

Pricing Management

Load Management

Lighting Control

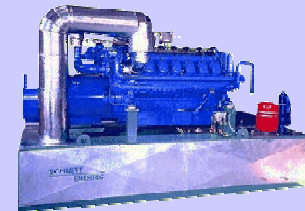
Individual Control



▶ **Connection of multi rate meters HT/NT switching**



▶ **Load management**
Connection and disconnection of load groups
Connection and disconnection of power plants



▶ **Control of lighting equipment**



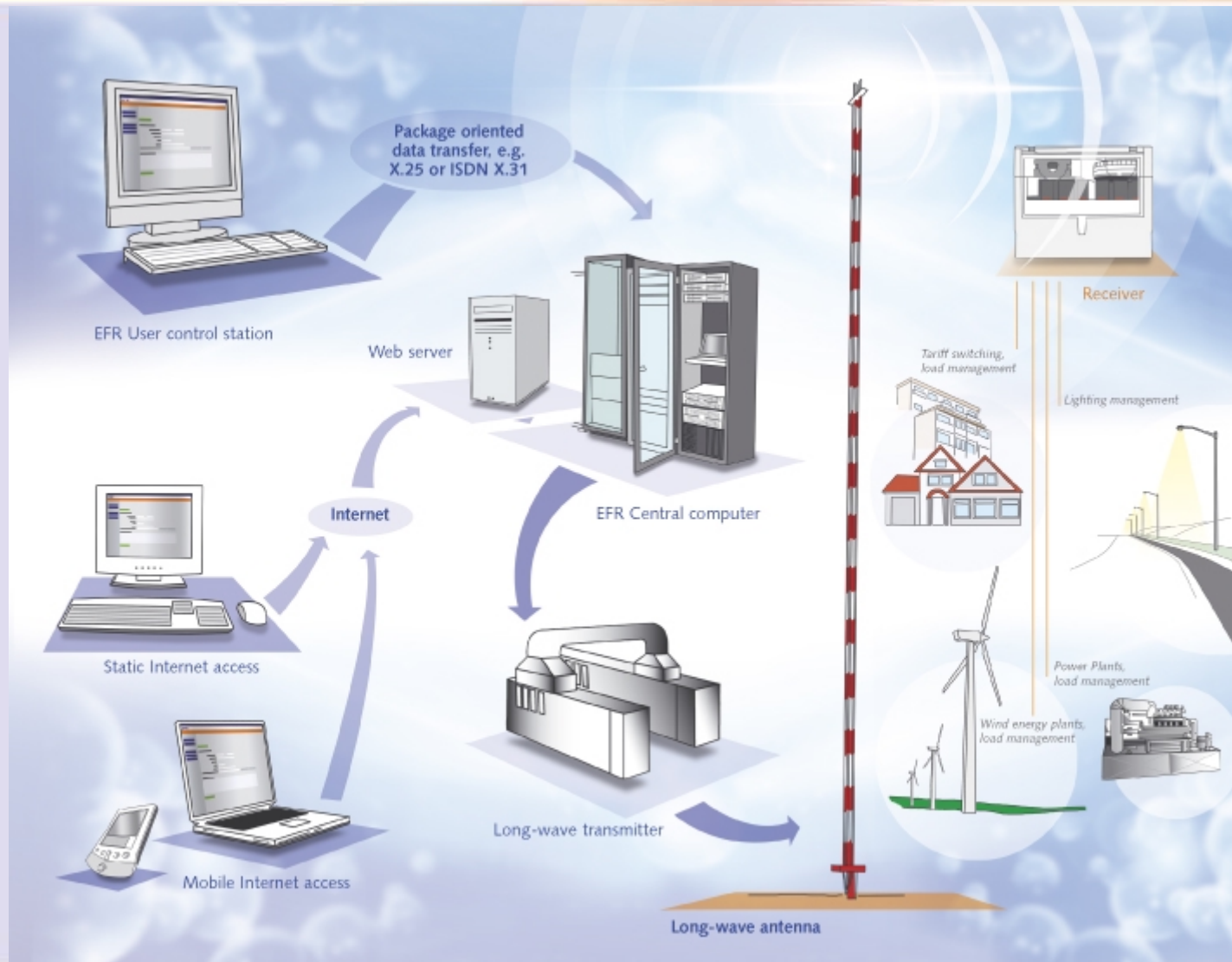
▶ **Individual controls**



Customers send their control applications to the host computer via Datex-P or ISDN using the user control station.

From there, the switch commands are passed on to the transmission devices.

Control via the Internet has also been available to customers in 2005.



- ▶ Standard PC, operating system: Windows NT or Windows 2000
- ▶ Telegram database for composing and changing telegrams in a simple way
- ▶ Web server principle for linking up to 25 clients via an Internet browser
- ▶ Option of coupling external hardware via voltage-free contacts and integration into existing control technology via TCP/IP and HTML script
- ▶ Administrator functions for adapting to the company structure, issuing access rights, setting up divisions and processors
- ▶ Constant monitoring of the system status, comprehensive reporting, protocolling functions and much more



- ▶ For communicating with the user stations and for addressing the long-wave transmitter using bus and control computers
- ▶ The data from the central computer (system parameters, users, transmission service et al.) are managed using a database computer
- ▶ The central computer causes the telegrams to be sent out at the right point in time. It regularly (approx. every 10 sec) sends out a time telegram for the purposes of synchronisation
- ▶ The computer is structured with full redundancy as a 2-computer system
- ▶ It conducts user management and checks the access rights of the system users. Comprehensive monitoring functions are integrated



Long-wave transmitter

Transmitting power:
(transmitter types)

Mainflingen	100 kW	TRAM 100 LC
Burg	50 kW	TRAM 50 LC
Lakihegy	100 kW	TRAM 100 LC

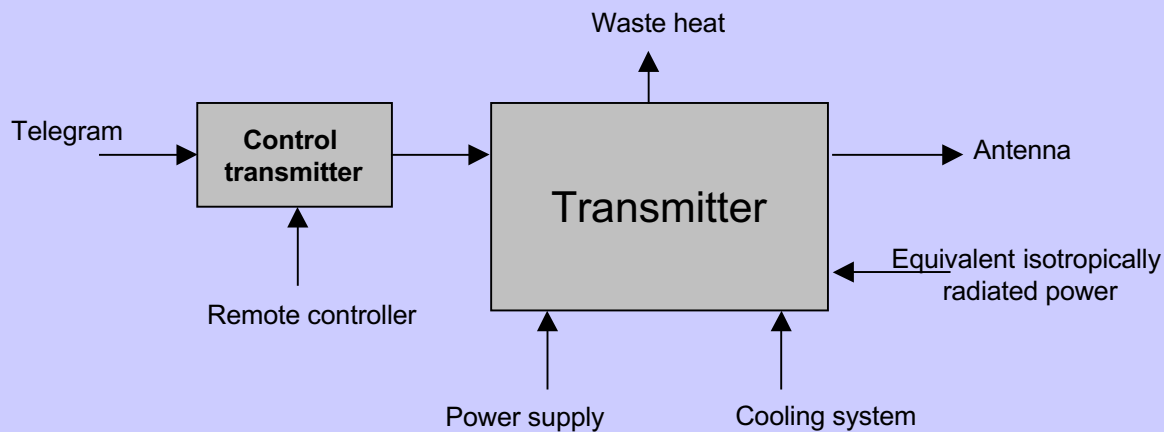
Carrier frequencies:

Mainflingen	129.1 kHz
Burg	139.0 kHz
Lakihegy	135.6 kHz

Type of modulation: FSK (Frequency shift keying)

Frequency swing: +/-170 Hz

Telegraph speed: 200 Bd



Antenna heights: Mainflingen 200 Meter
Burg 315 Meter
Lakihegy approx. 300 Meter

Antenna type: Mainflingen:
T-Antennas
(Vertical antenna with capacity
top)
Burg:
Double cone antenna
Lakihegy:
Double cone antenna

Transmit direction: Omni-directional antenna



nach DIN 19244 FT 1.2 IEC 57 (Sec)67 and ICE 57(CO)40

								PARITY	STOP	
0	0	0	0	1	0	1	1	0	1	1
0	Length							P	1	
0	Length repeated							P	1	
0	0	0	0	1	0	1	1	0	P	1
0	Reserved			Tel.-Number				P	1	
0	EVU-adresse (1)							P	1	
0	EVU-adresse (2)							P	1	
0								P	1	
0										
0										
								P	1	
0								P	1	
0								P	1	
0	Check sum							P	1	

Start signal

Telegram length

Telegram No.

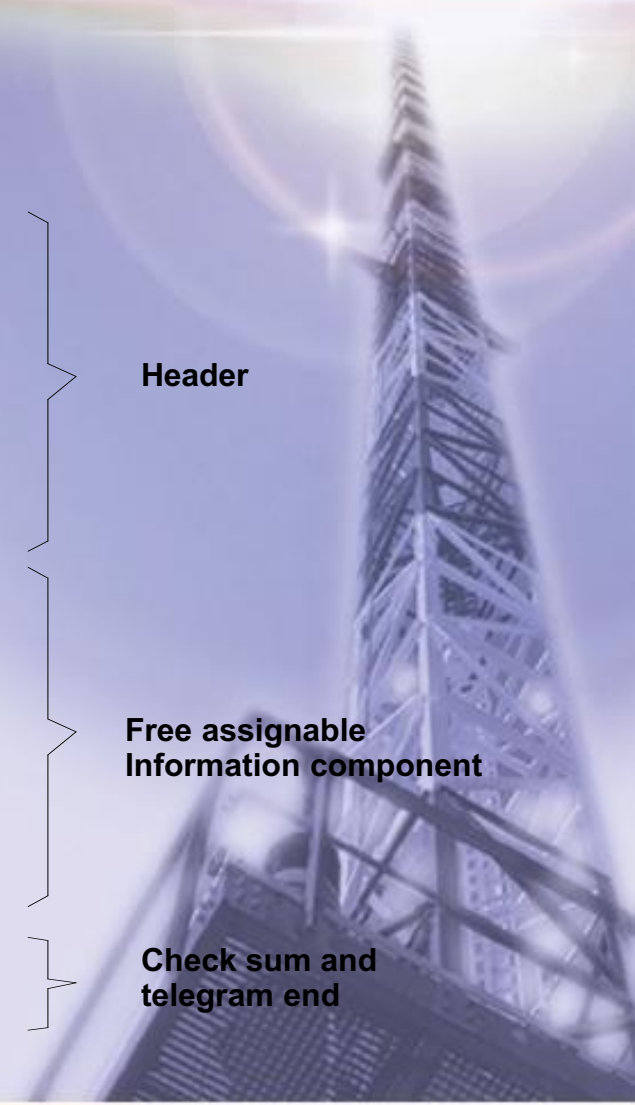
User-adresse

max. 6 byte
max. 24 byte

Header

Free assignable
Information component

Check sum and
telegram end



Radio receiver – technical properties

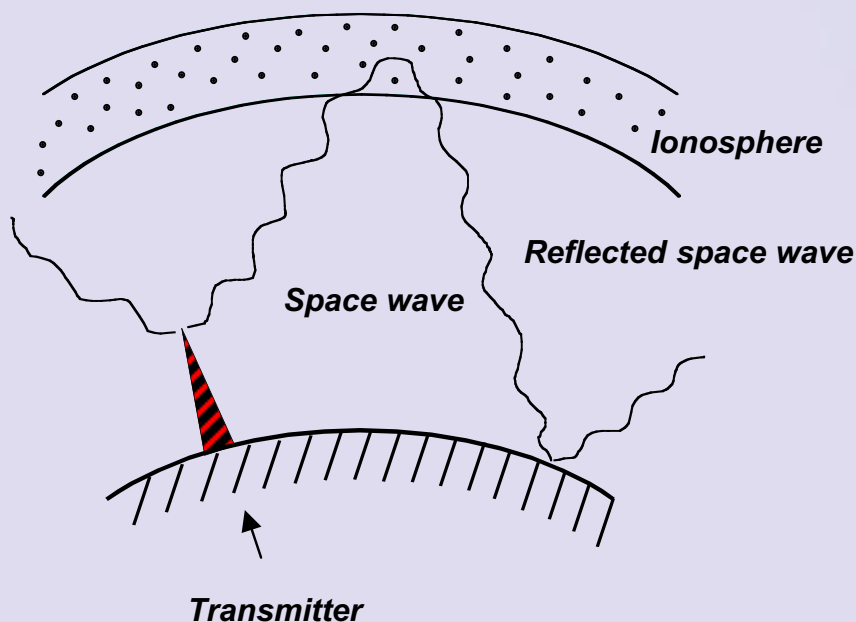


- ▶ Network connection as per EN61037, transformer with galvanic isolation
- ▶ Antenna integrated into housing, removable
- ▶ Programming using interpreter program and via optical interface as per EN 61107
- ▶ **Data transfer:** receiver frequencies: 129.1 kHz or 139.0 kHz,
modulation: FSK, radio transmission format as per DIN 19244,
telegram formats: Semagyr-Top or Versacom,
Receiving level >55 dB μ V/m
- ▶ **Relay:** 1 to 6 bi-stable, potential-free relay with two-way contact.
Position indication and hand operation
- ▶ **Accessories:** optical/acoustic alignment assistance, parameterisation database, parameterisation program et al.





- ▶ Fundamental propagation of long waves as ground waves and space waves



- ▶ Indirect reception by reflection at the D-layer of the ionosphere

Space waves can reach over long distances (depending on the angle of radiation and reflection)

Reflected space waves can be reflected again. Huge distances can be reached by multi-reflection

- ▶ Propagation of the space wave is heavily influenced by the time of day and by the season

- ▶ Space waves are not important for radio ripple control

- ▶ Only the ground waves are important for radio ripple control

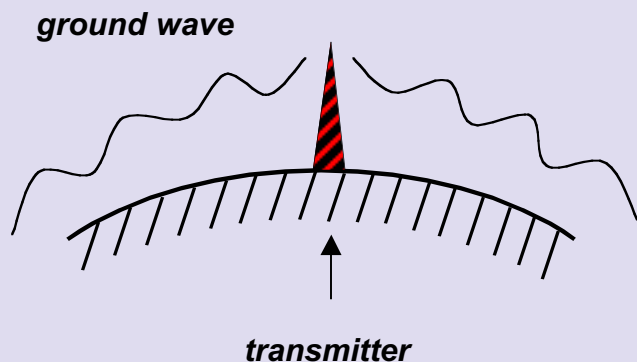
- ▶ Ground waves: Waves radiated from the transmission system which are parallel to the earth's surface

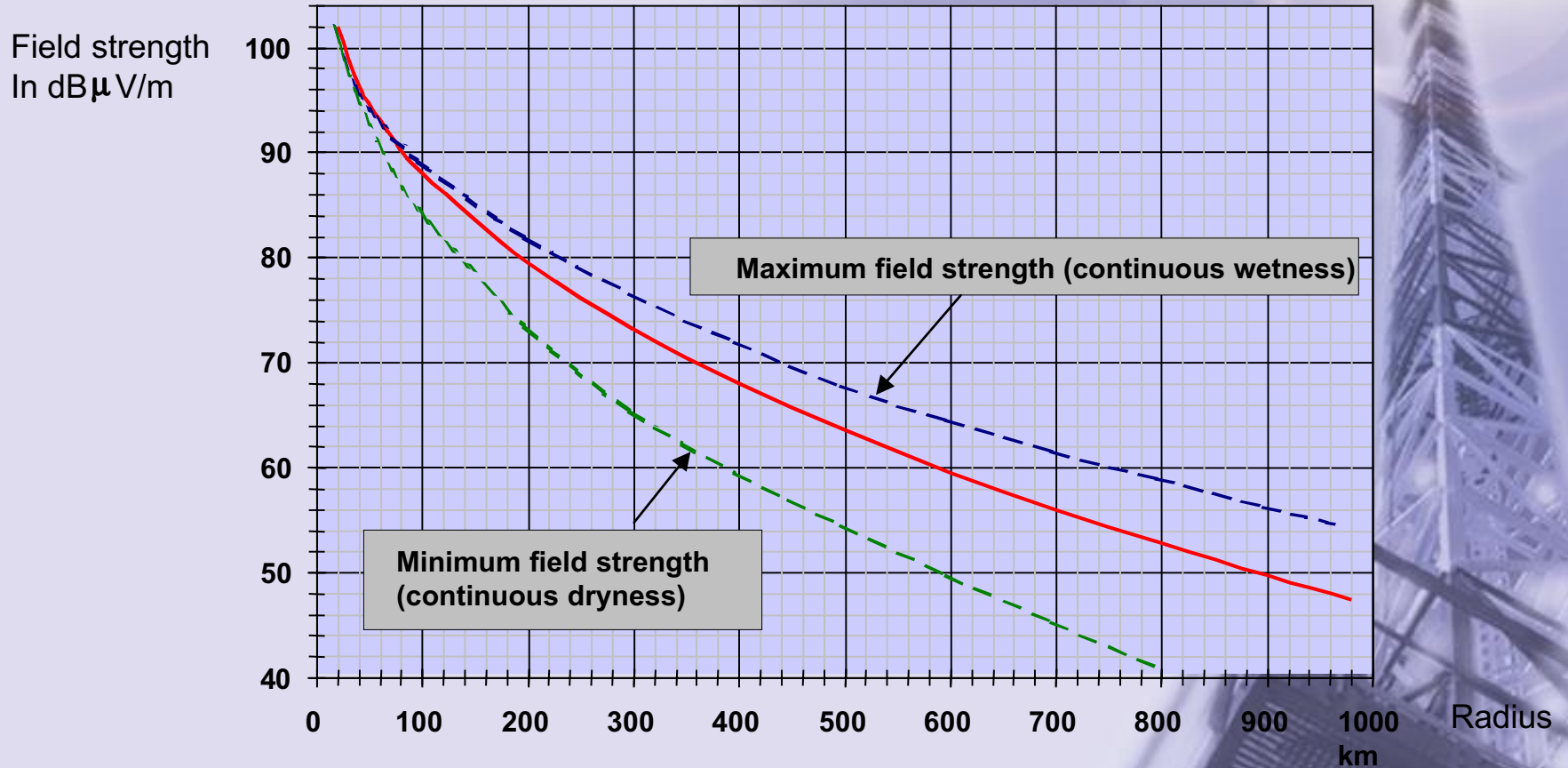
- ▶ The propagation of these waves is affected by obstacles such as forests, mountains and structures

The range of ground waves is limited by damping

- ▶ The ground wave also penetrates deep into the ground itself – the lower the frequency, the deeper the penetration

This means, that reception is also possible in basements!



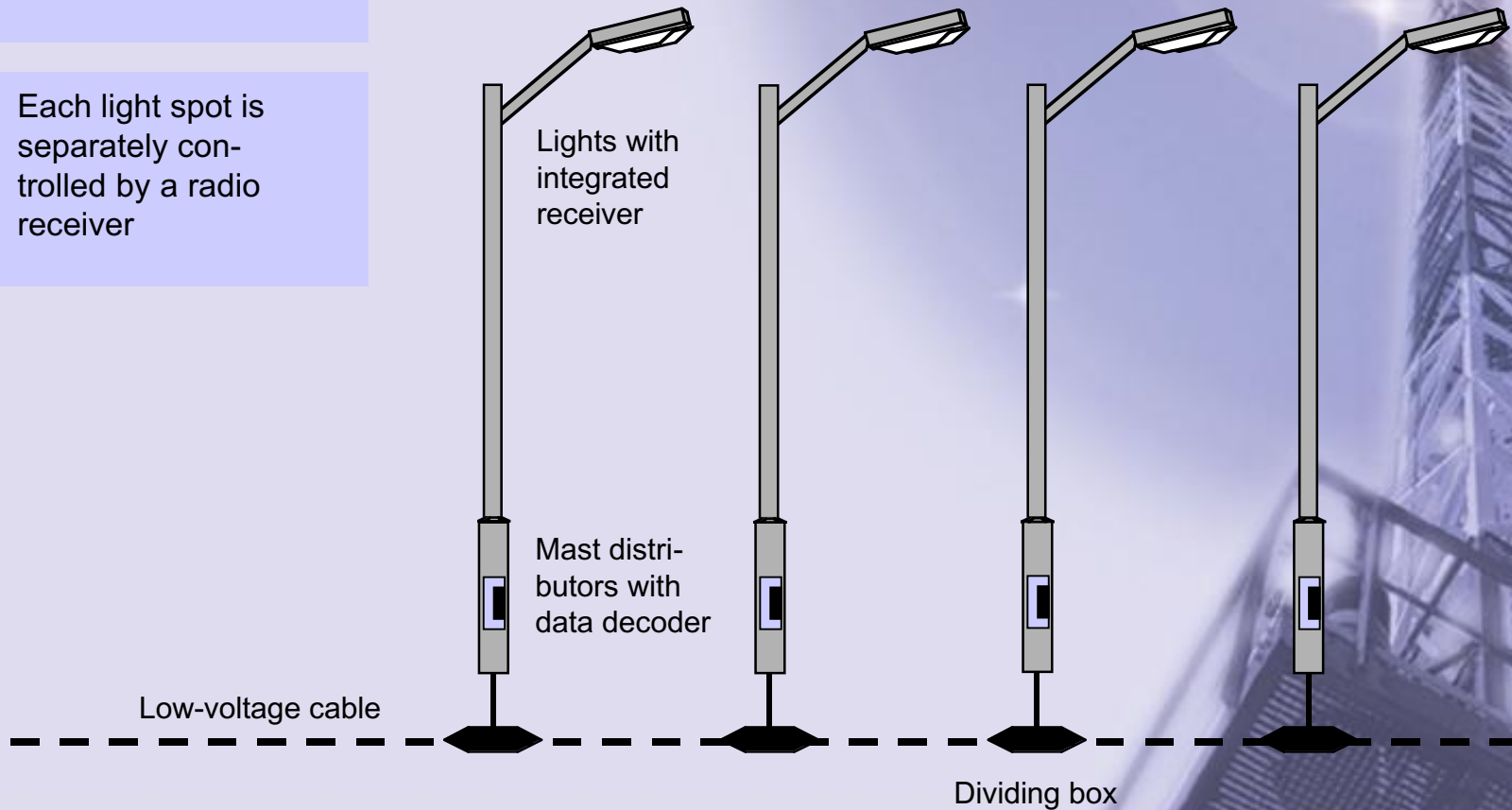




Connection options – individual switching

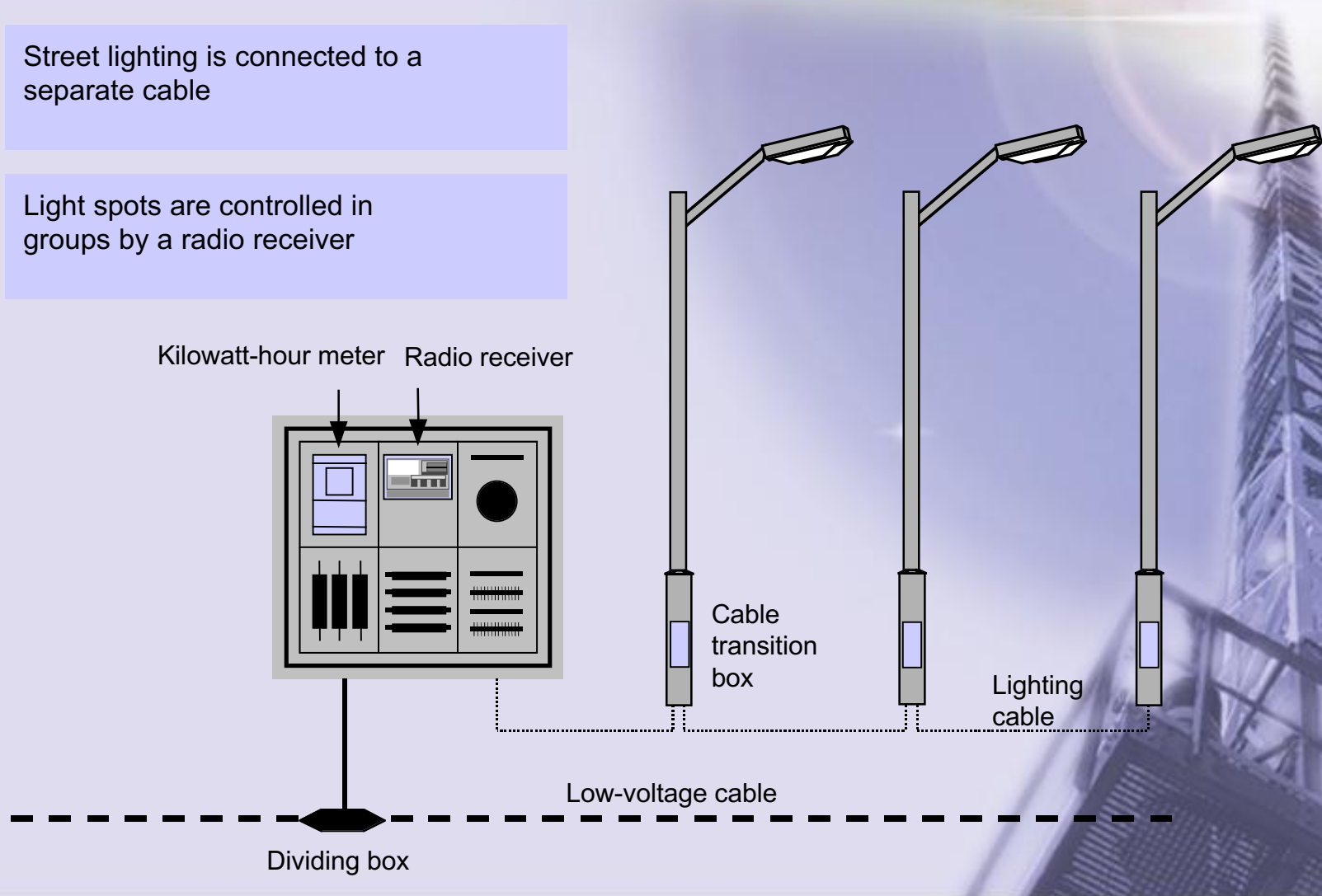
▶ Street lighting is directly connected to the low-voltage cable network

▶ Each light spot is separately controlled by a radio receiver



Connection option – group switching

- ▶ Street lighting is connected to a separate cable
- ▶ Light spots are controlled in groups by a radio receiver





Economical

through low investment and operational costs



Independent of network

without retroactive network effects, no effect on the voltage quality



Immediately available with blanket coverage

ease of installation

flexible group and individual control options

System comparison for non-quantifiable properties

Properties	Audio frequency ripple control	Radio ripple control
Several unit manufacturers	+	+
Flexible tariff adjustment	+	+
System availability	+	+
Service life of receiver	+	+
Installation	-	+
Transmission speed	-	+
Modulation range	-	+
Influence on voltage quality	-	+
Dependence on network condition	-	+
Operation of electrically isolated power supplies	-	+

+ = good - = less good

▶ **Commissioning and operation of transmission devices**

Commissioning and operation of transmission devices

Protocolling of the transmission operation

Coordination of the servicing plans for the transmission devices

Further development, operation and maintenance of the central computer unit

▶ **Sending out and managing telegrams**

Prioritising telegrams for immediate transmission

Plausibility testing and protocolling of radio telegrams

Composing individual ripple telegrams according to customer preferences

Time telegrams sent out regularly

▶ **Sales of radio ripple receivers and components**

Requirement analysis and product selection in conjunction with customers

▶ **Assembly of radio ripple receivers**

Creation of integration concepts

Call for tenders and issuing of assembly assignments. Coordination of assembly

Equipment documentation

▶ **User training**

Introduction on how to operate the user station

Parameterisation training for receiver software

Training of assembly staff



Field measurement

Performing technical radio examinations

Testing and authorisation of new products to be used in the radio ripple system



Consulting

Performance/support for economic testing, comparative testing of systems et al.

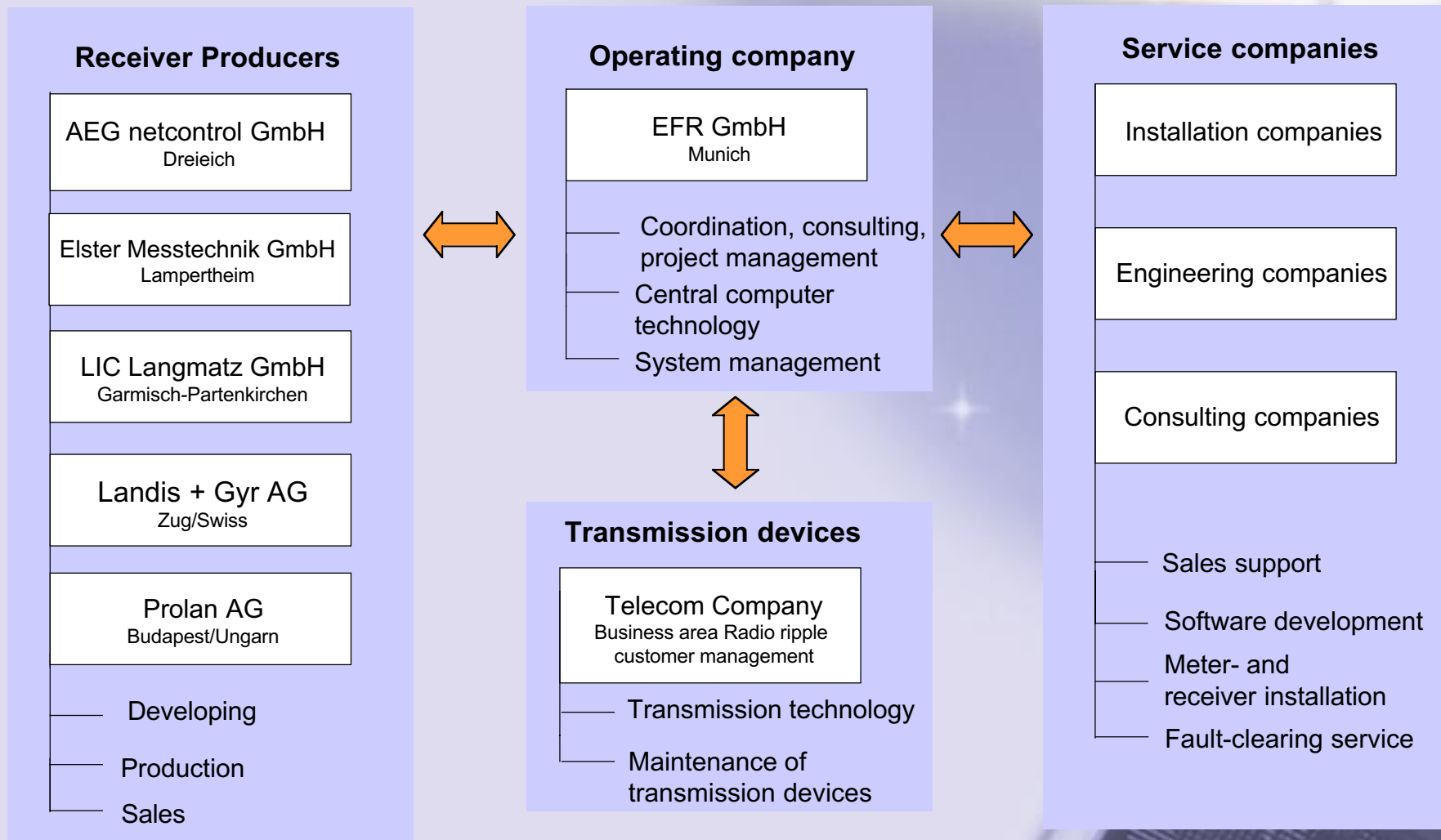
Consultation on all ripple control issues

Ready-to-use projects for the introduction of radio ripple



Fault service

Fault analysis, fault consultation and fault repair



References

(exemplary)



Number of radio receivers installed

