

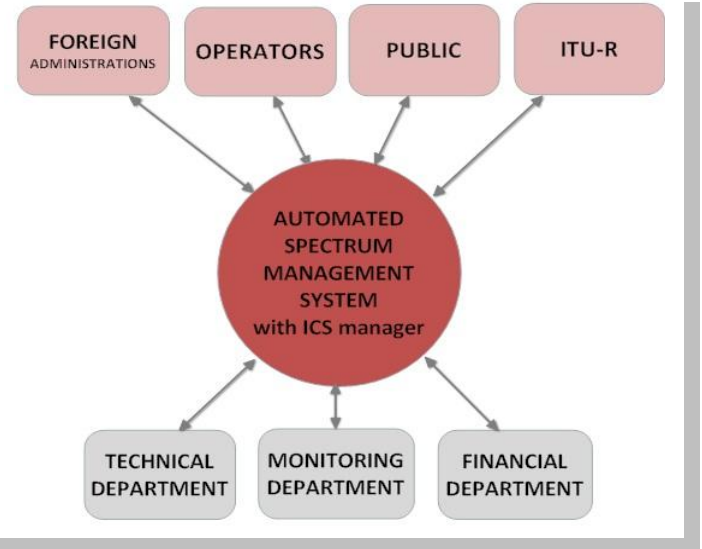
# AUTOMATED SPECTRUM MANAGEMENT SYSTEM with ICS manager

## An end-to-end automated spectrum management system

ICS manager is the most comprehensive spectrum management platform on the market. It amply meets the current and future needs of regulators in all areas related to spectrum management and control, while allowing fast ramp-up and quick user adoption

### ICS manager key functions:

- Validation of new services to avoid interfering with existing systems according to ITU, regional and national plans,
- Management of licenses and administrative procedures in accordance with national, regional and international rules and processes,
- Generation of documents (report, invoices, receipts), billing, and payment follow-up,
- Spectrum optimization and frequency sharing,
- License fee calculation and collection tracking for calculating and collecting license fees,
- Efficient information exchange and data sharing with stakeholders,
- Interface with spectrum monitoring systems.



### Key productivity tool

ICS manager is a powerful performance and productivity management tool that provides spectacular improvements of Key Performance Indicators, such as:

- Reducing application processing time,
- Reducing the data errors and inconsistencies,
- Enabling the implementation of quality systems,
- Simplifying and automating workflows
- Increasing the productivity of various processes several-fold
- Increasing employee job satisfaction and morale

### Spectrum refarming and the digital dividend

ICS manager includes all functions and data structures to manage the process of spectrum refarming. This includes detailed scenario analysis, technical and financial simulations, and actual implementation of the outcomes of the refarming process.

ATDI's platform is used extensively in planning for the digital dividend in the broadcast sector.

### Spectrum auctions, spectrum trading

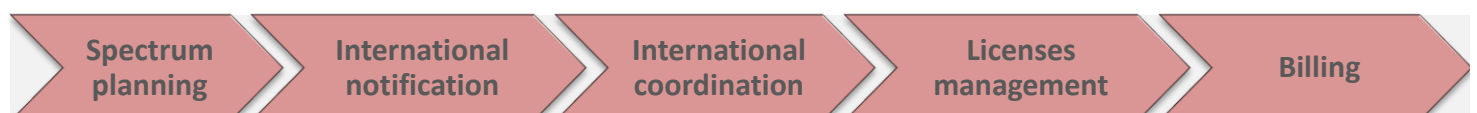
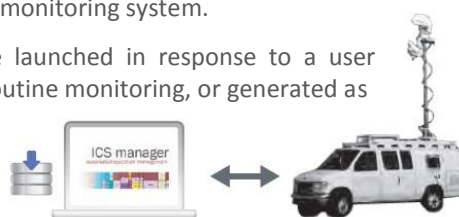
ICS manager allows regulators to manage the results of spectrum auctions and the process of spectrum trading. Tradeable spectrum can be defined in "licensed" blocks, on a geographical basis, frequency basis, and with restrictions on technology and conditions of use. ICS manager includes processes for the management of "licensed" blocks, including the tracking of issuance, renewals, modifications, transfers, etc...



### Interface with monitoring system

ATDI has developed interfaces to retrieve information from the ICS manager database and directly initiate measurements via any monitoring system.

Measurements can be launched in response to a user complaint, as part of routine monitoring, or generated as spot checks from ICS manager



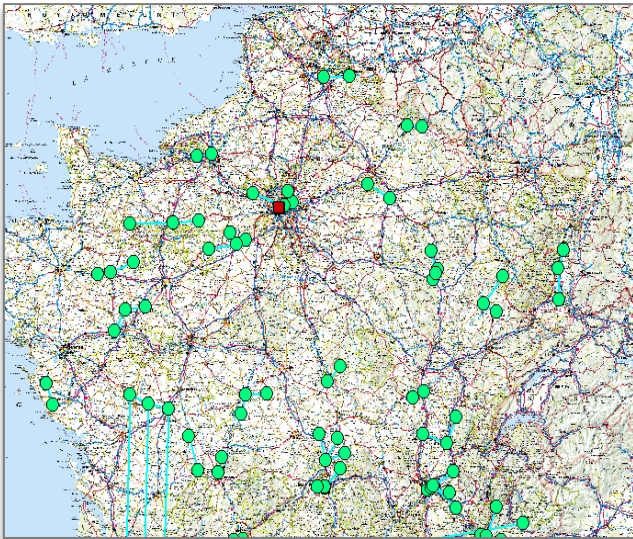
## ITU recommendations at the heart of ICS manager

ICS manager is based on the guidelines of recommendation ITU-R SM.1370. It offers:

- Upgradeable spectrum management database (SMDB) structure,
- A secure relational SMDB with direct management of access rights and user profiles,
- Standalone or client-server installation,
- Powerful data exchange functions for efficient and easy interaction with operators and other regulators,
- Report editing tools for a customized approach to each service,
- Dedicated data input interfaces and enhanced display functions for effortless handling of everyday spectrum management tasks.

### With the following main features:

- Multilingual environment,
- Project management with individual workspaces for each user,
- Fully integrated cartographic management (DTM, maps, geographical coordinate systems),
- Fully configurable and programmable process controls following custom workflows,
- Web-based access to most features, functions and processes via a secure front-office,
- Synchronized access to external tools: radio planning tool (ICS telecom), spectrum monitoring and billing systems,
- Modules adapted to each field of activity/service: broadcasting including ITU-R T01-T04, TB1-TB5, coordination and notifications according to Geneva 06, microwave, earth stations including APS4/III, FWA stations, GSM, coordination of fixed services, coordination of mobile services, Vilnius 2005 agreement (HCM), notification including T11-T17,
- Import from standard SMDB: BRIFIC, SRS, HCM, TVA, TVD, etc.



Complete digital mapping functionalities in ICS manager

## Co-existence of wireless technologies

ICS manager, used in conjunction with ICS telecom, enables regulators to dig deeply into issues of co-existence of networks and technologies, as it applies to their own country's rules, situation, and even geography.

ATDI's advanced system has been instrumental in conducting numerous studies related to spectrum engineering and interference mitigation: digital broadcast plans for the digital switchover, LTE/DVB-T co-existence studies, spectrum allocation between mobile operators in the same country, microwave/satellite interference, FM/aeronautical systems co-existence, wind turbine interference to radio links.

CH 58	CH 59	CH 60	FDD 1	FDD 2	FDD 3	FDD 4	FDD 5	FDD 6	FDD 1	FDD 2	FDD 3	FDD 4	FDD 5	FDD 6		
766-774	774-782	782-790	790-791	791-796	796-801	801-806	806-811	811-816	816-821	821-832	832-837	837-842	842-847	847-852	852-857	857-862
DVB-T			guard band	LTE DOWN LINK						duplex gap	LTE UP LINK					
8 MHz			1 MHz	30 MHz in 6 blocks of 5 MHz						11 MHz	30 MHz in 6 blocks of 5 MHz					

## Online access to ATDI's spectrum management system

ICS manager has flexible three-tier architecture, allowing regulators to offer a number of e-government services, such as:

- Online issuing, renewal, modification, transfer and termination of existing and new licenses,
- Online application for licenses,
- Online fee calculation based on the pricing policy of the authority,
- Online printing of license, technical amendments and invoice documents,
- Online EMC analyses,
- Online billing/payment status information,
- Online tracking of the licensing process.

Features and data may be selectively available to the public, to authorized users such as operators, or to the regulator's staff, on a roles and privileges basis. The interface is customizable to allow the integration of the front-end with other online services, and to allow familiar look and feel to the users.

Licence Name	Customer Name	Licence Type	Judet
FX-RRL 05/2005	S.C. COSMOTE ROMANIAN MOBILE TELECOMMUNICATIONS S.A.	Fixed	B6
FX-RRL0002/2011	S.C. COSMOTE ROMANIAN MOBILE TELECOMMUNICATIONS S.A.	Fixed	B6
FX-RRL 01/2007	S.C. COSMOTE ROMANIAN MOBILE TELECOMMUNICATIONS S.A.	Fixed	B6



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