



Recommendation ITU-R SM.1370-2
(08/2013)

**Design guidelines for developing
automated spectrum
management systems**

SM Series
Spectrum management



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Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R SM.1370-2

**Design guidelines for developing automated
spectrum management systems**

(1998-2001-2013)

Scope

This Recommendation gives design guidelines for an automated spectrum management system, including the recommended functionality for such a system, and the data elements required for frequency management at national level while also ensuring the data is collected to meet the international obligations for frequency coordination and notification.

The ITU Radiocommunication Assembly,

considering

- a) that the demand for spectrum is increasing, that radio systems are becoming more complex and thus the task of frequency assignment is becoming more challenging;
- b) that an automated spectrum management system (ASMS) would facilitate national spectrum management and monitoring, coordination among administrations and exchange of information with the Radiocommunication Bureau (BR);
- c) that an ASMS has the capability to manage and maintain the data elements required for administrative records of frequency authorizations; billing and invoicing functionality for spectrum fees; technical analysis for aiding the decision process on the right parameters to assess potential for interference and the efficient use of spectrum;
- d) that data elements used in national spectrum management for international coordination and notification have been reflected in Appendix 4 of the Radio Regulations (RR) and Recommendation ITU-R SM.1413 – Radiocommunication Data Dictionary for notification and coordination purposes;
- e) that Recommendation ITU-R SM.1413 on a radiocommunications data dictionary may supplement the Preface to the International Frequency Information Circular of the Radiocommunication Bureau (BR IFIC);
- f) that many administrations have been successful in implementing an automated spectrum management system using relational databases and supporting online portals for processing of applications for the use of spectrum, in the development and maintenance of their national spectrum management data;
- g) that the functionality of automation and integration of spectrum monitoring systems with ASMSs is described and explained in some detail in Recommendation ITU-R SM.1537;
- h) that a spectrum management software has been developed by the Telecommunication Development Bureau (BDT), in cooperation with the ITU-R, for developing countries under the name SMS4DC (Spectrum management system for developing countries)¹;
- j) that an ASMS may have the capability to assist in the preparation of electronic notices for the BR and use propagation databanks and computer programs associated with ITU-R

¹ SMS4DC is an integrated user-friendly spectrum management software package which covers terrestrial fixed, mobile, broadcasting services in the bands above 30 MHz, including the GE06 Agreement as well as satellite earth stations in space services.

Recommendations of the P Series (Radiowave propagation) made available by BR in accordance with Resolution ITU-R 25;

k) that the ITU Handbook on computer-aided techniques for spectrum management provides a useful reference for ASMSs,

recognizing

Resolutions 55 (Rev.WRC-12), 906 (Rev.WRC-12), 907 (WRC-12) and 908 (WRC-12),

noting

a) that BR has several terrestrial and space services software packages available on its website and BR IFIC;

b) that Resolution ITU-R 11-4 resolves that Study Group 1 should continue to assist in the further development of SMS4DC,

recommends

the following design guidelines for an ASMS:

1 that the ASMS should use the data elements contained in RR Appendix 4, Recommendation ITU-R SM.1413 and the ITU Handbook on computer-aided techniques for spectrum management and provide a mechanism for transferring existing data to the ASMS data structure;

2 that the ASMS should allow multiple users and have appropriate data security features;

3 that the ASMS should contain engineering calculation features for radio services;

4 that the ASMS should be capable of using a terrain database for specific engineering calculations;

5 that the ASMS should, where feasible, operate in the customer's national language(s) and support Unicode for additional languages;

6 that output documents (e.g. licences and invoices) should be easily generated in the local language and character set;

7 that the implementation of such systems should include the necessary training and support;

8 that the design should consider the networking and computer hardware elements for ease of access, user control, security and other features;

9 that the specific administrative functions of spectrum management given in the Annex should be considered when developing an ASMS.

Annex

Design guidelines for developing automated spectrum management systems

1 Operational guidelines

As a minimum, an ASMS should support the following functions:

1.1 Processing of application for the use of spectrum

Following the national rules, this function should support the data entry of an application for radio service. This can be an application for new station, for modification to an existing licence, or modification to a pending application. The applications should be processed sequentially, typically through the following steps: check that all information is included; check specified equipment; check channel availability; check administrative compliance. If any of these checks fail, a standard notice should be produced for the applicant, indicating the nature of the problem. If the proposed site is located within a region of international coordination (i.e. border area), the system should produce a request for international coordination, including all the data required by ITU or by bilateral agreements with neighbouring administrations. In those cases where it is required, the system should also assist in the preparation of the appropriate BR coordination or notification notices, as appropriate. Once all approvals are granted and, if required, all fees are paid, the application may become a licence ready to be issued.

1.2 Frequency allocation plan/channel processing

This function should support the processing and analyses required to approve a requested frequency channel, or to respond to a request for international coordination from a neighbouring administration. This function may also be used to investigate the availability of unassigned RF channels, international and regional plans.

This function should have the following characteristics:

- provide utilities to create and maintain the national frequency allocation plan. Information to be recorded should include the relevant parts of the RR, including Article 5 as a minimum;
- provide capability to maintain channelling plans. Utility should be included for the automated generation of channelling plan with user entered parameters;
- capability to store and retrieve frequency plan footnotes;
- retrieval of frequency channel pairs and applicable footnotes confirming with user specified parameters;
- system should be able to access the national frequency allocation plan, channelling plans, footnotes, and other system maintained databases on user supplied parameters;
- provide the allocation table in an automated display that a frequency assignment can be checked against, to ensure that it is a valid frequency assignment.

1.3 Licence processing

This function should support the following activities:

- issue a new or modified licence;
- renew an existing licence;
- adjust the fee for an existing licence;

- terminate a licence for non-compliance with the licensing conditions;
- query the database to locate one or a group of licences.

The system should support licensing processes if required, for stations in:

- aeronautical services;
- maritime mobile services;
- land-mobile and fixed services;
- the space services, e.g. earth stations; note that space services require extensive additional data elements;
- broadcasting service;
- radio amateur service;
- other services.

In addition, the system should:

- support assigning sets of frequencies for aeronautical and maritime mobile stations;
- support data collection for existing licences (data conversion);
- provide a convenient manner for printing of licences;
- detect licences due for renewal, and generate renewal invoices;
- support licence cancellation and cancelled licence re-instatement and automatically calculate the appropriate fees whenever applicable;
- provide online queries capability to permit perusal of technical and licence information contained in the database (more details in § 11.5);
- provide extensive management reporting capabilities (see § 9);
- control and track the processing of licence applications to ensure that the correct applications are available at each stage of the application cycle, and that applications are automatically progressed to the next stage as each process is completed.

1.4 Fee processing

This function should support the management of financial tasks, such as recording of fee payments, production of invoices, and production of financial statements in statistical or individual format. It should also allow the setting and changing of fee rates. The fee processing function should use the standard double-entry accounting method to record and report all transactions (see also § 6).

The choice of cash or accrual accounting should be in line with the administration's common practice. The system will provide fee:

- schedule maintenance;
- calculations for all transactions with charges and automatic interface to invoice generation. Fee calculation should be capable of applying and accounting for sales taxes or value added taxes.

1.5 Report processing

This function supports the query of the database and production of reports in graphic or text form. The ASMS should have a number of standard reports and standard letters, and should also support the production of customized reports as specified by the operator. (More details are given in § 9.)

1.6 Complaint processing

This function should support the efficient processing of interference complaints through the following steps:

- record the complaint;
- check the complaint for administrative merit;
- analyse the complaint for technical merit (use engineering analysis tools);
- generate a monitoring task for the technical verification of stations;
- review the monitoring results and produce a complaint resolution report.

1.7 Reference tables processing

This function should support the review, update and printing of all reference tables used by the system. The system administrator should be the only person with the authority to view or modify any table in the system. Equipment tables, such as antennas, transmitters, receivers may be viewed by all operators, but should be modified only by technical personnel. The security access table should only be viewed and modified by the system administrator. The frequency allocation table, which defines frequency plans used by the system may be viewed by all operators, but should be modified only by the system administrator.

1.8 Security processing

Spectrum management staff should, in general, have read access to the data records. This function should restrict update access to specific data records or to certain types of transactions to only those operators who have the proper security access role. The required security roles should be built into the design of the ASMS. The allocation of operators to one of several security roles should be controlled by the password table or by some other mechanism created as each operator is registered by the system administrator.

1.9 Transaction processing

This function creates a record in the database, registering the date, time and identity of the operator who performs each transaction, such as administrative approval of a licence, for instance. The system should also ensure that the operator attempting the transaction meets the security access criteria, and that all necessary preceding transactions have been completed. This function should also prevent an operator from repeating a transaction that has already been completed once. The transaction processing implemented by the ASMS should guarantee the integrity, reliability and recoverability of the database.

2 Record keeping guidelines

The ASMS should support a database containing frequency assignment data and information concerning individual licence holders. Any data required to calculate propagation should be provided. RR Appendix 4 and the radiocommunication data dictionary (RDD) (Recommendation ITU-R SM.1413) should also be referenced in system design to ensure compatibility of definitions and formats for future coordination and notification purposes.

The ASMS should include a high-performance, Relational Data Base Management System (RDBMS) for distributed client-server or centralized operation depending on the configuration and needs of the administration. It should use friendly graphical user interface screens and forms to enter information and generate queries and reports. It should support user definable reports to provide a variety of data retrieval alternatives. It should have a built in audit trail function for