.; (2007), The thermal environment of the fiber glass dome for the new solar telescope at Big Bear Solar Observatory, Solar Physics and Space Weather Instrumentation II. Edited by Fineschi, Silvano; Viereck, Rodney A. Proceedings of the SPIE, Volume 6689, article id. 66890Y, 12 pp, doi: 10.1117/12.734948