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Mexican Virtual Solar Observatory project

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The Virtual Solar Observatory (VSO) concept outlines a software environment for searching, obtaining and analyzing data from archives of solar data that are distributed at many different observatories around the world (Hill 2006, in this volume). The VSO, however, not only provides fast and reliable access to the existing data of Solar Active Regions, but also represents a powerful and unique tool to perform numerical simulations of the evolution and present state of solar phenomena. Two centers at UNAM, the Institute of Astronomy (IA) and the Supercomputer Center (DGSCA), along with the Sonora University, are working together to create the Mexican Virtual Solar Observatory (MVSO) that will be part of a wider national effort.

Here, we present a general description of the MVSO project, as well as the most recent advances. This project has three principal areas: Computational, Observational, and Educational. In the Computational area, we have developed a Portal that allows users to run Numerical Simulations Remotely. This Portal consist of three layers: the Graphics User Interface (GUI), the Numerical Simulation, and the Data Archives. The GUI is programmed in *ASP* and *.NET*, and we are using *MONO* & *XSP* so that it runs in Linux Systems. For the Numerical Simulations, we are using the MHD ZEUS-3D code, though this is not the only option, and a similar scheme be applied to use of any other numerical code.

Finally, the results produced by the numerical simulations are stored in a set of Data Archives, that are written in HDF format. They contain the following physical variables: density, internal energy, velocity, and magnetic fields. The three layers are related, which allows the user to make numerical simulations or searches within the data base of the MVSO, all through the GUI. We have applied this tool to the *Evolution of Coronal Mass Ejections in the Interplanetary Medium*. Regarding the observational data, the University of Sonora has made Solar Observations during the last decade with a set of filters (Ca II and Hα) and have made a Catalog of Solar Active Regions. In order search the Catalog, we have developed a GUI that allows the user to access the information via *date*, *filters* or *active region*.

Regarding the observational data in radio frequencies, the Geophysical Institute of UNAM is constructing the Mexican Array Radiotelescope (MEXART) that uses the technique of Interplanetary Scintillation (IPS). With MEXART, it will be possible to obtain information on the large-scale shape and velocity of solar wind disturbances within a range in the interplanetary medium for which no other technique exists. They will contribute to better understanding solar storm propagation and to space weather predictions. All observational data produced by this radiotelescope will be available for the astronomical community via MVSO.