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| REVIEW OF BR INFORMATION SYSTEMS |

This document provides with its annex, a brief review of information systems used by the Bureau for notice submission, processing, examination, publication and distribution both for terrestrial and space services. Some of the software components are available to administrations and operators on distributed electronic media or by electronic download from the website. Administrations and operators have been requested by several WRC Resolutions to submit notices electronically to the Bureau, and the Bureau to publish electronically.

Today, notices for terrestrial services are handled, stored and published separately from those for space services that are further divided into space planned and unplanned services. Graphical user interfaces and database management systems used inside the Bureau and distributed outside on electronic media have gone in different directions with the consequence that the International Frequency List (RR Article 20) has not been published for ten years.

Although in recent years the treatment of space notices has improved and is considered within the regulatory framework, fragmentation and duplication of data, lack of consistent database transaction processing, manual interventions remain the practice. Basic software developed up to twenty years ago and no longer compiling on today’s PC operating system remain in operation, .while software development methods and information exchange techniques have seen drastic changes over the last decade.

Several instances have acknowledged the importance of reducing the ICT costs by centralizing data and streamlining business processes, as to avoid inappropriate or ad-hoc costly software developments. For security, consistency, traceability, audit ability, accessibility and efficiency reasons, all data resulting from submission of notices to the Bureau should be brought in-line with general practices in database management systems namely, brought into one centralized and integrated database system with complete notice transaction processing implementing the different Radio Regulations or Agreements procedures that conceptually are largely similar.

These factors highlight the urgent need for the Bureau to review and revise information systems and related working methods in place for two decades. To further increase the throughput and improve services and interactions with administrations and operators in a context of major budgetary reductions, it is imperative to reconsider organizational aspects, working methods, internal procedures, databases and software.

A decade ago, the Council endorsed the establishment of an Informal Correspondence Group on Satellite Filings (known as SATBAG) to address backlog problems in processing satellite system coordination and notification requests by the Bureau that undermined the ability of administrations and operators to respond to evolving needs in radiocommunications.

To address the needs of both the membership and the Bureau, RAG may consider establishing a Task Group composed of representatives from the membership, the Bureau and the ITU Information Services Department that would review and define requirements for a consolidated and integrated information system, largely shared with the membership, and establish a roadmap for its implementation. Most of the work could be done by correspondence.

**ANNEX**

1. **Introduction**

Today, the BR information systems for terrestrial and space use different approaches to exchanging information with administrations, such as:

* Submission of notices by administrations: formats and mechanisms;
* Publication of BRIFIC and its Special Sections, the Preface, including the physical support;
* WWW accessibility to an incomplete space dataset via outdated software; no WWW availability to the terrestrial dataset, except for MARS with limited functionality; different Web-pages layouts;
* The BR’s obligation to publish the entire International Frequency List as per RR Article 20; maintain and review the Master International Frequency Register as per RR Article 13.
1. **Consolidate regulatory, examination & processing data**
	1. **Terrestrial datasets**:

Almost all data for planned and unplanned terrestrial services is stored in a centralized database (TerRaBase). Following the GE06 Planning Conference, Plan data is integrated to the centralized database, although Reference Situations of several Plans remains to be integrated (e.g. LF/MF).

* 1. **Space datasets**:
* A large amount of data for unplanned space services is stored in SNS database.
* The unique reference for the Space Plans Appendices 30 & 30A dataset and Appendix 30B dataset are in separate MS-Access containers located on individual PCs.
* Antenna gain contours of shaped beams and services areas for both unplanned and planned space services, and antenna gain toward the GSO orbit are stored in one MS-Access container (GIMS) located on a shared network drive.
* The ESCC “master” database (Earth Station Coordination Contours) together with horizon elevation and distance diagrams is located on a shared network drive.
* Several sets of data are in separate files or databases, such as administrations and Bureau’s notes or comments; intermediate calculation results for coordination and notifications requests and are located on individual PCs or on a shared network drive.
* Some key information remains only available in the paper-like PDF Special Sections and is not stored in any database for later retrieval, on-line consultation, etc.
* Tracking notice processing data for both unplanned and planned services, is in one MS-Access container (SNTRACK), shared on a network drive.
* The cost recovery information for a notice is stored in another small MS-Access container (SNI) while SAP produces the actual invoice.

***Conclusion 1****: Consider integrating all data into one single database system with role-based granting of access rights per specific user in order to control, secure and trace data.*

The structure of the space database still partly reflects the IDMS[[1]](#footnote-1) hierarchical model of FMS and must be simplified and conforming to the relational model, i.e. no derived data, to avoid inconsistencies. Information, e.g. date and status, qualifying the stage in the transaction processing (tracking) of each assignment (or group of assignments) must be stored together with the assignment (or group) itself in the centralized database as it was in FMS[[2]](#footnote-2) on the IDMS/mainframe environment and is in TerRaSys.

***Conclusion*** ***2****: Consider reviewing and restructuring data according only to its purpose and to relational DBMS principles (database design) in order to facilitate access.*

1. **Review notice transaction processing**
	1. **Terrestrial processing**: Almost all types of notices are successfully processed entirely through TerRaSys. Notices for GE06 Plans and for low-volume LF/MF Plans are partly implemented or under development.

The transaction processing workflow includes frequency-related examinations and review of proposed findings by TSD engineers. TerRaSys relies on a centralized database in the Ingres/Unix environment far more than the limited space applications running on it. A notice tracking facility is included within TerRaSys as it used to be in FMS.

* 1. **Space processing**: The processing of the different notice types is fragmented and in some areas either does not exist or is incomplete (gaps). The Master Register of all frequency assignments to space services does not exist and therefore neither published nor available to administrations and operators.

There are different practices within the department: Space Plans notices are handled in a different manner than the bulk of the unplanned services and the meaning and location of (assignment) findings and coordination requirements differ.

None of the findings proposals or network summaries presented at the BRIFIC Weekly Approval Meetings is produced from the central database, contrary to terrestrial services or previously from FMS.

1. **Identification of workflows, processes and transaction processing**: Several processes inherited from all-paper submissions must be reviewed; the flow must be streamlined, manual interventions minimized, to ensure data accuracy and consistency while providing transparency and a better service to administrations. Areas where no regulated processing (or fragmented) has ever been adopted, should work from the centralized database system using properly defined stages for each notice-type life-cycle.

Several levels of workflows are running in parallel, in sequence, sometimes inter-acting: those imposed by the Radio Regulations procedures, those initiated by the correspondence, those created by BR internal working practices, etc. To normalize***[[3]](#footnote-3)***business processes, they must be analyzed by raising the abstraction level for each stage, for each procedure, that is modelled.

When modelling, i.e. writing down what is done in reality and what should be done, many aspects, loops and contradictions might appear. Implementing any workflow requires to review the processes, to re-think the process when modelled, to re-engineer it, including manual or software means.

***Conclusion 3****: Consider formalizing notice processes for all services by rigorous workflows using standard modelling practices and tools to help communications and common understanding as well as database consistency.*

1. **Review notice submission methods**
2. **Notice format for submission**: There are different approaches for submitting terrestrial or space notices. Terrestrial notices and space standard graphical data are submitted in a pre-XML format, while Space alphanumerical data are provided in MS-Access containers with additional information on paper. For terrestrial notices, XML[[4]](#footnote-4) compliant formats have been recently defined allowing software developments to proceed and once completed, they will be used for submitting terrestrial notices.

***Conclusion 4****: Consider conforming to the XML standard in all BR notice submissions.*

1. **Notice capture & validation**: The software (TerRaNotices) distributed on terrestrial BRIFIC captures electronically notices and validates them as well as those notices in the same data format created by other mechanisms. Software is available for capturing (SpaceCap) and for validating (SpaceVal) alphanumerical data of space notices. It also validates notices created by other software providing they are formatted alike in an MS-Access container. GIMS[[5]](#footnote-5) allows capture and validation of standard antenna diagrams. Normalizing all notices for submission to XML standard implies to review this software.
2. **Electronic submission mechanism:**Today’s practice of submitting space notice data as multiple attachments to an email message sent to brmail@itu.int is cumbersome, risky to handle and often blocked by the security (e.g. MS-Access containers for space alphanumerical data).

A submission is first registered and loaded into the docbase[[6]](#footnote-6) BRDMS. Then the concerned department off-loads from BRDMS the submission and each attachment is saved on a local drive and often it must be unzipped into several files that are finally copied on a shared network drive (generally space submissions). A shared network drive was a valid solution for storing and sharing information when moving to a networked architecture long ago, it is not as secured as a docbase.

Since Circular Letter CR/297 of 22-01-2009, the **W**eb **I**nterface for **S**ubmission of **F**requency **A**ssignments to **T**errestrial services (WISFAT) is operational.

***Conclusion 5****: Consider consolidating and expanding WISFAT to submit any notice to the Bureau through a unique mechanism to achieve security and traceability.*

1. **Review publication & distribution methods**
2. **IFL Preface**: Two IFL prefaces are now published, one for terrestrial and one for space services presenting substantial differences in findings and identification of coordination requirements, formerly named columns 11 and 13. For terrestrial services, findings have been reviewed and clarified while implementing TerRaSys, easier to understand for external readers than the coding still used for space services when a single character (byte) had to be spared making the meaning rather obscure. Costs and sizes of hard disks and other electronic media (DVD) allow unambiguous clarity and consistency.

***Conclusion 6****: Consider aligning the presentation of BR findings and maintaining one common reference for the IFL Preface.*

1. **BRIFIC**: The terrestrial and space services BRIFIC are now published separately. The terrestrial BRIFIC contains the entire set of MIFR and Plans data, including the updates. The space BRIFIC contains only the updates and paper-like PDF of the Circular & its Special Sections since some key information is only available in paper-like PDF and not stored in any database for later retrieval, on-line consultation, etc.

***Conclusion 7****: Consider aligning terrestrial and space electronic publications to a consistent format for ease of use.*

1. **MIFR & IFL (List I)**: Terrestrial services expand upward and space services downward: the spectrum is a continuum and bands shared by the two groups require a common assigned frequency index that is the International Frequency List (IFL). In addition, such complete index is the entry-point to an integrated view of all frequency assignments from Master International Frequency Register (MIFR), terrestrial and space Plans, Coordination Requests and Transactions in Process (TIP). IFL basic data would be assigned frequency and bandwidth, service and class of station, designation of emission, location of transmitter and receiver, administration and a link to the details in each set. This index as the entry-point should be included on both fortnightly electronic media publications and for WWW consultations.

***Conclusion 8****: Consider resuming the publication of the International Frequency List as per Article 20 in order to fulfil Bureau’s mission and information accessibility.*

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1. IDMS, INGRES, ORACLE or MS-SQL Server are DBMS, Data Base Management Systems. FMS, the Frequency Management System was developed as of 1981and operational until the end of 1999. [↑](#footnote-ref-1)
2. FMS, the Frequency Management System is the system built on IDMS Data Base/ Data Communication infrastructure that was put in place by the IFRB as of 1980 with the assistance of consulting companies, maintained and expanded by the staff and operational until 31 December 1999. [↑](#footnote-ref-2)
3. **Nowadays there are techniques developed together with related software packages to define, put in place, follow and control** “tracking” of processes or workflows, usually called **BPMN** (**B**usiness **P**rocess **M**anagement **N**otation) is a simple notation to learn and would bring the rigorous formalism that is missing in the communications and specifications. [↑](#footnote-ref-3)
4. Jointly developed with ISO and derived from the previous Standard Generalized Mark-up Language (ISO 8879:1986 SGML). The eXtensible Mark-up Language has been set up by <http://www.w3.org/XML/>and thus commonly used for web-publishing and data exchange. It is available as data format for import and export from most DBMS and from software packages such as Microsoft Office through menu Save as type XML document. [↑](#footnote-ref-4)
5. GIMS is Graphical Information Management System [↑](#footnote-ref-5)
6. In Document Management Systems, e.g. EMC2/Documentum, a docbase is a repository containing documents and indexes. It relies on a Data Base Management System (DBMS) such as MS-SQL Server (ITU) or Oracle. [↑](#footnote-ref-6)