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## **Working Party 8B**

### **DRAFT CIRCULAR LETTER FOR THE RADAR SEMINAR**

#### **To Administrations of Member States of the ITU, Radiocommunication Sector Members and ITU-R Associates participating in the work of Radiocommunication Study Group 8**

**Subject:** Study Group 8 Working Party 8B Seminar on “Radar Spectrum: Challenges and access in the new millennium”

Dear Sir/Madam,

ITU-R Working Party 8 is organizing a Seminar on “Radar Spectrum: Challenges and access in the new millennium”. This seminar will take place on 23 September 2005 at the ITU Headquarters in Geneva. The seminar will occur in the same timeframe as the meetings of ITU-R Working Parties 8A (22-28 September 2005), 8B (20-27 September 2005), and 8D (21-27 September 2005), to facilitate attendance by participants in these Working Parties. The presentations will be in English.

The preliminary program for this seminar is provided in Attachment 1. The objectives of this seminar are to provide a forum to provide information, exchange views, and reflect on technology advances for radar which may impact your preparations for ITU-R meetings, including WRC-07.

Participants in the various ITU-R Working Party meetings being held in Geneva at this time will not be required to register separately for the seminar. Individuals not participating in the Working Party meetings are required to register at the registration desk, located on the second basement level (2SS) of the ITU Tower building from 08:30 a.m. on 20 September 2005.

**Attention:** The information contained in this document is temporary in nature and does not necessarily represent material that has been agreed by the group concerned. Since the material may be subject to revision during the meeting, caution should be exercised in using the document for the development of any further contribution on the subject.

Information on hotels in the area is provided on the ITU web site at <http://www.itu.int/travel/index.html>. We would remind you that citizens of some countries are required to obtain a visa in order to enter and spend any time in Switzerland. The visa must be requested and obtained from the office (embassy or consulate) representing Switzerland in your country or, if there is no such office in your country, from the one that is closest to the country of departure. If problems are encountered, the Union can, at the official request of the administration or company you represent, approach the competent Swiss authorities in order to facilitate delivery of the visa.

Valery Timofeev  
Director, Radiocommunication Bureau

Distribution:

- Administrations of Member States and Radiocommunication Sector Members participating in the work of Working Parties 8A, 8B, 8D and 8F of Radiocommunication Study Group 8
- Chairman and Vice-Chairmen of Radiocommunication Study Group 8
- Secretary-General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

## DRAFT

# **ITU-R Study group 8 Seminar on “Radar spectrum: challenges and access in the new millennium”**

### **Introduction**

Over the past few years it has become evident that significant international regulatory attention has been focused on spectrum allocated to radiodetermination radar operations. Various ITU-R working parties need to have a better understanding of how radars work, radar technological capabilities, and general radar operation both in theory and practice. There needs to be a better appreciation that radar provides a wide variety of applications for the world community from imaging and mapping to air traffic control and navigation both by air and by water as well as for weather monitoring and prediction.

### **Objective**

The objectives of this seminar are to provide a forum to discuss, exchange views, and reflect on how radars really operate, separating what is fact and what is fiction in an effort to help the ITU better understand radar spectrum requirements, radar protection, functions, and benefits to the world. Another objective of the seminar is to provide the best information possible to national and international regulators regarding the challenges of meeting future spectrum access requirements for satisfying radar operations, address issues related to the draft work program concerning studies of the feasibility of the use of statistical and operational aspects in the protection criteria for radiodetermination radar systems, and address issues related to radar unwanted emissions.

### **Program outline**

#### **Keynote address: radar architecture, where we are today and where we are going?**

The intent of the keynote address is to provide regulators with information on current and future radar architectures highlighting antenna types, transmitters types, bandwidth requirements, receiver types, and basic signal and data processing with a focus toward radar protection and spectrum requirements.

#### **Radar missions, operational and spectrum requirements, architectures, and interference mitigation considerations**

To understand the impact of potential interference on a specific radar application, several issues must be understood. First, the mission of the radar must be clearly defined (e.g., capture of weather related phenomena, navigation, or detection of discrete targets (e.g., boats, aircraft)). This mission requirement describes how the information gained from the radar is to be used by the operator and others who received the information. From this, the specific operational requirement as related to this mission must be determined (e.g., detection of objects of a certain size, at a maximum range, within certain time constraints, and with a specific reliability value). Alternative radar architectures or designs can be proposed to meet these mission and operational objectives. Here the hardware and software that will comprise the radar will be described. These architectures will also include specific spectrum requirements in terms of desired frequency band, number of frequencies needed, and waveform characteristics. Finally, for each of these architectural alternatives the relative impact of various types of interference (e.g., natural and man made interference sources) on the operational performance of the radar will be described. The impact of interference sources should include details on how radar designers account for interference and its impact on the technical and operational performance requirements for each type of radar application. Emphasis should be placed on the effect of different types of interference and the impact various types of radar receiver

processing techniques have in mitigating this interference in terms of these performance requirements. Each of the organizations below should follow this structure for their presentation:

- Radar mission
- Operational requirements
- Spectrum requirement
- Architectures
- Interference mitigation considerations

This session will end with an overview by the regulatory body on radiodetermination services.

**ICAO/EUROCONTROL/RTCA – Aviation**

**IMO – Maritime Navigation**

**WMO/EUMETNET – Weather Radar**

**RCG – Modern/Advanced Radiolocation/Radar Architectures**

## **Radar and interference**

Factors to Consider for Intersystem EMC:

- Interference signal structure
- Desired signal characteristics
- General effects to radar receiver
- Natural noise – The impact of natural noise sources (e.g., Sun) on the design and operation of radars.
- Man-made interference – Appropriate system (e.g., I/N) and operational (e.g., detection range) protection criteria associated with each type of radar for sharing studies in the ITU-R.
- Statistics relevant to sharing studies in the ITU-R – Variability of sharing study elements (e.g., RCS and propagation) in ITU-R analyses.

## **Radar Emissions**

### **Panel Discussion**

Frederick D. Moorefield, Jr. and Thierry Jurand  
Seminar Coordinators

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### PRELIMINARY SEMINAR PROGRAM

<b>08:30 – 09:00 hours</b>	<b>Registration</b>
<b>09:00 – 09:15 hours</b>	<b>Opening Session</b>
Opening of the Seminar, Mr. Fred Moorefield (United States) and Mr. Thierry Jurand (France), Seminar Co-coordinators	
Welcome address by ITU Valery Timofeev, Director, Radiocommunication Bureau	
<b>09:15 – 10:45 hours</b>	<b>Session 1: Keynote address: Radar Architecture, Where We Are Today and Where We Are Going?</b>
<b>1.1 Introduction by WP 8B Chair</b> , Mr. Thomas Ewers, Germany – 5 minutes	
<b>1.2 Keynote</b> : Radar Architecture, Where We Are Today and Where We Are Going? – 45 minutes	
<b>1.3 WMO/EUMETNET</b> – Weather Radar – 30 minutes	
Questions and answers – 10 minutes	
<b>10:45 – 11:00 hours</b>	<b>Coffee Break</b>
<b>11:00 – 12:30 hours</b>	<b>Session 2: Radar Missions, Operational and Spectrum Requirements, Architectures, and Interference Mitigation Considerations:</b>
<b>2.1 ICAO/EUROCONTROL/RTCA</b> – Aviation - 40 minutes	
<b>2.2 IMO</b> – Maritime Navigation – 40 minutes	
Questions and answers – 10 minutes	

<b>12:30 – 14:00 hours</b>	<b>Lunch break</b>
<b>14:00 – 15:30 hours</b>	<b>Session 3: Radar Missions, Operational and Spectrum Requirements, Architectures, and Interference Mitigation Considerations: Continued</b>
<b>3.1 RCG</b> – Modern/Advanced Radiolocation/Radar Architectures – 35 minutes	
<b>3.2 Overview by the regulatory body on radiodetermination services</b> – 15 minutes	
<b>3.3 Factors to Consider for Intersystem EMC</b> – 30 minutes	
Questions and answers – 10 minutes	
<b>15:30 – 15:45 hours</b>	<b>Coffee break</b>
<b>15:45 – 17:15 hours</b>	<b>Session 4: Panel discussion</b>
<b>4.1 Factors to Consider for Intersystem EMC (Continued)</b> – 30 minutes	
<b>4.2 Radar Emissions</b> -15 minutes	
<b>4.3 Panel discussion</b> – 45 minutes	
<b>17:15 – 17:30 hours</b>	<b>Closing Session</b>
Summary and Conclusions: Mr. Fred Moorefield (United States) and Mr. Thierry Jurand (France), Seminar Co-coordinators	