

The Space Weather Monitor (SID) Program

What is it?

The Stanford Solar Center has developed an education project to build and distribute inexpensive scientific instruments to students around the world. These instruments track the Sun's influence on the Earth's ionosphere by detecting solar flares and other ionospheric disturbances, called **Sudden Ionospheric Disturbances (SIDs)**. Two versions of the monitor exist - the original SID instruments, and a new, lower-cost SuperSID instrument. The monitors are distributed to teachers and students at no cost.

Earth's ionosphere reacts strongly to the intense X-ray and ultraviolet radiation released by the Sun during a solar flare. By using a receiver to monitor the signal strength from distant VLF transmitters, and noting unusual changes as the waves bounce off the ionosphere, students around the world can directly monitor and track these SIDs.



Stanford's Solar Center and local educators developed these inexpensive instruments for students to install and use at their local high schools. Students "buy in" to the project by building their own antenna, a simple structure costing less than \$10 and taking a couple hours to assemble. Data collection and analysis are handled by a local PC, which need not be fast nor elaborate. Because there are VLF transmitters scattered around the world, the monitors can be placed virtually anywhere there is access to power. Stanford is providing a [centralized data repository](http://sid.stanford.edu/database-browser/) (<http://sid.stanford.edu/database-browser/>) where students can deposit, share, and extract data.

Obtaining Monitors

The [Society of Amateur Radio Astronomers](#) (SARA) has partnered with the Stanford Solar Center to distribute the newer SuperSID monitors. For information on obtaining monitors, contact [SARA](#) (SuperSID@radio-astronomy.org)

SARA also maintains a [Yahoo SuperSID group](#) where students can exchange questions and discuss data.



United Nations Recognition

The International Heliophysical Year (IHY) Organizing Committee and the United Nation's International Space Weather Initiative (ISWI) have both designated our Space Weather Monitors as supported projects. We have placed over 900 monitors throughout the world!



Additional Resources

The primary SID monitor website is: <http://solar-center.stanford.edu/SID/>

There is a SID Powerpoint Presentation available at the Solar Center:

<http://solar-center.stanford.edu/SID/SID-Presentation.pptx>

The presentation is designed to describe the SID project and an introduction to the science for a potential mentor audience. The presentation could also be adapted to be given to high school students who have received a SID monitor.

We have also developed an online [Tracking Solar Flares](#) activity.

<http://solar-center.stanford.edu/SID/activities/>

Read our article [Distributing space weather monitoring instruments and educational materials worldwide for IHY 2007: The AWESOME and SID project](#) in *Advances in Space Research* (COSPAR).

The SID packages passed [NASA Product Review](#) with "Outstanding" ranking! One review stated "This might be the most well put together resource I have ever reviewed!"



Image Credits:

- Above image shows Earth from the lower ionosphere. Courtesy Jorgen Hedin and Michael Erneland, taken from an atmospheric balloon high about Rovaniemi, Finland.
- Earth image, at top, courtesy of NASA.

