

Editorial

Dear Readers,

This edition is published for the ITU World 2016 in Bangkok where LS telcom is present with a large team of experts. Meet us at the ITU World to find out how we can help you to manage your frequency spectrum more efficiently.

If you cannot make it to the ITU World from 14 - 16 November 2016, then read up on our latest projects and industry news in this Spectrum edition.

Read about our exciting 5G project we are involved in for the UK National Infrastructure Commission (NIC), or how the Australian regulatory authority, the ACMA, is future-proofing spectrum management with our SPECTRA Enterprise system.

By the way, we have introduced the new BPMN standard for business process design and implementation in SPECTRA. You find all the advantages of BPMN in this Spectrum issue.

The European Union Agency for Railways recently published a report by LS telcom about the possible co-existence of a GSM-R system with a future LTE system. Find the results in this edition!

On the monitoring side, we are supplying a nationwide monitoring system to the spectrum regulator SDPPI in Indonesia.

But this isn't all...read for yourself! We hope you enjoy reading this Spectrum magazine.

Latest

Future-proofing spectrum licensing at Australian regulator with LS telcom

LS telcom's spectrum management and licensing system SPECTRA Enterprise is now fully operational at the Australian Communications and Media Authority (ACMA) after a multi-year implementation project.

ACMA chose a SPECTRA Enterprise system from LS telcom to support, enable and enhance ACMA's spectrum management capabilities. The system includes software for spectrum licensing, broadcast license area planning and allocation, technical frequency assignment, device registration, spectrum auction planning, and apparatus license management.

SPECTRA Enterprise fully interfaces with ACMA's third-party auction, CRM and financial management systems, as well as ACMA's B2G (business to government) portal ALF-E. Over twenty-five radio communication services, divided into more than one hundred sub-services, are handled by the system. Thirty workflows support the automation of sophisticated licensing, business and technical analysis processes passing through the different systems and departments.

Rohde & Schwarz, prime contractor and LS telcom's partner for Australia for nearly twenty years, supported the ACMA team and LS telcom in the realization of the project with a

significant contribution to project implementation and customer relationship management.

Mark Loney, Executive Manager of ACMA's Operations, Services & Technology Branch, confirmed, "The SPECTRA Enterprise system from LS telcom has increased the productivity of ACMA staff and provided accredited persons with the ability to lodge complete license applications on behalf of their clients. The integrity of license data has improved with the introduction of SPECTRA and the use of licensing workflows to process electronically lodged applications has improved processing turnaround times. With the SPECTRA Enterprise system we now have the infrastructure in place and are well-positioned to implement the government's spectrum reform agenda."

The Australian spectrum reform agenda provides increasing opportunities for market-based arrangements, including spectrum sharing and trading, as well as secondary markets, which the software system will support. SPECTRA Enterprise also produces the data published in the Register of Radiocommunications Licences, which ACMA makes freely available from its website through downloads and APIs (application programming interfaces).

The implementation project finished

with the final acceptance in May 2016. It was split into several phases. LS telcom experts brought in their broad expertise in data management and analysis, data cleansing and re-structuring. They migrated all the ACMA spectrum data from several legacy systems into SPECTRA, which provides ACMA today with one centralized master database and a single view of the national spectrum.

Dr. Georg Schöne, CTO and Board Member of LS telcom, emphasizes, "Completing this project for ACMA, which included a mix of SPECTRA commercial-off-the-shelf modules and very specific customization to meet challenging Australian spectrum management requirements, adds to our long record of success, and that even with the geographical distance and time zone differences to ACMA. Once again, we have demonstrated our capabilities in managing and realizing multi-phase, multi-dimensional projects as we have already proven before, i.e. at ISED Canada, Ofcom UK, BNetzA Germany, and several world-class regulators in the Middle East. As for all projects of this size, LS telcom has established a permanent local first-class support which is realized in a joint effort by our reliable local partner Rohde & Schwarz and us." ←

Modern Business Process Management with BPMN now in SPECTRA

LS telcom has added a new standard, Business Process Model and Notation (BPMN 2.0) for workflow automation and integration in SPECTRA.

BPMN 2.0 is the leading industry and most recent ISO standard for graphically developing and documenting business processes. This standard industry notation is understandable by all parties involved in business process

design and implementation. It serves as a "common language" between business analysts, business managers and developers and makes communication between them much easier. BPMN can be transcribed directly into

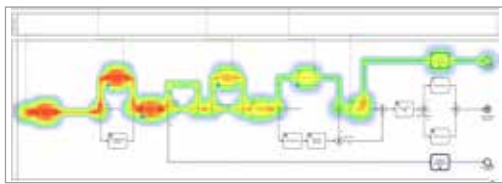


Dr. Georg Schöne, Dr. Manfred Leber, Roland Götze
Members of the Board

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executable code, not only bridging but also avoiding the gap between design and implementation so common with other methods.

As an open standard aimed at interoperability, BPMN is very cost-effective. Adopting the cutting-edge workflow engine from a leading vendor and combining its Enterprise Suite, Services, and Open Source components with complete integration in the SPECTRA System, operational costs can be reduced by a factor of between two and five as compared to other vendors' current Enterprise SOA Suite market prices. "With our sixty-plus different products in the service-catalogue,



Picture: BPMN heatmap

each with several dozens of commercial transactions and steps for regulatory purposes, technical analyses, messaging and compliance in our typical customer installations, BPMN is a real accelerator for our business process design and implementation. It helps us to shorten the design and implementation phase for our customer-adapted application and license management software by a factor of two or more," explained Dr. Marco Börger, Head of System Solutions at LS telcom. "Communicating internal business procedures in this standard manner makes cooperation between different specialists and understanding of customer-specific processes much easier."

With the BPMN Cockpit you can track your workflows and extract KPIs to improve your processes and identify bottlenecks. KPIs can be visualized in graphs, which helps to recognize and

realize the potential for improvement in a process more quickly. A popular example of this possibility are "heat-maps" that represent the frequency by which particular paths of a process have been passed through in a given period. (see picture)

A number of LS telcom customers, such as the national telecommunications regulators from Germany and the UAE, already use and benefit from the advantages of BPMN. The reach of Enterprise Level BPMN will be extended to all customers, from one-seat professional environments at one location to full scale integrated systems with several hundreds of users spread over offices spanning a continent, without any entry-hurdle or upfront licensing. ←

For more information on BPMN:

www.bpmn.org

www.camunda.com/bpm/features

UK Ministry of Defence to use LS telcom's spectrum management system SPECTRA through contract with CGI

LS telcom, the leading worldwide provider of spectrum management systems, today announces that the UK Ministry of Defence (MOD) will be using its spectrum management system SPECTRA as part of the MOD's contract with CGI.

The commercial off-the-shelf SPECTRA system will build upon the Ministry's existing Spectrum Portal to extend and improve the MOD's spectrum planning, engineering and enforcement capabilities.

The extended, entirely integrated, and interoperable spectrum management system enables spectrum managers to allocate and assign the electromagnetic spectrum more effectively. The process automation

of the system secures and accelerates processes to improve decision-making, and is another contributor to more efficient spectrum use. This is essential with military spectrum becoming increasingly congested and contested.

The spectrum management system SPECTRA is in use at the UK spectrum regulator Ofcom, and in over 100 countries around the world. ←

SPOT ON:

Costa Rica: LS telcom delivers SPECTRA system extension to SUTEL – ITU Notification module

SUTEL extends its spectrum management system SPECTRA with the ITU Notification and Coordination module to streamline the notification and coordination process and relating data exchange with the ITU and to have a direct BRIFIC and SRS data import capability. The project included the delivery and installation of the module as well as user training.

Thailand: LS telcom delivers customization project for NBTC

LS telcom has delivered a major customization project for the regulatory authority NBTC of Thailand, and adapted NBTC's Spectrum Management Solution SPECTRA to NBTC's policy changes and system requirements. The customization program included user training to familiarize the system user with the implemented changes. The project was implemented together with LS telcom's long-term local partner SkySoft.

LS telcom joins African Telecommunications Union

LS telcom joins the African Telecommunications Union (ATU) as associate member.



Picture: Presentation of LS telcom's membership certificate, Abdoul Karim Soumaila, Secretary General from ATU (right) and Laurent Uguen, Area Sales Manager LS telcom SAS (left)

"We are delighted to join the ATU" said Jean-Paul Chaib, Managing Director of LS telcom SAS, "LS telcom has always been very active in the African telecommunications market. In the past several years, the continent's telecommunications sector has been the theater of amazing innovation and breathtaking growth, often leapfrogging the developments of more mature markets. In many aspects, Africa is now leading the way. As the leading provider of solutions to regulators, it is therefore a natural step for LS telcom to join the ATU. We look forward to working with ATU and its member states, and to support them in channeling the growth of the ICT sector, thanks to our solutions for efficient spectrum management and control."

Abdoul Karim Soumaila, Secretary General from ATU, said, "We are very

pleased to welcome LS telcom as member to the ATU. LS telcom is a highly respected company in the area of spectrum management, radio monitoring, and spectrum consulting. We are confident that LS telcom will play a key role in assisting ATU to meet its objectives particularly in promoting the rapid development of information and communication technologies and the knowledge society in Africa."

The African Telecommunications Union is the leading continental organization fostering the development of information and communication technologies infrastructure and services.

LS telcom participated in the 1st ATU Preparatory Meeting for 2019 World Radiocommunications Conference (APM19-1), from 19 - 22 September 2016 in Nairobi, Kenya. ←

LS telcom supplies national sensor-based radio monitoring system for Indonesian spectrum regulator SDPPI

LS telcom, together with its local partner and prime contractor PT Berca Hardayaperkasa, will implement its sensor-based radio monitoring system LS OBSERVER for the Ministry of Communication and Information Technology, Directorate General of Resources and Equipment of Posts, Telecommunications and Information Technology (SDPPI), Indonesia.

SDPPI will use the system for nationwide radio monitoring and automatic violation detection.

The new system will enable SDPPI to continuously monitor the complete spectrum and to detect illegal and unwanted radio frequency emissions immediately. The project with a total volume of about 6.3 million Euro, of which a main share is dedicated to LS telcom's products and services, consists of more than sixty fixed remote monitoring units, which will be distributed all over Indonesia, and a large number of central control units, located in SDPPI's regional offices and their headquarters.

Dr. Manfred Leberherz, CEO and Board Member of LS telcom, explained, "Automatic violation detection necessitates true integration of spectrum monitoring systems with

the spectrum management licensing database, as well as sophisticated data analysis software. We will provide this together with unique storage, mining, and post-processing capabilities for Big Data in our LS OBSERVER system. It is the first time ever that a system of this kind and complexity is installed at a national level."

SDPPI operators will be able to detect unlicensed transmitters and identify transmitters, which are not operating within their licensed parameters. Based on the licensed transmitters' parameters in the licensing database, the integrated software calculates which signal strength should be received by a

given monitoring station at its location. If the measured signal strength does not correspond to the calculated "should-be" signal strength, the operator receives an automatic alert and can take action immediately. Duta Subagio Sarosa, Director of PT Berca Hardayaperkasa, said "Following the implementation of LS telcom's fully automated and integrated radio monitoring system LS OBSERVER, SDPPI will be able to react much faster to illegal frequency use and ultimately increase efficiency in spectrum control and management. The system to be built will be a first step in gradually and automatically building a massive but flexible spectrum inventory for future use." ←

LS telcom carries out 5G study in the UK

The UK National Infrastructure Commission (NIC) was asked by the Chancellor to "consider what the UK needs to do to become a world leader in 5G deployment, and to ensure that the UK can take early advantage of the potential applications of 5G services."

In this context, LS telcom recently won a project with NIC to assess the existing telecommunications infrastructure in the UK, which could enable future wireless networks to emerge and any challenges that might be associated with fully exploiting that infrastructure in the most efficient way.

LS telcom experts focus on understanding the type of sites deployed, their ownership, the technology and spectrum that is being used and how the sites connect to the available backhaul. The study will produce a comprehensive report addressing all of the key issues and challenges that impact the use of a diverse mix of

infrastructure and identify any challenges the UK will face in deploying the infrastructure needed for 5G roll out.

The results of the study will be part of a wider report to be published by NIC, which will provide advice to the government on the 5G infrastructure challenges by the end of the year. ←

LS telcom measures and monitors frequencies for you

You need to survey the frequency environment of critical sites or for special events? You need to geo-locate the source of interference? You are in dire need to know which frequencies are really in use?

For successful radio monitoring you do not only need the suitable monitoring equipment and define the best locations to place your devices.

You also need monitoring data analysis and reporting software as well as monitoring experts for analyzing the huge amount of measured data to provide the results you're looking for. **If you don't have monitoring devices and monitoring experience in-house, have you thought about outsourcing to LS telcom?**

We can provide you with everything you need for your monitoring exercise. We have monitoring experts to set up and operate the system, measure, store and analyze the data for

you. We deliver complete reports, which help you make informed decisions and take action immediately.

Our turnkey monitoring service includes the leasing of all the hardware, software, and expert staff as well as system maintenance. We provide our service for short-term and temporary measurement campaigns as well as for long-term and permanent measurements over several years.

We supply all types and brands of monitoring units, from fixed units to

portable, transportable, and airborne units depending on where and which frequencies you want to measure.

If you have monitoring experts in-house, then we can just provide the monitoring hardware and vice versa, if you have the system in place, but no one to use it, our experts can operate your system. Above all, we help with monitoring training and capacity building. We assist in the selection of monitoring equipment best adapted to your specific monitoring needs. ←

European Union Agency for Railways publishes report by LS telcom on co-existence of GSM-R system with future LTE system

The European Union Agency for Railways has recently published a report by LS telcom on the possibility of using the ER/R-GSM spectrum by other radio communication systems for railways in coexistence with the existing GSM-R system operated in that frequency band.

The objective of the study was to find out whether new spectrum is required for a successor system or whether band sharing during migration from GSM-R to its successor would be feasible.

Thomas Chatelet, ERTMS Project Officer at the European Union Agency for Railways, said, "Their study will contribute to informed decision-making for the railway industry's future spectrum require-

ments. We were very satisfied with the work carried out by LS telcom and we look forward to working with them again."

LS telcom reviewed several technologies, which met the rail industry's needs, and identified LTE / LTE Advanced as the only feasible technology currently available. The study further showed that the implementation of an LTE system within the R-GSM band in co-existence with

the current radio system is unlikely to be feasible unless a number of mitigating measures are taken.

LS telcom carried out feasibility and compatibility analysis, which were complemented by capacity and coverage simulations and by laboratory measurements made by the Dresden University of Technology. ←

Find further information and the report here: www.lstelcom.com/en/news/

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our Booth...

**ITU Telecom World,
Bangkok/Thailand**
14th - 17th November 2016

**PMRExpo, Cologne/
Germany**
22nd - 24th November 2016

**Mobile World Congress,
Barcelona/Spain**
27th February - 2nd March
2017

**ABU Digital Broad-
casting Symposium,
Kuala Lumpur/Malaysia**
6th - 9th March 2017

Save the date for the
22nd Annual
**Spectrum
summit**
Lichtenau, Germany
5th July 2017



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Brazil: LS telcom to review analog to digital migration and co-existence of LTE with Digital TV

Following the 700 MHz auction held in Brazil in September 2014, EAD, the consortium of the country's four mobile operators, will manage the migration from analog to digital TV. At the same time, the mobile operators will deploy 4G LTE services in the 700 MHz band.

EAD commissioned LS telcom to review the migration strategy, including results, simulations and interference mitigation. LS telcom will identify zones of potential interference of digital and analog TV with LTE services in the same band, using advanced simulation techniques integrated in LS telcom's planning and coordination software CHIRplus_BC. If required,

LS telcom will determine and recommend interference protection and mitigation measures to ensure that the two services can co-exist without performance degradation to any of them.

"We chose LS telcom for their extensive experience in this particular field. LS telcom experts have assisted operators and regulators alike with interference calculation between LTE and DTT services, mitigation techniques and optimal LTE network scenarios," explained Gunnar Bedicks, Technical Director at EAD. LS telcom has recently carried out similar studies and analyses in the UK, several countries in Asia and the Caribbean. ←

LS of South Africa inaugurates training center

LS of South Africa has launched a new training center on 26 August this year. The first training course on FM Radio 101 was presented to delegates from local radio stations. The delegates actively participated in the subject matters being presented and the practical sessions proved invaluable for the delegates who were each afforded an opportunity to set up a modern FM transmitter. This course was followed by an intensive four-day Broadcast Planning course presented to ICASA, using CHIRplus_BC planning software and



Picture: Trainees from local radio stations

many other courses took place since then.

"We felt that there was increased need for specialist training programs around radio frequency and spectrum engineering. These skill sets are in a state of decline in South Africa and the SADC* region. As very few courses are available at tertiary educational institutions, our new training center in South Africa is therefore an invaluable opportunity for the radio communications industry to receive professional training," explained Koenie Schutte, CEO of LS of South Africa.

The training center intends to obtain accreditation from the applicable Services Sector Education and Training Authority (SETA) for these training programs in the near future. ←

*Southern African Development Community

SPOT ON:

Canada: Indonesian Regulator visited LS telcom Canada for spectrum management training

The Indonesian Regulator Ministry of Communication and Information Technology, Directorate General of Resources and Equipment of Posts, Telecommunications and Information Technology (SDPPI) visited LS telcom's offices in Canada for a training course on Spectrum Management Best Practices. The course curriculum included among others a workshop style session where SDPPI's spectrum management practices were benchmarked with the practises applied at ISED Canada.

LS telcom at IBC in Amsterdam

A team of LS telcom broadcast experts was present at the IBC in Amsterdam, from 9 - 13 September 2016 to demonstrate and give expert advice on broadcast network planning, broadcast antenna measurements, network engineering and consulting as well as containerized transmitters. ←



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