12th INTERNATIONAL IONOSPHERIC EFFECTS SYMPOSIUM

IES2008

"Bridging the gap between applications and research involving ionospheric & space weather disciplines"

- A triennial symposium inaugurated in 1975 -

Date of Symposium: May 13-15, 2008

CALL FOR PAPERS & POSTERS NOW ACTIVE

Abstracts for POSTERS and ORAL Presentations are solicited:
http://www.ies2008.com
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Abstract Deadline for Oral Presentations	**February 01, 2008**
Abstract Deadline for Poster Presentations	**April 01, 2008**
Full Paper Deadline (for oral presentations)	**April 01, 2008**
Early Registration Deadline	**April 01, 2008**
Radisson Hotel Group Rate Reservation Deadline	**April 19, 2008**

We urge submission of abstracts promptly. If there is some difficulty in obtaining release, please submit a title ASAP with full abstract to follow. Thank you for your consideration in our planning.

*Note-1: Waiting to submit an abstract by the 1 February 2008 deadline can be problematic. That leaves only 2 months to obtain acceptance, prepare the manuscript, and, if necessary, obtain approvals for release from the parent organization or the government. The IES2008 Managers require a full month to assemble all the papers and compile the Pre-Print Proceedings document for distribution at the registration desk by May 13th, 2008. Therefore we URGE submission of abstracts as soon as possible to assist staff in planning.

DESCRIPTION OF IES2008

IES2008 follows in the tradition of the eleven previous Ionospheric Effects Symposia that have been held in the Washington DC area since 1975. Partial support for IES2008 is provided by the Office of Naval Research (ONR), and the Air Force Office of Scientific Research (AFOSR). Other government sponsors are being solicited. We are also happy to welcome International URSI as a sponsor of the symposium. Other affiliated agencies include: the Naval Research Laboratory

(NRL), the Air Force Research Laboratory (AFRL), the Space Weather Prediction Center (SWPC) of NOAA; the Air Force Weather Agency (AFWA), and the Federal Communications Commission (FCC). The symposium is a three-day event covering an array of topics of importance to both military and commercial systems and their operation. Traditional topics have included: Space-Weather Effects on Telecommunication Systems; Current Solar Cycle Phenomena and Impact on Operational Systems; Modeling, Forecasting, and Prediction Systems; Sounder Methods and Measurements; Applications of Ionospheric Tomography; Transionospheric Effects, including Scintillation; Ionospheric Effects on WAAS and other systems supporting Aviation; High Frequency Communication Systems; Longwave Propagation Systems and Effects; and Global Positioning System and Total Electron Content Studies. A more complete listing of topics is given below, under "Topics Acceptable".

DATES & VENUE

- **Dates:** May 13-15, 2008; (The weather in Washington, DC is typically good in the Spring.)
- **Venue:** *Crowne Plaza Old Town, Alexandria, Virginia (formerly the Radisson Hotel*
- **Lodging:** There are a number of excellent hotels in the area. At the Crowne Plaza, a special block of rooms is being held until April 19th, 2008. Be sure to specify the IES2008 group when making the reservation. The specified rate is $188.00 (plus applicable local taxes) for a standard room (single or double). Since the conference is being held in the Spring, the nominal rate would otherwise be > $200 plus tax at the Crowne Plaza Hotel.

The Crowne Plaza Old Town Alexandria is located in the heart of Alexandria, convenient to Old Town Alexandria and Washington DC. This hotel near the Potomac River is eight blocks from shops and historic homes on Old Alexandria's revitalized waterfront. Numerous Old Town historic attractions are within walking distance or a short bus ride away including; Mount Vernon, George Washington's Estate, Alexandria Black History Museum and the Fort Ward Museum. Walking tours of the city of Old Town, Potomac River Cruises of our Nation's capital's monuments, and boutique shopping are just a few of the fun and interesting things to do when you come stay with us.

TOPICS ACCEPTABLE

The following topics are considered as guidance for the IES2008 conference, but other related topics may be acceptable:

Sample Topics Follow (Papers & Posters)

- Space-Weather and ionospheric effects on telecommunication systems
- Current solar cycle phenomena and impact on operational systems
- Modeling, forecasting, and prediction systems
- Ionospheric sounder methods and measurements

- Multi-Sensor contributions to the solution of Space-Weather effects on ionospherically-dependent systems
- Applications of ionospheric tomography
- Transionospheric effects, including scintillation
- Ionospheric effects on WAAS and other systems supporting aviation
- High Frequency communication and surveillance systems
- Longwave propagation systems and effects
- Global Positioning System and total electron content studies
- Impact of the lower atmosphere on the Ionosphere
- Contribution of the IHY to the understanding of the ionosphere at all longitudes
- Impact of global electrodynamics on the storm-time ionosphere
- Results derived from COST-ACTION programs (viz., 238, 251, 271, 724, and 296)
- Impact of solar noise bursts and environmental noise on telecommunication and navigation systems
- Space-Weather program activities having relevance to ionospheric effects on C3I and navigation systems
- Products and services offered by industry relevant to prediction & forecasting of ionospheric effects
- Government projects associated with the forecasting and/or mitigation of deleterious effects on national and/or military systems
- Studies of documented system impacts during major geomagnetic storms and other solar-generated events

Special Sessions Confirmed to Date (in BLUE)

Any one of the sample topics above may take the form of a special session

Special Session on Ionospheric Sounder Methods & Measurements: Chaired by Prof. Bodo Reinisch, UML

Special Session on Impact of the Lower Atmosphere on the Ionosphere: Chaired by Dr. Tim Fuller-Rowell, NOAA-SWPC

Special Session on The Impact of Solar Radio Bursts & Solar Flare Effects on Technological Systems: Chaired by Dr. Anthea Coster, MIT-Haystack and Dr. Alessandro Cerruti, Cornell Univ.

Special Session on Mitigation of Ionospheric and Space Weather Effects on Telecommunication and Navigation Systems: Chaired by Dr. Alain Bourdillon, University of Rennes, France

Special Session on Ionospheric Effects on Aviation Systems: Chaired by Patricia Doherty, Boston College

Special Session on the Arctic Ionosphere - Research & Applications: Chaired by Dr. John M. Goodman, RPSI and Dr. Dave Boteler, NRCanada

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Short Synopsis of Topics and Potential Special Sessions

- ***Space-Weather and ionospheric effects on telecommunication systems***

This particular topic will stress the direct relationships between impairments upon telecommunication systems and space weather events or phenomena. Telecommunication systems of interest include but are not limited to the following: longwave communication and navigation systems; shortwave (HF) communication and OTHR systems; HFDF systems; VHF communication systems; UHF radar surveillance systems; UHF-SHF satellite communication systems; L-Band satellite navigation systems (GPS, GLONASS, etc.); cellular systems. Propagation phenomena and system impairments such as scintillation, phase fluctuations, loss of phase-lock, angle-of-arrival errors, absorption effects, ranging errors; radio blackout conditions, optimum working frequency fluctuations. Actual data is emphasized when possible.

- ***Current solar cycle phenomena and impact on operational systems***

This topic should stress phenomena observed during the later stages of the most recent solar cycle (#23) and the emergent solar cycle (#24). Operational systems are to be emphasized. They could include, but are not limited to the following: the GPS system and aviation applications such as WAAS; HF-ALE systems; GLOBALink/HF; Trans-polar HF voice service for airlines; Milsatcom; etc.

- ***Modeling, forecasting, and prediction systems***

This topic is dedicated to the elucidation of the myriad of modeling efforts leading to the development of forecasting and prediction systems. These efforts and the systems themselves may be directed to the prediction./forecasting of space weather events (as an end-product) or the prediction/forecasting of system impairments (where space weather is an intermediate product). It is presumed that the space weather events are pertinent vis-a-vis system effects. Military systems such as SCINDA and C/NOFS are of interest, and there are many examples climatological predictions systems that may be subject to update.

- ***Ionospheric sounder methods and measurements: chaired by Prof. Bodo Reinisch, UML***

This topic encompasses all types of sounder systems and related measurement techniques, including legacy systems, advanced digital sounders, single frequency beacons, and wideband probes, deployed either terrestrially and aboard satellites. Of

special interest are sounder techniques that can be exploited to derive operationally relevant ionospheric information. Another interest is the comparison of information derived from sounder systems and independent measurement schemes such as: in-situ probes (rockets and satellites), incoherent scatter techniques, etc.

- ***Multi-Sensor contributions to the solution of Space-Weather effects on ionospherically-dependent systems***

This topic involves an examination of the ionosphere using multiple sensors, such as the sensors suggested under the international DASI effort. These sensors may include radio receivers and telescopes, ionosondes, radars, TEC polarimeters, magnetometers, optimal instruments, solar imagers, and so on. The multi-sensor approach enables corroborative measurements to be obtained, and allows for a more general evaluation of the ionospheric personality during periods of system disturbance, or inferred impairment events.

- ***Applications of ionospheric tomography***

Ionospheric tomography is a relatively new imaging technique that allows for evaluation of Ne gradients and large-scale structures. These are important during disturbed geomagnetic periods. Of special interest are studies that have been stimulated by the International Polar Year (IPY:2007-2008).

- ***Transionospheric effects, including scintillation***

This topic emphasizes the impact of the ionosphere on radiowaves transmitted to/from satellites and even signals from radio stars. Of primary interest are propagation effects such as Faraday rotation, phase and amplitude scintillation, wedge refraction, ranging errors, group path delay fluctuations, and miscellaneous phase path effects. Examples include scintillation introduced on the GPS space segment, and scintillation impairments in connection with communication systems, observed especially during geomagnetic storms, emphasizing polar, auroral, and equatorial regions

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- ***Ionospheric effects on on Aviation Systems: Chaired by Patricia Doherty, Boston College***

This session will be dedicated to ionospheric effects on aviation, navigation, and communication radio systems. These systems may include Satellite-Based Augmentation Systems (SBAS), Ground-Based Augmentation Systems (GBAS), satellite communication and shortwave voice and data communication systems. The FAA's WAAS system was the first SBAS deemed operational in July 2003. Since that time, the greatest impacts on WAAS availability have been the extreme solar storm events. As we enter a new solar cycle, solar storms will continue to be source of concern for SBAS and GBAS systems worldwide. Solar storms will further confront aircraft operating in the polar region, where communications blackouts and potential

radiation hazard to passengers result in costly route changes and flight delays. Augmentation and aircraft systems planned to operate in the low latitude regions will be seriously challenged by the extreme ionospheric dynamics in the near equatorial ionosphere. As the aviation industry becomes more dependent on satellite based navigation and communication systems, it is important to assess the impending worldwide challenges of solar cycle 24. This session invites abstracts related to ionospheric assessments, algorithm development, performance assessments and program status for all navigation and communication radio systems.

- ***High Frequency communication and surveillance systems***

This topic is principally dedicated to the ionospheric and space-weather effects on high frequency (HF) communication and surveillance systems (i.e., HFDF, HF-SSL, and OTHR). The communication systems include legacy voice and data link (i.e., HFDL).

- ***Longwave propagation systems and effects***

This topic concerns the interaction of certain legacy systems used for navigation and communication at frequencies belonw the shortwave (i.e., HF) band. Many of these systems are still is use and are of importance in backup scenarios. Other applications may be primary in nature.

- ***Global Positioning System and total electron content studies***

This topic emphasizes the impact on the ionospheric electron content (i.e., TEC) upon navigation systems that operate using methodologies for which the compensation is non-existent or incomplete. Examples include single-frequency GPS receivers.

- ***Impact of the lower atmosphere on the Ionosphere: chaired by Dr. Tim Fuller-Rowell, NOAA-SWC***

The last few years have seen a plethora of new observational evidence illustrating terrestrial weather impacts on the ionosphere. The evidence has emerged from several different data sources, all of which unambiguously display manifestations of lower atmosphere dynamics on the upper atmosphere. The observations fit into broad categories of either spatial structure or temporal variability, at both low and mid latitude. Papers are encouraged that will help quantify the impact of the lower atmosphere on the ionosphere, and systems impacted by the ionospheric variability. [as revised 12-05-2007]

- ***Contribution of the IHY to the understanding of the ionosphere at all longitudes***

This topic will look to contributions by participants in studies associated with the International Heliospheric Year. Collaborative investigations and reports are of primary interest.

- ***Impact of global electrodynamics on the storm-time ionosphere***

Knowledge of the storm-time ionosphere is of paramount interest to system engineers as well as practicing ionosphericists. There have been a number of theoretical models that may account for many aspects of the storm-time ionospheric morphology, and many aspects of the behavior are now understood. Still other aspects of the geomagnetic storm are not known, and there are inconsistencies from one storm to the next. Empirical models have provided a useful procedure for estimating the general behavior of ionospheric storms. Global electrodynamics can provide a macroview of the important phenomena, and along with empirical data for verification, may be the way forward and lead to a more fulsome understanding. Studies of storm behavior through the lens of global electrodynamics are solicited.

- ***Mitigation of Ionospheric and Space Weather Effects on Telecommunication and Navigation Systems: Chaired by Dr. Alain Bourdillon, University of Rennes, France.***

This topic pertains to COST (Cooperation in the Field of Scientific and Technical Research) actions-framework undertaken by the European community and its affiliates having relevance to the ionosphere and space weather effects upon telecommunication and navigation systems. Results are to be presented from five four-year actions well known as 238, 251, 271, 724, and 296 conducted over the period 1991-2007 emphasizing substantive scientific and engineering studies. A limited number of papers would be devoted to programmatic aspects of these actions.

- ***The Impact of Radio Solar Bursts and Solar Flares on Technological Systems: Chaired by Dr. Anthea Coster (Haystack-MIT) and Dr. Alessandro Cerruti (Cornell Univ.)***

This topic recognizes that solar radio bursts, solar flares, and environmental noise can impact telecommunication and navigation systems. Solar flares can produce sudden ionospheric disturbances (SIDs) as the Earth's ionosphere reacts to the intense X-ray and ultraviolet radiation. SIDs can interrupt or interfere with telecommunication systems. System performance typically depends upon signal-to-noise ratios (SNR), and systematic, man-made, and environmental noise are major factors in the determination of how well a radio wave system may perform. Solar radio bursts have been shown to have a measurable impact upon the GPS system, and recent studies of an historical solar radio burst in December 2006 (circa 2006 and following) have confirmed that severe performance degradation occurs. Further examination of these effects would be of interest. Studies of the effects of solar flares and of man-made noise, galactic noise, atmospheric noise, and cosmic noise bursts are welcome.

- *Special Session on the Arctic Ionosphere - Research & Applications: chaired by Dr. John M. Goodman (RPSI)and Dr. Dave Boteler (NRCan)*

This session will emphasize the science and applications associated with the polar ionosphere, with an emphasis upon the Arctic. With the growth in commercial aviation traffic over-the-poles and with the increased importance of the Arctic region from a variety of perspectives, including the potential availability of the region for shipping, an examination of the scientific infrastructure for specification the arctic ionosphere is in order. The session will take a look at existing systems for monitoring the auroral and polar ionosphere, including those space and terrestrial sensors that are currently operating as well as those that are planned. For example, results from ground-based Radars, and networks of Riometers, Magnetometers, and sounders are welcome. The goal is to cover those ionospheric activities that can lead to an improved capability for communication, navigation, and surveillance of a region that is having increased importance and focus. (Draft: October 12, 2007: JMG)

Other Topics

- Space-Weather program activities having relevance to ionospheric effects on C3I and navigation systems
- Products and services offered by industry relevant to prediction & forecasting of ionospheric effects
- Government projects associated with the forecasting and/or mitigation of deleterious effects on national and/or military systems
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