

Summary of three input documents covering *themes , guidelines for submissions, and Task Groups*

1. Introduction

An action resulting from the April 2002 meeting was to summarise documents RRAC(02)06Rev3 (Developing the four themes), RRAC(02)07Rev1 (outline guidance on submitting research projects to RA), and RRAC(02)08 (Task Groups) in one document for further discussion.

2. Developing the themes of the research strategy

2.1 Improvements in current use of spectrum

- *Technology*
 - Smart antennas
 - Convolutional coding
 - Software defined radio
 - "orthogonal" techniques for radio
- *Planning*
 - Impact of Automatic Transmitter Power Control (ATPC)
 - Re-use factor for different services (link to sharing studies)
- *Architecture*
 - Network interoperability
 - Ad hoc and adaptive networks
 - Efficiency of mesh networks
- *Other*
 - Propagation in existing bands to support improvements in current use
 - Automatic detection/logging of illegal use
 - Monitoring
 - Time, frequency or spatial sharing factors
 - Analyse timescales for new technology implementation
 - Literature searches and periodic appraisal of radio-related research activities (UK, Europe, World-wide)

2.2 Sharing and coexistence studies (including EMC)

This aims to develop studies into the sharing of existing and new services.

- Sharing studies (intra- and inter- band sharing of services) (e.g. radar bands, satellite)
- Coexistence with current radio systems (e.g. UWB and TETRA issues)
- Coexistence with non-radio systems (e.g. xDSL, PLT, Microwave ovens/ISM)
- EMC and transmitter/receiver immunity issues
- Coexistence to support the introduction of 3G mobile and BFWA services
- Enforcement
- Techniques or equipment offering improved sharing potential (e.g. Frequency Selective Surfaces)
- Wireless Access inter-operation (LAN's, networks)

2.3 Spectrum Efficiency Issues

- Spectrum Efficiency Scheme (SES) - "Research element" – (note Refarming and Training are dealt with separately and are outside this research area.)
- Technical support of spectrum trading and economic incentives for radio users to give back lightly used spectrum
- "Metrics" for spectrum efficiency (occupancy, value, benefit, practical limits of use)
- Research relating to the development and analysis of new technology for spectrum efficiency
 - Delivery
 - Dynamic channel sharing and channel assignment
 - Increasing network/operator capacity (This could be the responsibility of industry?)
 - Filtering (hardware & software), (low-noise (super-conducting) elements?)
 - Availability and Grade of service ("best endeavour" to "high level availability" and related data rates?)

2.4 Forward (long-term) Research (including extending the use of the usable frequency range)

New Technology (e.g UWB)

- "Mobility", "Wireless Internet" and "Broadcast" technology
- Convergence
- Bandwidth requirements
 - Software related tools

New Delivery

- micro satellite, picocell infrastructure,
- urban, suburban, rural network capacity and topology
- stratospheric platforms

Studies (including new propagation scenarios)

- Analyse timescales for new technology implementation
- Future Mobile service needs (1 to 5 GHz bands)
- Maximum usable propagation frequencies for urban environments
- "Small Area Network" type services
- Use of bands above 60 GHz
- New generic allocation categories ("dialogue, messaging, retrieval, and distribution")
- Software and smart agents
- Spectrum sharing for very high user rates (>>2MB/s)

3. Guidance on submitting research projects to RA

The proposed text of the outline guidance is shown in Annex 1.

4. Task Groups

The current Task Groups will remain largely unaltered but will report to the RA; the RRAC terms of reference may need to reflect this.

Discussions will continue with the TG chairmen, concerning the future direction of each TG and their convergence towards the four RRAC themes by the development of new initiatives. New TGs may potentially be formed where a long-term programme of collaborative study is seen to be desirable in a new area.

Future directed-study programmes which are proposed by the RRAC will be carried out as a standard project funded by the Technical Forum (instead of creating a “funded TG”). In such cases, the project officer will be a member of ERU staff and any proposal of this kind will follow the normal evaluation and tendering procedures of the Technical Forum. These procedures include the justification of the research in terms of Agency objectives, a statement of project aims and deliverables which will be supported by milestones and a preliminary budget. Regular reports back to the RRAC from these directed-study programmes will be ensured in the project terms and conditions.

5. Summary

This document is a brief summary of three RRAC input documents covering the four research themes, proposed guidelines for external submissions of research work and an outline of changes to Task Group structure.

Annex 1

OUTLINE GUIDANCE ON ENGINEERING RESEARCH PROPOSALS TO THE RADIOCOMMUNICATIONS AGENCY

The Radiocommunications Agency has a research budget of £4 million per year, we welcome suggestions for projects that are in line with our needs and our research programme is subject to competitive tendering. This document gives some guidance on what we seek, and the form of submission.

Research in the Agency is targeted towards supporting our regulatory function. This involves gaining an understanding of technology areas relevant to maintaining efficient spectrum usage. An understanding of the needs of the Agency can be obtained from our website <http://www.radio.gov.uk/> where previous research is reported and the current overall aims of the Agency are stated.

The Agency is advised on research policy by an external committee known as the Radio Research Advisory Committee (RRAC). Further details of the RRAC may be found on the Agency website (select *Research* on the home page, and then *RRAC* from the research page). Of particular relevance is their *First Annual Progress Report, 2001*. This provides more guidance on themes around which the Agency will be conducting research:

- improvements in current use of spectrum
- sharing and coexistence studies
- spectrum efficiency issues
- forward research and technology benefits, including extending the usable frequency range

Tasks are driven by the needs of the Agency, as distinct from providing a competitive source of funds along the lines of the Research Councils. There is a limited budget, and funding will be targeted to particular objectives within overall Agency needs. We do not therefore seek fully-costed proposals, nor those outside our current objectives, nor which are beyond our funding capacity.

Our research contracts are normally let on a competitive tendered basis. The information about the proposed research will be publicly available should we decide to issue an invitation to tender (ITT). Proposals should allow for open and fair competition. We do not normally support specific proprietary commercial ideas. For funding for specific products consult the DTI website for details of business support funding, <http://www.dti.gov.uk/>

Within the Agency staff in appropriate technical areas of the Agency, including the Engineering Research Unit (ERU) (who administer the research budget), initiate projects. An in-house committee known as the Technical Forum (TF), comprising representatives from all the technical areas, determines the need for the project, and the funding to be allocated. The appropriate RA project officer will compile a set of targets for the project and issue it through our Agency contracts area.

Should you wish to suggest a project area for Technical Forum funding, please contact the TF secretary, Mr Chris Miles, who will put you in touch with an Agency project officer. This officer will present a proposal to the TF, which if successful, will lead to an ITT being issued. Some key factors in selecting the successful tender will be; the benefit to the agency, the methods used, the track record of the contractor, a favourable risk analysis of the proposed research and the cost.