

Physicist speaks at AAAS symposium about space weather

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Most people leave home without checking the space weather report. But if New Jersey physicist Louis J. Lanzerotti, PhD, distinguished research professor at New Jersey Institute of Technology (NJIT), has his way, they won't leave home without it.

"For more than 150 years, we've known about solar disturbances in space weather affecting technology," said Lanzerotti. "The first technological advance, the electrical telegraph, showed space-produced effects could be problematic in their operations. It took decades, however, for scientists to understand why. Today solar disturbances can play havoc with technologies ranging from electrical power grids to GPS systems."

The safety of technologies and humans in space, based on weather, is of special interest to Lanzerotti, who in 2006 was the principal investigator for instruments on the new NASA Radiation Belts Storm Probes mission to investigate Earth's Van Allen radiation belts. He is also renowned among scientists for chairing the blue ribbon national science committee to decide the fate of the Hubble Telescope Spacecraft. In 2003, the American Geophysical Union named him the founding editor of Space Weather, The International Journal of Research and Applications, a title he still holds.

GPS systems can be quite susceptible to solar disturbances. Solar radio noise from a large solar flare--fed by the usual assortment of intense and variable charged electrons, protons and heavier ions--can knock out a GPS receiver.

Charged particles produced in a solar event can also seriously degrade or make unusable communications on trans-polar aircraft flights causing diversions of flight plans. Intense solar activity can also affect Earth-orbiting satellites, more distant space probes and human space flights above the atmosphere, including back to the Moon and on to Mars.

Space weather can also impact high frequency radio transmissions, radars, even cell phone installations.

Is it any wonder that scientists in government, industry and research search for ways to read the skies?

Lanzerotti detailed cutting-edge data on space weather and its impact on society during a symposium at the American Association for the Advancement of Science (AAAS) annual meeting in San Francisco, CA, Friday, February 16.

Lanzerotti has spent four decades contributing to research that includes studies of space plasmas and geophysics, and engineering problems related to the impact of atmospheric and space processes on terrestrial technologies, and those in space. Prior to joining NJIT in 2003, Lanzerotti spent the greater part of his earlier career at Bell Laboratories-Lucent Technologies, Murray Hill, NJ. Today, he is a consulting physicist to that organization.

U.S. President George W. Bush recently nominated Lanzerotti to the 24-member governing body of the National Science Foundation.

NASA has twice recognized Lanzerotti's contributions to science with the agency's Distinguished Scientific Achievement Medal. The esteemed physicist has also received the NASA Distinguished Public Service Medal and the William Nordberg Medal for space science from the international Committee on Space Research (COSPAR). Lanzerotti is an

elected member of the International Academy of Astronautics and the U.S. National Academy of Engineering (NAE).

Lanzerotti's key research interests date to the 1960s and 1970s when he began geophysical research in the Antarctic and the Arctic, directed toward understanding Earth's upper atmosphere and space environments. Minor Planet 5504 Lanzerotti recognizes his space and planetary research, and Mount Lanzerotti (74.50° S, 70.33° W) recognizes his research in the Antarctic.

Lanzerotti has been principal investigator or co-investigator on several NASA interplanetary and planetary missions including Voyager, Ulysses, Galileo, and Cassini. On these missions, he measured the plasma environment of the inter-planetary medium as it affects Earth and the plasma and atmospheric environments of the outer planets.

As 20th century communications technologies evolved to radio, cable, microwaves and satellites, the space environment was found to affect each of these in different ways, and the environment needed to be taken into consideration for design and operation purposes. "In the final analysis," Lanzerotti said, "the increasing number of technologies affected by the space environment means that a more sophisticated understanding of the Sun and Earth's environment is required for successful designs and operations of these technologies."

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