



International Kristian Birkeland Medal for space weather and space climate

The International Kristian Birkeland medal for Space Weather and Space Climate relates to outstanding scientific or technological results. This year, the International Medal Committee decided to award

Prof Bodo W. Reinisch

Dr. Reinisch is president and CEO of Lowell Digisonde International, LLC which designs and manufactures ionospheric HF systems, and participates in the development of ionospheric models. From 1965 to 2010, Dr. Reinisch was at the University of Massachusetts Lowell where he served as Professor and Chair of the Electrical Engineering Department and later as Professor in the Atmospheric Sciences Department. In 1975 he founded the Center for Atmospheric Research at UML and served as its director until 2010. In 2011 he received the International Union of Radio Science 'URSI Appleton Price' with the citation "*For revolutionizing radio sounding from ground and space with development of the Digisonde and the IMAGE/RPI instrument, both data providers for space weather monitoring and ionospheric modeling*". In 2012 he received the Cross of Merit 1st Class from the president of Germany for outstanding achievements in international cooperative research and education.

Dr. Reinisch has been in charge of the development of the "Digisonde" ionospheric sounder and the global ionospheric radio observatory (GIRO). He also was the PI for the development of the highly successful radio plasma imager (RPI) instrument on NASA's IMAGE mission, and the Co-PI for the development of a magnetospheric sounder instrument for the USAF's DSX mission.

He has authored/coauthored more than 290 publications in peer-reviewed journals. He has served as Chair of the International Digisonde Users Group (1989-2014); International Vice Chair / Chair for Commission G of URSI (1993-1999); Vice Chair / Chair of the International Reference Ionosphere (IRI) Working Group of URSI/COSPAR (1994-2010); Assoc. Editor for Radio Science (1988-1998); Editor for Advances in Space Research (1991-); Assoc. Editor of IEEE Antennas and Propagation Magazine (2003-2009); Editor for Earth, Planets and Space (2010-2011), Editor for Space Weather and Space Climate (2013-).

Professor Bodo Reinisch is cited for his substantial contribution to space weather research involving activities in three areas:

(1) The development of the Digisonde, an automated and advanced ionosonde, that revolutionized the space weather monitoring from the ground. They provide more insight into the physics of the ionosphere than earlier ionosondes and their unique capabilities have transformed the engineering use of ionosonde data by making them quickly accessible. The Global Ionosphere Radio Observatory network of Digisondes covers the globe. From early on, Bodo recognized the importance of real time access to both ionogram data and the vertical electron density profiles, together with a need to standardize ionogram data formats for archiving and international data exchange. Digisondes are now an essential element of space weather forecasts and an important data source for global assimilative ionospheric

models.

(2) The Radio Plasma Imager on the IMAGE satellite was the first combined long-range radio sounder and plasma wave instrument for the magnetosphere. RPI used advanced digital processing techniques and it has stimulated a new generation of models for both the plasmasphere and polar cap regions of the magnetosphere. Bodo, and his team, have made extensive use of these data to develop a dynamic model of the plasmasphere that describes the emptying and refilling of this region and a model that connects the topside of the ionosphere to the plasmasphere. Bodo's measurements provided a unique view of inner magnetospheric structures and dynamics that are helping to better understand the processes that are shaping the plasmasphere.

(3) Using Digisonde data Bodo has made very important improvements of the International Reference Ionosphere model, especially in the bottom side ionosphere. The IRI, a joint project of URSI and COSPAR, is the ISO standard for the ionosphere. He has led the IRI Working Group since 2002 and has also served as editor for many of the dedicated IRI issues of *Advances in Space Research*.

These three connected activities have made possible the mapping of both the ionosphere and the plasmasphere and the incorporation of this knowledge into a model that is recognized throughout the world as the standard. Bodo is also cited for his collaborative and international activities that have benefited science and engineering in the developing as well as the developed nations. His research has been published in well over 250 refereed articles.

Bodo is a strong supporter of international collaboration and has worked closely with scientists from many countries. He helped found the first COST ionospheric Action in Europe, and actively participated in the follow-on Actions. Since 1985, he has served as Chair of the International Digisonde Users Group and in 1993, he was elected to serve first as Vice-chair and then in 1996 as Chair of URSI Commission G. For all these reasons, the Committee decided to award Professor Bodo Reinisch with the 2014 Kristian Birkeland Space Weather and Space Climate medal.