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About

Dr Matthew Angling is a senior research Fellow in the **Poynting Institute (/research/activity/poynting/index.aspx)** at the University of Birmingham. He is also a Fellow at QinetiQ (Malvern).

Dr Angling has over 15 years experience of radio propagation and space weather research. His activities have included research on the impact of the environment on radio systems, ionospheric measurements, and the development of propagation products based on assimilative models of the ionosphere.

He has extensive experience of using GPS systems for ionospheric studies and has also investigated their use for the detection of anomalous tropospheric propagation.

Dr. Angling has led programmes to capture user requirements for operational, real-time space weather products and to subsequently develop web based tools using service orientated architectures.

Qualifications

- Fellow of the Institute of Physics
- Chartered Physicist
- Chartered Engineer
- PhD in high frequency radio propagation, University of Leicester, 2001
- BA in Physics, St. John's College, Oxford, 1993 St. John's College, Oxford, 1993

Biography

After graduating from Oxford University, Dr. Angling joined the Communications Department at DRA Malvern and has been involved in a variety of ionospheric research projects. In 2001 he gained his PhD from the University of Leicester for research conducted in the field of shortwave channel evaluation whilst at DERA Malvern.

He has extensive knowledge of shortwave sounding techniques and has worked with both chirp and pulse compression systems. He has provided support to a variety of projects, including a number of NATO groups. Dr. Angling has been the technical leader of the QinetiQ DAMSON and EU 5th Framework programmes and has been instrumental in the development of analysis techniques for HF sounder data.

More recently Dr. Angling has been the principle investigator for a research programme examining the use of radio occultation techniques for both ionospheric and tropospheric radio frequency applications. He is currently developing a data assimilation system that draws on meteorological techniques to provide accurate and timely specifications of the ionosphere.

Dr. Angling has published widely in journals and conference proceedings and is the chair of URSI working group G4 on ionospheric research to support radio systems.

Research

Research Themes:
Radio wave propagation, space weather, impact of the ionosphere on radio systems.

Research Activity

Dr Angling's research is predominantly concerned with the understanding and possible mitigation of the effects of the ionosphere on radio systems. Within this context a range of activities have been undertaken:

- **Development of ionospheric data assimilation systems.** Such systems apply meteorological techniques to ionospheric measurements to produce an accurate specification of the ionospheric electron density. The Electron Density Assimilative Model (EDAM) is currently able to assimilate ground and space based GPS total electron content measurements, in situ electron density, and vertical ionosonde data. Much of this work is conducted within a US-UK collaboration and is being applied to communications, navigation and radar systems.
- **Development of techniques and waveforms for HF communications and broadcasting**. For example, real time adaptation of DRM digital broadcasts can be used to overcome ionospheric propagation impacts on the system. Research on such techniques has been undertaken as part of an EU Framework programme.
- **Service orientated architectures for ionospheric propagation tools**. Web based tools and service orientated architectures have been used to expose HF propagation services based on real time ionospheric models and ray tracing methods.

Other activities

Chair of URSI working group G4 on ionospheric research to support radio systems

Publications

Angling, M. J., P. S. Cannon, and N. K. Jackson-Booth (2010), On The Assimilation Of Collocated And Concurrent Data From Ionosondes And GPS Receivers, paper presented at Beacon Satellite Symposium, Barcelona, Spain.

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Jakowski, N., R. Leitinger, and M. J. Angling (2004), Radio occultation techniques for probing the ionosphere, Ann. Geophys., 47(2-3 SUPPL.), 1049-1066.

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