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| **Radiocommunication Advisory GroupGeneva, 25-27 June 2012** |  |
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| Chairman of the Correspondence Group on BR Information Systems[[1]](#footnote-1) |
| REPORT OF THE CORRESPONDENCE GROUP ONBR INFORMATION SYSTEMS  |

1. **Background**

1.1 The Radiocommunication Advisory Group in its 18th meeting 8-10 June 2011, Geneva agreed to establish a Correspondence Group (CG) to review and define requirements for a consolidated and integrated BR information system largely shared with the membership for the treatment of space and terrestrial notices and establish a roadmap for its implementation, together with a work plan and costs involved.

1.2 The scope of work of the Correspondence Group as contained in the terms of reference (see Annex 1) is to prepare a report intended to provide advice to the Director, BR, on the following aspects, taking into account the summary of conclusions of the 18th meeting of RAG:

 – review notice processing workflows;

 – review existing software and databases;

 – review the means to ensure the security and integrity of the software and databases;

 – evaluate existing platforms;

 – evaluate cost/benefit implications and give recommendations;

 – prioritize recommendations;

 – establish target dates and a roadmap based on the recommendations.

 1.3 The matter should be reported in a timely manner to Council.

 1.4 Related background information can be found in the Draft Summary Conclusion of the 18th Meeting of the RAG (<http://www.itu.int/md/R11-RAG2011-110608-TD-0004/en> )

**2 Introduction**

2.1 The Radio Regulations is an international treaty. BR Information Systems reflect provisions of the Radio Regulations. Databases are repositories of data of administrations signatories of the treaty: it is ITU’s obligation to ensure the secure handling and availability of data and derived information, therefore making this a database system of strategic importance for the ITU.

2.2 In accordance with the terms of reference of the Correspondence Group, RAG participants were requested to contribute to the work of the Correspondence Group. Interviews and discussions with BR staff have been started in August 2011. Summary of the discussions and contributions have been posted on the share point site of the Correspondence Group (<https://extranet.itu.int/itu-r/conferences/rag/cg_br_infosystems/SitePages/Home.aspx>).

2.3 In parallel with the work of the RAG Correspondence Group, the Business Continuity and Disaster Recovery project has been initiated in the BR to explore security risks of BR Information Systems to give recommendations for risk mitigation. The RAG Correspondence Group recognizes the excellent contribution of this BR team and has integrated the team’s recommendations into the Correspondence Group’s recommendations.

2.4 The RAG Correspondence Group in reviewing the BR Information System focused its attention on space notice processing system and related software.

**3 Review of notice processing workflow**

3.1 The Correspondence Group after having reviewed the notice processing flow noted that processing is performed in separate and autonomous systems (TerRaSys, SNS and MARS). Since each of these systems have been designed by different teams and in different periods, no common methodology, approach or technology have been used in the design and implementation of the systems.

3.2 As a result of the review of notice processing workflow, the Correspondence Group has concluded that there is no urgent processing need to integrate space and terrestrial systems. Issues identified requiring information from both space and terrestrial databases are:

 - publication of the International Frequency List (IFL);

 - processing of High Altitude Platform Stations (HAPS), if any.

Publication of the IFL has been requested only by a few administrations. Processing of HAPS may be influenced by decisions of WRC-15.

3.3 Thefollowing immediate priorities have been identified for the space systems:

 - secure the overall system software/operating system/platform/programming language etc.;

 - secure maintenance for the 3 to 5 coming years;

 - rewrite software that is difficult to maintain, taking into account of RR and BR internal users’ requirements but also administration/sector member/customers’ constraints and requirements, particularly for the electronic exchange/availability of related data.

3.4 On-line IFL web application may be developed. It should be based on appropriate queries of data from both terrestrial (TerRaSys) and space (SNS) databases, without the need to merge all data in a single database.

3.5 After analyzing BR Information Systems, the CG has concluded that it is necessary to adopt a common conceptual approach, the result of which is reflected in a common framework based on unified conceptual database design.

1. **Review of environment**

4.1 Evaluation of the interviews conducted within BR showed good cooperation between the Informatics, Administration and Publication Department (IAP) and the Service Departments (SSD and TSD).

4.2 It has been indicated that assistance given to administrations in the use of BR software need to be improved by providing on-line help and more user-friendly interface. It is felt that administrations may lack information about the existence of on-line tutorials and help systems; therefore, BR communication strategy should focus on disseminating this information.

* 1. With retirement of some professional staff, expertise in certain information technology areas becomes scarce within the BR and may jeopardize maintainability and business continuity of some applications. The knowledge transfer, along with expertise, to remaining professional staff needs to be established.

4.4 Task of analyst responsible for BR Information Systems is complex. They are involved in:

 - specialized software development;

 - regular maintenance tasks;

 - operational issues;

 - assistance and training (workshops, seminars) to users both in-house and outside the ITU.

To meet requirements in performing these tasks, analyst should have:

- sound expertise in information technology;
- reliable knowledge of the Radio Regulations;
- general knowledge of radiocommunication.

Complexity of the work requires careful allocation of tasks with special attention to planning backup and support.

* 1. Training in software development methodologies, tools and environment should be provided more regularly. Efficiency of training may be increased in case staff members do not perform regular tasks in parallel to training sessions.

	**Concerns**
	2. Importance of systematic knowledge transfer procedure

The RAG Correspondence Group notes that systematic transfer of knowledge of experienced staff to newly recruited professionals may result in increased workload and may contribute to resource problems. Significant improvements in documentation of BR information systems are also recognized.

**Formal and informal ways of regular transfer of knowledge** should be further improved within divisions directly involved in development maintenance and operation of BR information systems (Space Application Software Division and Terrestrial Application Software Division of IAP). When responsibilities of maintenance and operation tasks are assigned to staff members, backup persons are to be identified.

* 1. Cooperation between IAP Divisions

	Cooperation between Space Application Software Division (SAS) and Terrestrial Application Software Division (TAS) to exchange ideas, methods and best practices could be improved through more regular meetings.
	2. Trainings

	Similarly trainings in changes of Radio Regulations provisions and in new results of Study Groups should be considered and these trainings may be provided in-house by Space Services Department (SSD), Terrestrial Services Department (TSD) and Study Group Department (SGD) of BR.

 **5 Review of existing software**

* 1. User requirements

	The RAG CG notes the general satisfaction of external users related to the work of BR in implementing and applying the Radio Regulations. Existing software satisfies requirements of internal users. Administrations in their contributions indicated, however, that software received from the BR may be improved.
	2. Software maintenance

	No problems have been signalled in software maintenance; maintenance activities by staff are always performed in a timely manner.
	3. Implementation of new requirements or small fixes

	Similarly, new requirements or small fixes are being analysed in good cooperation with the service departments and are developed, tested and delivered to users as quickly as possible.

	**Concerns**
	4. Space technical examination software

	Space technical examination software has been originally written mostly in COBOL for SIEMENS mainframe. Subsequently, the software has been migrated to new platforms without major modifications. The RAG CG notes that BR has undertaken initiatives to rewrite space **technical examination software.**
	5. SpaceQry

	SpaceQry software has been implemented in Visual Objects (VO). Maintenance of the system may prove to be difficult because of resource problems. The system should be rewritten and should be aligned to other software.
	6. SNS Online

	The Web-based application uses Linux shell scripts and awk scripts for presentation. The RAG CG recommends that the application is to be reviewed and its functionalities should be enhanced.
	7. Merging of SpaceQuery and SNS Online

	Functionalities of SpaceQry and SNS Online overlap. Merging of the two applications should be considered.
	8. Merge component

	Certain features of the module used to apply modifications to existing network/station in MIFR (merge program using Linux awk scripts and remote shell component) may not be supported by new versions of Microsoft Windows. The module is to be reviewed and eventually rewritten.
	9. SNTrack

	SNTrack is an important part of the system used internally by the BR. It is difficult, however, to maintain and modify the software. It needs to be reviewed to allow more flexibility and better support of multi-user environment.
	10. Inconsistent, not-straightforward, outdated interfaces

	Many of the BR space applications do not currently have a common database of background data. As a result, the BR is unable to consolidate applications in its current setting. For example, automatic population of special section data when modifying CR/C notices in SpaceCap is currently not implemented. Additionally, SpaceCom did not contain knowledge of frequency information of affected networks and therefore does not allow efficient objection processing based on identified notice groups. The RAG CG notes that, as of January 2012, the Space Radiocommunications Stations (SRS) on DVD-ROM has been replaced by the BR International Frequency Information Circular (BR IFIC) - Space Service. As each edition of the BR IFIC Space Services published in 2012 will contain the SRS database, the knowledge of frequency information of affected networks has been made available.
	11. Application stability/resilience

	Current BR software is not based on a rich, secure web-based application. As a result, users must locally install and upgrade BR provided software, and the user software environment generally tends to lag behind the BR in currency and capacity. Additionally, there is a limit to the level of cross-application data sharing since the applications currently have no direct connectivity to BR databases stored and maintained on BR servers. Introduction of Web2.0 service framework may be considered to overcome the limitation.
	12. Application Support/Tutorials

In itscomments, the US has evoked the lack of on-line help, chat assistance, etc. In its response, BR/IAP referred to existing help features, on-line tutorials and e-mail assistance. The Correspondence Group feels that, in addition to streamlining requested assistance features, more active means and forms of outreach should be considered.

 **6 Review of existing databases**
6.1 Space databases exist on different platforms raising problems of synchronization**,** integrity, security, control, etc. Central database should be used for processing of AP30, 30A and 30B plans or data should be extracted from it. Results of processing should be reflected on the central database at all times.

* 1. Database administrative functions are central to a reliable system. These functions related to space databases have to be considered seriously. There is a need for a full time database administrator (DBA) to perform functions related to the defining, building, maintaining, monitoring and tuning the space database to ensure reliable and secure functioning of the system.
	2. Results of processing should be reflected on the central database at all times.

**7 Review of security issues**

7.1 Extensive internal review has been started in the BR to identify security risks of BR Information Systems. The project, in addition to analysis, proposes methods and measures to mitigate potential security risks. Findings of the project should be integrated into BR Information Systems.

7.2 Security considerations affect flexibility of IT systems. Internal users of TerRaSys emphasized that central control and strict security imposed on users result sometimes in looking for solution to counter rigidity of the system.

7.3 As considerable part of processing of space notices is loosely linked to the central system (technical examinations, plan processing, graphical data processing), central control and security measures have been put in place only to a small extent.

7.4 Security issues of SNS are to be reviewed, redesigned to become an integral part of the system.

7.5 The Correspondence Group has concluded that there are no common security principles for BR Information Systems.

**8 Review of platforms**

8.1 Development of BR Information Systems have started in the late 1980’s. Mainframe legacy systems evolved over the years. On one hand, the systems have been modified reflecting decisions of radio conferences (WARC-s, WRC-s and Regional Conferences) and on the other hand, with the evolution of information technology, they have been migrated to newer platforms.

8.2 Presently, Linux and Windows-based servers, Linux and Windows clients allow users to access BR databases on Ingres, SQL Server, MS/ACCESS and SQLite using applications written in Visual Basics (VB), Visual Objects (VO), MS/ACCESS macros, C++, FORTRAN, COBOL and UNIX/Linux shell scripts. In web-based applications, HTML and JavaScript are also used.

8.3 Some software written in COBOL, VO, MS/ACCESS BASIC or shell scripts need to be revised and eventually be rewritten in more popular programming language.

8.4 BR has not yet considered developing referred applications for mobile devices.

8.5 Web-based applications (SNS Online, SNL Online) show that there is need to provide 7/7 day and 24h/24h service to external users. Technical problems resulting in limited access to the Internet in some countries should be also considered.

1. **Recommendations/priorities**9.1 Approach

Recommendations of the RAG CG are to be implemented in three phases.

 **Phase 1:**

In Phase 1, the Correspondence Group recommends, that in addition to the implementation of decisions of WRC‑12, urgent tasks of upgrading some legacy software is to be considered. In implementing Results of preliminary analysis related to WRC-12 resolutions on using modern electronic tools in correspondence between administrations and electronic submission of Advance Publication Information (API) will be considered in Phase 2.
9.2 Implementation of decisions of WRC-12:

- database changes;

 - program changes;
 - analysis of Resolution 907 (WRC-12) on using modern electronic tools in correspondence between administrations and the BR;
 - analysis of Resolution 908 (WRC-12) on electronic submission of Advance Publication Information (API);
 - consider tools/methods to consolidate geostationary satellite network filings of administrations pertaining to the same orbital position (request of RUS during WRC-12).
 **Timeframe:** 1 April 2012 – 31 December 2012

**Phase 2:**

9.3 Implementation of paragraphs 5.5 - 5.9:

 - rewrite technical legacy software for technical examinations;
 - rewrite SpaceQry written in VO;
 - reconsider use of remote shell;
 - review SNTrack system;
 - review SNS Online.

9.4 Take measures to enhance dissemination of information related to BR Information Systems. Make tutorials, presentations and workshop materials of World Radiocommunication Seminars and Regional Seminars available to external users. Provide RSS feed and use other modern electronic means (social media) to inform users about software and other upgrades.

**Timeframe**: 1 April 2012 – 30 December 2015

**Phase 3:**
Create BR project team, including experts from IS Department in addition to BR staff members and external experts, to:

9.5 Design common conceptual database for terrestrial and space.

9.6 Define standard application framework for Space and Terrestrial Systems including Maritime System (MARS) based on ITU maritime databases.

9.7 Redesign Space System – (apply SOA[[2]](#footnote-2)).

Integrate space databases into one central database for non-planned and planned bands, revise processing from the central database based on WRC-12 Resolution on requirements to use modern electronic means implement integrated WEB-based system with all existing functionalities:

* + - * submission of filings (advance publication information, coordination requests, notification, due diligence);
			* validation;
			* query (integrate functionalities of SpaceQry and SNS Online);
			* publication;
			* link to graphical interface management software (GIMS);
			* technical examinations.

9.8 Consider centralized risk, recovery and security management.

**Timeframe**: 1 January 2016 – 31 December 2018

1. **Cost/benefit analysis**

10.1 The RAG CG evaluated implications of its recommendations. No quantitative cost analysis has been made. Activities with possible cost impacts (i.e. costs in addition to budgeted expenses) have been identified. Benefits of these activities have also been established.

**Phase 1:**

10.2 Tasks related to WRC-12 decisions have to be performed without analysing costs and benefits. Preliminary analysis of Resolutions 907 and 908 has cost implications.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Topic | Activity | Cost  | Benefit |
| 1 |  WRC-12 decisions | Implementation  | Regular  | Ensure continuous processing |
| 2 | Resolution 907, Resolution 908 | Preliminary analysis  | Cost implication | Input to Phase 2 |

**Phase 2:**

10.3 Implementation of §§ 5.5-5.9 (rewrite technical legacy software for technical examinations; rewrite SpaceQry written in VO; reconsider use of remote shell; review SNTrack system; review SNS Online) has no cost implication. The RAG CG evaluated the benefits related to implementation of §§ 5.5-5.9 in Phase 2. It has concluded that reliability, stability and security of BR Information Systems may be jeopardized in case of delay or no action in the implementation of its recommendations.

10.4 Implementation of Resolution on use of modern electronic means (Resolution 907 (WRC‑12)) and Resolution on electronic submission and publication of advance publication information (Resolution 908 (WRC-12)) would imply, in addition to analysis, development, testing and putting into operation, impact analysis on activities in Phase 3. Results of this analysis should be considered in the design activities of Phase 3.

10.5 Training on Service Oriented Architecture (SOA) as well as in design and implementation of web based applications is required. Training will have cost implications.

10.6 Training in Modern Project Management methods is also required for staff involved in Phase 3.

10.7 Including external expert in the project team for Phase 3 has cost implications.

10.8 The following table shows a summary of the qualitative cost/benefit analysis of activities in Phase 2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Topic | Activity | Cost  | Benefit |
| 1 | Space Technical Examination Software | Rewrite legacy software for technical examinations | Regular budget | Improved stability of the system |
| 2 | SpaceQry | Align SpaceQry to other space software | Regular budget | Improved stability of the system |
| 3 | Merge component | Reconsider use of remote shell  | Regular budget | Improved stability of the system |
| 4 | SNTrack | Review SNTrack system | Regular budget | Improved stability of the system |
| 5 | SNS Online | Review SNS Online | Regular budget | Improved stability of the system |
| 6 | Integrated Space Information System – methodology  | Training in SOA | Cost implication | Preparation for Phase 3 |
| 7 | Integrated BR Information System – Project Management | Training in Project Management | Cost implication | Preparation for Phase 3 |
| 8 | Integrated BR Information System – external expert  | Recruit expert | Cost implication | Expertise in specialized field  |
| 9 | Analysis of Phase 3 | Analyze feasibility of new system | Cost implication | Preparation for Phase 3 |

**Phase 3:**

10.9 The objective of the recommended project in Phase 3 is to implement an integrated, reliable and secure system using Service Oriented Architecture. It is difficult, however, to estimate at this stage the costs and benefits of the project.

10.10 Implementation of the recommendation of the RAG CG related to Phase 3 in addition to regular resources requires extra resources.

10.11 The new system should be made available before decisions and resolutions of the WRC-15 are to be implemented. Timely delivery may reduce costs and increase benefits. To achieve these goals, analysis of the new system should be started in parallel with Phase 1 activities, followed by development and testing.

10.12 VB6.0 IDE is no longer supported as from 8 April 2008. It is anticipated that Microsoft may stop supporting VB6.0 from mid 2013 (<http://msdn.microsoft.com/en-us/vstudio/ms788708.aspx>). With the project, BR will avoid that applications written in VB6 may becomes obsolete.

10.13 Security systems should be implemented as an integral part of BR Information Systems following recommendations from BR internal Task Force.

10.14 The following table shows a summary of the qualitative cost/benefit analysis of activities in Phase 3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Topic | Activity | Cost  | Benefit |
| 1 | Integrated BR Information System- Conceptual Database  | Design | Regular  | Basis of common approach for space and terrestrial systems |
| 2 | Integrated BR Information System (space)- design  | Analysis/Design  | Cost implication | Platform independence |
| 3 | Integrated BR Information System (space) – implementation | Detailed design/implementation/testing | Cost implication | Service oriented architecture |
| 4 | Integrated BR Information System (space) – deployment  | Training in Project Management | Cost implication | System flexibility, enhanced security  |
| 5 | Integrated BR Information System (space)– training, on-line help  | Create training material, publications, seminars, on-line help | Cost implication | Greater user involvement |

**11 Conclusion**The RAG Correspondence Group (CG) on BR Information Systems has concluded that functionalities of existing systems satisfy requirements prior to WRC-12. It has also recognized that, to maintain a stable and reliable space system, there is urgent need to rewrite some of its components. Integration of databases has been identified as primarily the most important element to centralized and secure processing of filings submitted by administrations. In its recommendations, the RAG CG has suggested to the BR Director to initiate a project in two phases: in Phase 1, implement decisions of WRC-12 and analyze pertinent resolutions. In Phase 2, redesign/rewrite/review identified components and implement WRC-12 Resolutions 907 and 908. In Phase 3, it is suggested to redesign and deploy an integrated space system based on modern IT and web-based technologies taking into consideration foreseen and future requirements (WRC-15 and beyond) and could eventually integrate applications also for mobile devices.

Annex I

Terms of reference of the Correspondence Group
on BR information systems

# 1 Scope of work

The Correspondence Group shall prepare a report intended to provide advice to the Director, BR, on the following aspects, taking into account the summary of conclusions of the 18th meeting of RAG:

– review notice processing workflows;

– review existing software and databases;

– review the means to ensure the security and integrity of the software and databases;

– evaluate existing platforms;

– evaluate cost/benefit implications and give recommendations;

– prioritize recommendations;

– establish target dates and a roadmap based on the recommendations.

# 2 Form of work

The Correspondence Group shall work by correspondence. Some physical meetings of the members of the Correspondence Group may be foreseen, if strictly necessary.

# 3 Working methods

Access for the members of the Correspondence Group to documentation from the Bureau is under the authorization of the Director. The Group may conduct interviews, surveys, use questionnaires or any other means appropriate to achieve the targets described above.

# 4 Time-frame

The Correspondence Group shall start its work as of 1 July 2011. The Correspondence Group shall complete its work and its Chairman shall submit the Group’s report to RAG by the 2012 meeting of RAG.

# 5 Composition

The Correspondence Group shall be composed of members from the membership, the Radiocommunication Bureau and the ITU Information Services Department.

The Chairman of the Correspondence Group is Mr Peter Major, Hungary
(e-mail: pmajor@bluewin.ch), assisted by Mr Scott Kotler, United States
(e-mail: skotler@ntia.doc.gov).

BR will provide the secretariat support for the Correspondence Group.

Sharepoint site: Available on the RAG website at <http://www.itu.int/ITU-R/go/RAG>.

Annex II

List of BR databases and software (statistics on 18 April 2012)

 **INGRES databases**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | **Size [MB]** | **Description** | **Operated by** |
| TRSDB | 59,892 | Terrestrial Stations Database | BR/IAP |
| SNSDB | 6,262 | Space Network Systems Database | BR/IAP |
| MMSDB | 5,593 | Ship and coast stations database | SG/IS |
| MMSDB1/2 | 3,234 | Maritime mobile database | SG/IS |

 **SQL Server databases**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | **Size** | **Description** | **Operated by** |
| SPACE\_PUBLICATION | 1,500 | Contains documents (in 6 languages) to be included in Special Sections and keep history of publications | BR/IAP |
| SPACE\_REFDB | 400 | Contains Space Reference Data and Preface documents (in 6 languages) | BR/IAP |
| SPACECOM | 550 | Contains Administration comments on Special Sections | BR/IAP |
| GIMS | 3 | Graphical data  | BR/IAP |
| BRWebData | 973 | BR Web related data | BR/IAP |
| SPACE\_SPR | 10 |  | BR/SSD |
| Res647\_Space |  | Space Emergency Database | BR/SSD |
| BR\_BCBT\_ROC | 1196 | Read-only copy (updated daily) of FMTV and LFMF portion of TRSDB | BR/TSD |
| BR\_BCD\_Pub | 200 | Publication of lfmf and fmtv (excluding GE06) plans | BR/TSD |
| BR\_GE06 | 453 | Live GE06D plan | BR/TSD |
| BR\_GE06\_Pub2 | 800 | Publication of GE06 | BR/TSD |
| BR\_GE06\_tests | 1200 | Calculation-on-demand | BR/TSD |
| BR\_GE75 | 120 | GE75 broadcasting Plan and GE75-related MIFR standalone system data | BR/TSD |
| BR\_SPACE | 679 |  | BR/TSD |
| Res647\_Terrestrial | 18 | Terrestrial Emergency Database | BR/TSD |

**MS/ACCESS Databases[[3]](#footnote-3)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | **Size** | **Description** | **Operated by** |
| SNTrack |  | Space notices tracking data | BR/IAP |
| SPS |  | Space Plans database | BR/IAP |

**Terrestrial Services online databases and software**

**Database Applications**

[GLobal Administration Data System (GLAD)](http://www.itu.int/ITU-R/index.asp?category=terrestrial&rlink=glad&lang=en) - Online data-retrieval-system and central repository of ITU/Radiocommunication Bureau common information concerning Administrations and Geographical Areas.

[Maritime mobile Access and Retrieval System (MARS)](http://www.itu.int/ITU-R/index.asp?category=terrestrial&rlink=mars&lang=en) - Online Information Retrieval System allowing the Maritime Community to consult the current contents of Ship and Coast Station Information stored at ITU master database (MMSDB).

[BcQuery](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - To display data on assignments and proposed modifications to broadcasting Plans.

[My Administration Beta](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - Portal for individual Administration providing information on broadcasting assignments.

[The BR International Frequency Information Circular (BR IFIC) - Terrestrial Services](http://www.itu.int/md/R00-CR-CIR-0332%26type%3Dsitems/fr) - contains particulars of frequency allotments and assignments to terrestrial services as well as programs such as ***TerRaQ*** for queries, ***TerRaNotices*** for generation of electronic notices, and ***TerRaNV*** for validation of electronic notices.

**Planning Software**

[High Frequency Broadcasting](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - For the preparation of the HF seasonal schedule according to Article 12 of the Radio Regulations.

[SRTM3](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - Calculations of antenna effective height using data from publicly available SRTM3 digital terrain model.

[VHF-FM (GE84PLN)](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - Interference calculations and frequency search for VHF-FM services in relation to the GE84 Agreement.

[GE06Calc](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - Conformity calculations in relation to the GE06 Agreement.

Software for the preparation of notifications:

[eNotices](http://www.itu.int/ITU-R/terrestrial/broadcast/services/index.html) - PC based application designed to assist Administrations and BR in the creation of electronic notices T01, T02, G02, T03, T04, TB1, TB2, TB3, TB4, TB5, TB8 and TB9 relating to sound and television broadcasting services.

TerRaNotices - For the creation and validation of terrestrial electronic notices (all services except notice types T16, T17 and LF/MF broadcasting service). This program can only be installed from the BR IFIC DVD.

**Space Services related software**

[AP7Capture - Capture system for AP7 Input parameters](http://www.itu.int/en/ITU-R/software/Pages/ap7capture.aspx)
Software package which allows the capture and modification of data that is relevant to the AP7 Analysis.

[Electronic submission of graphical Data](http://web.itu.int/md/R00-CR-CIR-0058/en)Description of the format for electronic submission of graphical data related to satellite networks.

[GIBC (Graphical Interface for Batch Calculations)](http://www.itu.int/en/ITU-R/software/Pages/gibc.aspx) is a software package which provides the user with the ability to carry out calculations on satellite networks which allow determining the coordination requirements on satellite networks, relating to Power Flux Density (PFD) examination, Appendix 8 and Appendix 30B (Annexes 3 and 4), and on Earth stations relating to Appendix 7.

[GIMS - Graphical Interference Management](http://www.itu.int/en/ITU-R/software/Pages/gims.aspx)
Software package which allows the capture and modification of graphical data relating to the electronic notification of satellite networks.

[SAM - Space Applications Manager](http://www.itu.int/en/ITU-R/software/Pages/sam.aspx)
This software provides the user with a unique tool to easily run all installed BR Space Applications software from a global, menu-driven list, rather than searching for and starting applications individually.

[SNL – Space Network List](http://www.itu.int/ITU-R/go/snl/en)The SNL is a group of 20 lists of data concerning planned or existing space stations and earth stations giving information on the use of the frequency spectrum, the occupancy of the geostationary orbit, as well as on non-geostationary orbits.

[SNS – Space Network Systems](http://www.itu.int/ITU-R/go/sns/en)Online data-retrieval system containing AP4 data of almost 10500 geostationary satellite filings, 1100 non-geostationary satellite filings and 8000 earth station filings.

[SpaceCap – Space data capture](http://www.itu.int/en/ITU-R/software/Pages/spacecap.aspx)
Data capture software for electronic notification of satellite networks and earth stations in the space radiocommunications services.

[SpaceCom - Capture system for comments on  Special Sections](http://www.itu.int/en/ITU-R/software/Pages/spacecom.aspx)
SpaceCom software package is a stand-alone application designed to assist administrations and the Bureau in the management of the comments on four types of Special Sections: CR/C, API/A, AP30(30A) Part A, AP30-30A/F/C.

[SpacePub – Space Publication](http://www.itu.int/en/ITU-R/software/Pages/spacepub.aspx)
Software package for printing satellite networks / Earth stations from the SRS database.

[SpaceQry – Space Query and Extract System](http://www.itu.int/en/ITU-R/software/Pages/spaceqry.aspx)
Software package which provides access to the Radiocommunication Bureau's Space Radiocommunication Stations database.

[SpaceRefdb – Space Reference Tables](http://www.itu.int/en/ITU-R/software/Pages/spacerefdb.aspx)Software to install an up-to-date copy of the BR Reference tables.

[SpaceVal – Space Filings Validation Software](http://www.itu.int/en/ITU-R/software/Pages/spaceval.aspx)
Software for validating electronic notices captured by the BR SpaceCap software; provides interactive validation facility in SpaceCap.

[SPS – Space Plans System  (MSPACEg)](http://www.itu.int/ITU-R/go/space-plans-ap30-30a/en)The SPS computer system has been developed to allow determination of the coordination requirements for the Plans for space networks in Appendices 30 and 30A of the Radio Regulations.

[SRS – Space Radiocommunications Stations on DVD-ROM[[4]](#footnote-4)](http://www.itu.int/en/ITU-R/software/Pages/srs.aspx)Containing information (alphanumeric and graphic) relating to satellite networks and earth stations recorded in the Master International Frequency Register (MIFR) or in the process of coordination in accordance with Section II of Article 9 of the Radio Regulations.

[SRSConvert – Database Conversion Utility](http://www.itu.int/en/ITU-R/software/Pages/srsconvert.aspx)
Utility which allows the user to convert the data contained in an existing SRS-formatted database from a version 5 database into a version 6 database.

[SRSFixDB – Fix Electronic Notification Database Utility](http://www.itu.int/en/ITU-R/software/Pages/srsfixdb.aspx)
Utility that was created to correct certain information in electronic notification databases that were sent to the BR.

Annex III

 **Acknowledgements**

The RAG Correspondence Group on BR Information systems acknowledges valuable contributions from **Mr. Scott Kotler** (United States), **Mr.Aldo Ongaro** (Canada) and **Mr. Kavouss Arasteh** (Iran).

Indirect contributions from **Mr. Stephen Limb** (UK) and **Ms Chantal Beaumier** (Canada) involved in discussions and drafting of COM5/1 and COM5/2 during the WRC-12 are also acknowledged.

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The following staff members in BR provided information, comments and suggestions to the Correspondence Group:

**Mr. Fabio Leite** – Deputy Director BR, Chief IAP;
**Mr. Yvon Henri** – Chief, SSD;
**Mr. Alberto Mendez** – Chief, TSD;

**Mr. Nelson Malaguti** – Counsellor, SGD;

**Mr. Bachar Abouchanab** –Head, IAP/TAS;
**Mr. Pham Hai** – Head, TSD/BCD;
**Mr. Attila Matas** – Head SSD/SPR;

**Mr. Mitsuhiro Sakamoto - Head, SSD/SNP;**
**Mr. Srinivasan Venkatasubramanian -** Head, SSD/SSC;
**Mr. Nikolai Vassiliev** - Head TSD/FMD;
**Ms Barbara Warren** – Head IAP/SAS;

**Mr. Miroslav Cosic –** Senior Analyst TSD/TPR;

**Ms Michèle Degert-Coat** - Senior Analyst, IAP/TAS;
**Mr. Fabrice Evangelisti** - Senior Analyst, IAP/SAS;
**Mr. Olivier Evrard** - Senior Analyst, IAP/SAS;

Consultations have been conducted with staff members if ITU Information Services Department.

**Mr.** **Anders Norskers** – Chief, IS;
**Mr. Jarle Martinsen**  Head, IS/USD;
**Mr. Young Han -** Senior DBA, IS/USD;

Their valuable advices and suggestions have been incorporated in this report.

The RAG CG would like to recognize the significant help of the BR Secretariat in particular the remarkable work of **Mr. Steve Boswell**, Senior Analyst of IAP/SAS and excellent support and contribution of **Ms Grace Petrin**, Communication Officer of IAP/OPS.

**Annex IV**

**Glossary**

**awk** - a data extraction and reporting tool that uses a data-driven scripting language

**BCD** - Broadcasting Services Division

**BR** – Radiocommunication Bureau

**C++** - computer programming language

**CG** – Correspondence Group

**COBOL** – computer programming language

**CR/C** – Special Section publication contains requests for coordination submitted under Nos. **9.7** to **9.14** and **9.21** of frequency assignments to a space station of a satellite network, published in accordance with the provision **9.38**. (<http://www.itu.int/ITU-R/space/snl/descss/index.asp>)

**DBA** – database administrator

**FMD** – Fixed and Mobile Services Division

**Fortran** – computer programming language

**HAPS** – High Altitude Platform Stations

**IAP** – Informatics, Administration and Publication Department

**ICT** – Information and Communication Technology

**IFL** – International Frequency List

**Ingres** – database management system

**IS** – Information Services Department

**IT** – Information Technology

**ITU** International Telecommunication Union

**Linux** - UNIX-like operating system free and open software

**MARS** – Maritime Radiocommunication Systems

**MIFR** – Master International Frequency Register

**MS/ACCESS** – Microsoft Access – database management system

**OPS** – Outreach and Publication Services Division

**RAG** – Radiocommunication Advisory Group

**SAS** – Space Application Software Division

**SGD** – Study Group Department

**SNL –** Space Network List

**SNP** – Space Notification and Plans Division

**SNS** – Space Network Systems

**SOA** – Service Oriented Architecture

**SPR** – Space Publication and Registration Division

**SPS** – Space Plans Systems

**SQL Server** – database management system

**SQLite** – database management software

**SRS** - Space Radiocommunication Stations database

**SSC** – Space Systems Coordination Division

**SSD** – Space Services Department

**TAS** – Terrestrial Application Software Division

**TerRaSys** – Terrestrial Radiocommunication Systems

**TPR** – Terrestrial Publication and Registration Division

**TSD** – Terrestrial Services Department

**UNIX** – computer operating system

**VB6** – Visual Basics version 6

**VO** – Visual Objects

**WARC** – World Administrative Radiocommunication Conference

**WRC** – World Radiocommunication Conference

**Annex V**

Work Plan

RAG Correspondence Group

on the review of the information systems of the BR

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Task | Subtask | Responsible/participant | Target date | Comment |
| 1. | **Review of notice processing workflow** |  |  | 15.10.11 |  |
| 1.1 |  | Filing processes | BR/SSD, TSD, IAP  |  |  |
| 1.2 |  | Document tracking | BR/SSD, TSD, IAP |  |  |
| 2 | **Review of existing software**  |  |  | 15.11.11 |  |
| 2.1 |  | Administrative software | BR & Adm.  |  | Criteria of evaluation- design- language- maintainability- portability- interface |
| 2.2 |  | Technical software | BR & Adm. |  | Criteria of evaluation- design- language- maintainability- portability- interface |
| 2.3 |  | Filing process tracking | BR/ IAP, SSD, TSD |  |  |
| 2.4 |  | Document tracking  | BR /IAP, SSD, TSD |  |  |
| 2.5 |  | General evaluation- reliability- resilience- accessibility - user friendliness- support- tutorial  | IS, BR /IAP, SSD, TSD & Adm |  |  |
| 2.6 |  | Management- project mgmt- standards |  |  |  |
| 3 | **Review of existing databases** |  |  | 15.01.12 |  |
| 3.1 |  | Repertory of databases | BR/ IAP, SSD, TSD |  |  |
| 3.2 |  | Security: - access rights- roles - mirrors- archives/backup | IS, BR/ IAP |  |  |
| 3.3 |  | DBA activities: - performance-monitoring-integrity checks- maintenance activities- DBA tools- development assistance | IS, BR/ IAP |  |  |
| 3.4 |  | Management- corporate dba - local dba - backup staff |  |  |  |
| 3.5 |  | User/developer interface - database description and schema diagram- multilingual database documentation- physical parameters of the database- size |  |  |  |
| 4 | **Review of platforms** |  | BR/IAP, IS | 15.02.12 |  |
| 4.1 |  | Review of existing platforms in the ITU |  |  | Evaluate - hardware - software- support- compatibility- security- reliability- operation |
| 4.2 |  | Review of possible platforms  |  |  | Evaluate - hardware - software- support- compatibility- security- reliability- operation |
| 5  | **Recommendations/priorities** |  | RAG CG | 15.03.12 |  |
| 5.1 |  | IFL |  |  | Define data elements and consider processing methods |
| 5.2 |  | Emergency databases  |  |  |  |
| 5.3. |  | Other recommendations |  |  |  |
| 6  | **Cost/benefit analysis** |  | RAG CG  | 15.04.12 |  |
| 7  | **Schedule and target dates**  |  | RAG CG | 15.04.12 |  |
| 7.1 |  | Review of recommendations in view of the pertinent decisions of WRC-12 |  | 15.04.12 |  |
| 7.2 |  | Review recommendations, priorities and cost/benefit analysis |  | 15.04.12 |  |
| 7.3 |  | Schedule of implementation of recommendations |  | 15.04.12 |  |
| 8 | **Chairman’s report** |  |  |  |  |
| 8.1 |  | Compile draft report and publish it on the sharepoint site | Chairman | 1.05.12 |  |
| 8.2 |  | Comments on the draft report | RAG CG | 15.05.12 |  |
| 8.3 |  | Finalize and publish report on the sharepoint site  | Chairman | 1.06.12 |  |

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1. Mr. Peter Major, email: peter.major@ties.itu.int. [↑](#footnote-ref-1)
2. Service Oriented Architecture. [↑](#footnote-ref-2)
3. Data distributed to administrations in the Space and Terrestrial BR-IFIC are contained in databases in MS/ACCESS format (.mdb files). [↑](#footnote-ref-3)
4. The complete Space Radiocommunication Stations (SRS) reference database and the complete graphical data (GIMS) related to satellite networks is now available on the new [BR IFIC DVD-ROM (space services)](http://www.itu.int/md/R00-CR-CIR-0327/en). [↑](#footnote-ref-4)