

Editorial

## About LS telcom

LS telcom addresses:

- Spectrum monitoring
- Electronic warfare (EW)
- Spectrum management

with its

- LS OBSERVER, the monitoring and data analysis system for the forces
- SPECTRAmil system: an integrated, automated, centralised and net-centric system for spectrum management and electronic warfare
- Hardware and software system integration
- Spectrum consulting & engineering services, training

### Key points about LS telcom

- Our software and hardware systems are based on more than 20 years of experience and the most advanced information technology available
- The excellence of our consulting and professional services has been proven in many successfully completed projects worldwide
- Customers in 100 countries across the world: military organisations, ministries and regulatory authorities

Latest

## LS telcom builds tactical turnkey shelter monitoring solutions for EWOC and ESM

*The LS telcom monitoring and system integration team produces turnkey shelters for military monitoring applications, including direction finding and jamming functionality.*

This includes the integration of software and hardware as well as any other equipment necessary for full operational use of the unit. In a recent project for a customer the team built shelters to host an



Electronic Warfare Operation Centre (EWOC) as well as Electronic Support Measures (ESM).

The lightweight aluminium shelters are compliant with NATO ACE II standards. For this project, in particular, the LS experts integrated monitoring and spectrum analysis software as well as software for network planning, map generation and conversion. Omni and directional monitoring antennas for a frequency range of 9 KHz to 3 GHz were mounted in addition to direction finding antennas for HF, VHF & UHF. Other incorporated "must-haves" are the compass and Global Positioning System (GPS).

The LS engineers added a technical module in front of the shelter containing the power generator and redundant air conditioning. The shelters are equipped with either two or three operator positions respectively, with swivel chairs for more comfort and a three-point belt system for security, as the shelters can be loaded on a four-wheel drive truck. An optional electromechanical lifting system is available for auto-



nomous loading and unloading on vehicles without any other lifting capabilities.

A WiMAX microwave link establishes communications between the operation centres and the headquarters, when the distance between the units is not more than 30 km. This distance can be improved by using additional repeater stations built into small, agile vehicles.

The future operators of the centres, all specialists in monitoring, direction finding and analysis of radio signals, received comprehensive training by LS telcom. The training included modules on software, spectrum management, Signals Intelligence (SIGINT) and Communications Intelligence (COMINT) as well as practical training on rigging and handling the system. ←

## US Defense Information Systems Agency (DISA) chooses spectrum monitoring system from LS telcom

*The United States Military Joint Spectrum Center (JSC) under the direction of the Defense Information Systems Agency (DISA) acquired the spectrum monitoring system LS OBSERVER from LS telcom Inc, based at Bowie, Maryland.*

The delivery included four remote spectrum monitoring units (RMU), a central control unit (CCU) and a data analysis system. System installation, commissioning, and training were also part of the delivery. Spectrum managers from the JSC Operations Office as well as other specialised personnel

received detailed training on the equipment from LS telcom Inc. The monitoring raw data collected is directly stored within the remote units, which work in networked and stand-alone mode.

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## The forces detect, measure and monitor frequencies with LS OBSERVER

With the spectrum monitoring and analysis system LS OBSERVER you can measure the complete frequency range and store all the measurement data for immediate or future data analysis and processing (data mining, data comparison).

The system consists of a central management unit, software for detailed measurement data analysis and various remote measurement units (RMUs) for great flexibility. These can be fixed, portable, mobile or flying – depending on the demand.

The raw spectrum observation data is stored for 30 days within the remote monitoring unit (RMU).

The system then automatically compresses and stores the entire observed spectrum throughout the tuning range of the attached RF front end, while noise and zero occupancy are removed. The compressed data can be stored for about two years. A complex backhaul solution is not necessary with the data being stored within the remote monitoring unit. To access the remote unit a low bandwidth connection only is sufficient. ←



### Use LS OBSERVER for:

- Geo-spatial and temporal spectrum monitoring
- EW Operations (electronic protection, electronic attack, electronic support)
- Surveillance
- Spectrum availability, frequency channel occupancy
- Area of Operations (AOO) frequency channel occupation
- Network coverage measurements
- Direction finding to locate hostile or interfering transmitters
- Real or near-real time indications and warnings (I&W)
- Real, near-real time or post mission measurement analysis of data
- Comparative analysis of measured data against records in the authoritative database

### Geo-location / Direction Finding

You can carry out handheld direction finding and use Time-Difference-of-Arrival (TDOA), Power-Difference-of-Arrival (PDoA) and Angle-of-Arrival (AoA) techniques to geo-locate hostile and unknown transmitters and for immediate threat recognition.



## Customised Monitoring System Integration

We do not 'only' deliver monitoring equipment – our experts integrate them into your existing monitoring system, into the LS OBSERVER system and on whatever platform you need – on vehicles, naval units, aircraft and UAVs.

Our experts have extensive experience in integrating all surveillance monitoring and direction finding stations, which enables us to build completely customised solutions for client specific requests for a wide range of applications. If you need your monitoring devices and control centre on a vehicle: whatever the size and make of the vehicle, from a compact car, van truck, soft or hard skinned, we deliver the monitoring solution that suits you best. Depending on the customer's requirements our solutions include our LS OBSERVER technology, 3rd party products and also new product developments.

Our turnkey solutions cover the complete system integration project from consulting, system design, development, through to production, testing, delivery, training, and finally maintenance and support.

The success of each individual monitoring system integration project is based on our dedicated and experienced team of experts in monitoring and radio technology, IT, programming, testing, technical drawing operational military experience and project management. ←



## SPECTRAmil: The Military's Automated and Integrated System for Spectrum Management and Electronic Warfare

*Access to electromagnetic spectrum is a pre-requisite for all kinds of military operations. The military uses, controls and manages frequencies for long-term operations and temporary missions, for peacetime and humanitarian operations as well as electronic warfare.*

LS telcom's Spectrum Management and Electronic Warfare System SPECTRAmil covers all the procedures for electromagnetic spectrum operations from spectrum management, frequency assignment and allotment, policy, host nation and international coordination as well as electronic warfare operations.

In short, the system gives or can deny access to spectrum. Whatever your position - strategic or tactical spectrum manager, frequency assigner, user or requester - with SPECTRAmil you can plan, design and acquire spectrum. The Graphical User Interface (GUI), the user profile and information access to the system can be customised to your exact needs and to the tasks, you have to accomplish.

The same is true for interference analysis, frequency assignments, and other engineering calculations. They are adaptable depending on the level of command. They range from sophisticated calculation manipulation for high-level long-term frequency management, through to the warfighter's unique engineering and spectrum planning requirements, to 'one-button-operations' for real-time results presentation to dismounted soldiers. The engineering functionality covers all radio services throughout the whole radio spectrum, including radar, along with over twenty propagation models ranging from VLF to EHF (3 kHz - 300 GHz). Additional models can be integrated for specific needs.

### Support of Net-centric Operations

SPECTRAmil consists of several task specific software modules (database management system, tactical mission planning, military spectrum engineering, monitoring, DSA database, which are seamlessly integrated. Smooth data exchange throughout the different spectrum management entities involved in military spectrum operations and electronic warfare is guaranteed, making the system a true net-centric solution.

### The Operational Mode

The system can run in a networked client-server mode, on-site or in a cloud environment, or as a stand-alone mobile solution. The system operates in connected and disconnected mode. The spectrum engineering tools may be used on a laptop in disconnected mode allowing stand-alone electronic warfare (EW) activities.

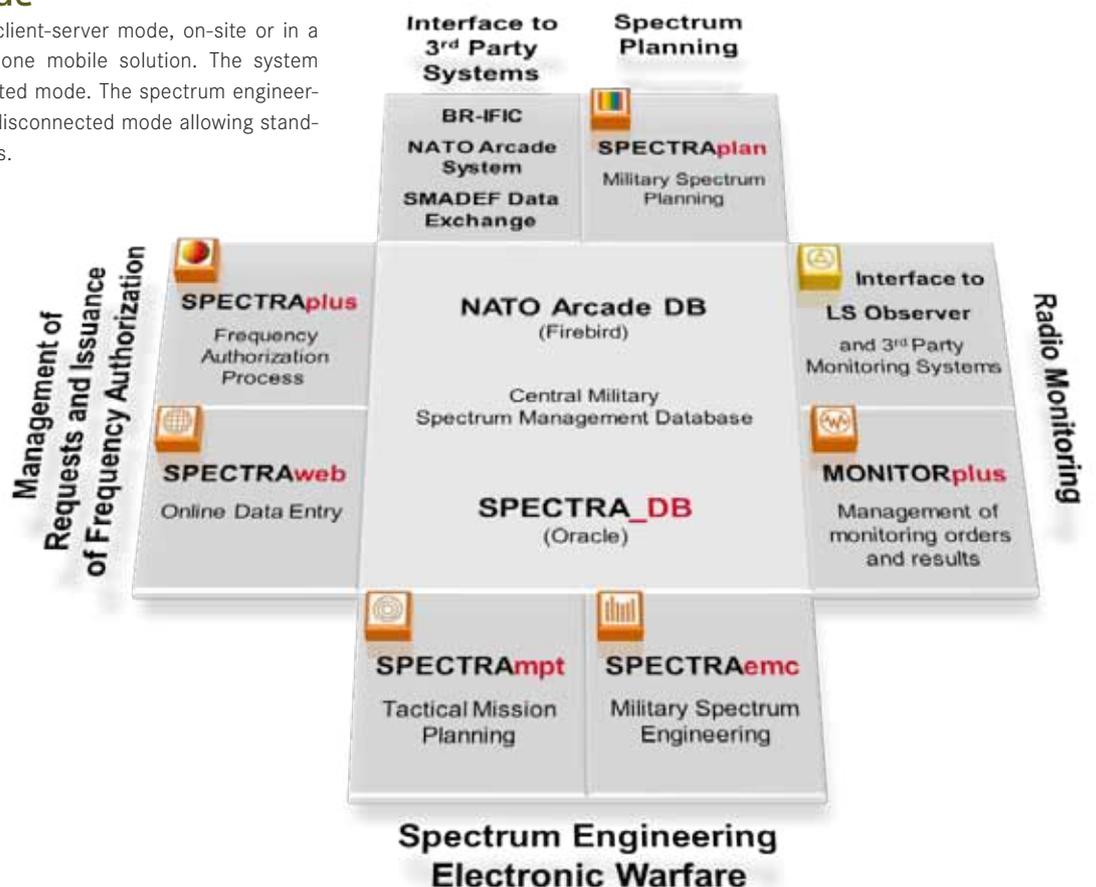
## Unique in SPECTRAmil: The wizard - your indispensable companion when you're out on a mission

*When there is no time to lose, use the SPECTRAmpt Wizard Workflow Technology for real-time tactical calculations and engineering with regards to your current location.*

When you're out on a mission, in the battlefield or in the midst of a trouble spot, you don't have hours to spend on time-consuming technical analysis to work in your favour. All your concentration is on the mission. The SPECTRAmil unique wizard technology is there to run the analysis for you and present you with immediate results to support you in the fulfilment of your mission.

The required steps for various complex analyses, such as interference analysis, de-confliction, inter-modulation analysis, near field and other calculations are mapped and stored in advance as so-called "wizards."

While out on a mission you can trigger whatever wizard you need. The wizard runs you through the calculation automatically or semi-automatically. Should human interaction be required the wizard will stop for the necessary input by the user. The wizard workflow technology provides you with immediate and straightforward results and reduces human error.



## Electronic Warfare

### Electronic Support Measures (ESM) / Electronic Support (ES)

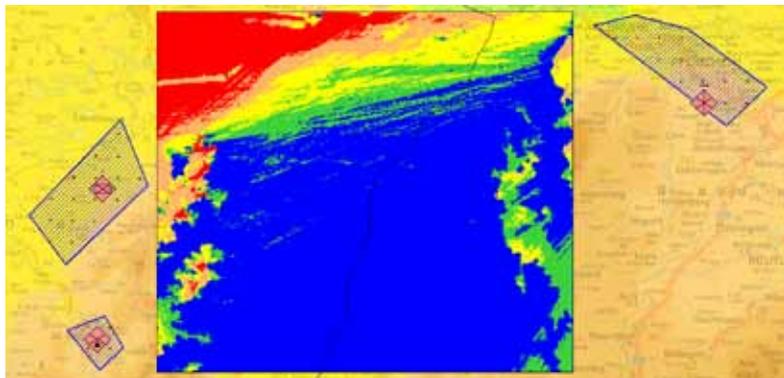
SPECTRAMil allows any operational command to simulate ESM actions to search for, intercept, identify and localise sources of intentional or unintentional radiated electromagnetic energy for the purpose of immediate threat recognition, targeting, planning, and conduct of future operations.

- Direction finding (AoA, ToA, PDoA)
- Signal interceptions
- Radars interceptions
- Reconnaissance

### Electronic Counter Measures (ECM) / Electronic Attack (EA)

SPECTRAMil allows any operational command to simulate the ECM actions to jam, dupe or destruct electronic assets or systems with electromagnetic or directed energy.

- Radar jamming
- Radio jamming
- Static and mobile jammers
- Location and power optimisation for jammers



*Pic: Optimum location for jammers*  
A colour code indicates a high or low jamming effect on the hostile radio depending on the jamming location. In this example the red zone is the best location to set up jammers, a jammer in the blue area would only have minimal effect on the enemy's ability to communicate

### Electronic Counter-Counter Measures (ECCM) / Electronic Protection (EP)

SPECTRAMil allows any operational command to simulate the EP actions to protect electronic systems as well as troops against Radio Controlled Improvised Explosive Devices (RCIEDs).

- Creation and management of Joint Restricted Frequency List (JRFL)
- Frequency hopping
- Radar countermeasures (change of radar transmission settings)

## Automated Spectrum and Frequency Management

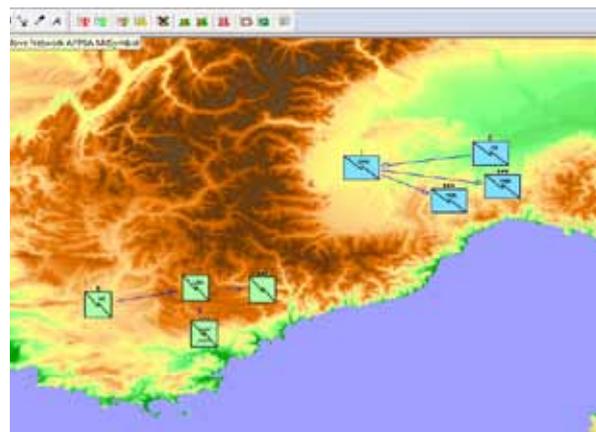
SPECTRAMil covers spectrum management for any equipment operating with electromagnetic spectrum in the frequency range from 3 kHz to 300 GHz. Frequency managers can optimise the use of the available spectrum by the forces for the support of all military operations, including command and control, intelligence, surveillance and weapon systems:

- Collection and storage in a central and secured database of all the spectrum information including the parameters and EMC characteristics of deployed emitters and receivers (EMS equipment databases);
- Import and export of spectrum management data and equipments' technical specification information;
- Compliant with the spectrum management procedures for military operations:
  - Routine or pre-planning phase
  - Planning phase
  - Deployment or implementation phase
  - Recovery phase

- Coordination of the forces' spectrum requirements (maritime, land, air, log, special forces...) with other nations and military and/or civil administrations
- Battlespace Spectrum Management (BSM) Plan including Frequency Allotment Tables, Frequency Assignments Tables, Combined Restricted Frequency List (CRFL) and Frequency Utilisation Tables;
- Control of the use of the Electromagnetic Environment (EME);
- Classification of spectrum use information (unclassified, confidential, secret, top secret).

## Network and Mission Planning

- Definition of an area of operation based on cartographic data (DEM/DTM/Clutter...) including the MGRS system
- Implementation of BSM plan
- Automatic frequency assignments and allotments (frequency hopping, free channel search, preferred frequency allotment, single use frequency...)
- Radio wave propagation simulations through various propagation models
- Congested battlespace / littoral simulations (naval, land and air emitters in the same operation area)
- Minimisation of unintentional friendly interference (fratricide interference)
- Minimisation of negative electromagnetic environmental effects (E3)
- Harmful, permissible and accepted interference
- Resolution of frequency conflicts
- Interference reports issuance
- Display of military symbols on map according to NATO APP-6A standard
- Definition of military (communication) networks and the hierarchical relation of units
- Moving units / networks directly on map



## System Interoperability

The SPECTRAMil system is interoperable with the NATO Arcade database through SMADEF XML, can use the Standard Frequency Action Format (SFAF) and is fully ITU compliant (ITU agreements, ITU IFL (International Frequency List) and interfaces to ITU databases (BR-IFIC and SRS)). In addition, the software includes extensive data exchange capabilities, such as CSV, XML file exchange format, can support the Pub 7 and Pub 8 data standard, and can be interoperable with allied and friendly forces' systems. ←

## US Defense Information Systems Agency (DISA) chooses spectrum monitoring system from LS telcom

...continued from page 1.

The connection between the central control unit (CCU) and the RMU requires only very low bandwidth. Sammy Moncada, CEO of LS telcom Inc. stated, "JSC bought LS OBSERVER to monitor the military spectrum in the Washington DC metropolitan area. The US military also used it in several joint exer-

cises for mission adaptability and activities in evaluating the Electromagnetic Environment (EME), JSC told us."

LS OBSERVER will support spectrum management teams at JCS in resolving interferences, in interference reporting, quantifying necessary spectrum and determining frequency sharing in the development of allotment plans. It is a valu-

able tool for the spectrum manager to make decisions on efficient spectrum use and for requirements definition. LS OBSERVER, combined with the spectrum management system, provides the ability to take a real-time snapshot of the electromagnetic environment for instant comparative analysis against records in the authoritative frequency database.

Sammy Moncada, further said, "LS telcom Inc. and LS OBSERVER passed the rigorous procurement selection criteria of the US military. This certifies the product's high quality and its capabilities. We are looking forward to further supporting DISA and the US military." ←

## Future challenges of military spectrum management and how to overcome them

Increasing spectrum demand and complexity: ensuring enough spectrum is available when and where needed



Sammy Moncada, Major, US Army Reserves and CEO of LS telcom Inc.



Richard V. Womersley, Director of Spectrum Consulting at LS telcom

The situation - Why is there a need for more spectrum?

Military operations increasingly depend on electromagnetic spectrum. An ever increasing number of communication and non-communication systems must share the existing spectrum. There is a rising number of automated Intelligence, Surveillance, and Reconnaissance (ISR) assets relying on wireless connectivity. In addition, advances in unmanned vehicles and drones for relay communications and observation as well as in improvised explosive devices (IEDS) are driving the increase in the military's demand for spectrum as does the integration of complex electronic attack (EA), electronic support (ES) and electronic protection (EP) technologies.

Finally, conflicts today involve many coalition and joint task forces, driving the demand for more and timely information at every level of command. Individual soldiers, for example, require situational awareness information resulting in more spectrum-enabled network links.

**The challenge - What needs to be done?**

**Sammy Moncada, Major, US Army Reserves and CEO of LS telcom Inc., and Richard V. Womersley, Director of Spectrum Consulting at LS telcom, answer our questions:**

In a nutshell, what is the imminent challenge in military spectrum management, Sammy?

**Sammy Moncada:** With the electromagnetic spectrum environment being more and more congested and contested, the greatest challenge is to have enough spectrum

available when and where needed to fulfil the required missions.

Very briefly, what needs to be done?

**Sammy Moncada:** Defence ministries and other military organisations have to become more efficient, flexible, and adaptable when it comes to access to spectrum, use, licensing and management. However, organisations are not quite prepared for this.

What would be the best way forward?

**Sammy Moncada:** There are two things: First, the military has to further deploy advanced technology, such as cognitive radio, frequency hopping and spread-spectrum devices. Secondly, the spectrum has to be managed more effectively, with the most modern tools and techniques available.

You have over 25 years of experience in spectrum consulting. In your opinion, Richard, how can military organisations succeed to overcome the challenges in spectrum management?

**Richard V. Womersley:** Defence Ministries and other organisations have to implement and improve processes and standard operational procedures of spectrum management. They have to clearly define, roles and responsibilities at strategic, operational, and tactical levels. LS telcom has worked on many change management and capacity building projects in spectrum management. Our consultants can help to establish effective organisational structures and develop frameworks for efficient decision-making in spectrum management.

The global wireless industry is looking into reallocating spectrum from defence to commercial use to meet consumer demand. This doesn't make things easier for the military...

**Richard V. Womersley:** The pressure on military (and other) spectrum users to 'hand over' spectrum to the commercial wireless industry is only going to grow and methods need to be found to enable win-win solutions for both the military and commercial users. LS telcom assists military organisations in identifying and evaluating incentives for spectrum sharing and exploiting technologies using under-utilised spectrum.

Military spectrum managers get support from LS consultants in their seeking to use commercial services and technologies without compromising national and military security.

Sammy, you mentioned before that the most modern techniques and systems are necessary for efficient spectrum management.

**Sammy Moncada:** Yes that is true. And LS telcom offers centralised and automated spectrum management and monitoring systems. Our systems are based on over twenty years of experience in radio frequency management and the most advanced software and information technology available. Our team of experts advises about the implementation so that the system adapts fully to your organisation's procedures. Work with us to set up effective organisational structures and integrated systems for spectrum superiority and mission success. ←

Visit us at our Booth...

- IDEX, Abu Dhabi/UAE**  
22<sup>nd</sup> - 26<sup>th</sup> February 2015
- LAAD Defence & Security, Las Vegas/ USA**  
13<sup>th</sup> - 16<sup>th</sup> April 2015
- Interpol World, Singapore**  
14<sup>th</sup> - 16<sup>th</sup> April 2015
- Electronic Warfare, Stockholm/Sweden**  
14<sup>th</sup> - 16<sup>th</sup> May 2015

LS telcom Training Academy



Download our Training Calendar on [www.LST.AG/Training](http://www.LST.AG/Training)



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**Coastal Radio System for Danish Defence and Maritime Authority**

LS telcom was chosen to prepare the tender for the design, delivery and implementation of a coastal radio system in Denmark that ensures safety at sea by enabling ship-to-shore and ship-to-ship communications using VHF and MF radio bands. The most prominent users of the system are the Danish Maritime Authority and the Danish Defence.

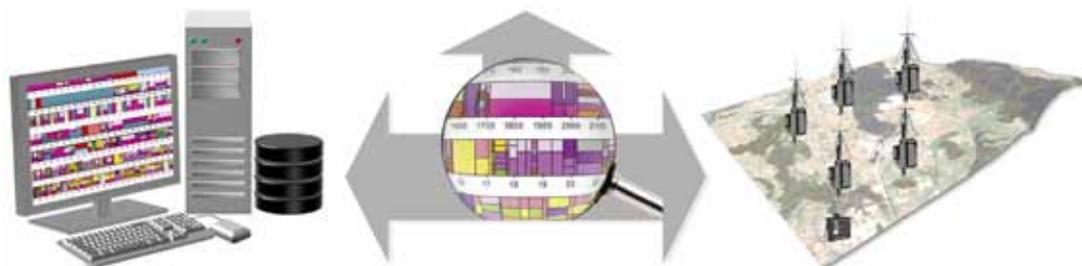
The radio system will support Denmark's fulfilment of its obligations as defined in the International Maritime Organisation's (IMO) treaty on supporting safety at sea and specifically in implementing the Global Maritime Distress and Safety System (GMDSS). ←



**Combined Spectrum Management and Monitoring Solution (CSMMS)**

The Combined Spectrum Management and Monitoring Solution (CSMMS) provides the ability to take a real-time snapshot of the electromagnetic environment for instant comparative analysis against records in the authoritative frequency database.

Spectrum Management	Data Analysis	Spectrum Monitoring
<ul style="list-style-type: none"> <li>• "A single view of the spectrum"</li> <li>• Coherent data entry</li> <li>• Sufficient spectrum for all the forces</li> <li>• Quick and efficient spectrum access</li> <li>• Dynamic Spectrum Access</li> </ul>	<ul style="list-style-type: none"> <li>• Comparison of real measured data with spectrum usage data in the database</li> <li>• Military spectrum assignment based on real-time measurement data</li> <li>• Achieve greatest efficiency possible for military spectrum use</li> <li>• Enables real spectrum superiority</li> </ul>	<ul style="list-style-type: none"> <li>• Detect, measure and monitor the entire frequency range and capture everything everywhere all the time</li> <li>• Get an immediate fingerprint of your electromagnetic environment (i.e. for leaving convoys)</li> <li>• Store „historic“ monitoring data for strategic spectrum planning</li> </ul>



**Upcoming Training Courses**

**LS telcom Training Academy, Lichtenau/Germany**

- Technical Issues in Radio Spectrum Management: February 23-27, 2015
  - Spectrum Monitoring Measurements & Techniques: March 24-25, 2015
  - Practical Spectrum Monitoring Measurements: March 26-27, 2015
- ...and many more!

For further information, please visit our website [www.LStelcom.com](http://www.LStelcom.com) or contact us:

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