Physical Research Laboratory, Ahmedabad

PUBLIC LECTURE

Speaker: **Prof. Daniel N. Baker**
Director, Laboratory for Atmospheric and Space Physics, University of Colorado-Boulder and Vikram Professor, PRL.

Title: **"The Impacts of Extreme Space Weather on Society and the Economy"**

Time: **Friday, 20 February 2015, 17.00 hrs.**

Venue: **K. R. Ramanathan Auditorium, PRL**

Abstract

This talk describes possible extreme space weather impacts and their economic and societal costs. Modern society depends heavily on a variety of technologies that are vulnerable to the effects of intense geomagnetic storms and solar storms. Strong currents flowing in the ionosphere can disrupt and damage Earth-based electric power grids and contribute to the accelerated corrosion of oil and gas pipelines. Magnetic storm-driven ionospheric disturbances interfere with high-frequency radio communications and navigation signals from Global Positioning System (GPS) satellites. Exposure of spacecraft to solar particles and radiation belt enhancements can cause temporary operational anomalies, damage critical electronics, degrade solar arrays, and blind optical systems such as imagers and star trackers. Moreover, intense solar particle events present a significant radiation hazard for astronauts during the high-latitude segment of the International Space Station (ISS) orbit as well as for future human explorers of the Moon and Mars. In addition to such direct effects as spacecraft anomalies or power grid outages, a thorough assessment of the impact of severe space weather events on present-day society must include the collateral effects of space-weather-driven technology failures. For example, polar cap absorption events due to solar particles can degrade – and, during severe events, completely black out–radio communications along transpolar aviation routes, requiring aircraft flying these routes to be diverted to lower latitudes. Modern technological society is characterized by a complex set of interdependencies among its critical infrastructures. A complete picture of the socioeconomic impact of severe space weather must therefore include both direct, as well as collateral, effects of space-weather-driven technology failures on dependent infrastructures and services. It is also imperative that we-as a global society-develop a truly operational space weather observing and modeling system in which the benefits of accurate forecasts are clearly established.

The Speaker

Dr. Baker obtained his Ph.D. degree with James A. Van Allen at the University of Iowa. Following postdoctoral work at the California Institute of Technology, he joined the physics research staff at the Los Alamos National Laboratory (LANL), and became Leader of the Space Plasma Physics Group at LANL in 1981. His primary research interest is the study of plasma physical and energetic particle phenomena in planetary magnetospheres and in the Earth's vicinity. Dr. Baker has published over 800 papers in the refereed literature and has edited eight books on topics in space physics. He is a Fellow of the American Geophysical Union, the International Academy of Astronautics, and the American Association for the Advancement of Science (AAAS). He has won numerous awards for his research efforts and for his management activities including recognition by the Institute for Scientific Information as being "Highly Cited" in space science (2002), being awarded the Mindlin Foundation Lectureship at the University of Washington (2003) and being selected as a National Associate of the National Academy of Sciences (2004).

Tea at 18:00 hrs.

ALL ARE WELCOME