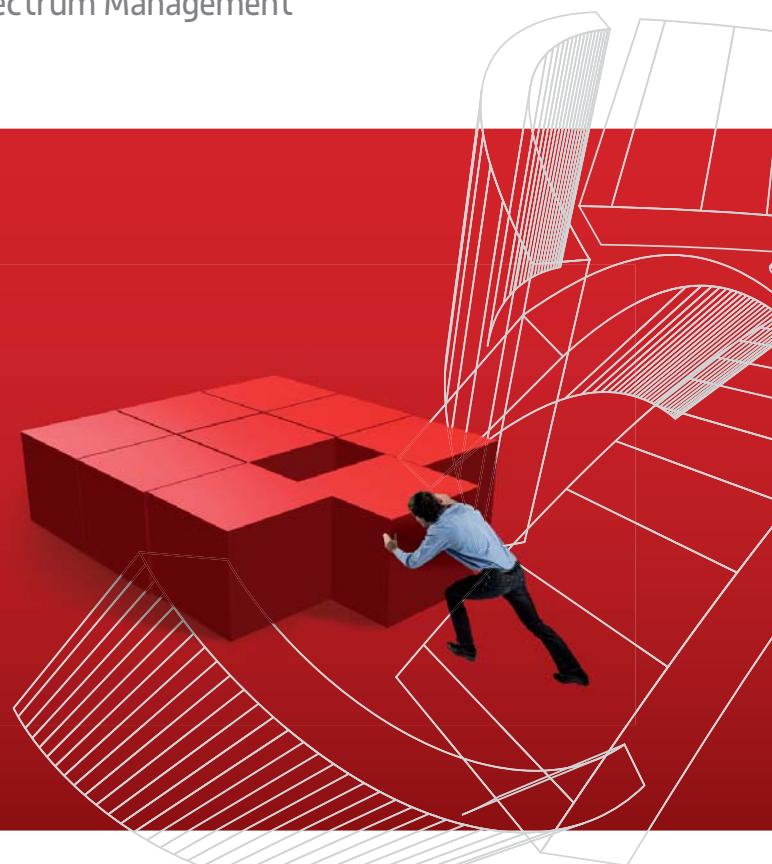




## Tomorrow's **Communication** Designed Today!

System Solutions and Expertise for Radio Spectrum Management  
and Network Planning & Engineering





# Meet the **only** Company...

for radio spectrum management and high-end wireless network planning, design & optimisation, truly offering the complete portfolio of software solutions, strategic consulting, training and radio engineering services to users and regulators of radio frequency spectrum – worldwide.

## **LS telcom:** Excellence in Software, Strategic Consulting & Training and Radio Engineering

We are the only company with a truly holistic offer for radio spectrum management and wireless network planning. **We have the mind and human capital to excel in all domains:**

**You need SOFTWARE:** We have software and radio engineers dedicated to the development and evolution of our software. Our software always incorporates the latest regulations and recommendations and covers the most recent technologies.

**You need STRATEGIC CONSULTING:** We have consultants who are experienced in radio communication business and strategic decision-making, highly skilled in project management, collaborative and dedicated to sharing their long-term experience and profound knowledge with our customers.

**You need RADIO ENGINEERING:** We have experienced radio engineers with thorough knowledge of specific characteristics, technical parameters and their interdependence. For them, there is no room for inefficiency when it comes to network planning and coordination. There is only distinction.

**You need TRAINING:** We have adequate resources to offer qualified trainers specialised in first-class broadcast, telecommunications, spectrum management and monitoring training courses, seminars and best practices education.

### **Our Expertise**

All our consultants and experts are highly trained and specialised. Our knowledge is based on almost two decades of expert research & development, our active participation in national and international organisations and study groups as well as our extensive partnership programmes with well-known universities and research institutes.

In addition, all our experts share ideas and exchange their experience in cross-disciplinary teams. This is how we ensure we are up-to-date and outperform in each of our business domains.



### **Locations of LS telcom**

The company is quoted on the German stock exchange under ISIN DE 0005754402 since 2001.

#### **LS telcom AG Headquarters:**

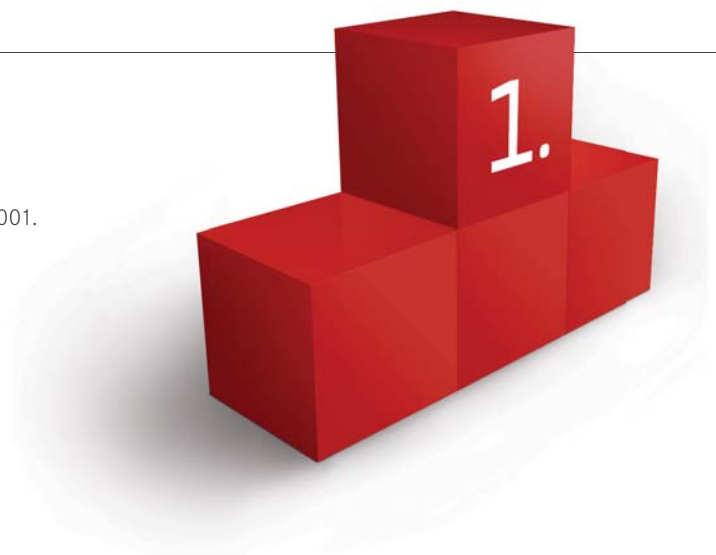
Lichtenau (Baden), Germany

#### **Subsidiaries:**

Canada, China, France, South Africa

#### **Representative Offices:**

Hungary, Oman



# Imagine the World without Wireless Technologies!

Today, modern society relies on quick and efficient communication, requires information to be accessible anywhere at any time, and depends more than ever on wireless technology: mobile telephone, broadband, private mobile radio, analogue and digital broadcast, Mobile TV, satellite communications, maritime radio, and air traffic control. Radio frequency spectrum, the basis for wireless communications, is a scarce and non-renewable resource. In line with the development and propagation of radio technologies there has been a constant increase in demand for frequency spectrum paralleled by its rising commercial value.

## Today's Challenges of Spectrum Management

Any entity dealing with frequency spectrum - whether it be **national regulatory authorities, military organisations or network operators** - is under mounting pressure to ensure that frequency spectrum is managed, attributed and used in the most efficient and optimal way. Spectrum managers today have to adopt a market driven approach which takes into consideration business rules and principles. Licensing and frequency allocation processes have reached a maximum level of complexity owing to new technologies, services and coordination activities.

**National regulatory authorities** have to live up to expectations of license owners which have risen in line with the high fees charged for lucrative licenses. At the same time, the end consumer expects high quality of

service together with reasonable tariffs. In addition, they need to consider spectrum liberalisation, spectrum trading and the anticipated use of the Digital Dividend.

**Network operators**, on the other hand, who manage thousands of stations and links and a large range of frequencies across a vast territory, for which they pay high licence fees, need to make sure they run operations in the most efficient way in order to guarantee profitability and network quality.

Only with a modern automated and integrated frequency management system solution can these challenges be met.



■ Today, LS telcom is designing tomorrow's communication!

# Solutions – Spectrum Management

## LS telcom: Experience, Excellence and Sustainability in Spectrum Management Systems and Services

LS telcom is the unchallenged worldwide market leader in the provision of Spectrum Management Systems and Services. The company was established during the early stages of spectrum management. Our SPECTRA Spectrum Management System and our expertise are based on almost two decades of expert research & development, our capacity for innovation, our dedication to customers and our active participation in national and international organisations and study groups.

The highly modular and flexible SPECTRA System covers all spectrum management tasks, such as application and licence processing; spectrum planning; technical analysis; coordination; monitoring and control, as well as financial management.

Our SPECTRA Enterprise System is one of the most advanced solutions in the world and is the flagship for modern office automation allowing for the 'paperless office' in spectrum management. Using Service Oriented Architecture (SOA) based on ORACLE BPEL,

complex automated workflows running through the complete system can be easily added or modified and can control or even be controlled by third party sub-systems. Based on this technology the SPECTRA System can, for example, be integrated with third-party products like Financial Software Systems or Customer Relationship Management Systems, such as SAP or SIEBEL, or even with an auctioning sub-system.

The solution is the most modern system for efficient spectrum management and is already equipped with intelligent functions supporting spectrum trading.



# Today's competitiveness is based on greatest **efficiency!**



**Wireless Network Operators** have to excel at every stage of the network lifecycle in order to survive in a highly competitive market. A high quality network solution that is future-proof and optimised in terms of technology, spectrum and cost efficiency needs to be guaranteed at all times.

The arrival of new wireless technologies as well as converging technologies and services bring about numerous new business opportunities. But the overlay of new and existing technologies also increases the complexity of frequency planning and network design. At the same time, consumer tariffs are falling and customers are not naturally willing to pay premium prices for diversified services and more quality. Meticulous network planning, design and optimisation are thus necessary to pinpoint the optimal network solution balancing high end-user service quality with network investments and operational expenditure.



Rely on LS telcom: LS telcom's Network Planning Solutions and Services address the efficient and profitable use of radio frequency spectrum and guarantee the most optimal operation of radio communication services covering all technologies...





# Solutions – Network Planning & Optimisation

LS telcom's offer for the telecommunications and broadcast market covers software, strategic consulting and radio engineering services for the planning of radio and access/transmission networks.

## Broadcast

The broadcast industry is undergoing rapid change and new challenges arise for the broadcast planning engineers. With the liberalisation of spectrum for new digital technologies such as DVB-T, T-DAB, DAB+, DRM and DRM+, many broadcast planning engineers have to cope in the coming years with a simulcast of analogue and digital networks before the switch-over to fully digital networks is completed.

We are the Pioneer in Broadcast & **Mobile TV** network planning solutions and services and our best-in-class Broadcast Planning Software Tool Suite is used for the planning, optimisation and coordination of **Mobile TV**, hybrid and broadcast networks. The software spans all technologies from analogue to digital broadcast and **Mobile TV**.

Many major broadcast operators and numerous broadcast regulatory authorities worldwide take advantage of our services and use our software.

## Digital Mobile Radio

The complexity and interaction of a myriad of parameters to be considered when planning a cellular radio network necessitate precise planning with a sound methodology.

Our Software Tool Suite and our experts for the design and optimisation of multiple technology 2G, 3G and 4G cellular networks support you in the design and operation of regional and nationwide networks. Our solutions for coverage- and frequency planning, interference and quality analysis cover the complete network lifecycle.

## Transmission

Our Software Tool Suite and our extensive portfolio of services for **access and transmission network planning** support operators, system integrators and equipment vendors in the planning, build-up and optimisation of point-to-point and point-to-multipoint transmission links, covering all technologies, such as fibre, SDH, PDH, FWA, WLL, LMDS and WiMAX.

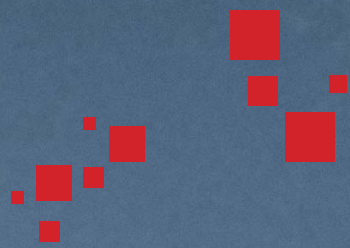
Whether you want to plan a new or extend and optimise your existing transmission network: we help you to find the best technically and financially viable network scenario.

## All our software solutions...

...are based on highly sophisticated Geographic Information Systems (GIS) and incorporate a powerful database engine. Our complete software portfolio is Windows-based and the software modules can be easily interfaced with one another and other third party tools.

Our software is highly user-friendly and adapted to the particular needs and requirements of the respective radio engineer. Relevant ITU and other national and international recommendations are integrated into the tools directly upon publication.





## PMR

Private Mobile Radio Networks used by the police force, fire brigades or ambulances – for public security and safety and to serve citizens in case of emergency – are by nature high-security networks which allow no failure rate at all. The planning for these special networks – based on, for example, TETRA and TETRAPOL technology – is a delicate undertaking and includes the indispensable planning of redundancy links for each single network connection.

With the fully-fledged PMR functionality in our Software Tool Suite and our extensive know-how and experience we are the ideal partner to serve your software, consulting and radio engineering needs for Private Mobile Radio and the related Access Network Planning.

## Satellite

Over the past forty years, communications and broadcasting via geostationary satellite systems have become integral and valued parts of the global information infrastructure.

Frequency coordination of satellite communication systems and satellite earth stations continues to be a complicated exercise. The number of parameters characterising a geostationary satellite system is so large that it is indispensable to have a reliable coordination tool to constantly check the risk of interference between satellite networks and to make sure earth stations are interference-free.

LS telcom's Satellite Planning Tool Suite and associated services support spectrum regulatory authorities and operators worldwide in the coordination of geostationary orbit (GSO) satellite networks, earth stations and radio astronomy stations.



## Software as a Service (SaaS)

**Cloud Computing:** LS telcom software is also offered as a service, which can be accessed via the Internet. Spectrum managers and radio network planning engineers can use the software literally from anywhere around the globe: from the office, from home, in the field during a site visit or from a conference venue. While the user may concentrate on his work, LS telcom takes care of software maintenance and permanent data backup. The advantages of this offer are not only of technical and practical nature, but there is also a financial dimension: during peak loads additional licences are only a mouse click away for authorised users, as is additional server capacity for temporary actions.

Privacy and protection are guaranteed through completely separate workspaces. The solution can be offered on an LS telcom server or on the customer's own server.



## Services

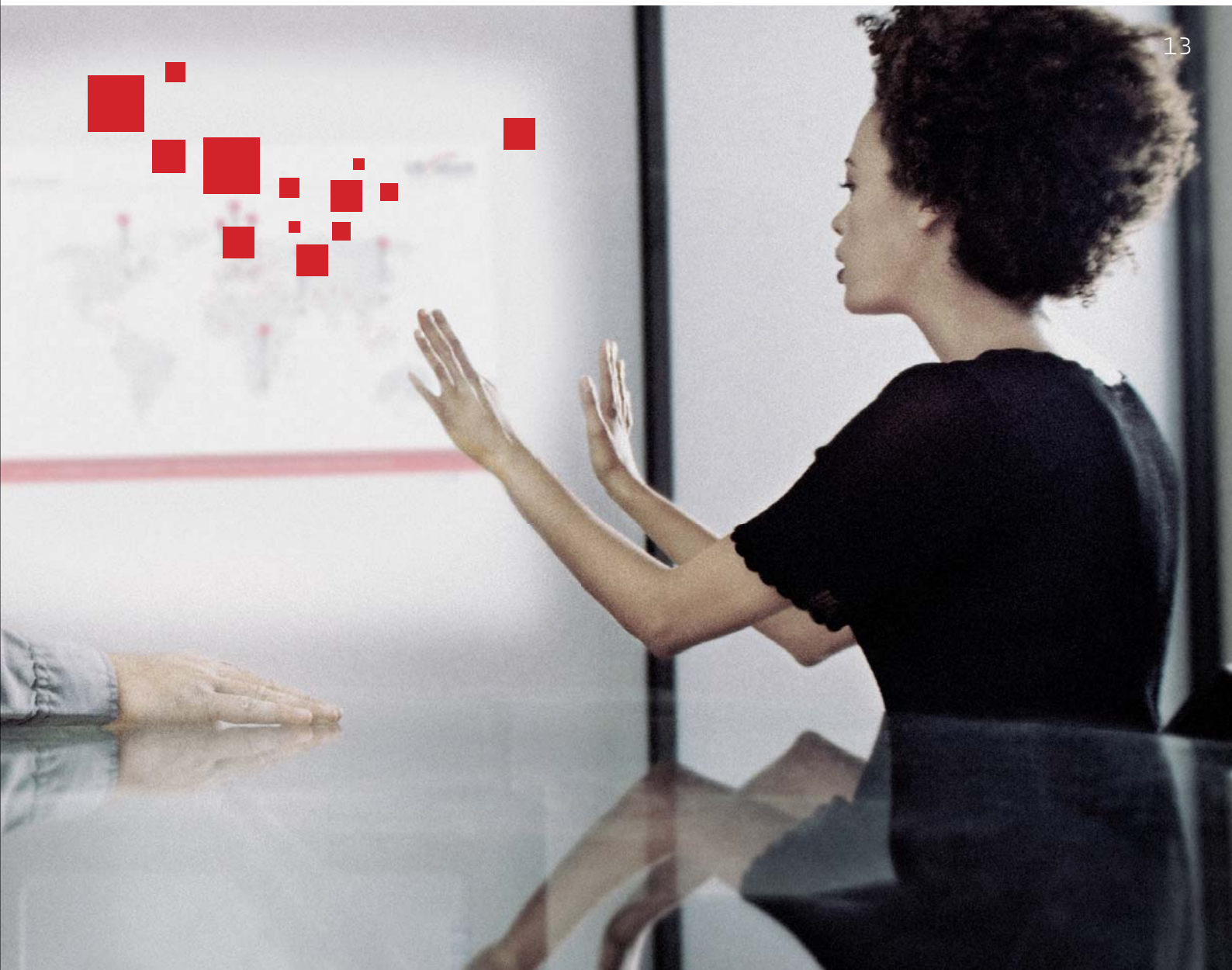
### Strategic Consulting

For frequency regulatory authorities and operators alike, operational efficiency and the optimised attribution and use of frequency spectrum are critical to assure profitability while at the same time providing the quality and service level the end user expects.

We offer high-level strategic consulting to improve processes and help make research-based decisions in radio communications. For almost two decades we have partnered and worked with network operators, radio regulatory and broadcast authorities in over 80 countries worldwide and have gained unparalleled experience in tackling radio technology and business issues.

We set worldwide standards and help our customers to:

- prepare for the future
- deliver optimal service quality to their customers
- secure quick ROI (Return of Investment)
- maximise productivity
- increase their bottom-line



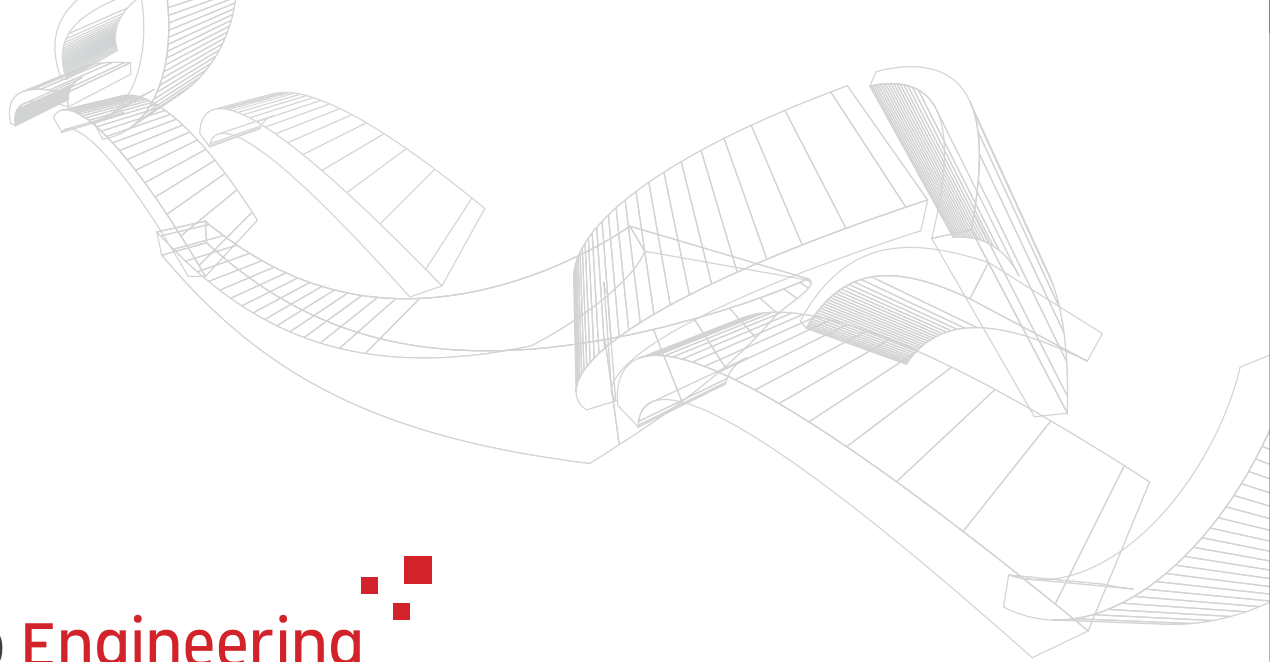
## LS Training & Competence Centre

Do you agree that your employees are your company's most valuable asset?

For more than 8 years, our LS Training & Competence Centre offers a constantly growing programme of first-class broadcast, telecommunications, spectrum management and monitoring training courses, seminars and best practices education to professionals of all levels. Our training is designed to help customers help themselves, with the focus on actionable knowledge and hands-on practice.

Today, LS telcom is designing tomorrow's communication!





## Radio Engineering

LS telcom is widely recognised in the industry for its radio planning and optimisation expertise and has a proven track record of delivering quality results in radio network planning, design, engineering and frequency coordination covering all common Broadcast, Mobile Communication and Microwave technologies.

Our extensive engineering and planning services portfolio addresses network operators, regulatory organisations as well as system suppliers and comprises the design of radio and transmission networks, coverage studies and analysis, spectrum planning & coordination, network implementation and quality optimisation.

We have experienced radio engineers with thorough knowledge of specific technology characteristics, technical parameters and their interdependence who work in close cooperation with the customer to guarantee successful projects with sustainable results.

## Global in (Customer) Experience

We draw from our global experience and listen closely to our clients to provide each customer with personalised service and results.



### Digital Mapping & Geo Data

Accurate and reliable mapping data in the appropriate format is an essential prerequisite to draw the maximum benefit from any software and planning & optimisation exercise alike using Geo Data and to produce results of greatest exactness.

LS telcom's cartographic data experts provide data for purchase and have longstanding experience in assisting our customers with the necessary data generation, integration, conversion and maintenance.



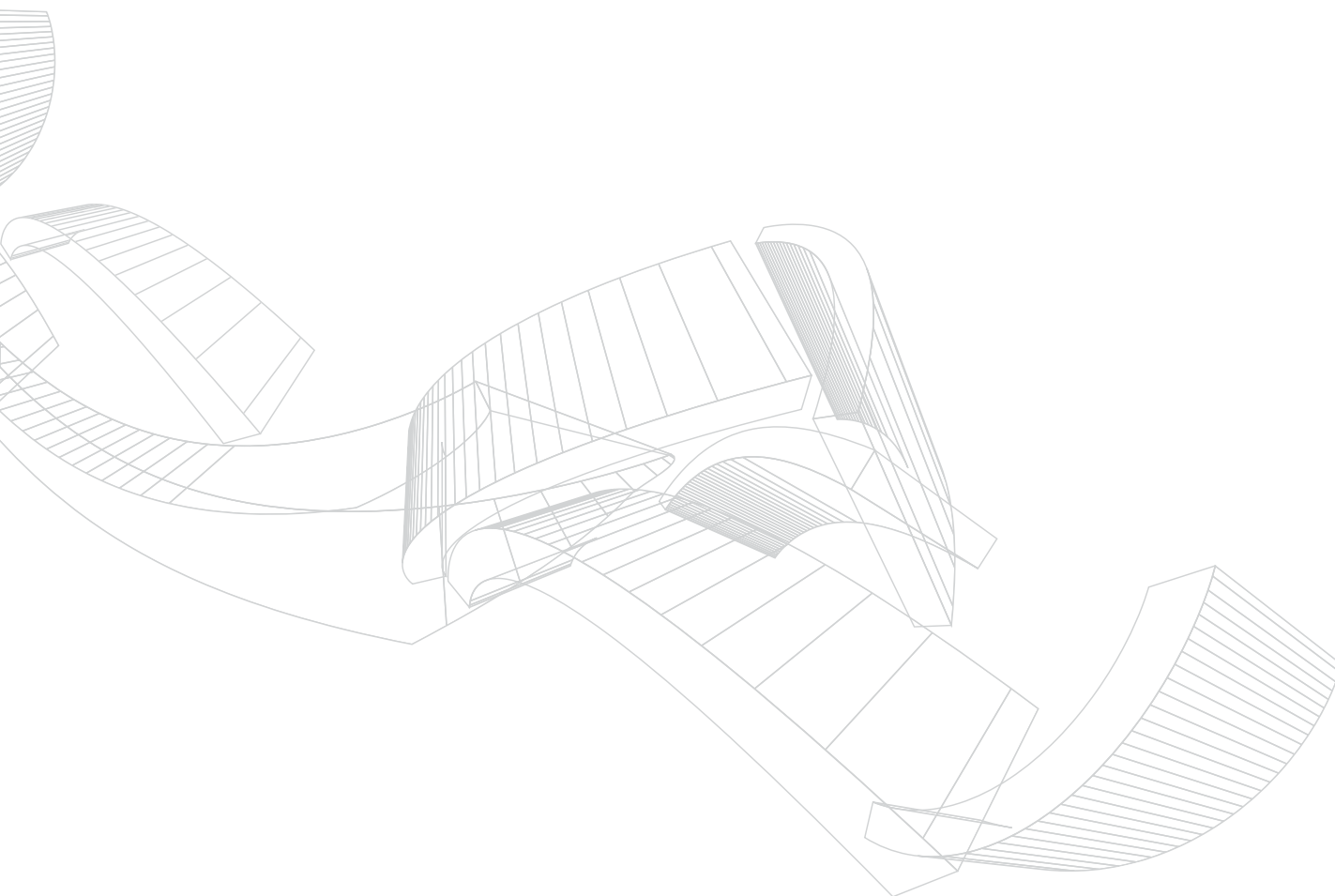
## Local in Customer Relationships

### LS telcom Customer Support Programme

Excellence in what we do and our customers' total satisfaction is our priority! We want our customers' satisfaction to last and our clients to be our long-lasting partners. This is why we have an extensive and versatile Customer Support Programme.

But we don't just talk about customer satisfaction; we make sure our customers ARE satisfied! And we have proof. Many of our long-standing customers have known us from the very beginning and have not only seen, but have also lived the evolution of LS telcom from the outset until today. Most of our customers have been confiding in our knowledge and expertise for many years and, through their feedback, have made LS telcom what we are today: a technological & expert leader in what we do. For this we would like to thank our customers!

We offer integrated, scalable and flexible software solutions which are future proven and for sustainable use. Our strategic consulting and engineering services are adapted to our customers' environment and requirements and result in long-term benefits and advantages for our clients. From 'simple' hotline support, online software updating, video conferencing, bug fixing, new software updates and refresher software training courses to new requirement definitions, customised assistance or any other problem solving: we adapt to your needs.



## We have customers in over 80 countries worldwide:

- Radio Regulatory Authorities
- Ministries
- Network Operators
- System & Infrastructure Service Suppliers
- System Integrators
- Media Companies
- International Institutions



For further information, please visit our website [www.LStelcom.com](http://www.LStelcom.com) or check our training calendar and product catalogue.

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