



Regiolux has broad horizons
Progress needs innovations that lead away from
supposedly predetermined paths. In turn, innova-
tions require both boldness and confidence in the
technology concerned. To find solutions for the
challenges of our time, we have to work together
in networks and interact more intensively – ex-
tending our horizons. Without such cooperation,
there can be no adequate and modern answers to
these challenges in our ever more complex world.
So we are enhancing our innovative strength by
forming better networks in order to promote new
technologies. This is the Advanced Services ap-
proach.

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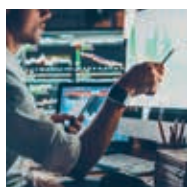
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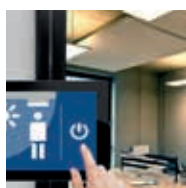
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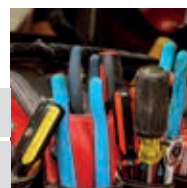
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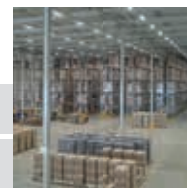
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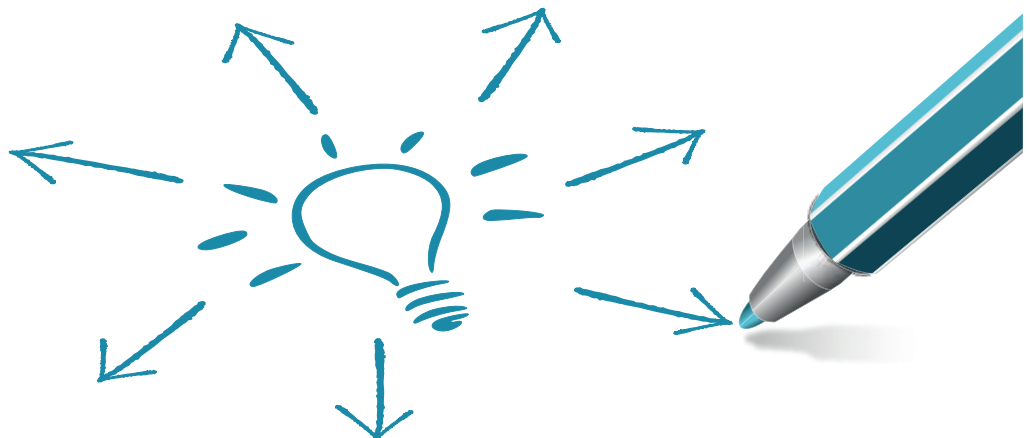


Luminaires as an infrastructure platform

As a specialist for intelligent lighting solutions, Regiolux also handles Advanced Services. This means that our specialists take care of the project planning and implementation of the wishes of customers who want to make use of new and innovative technical opportunities. We have also proved ourselves an expert partner for complex requirements going beyond the use of light and luminaires.

Luminaires are an ideal infrastructure platform for Advanced Services, since they allow the integration of additional intelligent components. These make use of the power supply of the luminaires and their even and

unimpeded distribution in the building. Specialists from Regiolux work closely with appropriate partners to implement the desired solution. Planners who have been commissioned by their clients to implement a system for indoor navigation, for example, can contact us directly. A concept is drawn up together with a partner. In this case, Regiolux integrates a beacon infrastructure in the luminaires and puts them into operation together with the partner company. The major customer advantage for all the Advanced Services is that Regiolux can recommend the most cost-effective system because it is not dependent on any particular manufacturer.



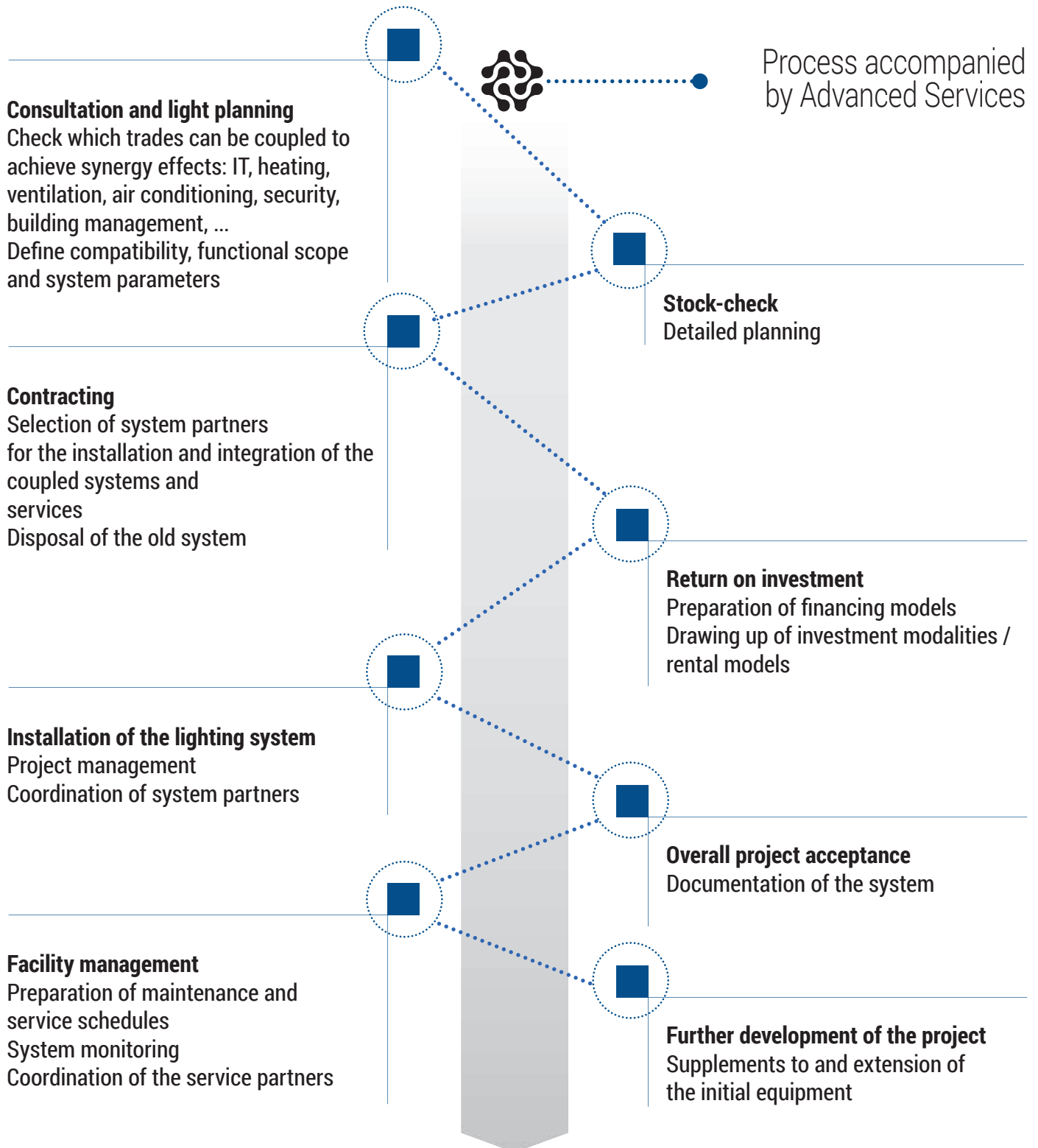


Regiolux Planning Concept

Using synergy effects for all trades means using the light infrastructure and Advanced Services.



Enhanced light quality
Energy-efficient modernisation and increase in efficiency
Implementation of Location Based Services
Investment management
Modern functionality and customer-oriented operating options
Scope for future options



Advanced Services



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FAQs

What does the term “Advanced Services” mean?

We have chosen the term because our conventional technical service tasks have changed. As well as advising our customers about products, we are being asked to provide more and more services and know-how that used to belong to the service sector.

Which new services do you mean?

Following the upheaval in the lighting industry caused by LEDs, further changes are taking effect. Terms such as “digitisation of light” and “light as infrastructure” are often used to describe these. IoT also plays a significant role of course. The intelligent networking of components generates data flows that can be linked with evaluation and tasks. We are on hand to provide assistance with our component and programming know-how. This goes far beyond planning and commissioning on site.



Products with this symbol are designed for Advanced Services: Advanced Services proof

How did this new field develop at Regiolux?

In the Light Control area of our product range, we not only supply modules for lighting solutions to our customers, we prepare these for specific projects as well. Light Control is the toolbox for this area. We always keep up-to-date here and follow technological developments.

So what is new about Advanced Services?

Based on the tasks and experiences in Light Control, we have pushed our own product development with partners. They help us to raise conventional lighting solutions to a new level. And now we also have Location Based Services and Smart Building concepts that can be integrated in the world of IoT.



What can Regiolux achieve as a conventional luminaire manufacturer?

We have already gained a great deal of experience with project solutions. In the shop and logistics sectors, the tracking options and so-called Location Based Services are of interest. The opportunities are now being used to enhance efficiency and make systems IoT-ready. This increases process efficiency.

Why go for a large-scale solution with “Advanced Services” from the start?

The developing a concept that provides for possible connection to likely system extensions pays for itself as soon as modifications are due to the existing system. During the start phase, relatively simple means can be used to lay the foundations for subsequent complex systems.

What is your objective with “Advanced Services”?

We design the lighting infrastructure and provide the interfaces for linking in further components. They have to fulfil their tasks safely and reliably within the overall system. Standards and protocols must be complied with here and we also accomplish this via software. We see ourselves as part-

ners and “system integrators” across all sub-areas. Every project solution has a different emphasis and its own focus or challenges. We see the greatest potential for Advanced Services at Regiolux in the required flexibility.

IoT

Internet of Things

The Internet of Things (IoT) is a collective term used for technologies of a global infrastructure which make it possible to interconnect physical and virtual objects and make them work together through information and communication technologies. Components such as sensors and actuators extend functionality by recording states or executing actions. The aim of the Internet of Things is to automatically record relevant information from the real world. This information is mutually linked and made available to other processes and systems in the network as well.



Industry 4.0

Industry 4.0 is the term used to describe the comprehensive digitisation of industrial production.

Industrial production is to be integrated with modern information and communication technology. Intelligent and digitally interconnected systems form the technical basis for this. With their help, self-organised production should be possible to a major extent: in Industry 4.0 humans, machines, systems, logistics and products communicate and cooperate directly with one another.



Regiolux luminaires with this symbol are "Ready for IoT"



Regiolux

Ready for IoT

In intelligent buildings, lighting systems form the ideal infrastructure for IoT technology. They are available throughout the building and provide the power supply for the components. Regiolux provides the required interfaces to IoT systems in luminaires in order to exploit the technology's potential. In the field of Advanced Services, Regiolux bundles expertise to achieve the integration of IoT

technology and services. This allows upgrading and retrofitting of lighting solutions depending on the specific task in question. We mark IoT-capable luminaires with a Ready for IoT symbol.

Location Based Services

As the name implies, Location Based Services are location-based services that are coupled to a mobile device. Personalised communication becomes possible based on the identification of the location of the mobile devices.

Knowing where everything is – tracking

The term tracking is used for following objects. The aim of tracking is to determine and retrieve the precise location of any object at a given time. This also includes recording and analysing customer behaviour. Processes can be initiated or optimised on the basis of this information. It is also designed to guarantee transparency within the different stages of a supply chain. With more information, departments such as Purchasing, Production, Distribution, Marketing and Controlling can plan and control measures.

On the spot – indoor navigation

Indoor navigation works like a GPS navigation device in your car. The difference is that Bluetooth signals are used rather than GPS signals and the satellites are called beacons. The idea is to make it easier to find products or offers through navigation aids. In addition, information can be displayed about the product or complementary products. Indoor navigation in a hospital is a solution for patients, visitors and employees. It helps people find their way and improves orientation.



Beacons

In conjunction with beacon wireless technology, smartphones and PC tablets can receive communication via an app. They are installed in buildings and used for position finding. Beacons are used in marketing and permit shop visitors to be localised and location-dependent information for the app to be sent to the mobile device. Application examples include:

state monitoring, tracking of security personnel, stock management, analysis of customer behaviour via heat maps and feeds containing typical shopping baskets. In a hospital, medical equipment can be located, and personnel & patients localised in the building. The freedom of movement for dementia patients can be controlled and mobile distress calls set up.





Beacons are small wireless transmitters which transmit signals to mobile devices via Bluetooth. They usually have no influence on other wireless networks or medical equipment. Their accuracy makes the precise determination of position possible. They can be integrated flexibly into lighting systems and in-house electrical systems.



Location Based Services in Practice

Healthcare

The recording and localising of technical medical stocks in hospitals offers cost-saving potential. Efficient use in the right place at the right time is a major advantage, particularly where high-quality equipment is concerned. Time-consuming searching is avoided and the capacity utilisation of the equipment can be improved. Location-related patient address including guiding and locating

systems accompany patients during their stay at the facility. They transmit relevant information and manage schedules with the aim of relieving the strain on hospital staff. At the same time, this allows processes to be streamlined and individual services to be offered to patients – without a language barrier.

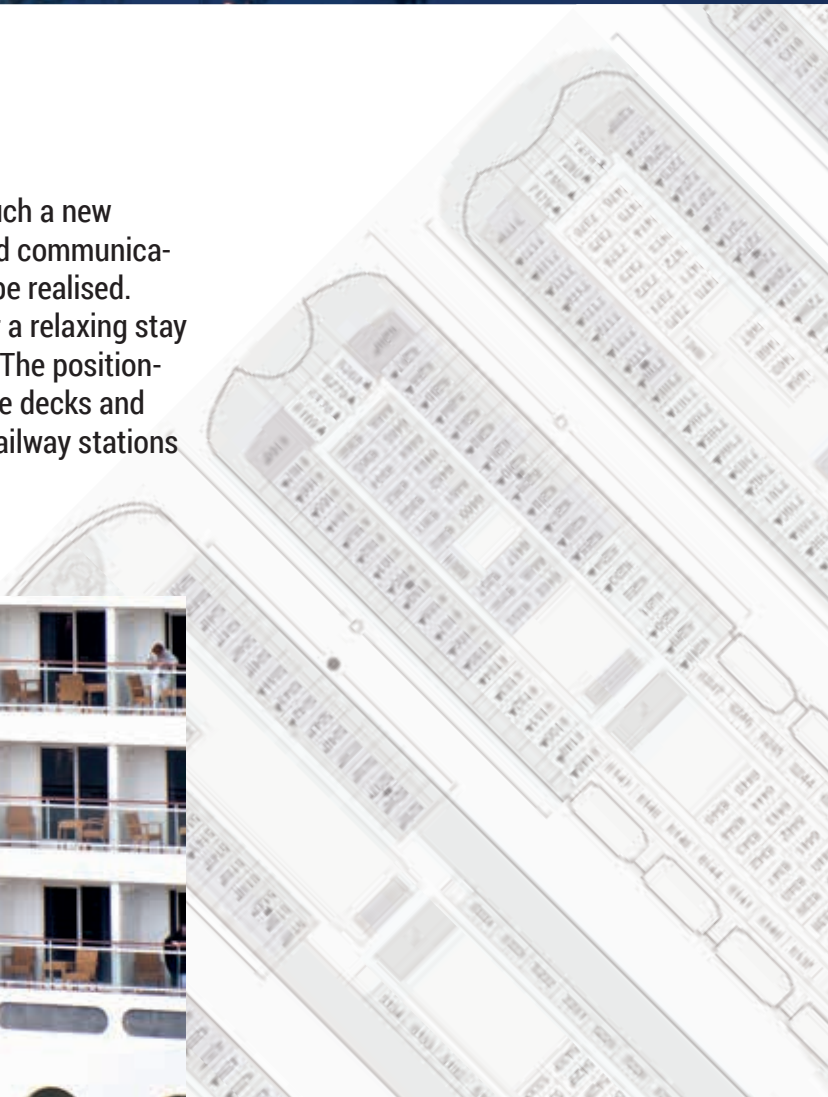
Location-based guide systems show people the way through large and complex buildings. Position-finding systems for equipment and consumables support employees.





Cruise & leisure industry

Mobile apps for passengers and crew can be key to such a new travel experience. With the aid of apps, orientation and communication with guests about activities or events can easily be realised. Safety is enhanced through a kids tracking feature for a relaxing stay on board and monitoring of certain areas on the ship. The positioning required is made possible by beacon roll-out on the decks and detailed floor plans. The system can also be used at railway stations or airports.





Network infrastructure in shops

In retail, the spectrum of customer-oriented applications based on wireless data is becoming larger all the time. Dialogue-oriented information and messages thus reach the recipient directly at the point of sale. Free Wi-Fi and shopping apps for customers, digital



displays and electronic shelf labels, mobile devices for employees and mobile checkouts are examples of the development. In addition, the technology has become more powerful. Modern access points transmit 2.4 and 5 GHz for Wi-Fi in parallel as well as Bluetooth and radio frequencies and cover ranges of up to 50 m on the sales floor. Free Wi-Fi access opens up further opportunities.

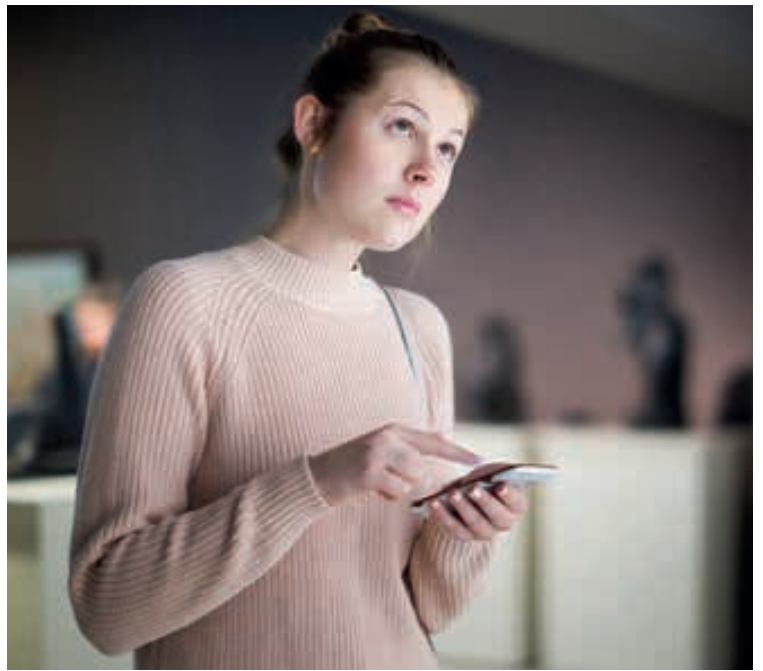
All these components have to be drawn up, controlled, managed and maintained. The services have grown in this area too, and it is nice if there is only one contact for the entire concept. With the implementation of omni-channel concepts, the complexity of the network solutions and individual components is increasing even further. Centrally set up, managed and monitored, they make complex individual processes easier. Here, potential for cost-savings can be found in digitisation and provision of infrastructure.

Visitor guidance

In many museums and cultural facilities, audio guides are a fixed part of the visitor concept. Visitors can find out more about the museum's exhibits or go on a theme-



based tour. If interactive elements and other multimedia elements from the internet are to be integrated into an exhibition, visitor apps for all age groups and nationalities are the more flexible solution. In addition, self-guided tours with a separate app are also possible at any time. Downloading the tour is not limited by information desk opening times, and an offline version means there is no need to connect to the internet. Localisation technology enhances outdoor museum tours as well. Suitable ad-



ditional information can be accessed for the location down to the last metre.

Yet conventional tour guide systems are intended to provide a lively and informative background for a visit as well. These can also be networked and access installed position-finding points. The technical equipment in a Smart Building plays a role in the options available.





In practice

Trade Fair Communication

At light+building, Regiolux demonstrated how we can use Advanced Services to make proximity marketing and interaction usable with information related to the position of the potential customer. Within the exhibition site, visitors receive information via a smartphone app as soon they are within range at the entrance area to the exhibition hall. This was prepared in the invitation to the trade fair, through mailing and participation in a competition. The messages are triggered by beacons with push messages in advertising columns and on the fair stand itself. They send an ID to the app and thus trigger stored actions. Messages had been prepared depending on the point of reception. Within range of a target area, the app user received welcome messages, information about the POI, product offers and events. Access to further information on the landing pages of the website was set up on a deeper level.

The user's smartphone was also used for positioning. It receives the signals transmitted from nearby beacons

so that the location on the trade fair stand is displayed in real time on a map saved in the app. The visitor flow can be analysed using the accumulated information. This heat map can also be broken down in terms of space and time and evaluated in the follow-up to the fair.

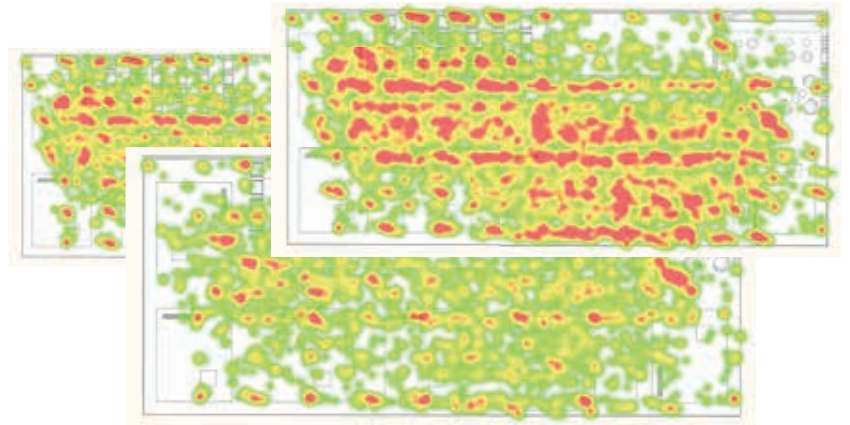


The beacon contains a powerful and extremely sensitive Bluetooth transmitter for precise tracking and navigation.



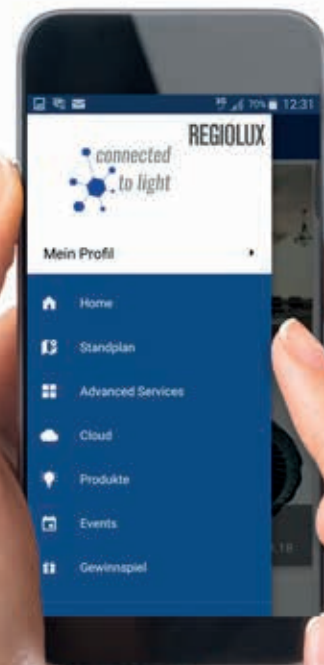
Heat map of visitors to the trade fair stand

Analyse customer flows, measure attractiveness and derive marketing measures.



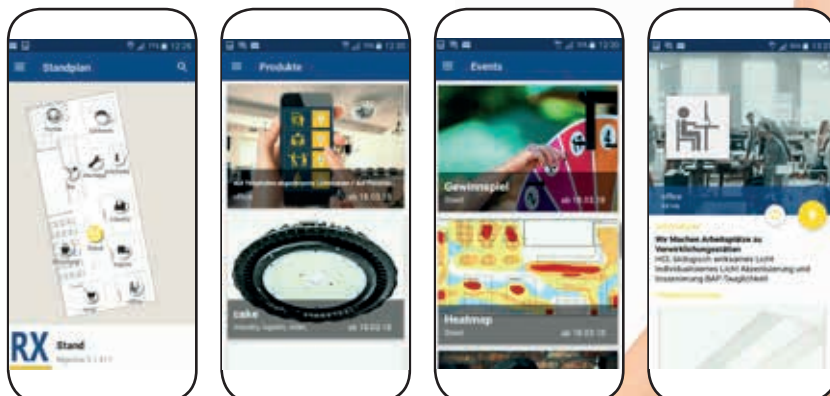
Profile of the trade fair app

- Advertising/communication
 - Regiolux and the digitisation of light
 - Services connected to light
 - Presentation of Advanced Services
 - Know-how and fun factor app
- Visitor registration:
 - Entrance voucher, competition, events, stand party
- Finding stand personnel
- Push messages
 - Where is Regiolux on the exhibition site
 - Invitation to the highlights of the day
- Indoor navigation
 - Where can which product highlights be found
 - Information about the most important product features
 - Connection to the landing pages (deep dive)
- Heat map and visitor analysis
 - What are the main interests of the visitors
 - When and where was the visitor peak
- Documentation of the trade fair visit through bookmark/favourite function



The Regiolux trade fair app

The app turned the trade fair visit into an experience

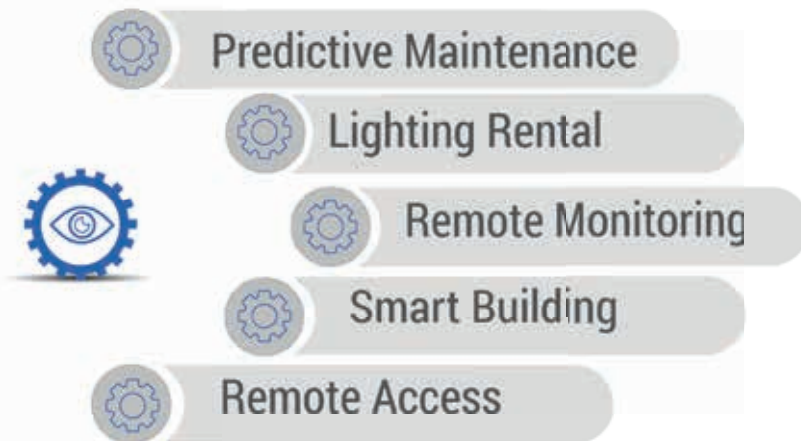


Monitoring

Collection and evaluation of system data – system monitoring. Monitoring and reporting support the energy-efficient, functional and appropriate operation and the optimisation of energy-efficient buildings.

Increased user requirements and greater degrees of technologisation of buildings also have to be considered.

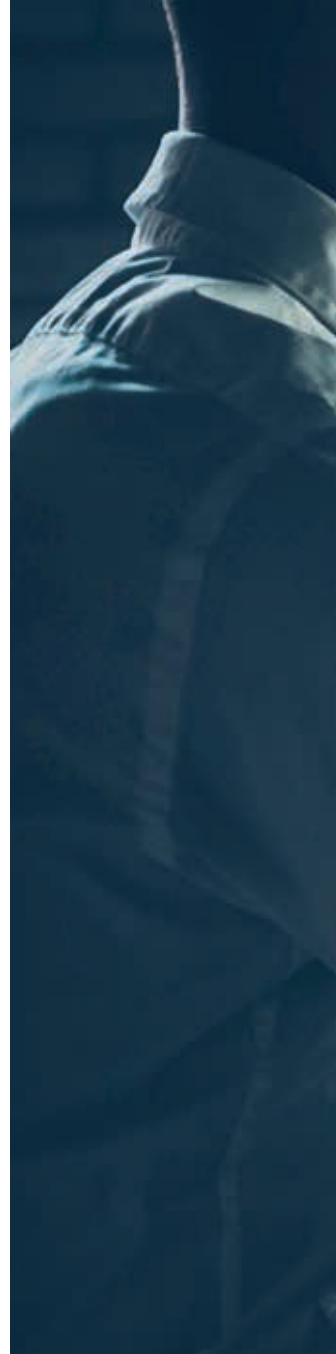
Different demands are made on lighting systems. In line with business operating schedules, time of day dependent areas are used more or less intensively. With a combination of light control and presence sensors, illumination can be defined in accordance with the usage profile. If the corridor is empty, the corridor function typically dims the system down to ten percent.



Predictive maintenance is seen as one of the components of Industry 4.0. It uses measuring and production data in the field of lighting systems too in order to derive maintenance intervals.

The objective is to prevent problems happening and prevent downtimes by reacting early.

If data related to reliable line operation are collected, the data material can be used as a basis for remote monitoring. In a further step, service intervals can be defined in advance following data evaluation, and investments and adaptation of the plant can be planned more easily.





DALI 2: The new standard makes it possible for control units with basic functions to be combined with one another regardless of the manufacturer. Control and application devices in a lighting system such as sensors, switch modules, operating terminals and even smartphone apps can communicate with each other without interference.

— *Smart Building*

Smart Building describes the automation and central operation of technical equipment in functional buildings such as offices, airports, shopping centres or production halls. One main topic is the optimisation of energy consumption during operation of the building, which saves operating costs on a huge scale. The smart building of the future will be able to act predictively thanks to intelligent analysis of the data collected in the building. It anticipates rather than just

reacting to concrete functional requirements. Functions and services are provided to the building operator and service provider proactively. This is based on the intelligent analysis of data from the connected sensor systems and by monitoring the technical systems. The IoT then makes simple system operation and maintenance possible.

In practice

Monitoring in Logistics

DB Schenker, Venlo NL

DB Schenker is one of the world's leading suppliers of global logistics services. They successfully guarantee smooth commodity flows and lean supply chains through additional services.

Schenker Logistic Benelux has invested around 35 million euros in a new multi-user warehouse. The lighting system must also be prepared for a high degree of flexible work in order to adapt quickly to the changing uses.

The new distribution centre was set up in the logistics

park Trade Port Noord in Venlo. Venlo has developed into the third most important logistics hotspot in the Netherlands behind Rotterdam and Schiphol. The new logistics centre has been operating since 2017. It is used by various customers working in the high-tech consumer goods sector.

The logistics centre has an area of around 50,000 m², a mezzanine area of over 3,800 m² and about 1,300 m² of office space. Roughly 100 employees work in the new warehouse.

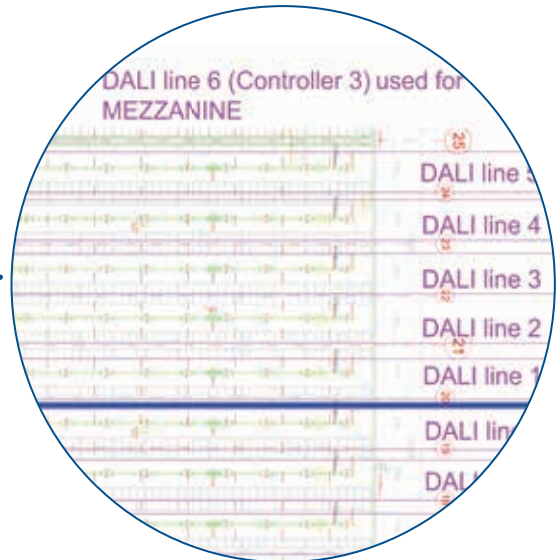
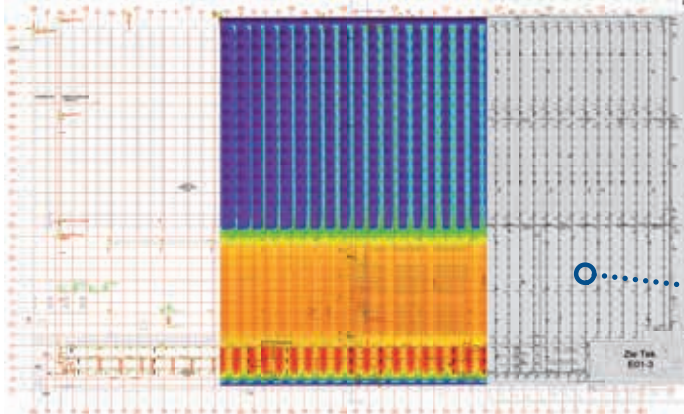
Project schedule





Expertise from a single source

Experience and expertise for the overall concept is required. Sensible and efficient bundling are marks of high-quality planning. Regiolux is involved in all project phases.



Planning

- Equipping with rack systems and warehouse technology
- Lighting planning on the basis of a light calculation
- Functional light control with the integration of presence sensors, emergency light units and remote maintenance options



Efficiency follows function

The zoned light control in the DALI protocol is programmed through Light Control modules in the control unit. These are compact, simple and can be adapted to changing requirements. In addition, they can be extended and used with additional modules for other, new tasks.



Different usage zones are mapped in functional areas of the light control.

— *Lighting Automation*



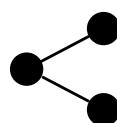
Lighting control systems where the individual devices communicate with each other via a wireless protocol are already widespread. Wire-connected systems can be found in addition or in parallel to these. They are powerful and offer a high degree of functional safety in particular as well as fast response times, even in difficult environments. Which technology should be used thus depends on local requirements and circumstances.

Argumentation

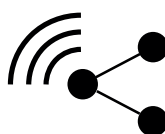
Wireless, Wired or Hybrid



- Mobile via app, touch panel
- Various wireless protocols
- Simple configuration
- Fast commissioning
- Simple/no cable routing
- Ideal for refurbishment
- Networking option/IoT



- Functional reliability
- Powerful
- Fast response times
- App, touch panel
- Networking option/IoT
- Large distances
- Programmable



- Can be extended to a hybrid solution wireless/wired
- Combination of both worlds

Human Centric Lighting (HCL)



Optimum use of HCL potentials



Natural daylight changes constantly from morning to evening, both in brightness and colour as well as direction. A professional lighting system can imitate this rhythm. It provides interior rooms with biologically effective artificial daylight or supports the natural light there. Especially lighting tasks in the office, care, industry, shop and education sectors can improve the feeling of well-being and the “body clock” through Human Centric Lighting.

Tunable white as functional light



As well as conventional daylight simulation, it is also possible to generate targeted illumination scenarios with a special function outside the circadian rhythm. The variability of the “white” light colour can thus be used in many fields of application.

Human Centric Lighting (HCL)

Human Centric Lighting simulates the natural course of daylight in its spectral quality. The colour control is started by a timer and runs as a typical HCL curve. The switching times are programmed and usually do not require adjustment.

In automatic mode, the system is switched on through the presence sensor and off following a delay when the room is left again. A wall switch allows the lighting to be switched on and off or changed over. This means

that automatic HCL operation or a defined lighting scene can be selected (meeting light 6000K, 100%, or working light 4000K, 60%) depending on requirements.

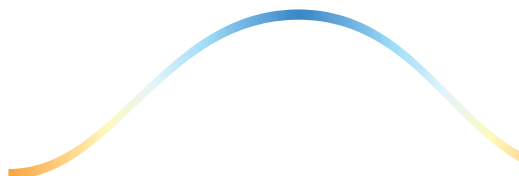
The luminaires are controlled as a group in broadcast mode. The control units and switches are delivered pre-configured so there is no need for programming and commissioning on site.

Client: BayWa, Wilzhofen, DE
Lighting planning: Regiolux Königsberg, DE
Installer: Eckl-Dyk-Service GmbH, Alteglofsheim, DE

Colour temperatures

BayWa Wilzhofen:
Sales room with no outside walls
or windows with HCL light control

HCL Typical progression



The system starts with 2700K and 50% light in the morning, gradually increases to around 6500K and 100% by midday and drops towards 2700K and 50% in the evening.

All included in the standard function:
LC-RX direct:LC controller





Krems: This the wine-tasting area, quality first. Modern design with the lighting as well. The room is immersed in a red or blue colour so that the colour of the wine does not influence the assessment of its taste.

Planning practice

The Taste of Light Colour

Light colours play a decisive role in our overall perception. They influence the taste experience and express an expectation. Many people associate blue surroundings or the blue sea with peace and quiet, relaxation and well-being, for example. If objectivity is required, a different approach has to be taken when training wine-growers in the art of evaluating wine quality. During tasting, the light in the room changes. The coloured lighting prevents visual distinction between the different wines. When the light colour changes from blue to red, all red and white wine samples have the same colour. This makes taste the decisive criterion for evaluating wine samples.



Lighting scenes: Conventional control through switches or user-friendly through a control panel

Client:

Wein- & Obstbauschule Krems, AT

Architect:

Architekt DI Christian Mang, AT

Lighting planning:

TB Gruber / 2880 Kirchberg / Wechsel, AT

Ing. Andreas Dunzinger Euro Unitech GmbH, AT

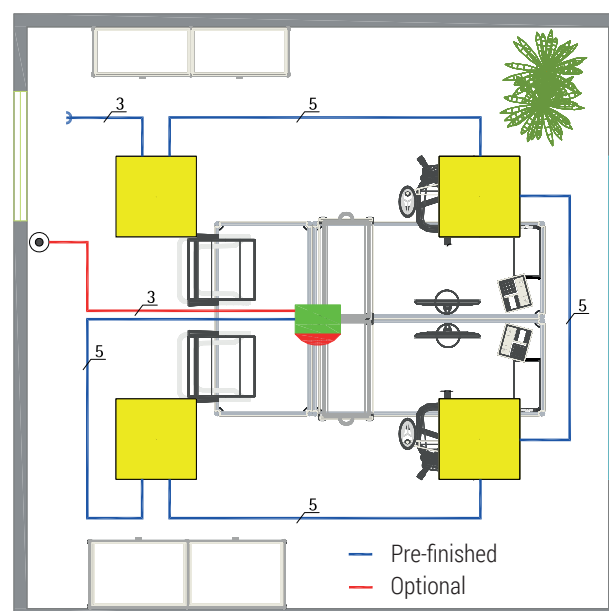


plug&play

All-inclusive Luminaire Sets

A luminaire set is the ideal starter-pack for lighting systems with modern lighting management for offices. The individual components are matched to one another. So there will be no surprises. The direct:LC controllers are pre-programmed and designed for the technical lighting requirements of a double workstation. They have been prepared for plug&play with pre-assembled cables. This plug&play concept allows the straightforward implementation of standard applications and refurbishment work. Luminaire sets are all-round carefree solutions from Regiolux that have all the answers.

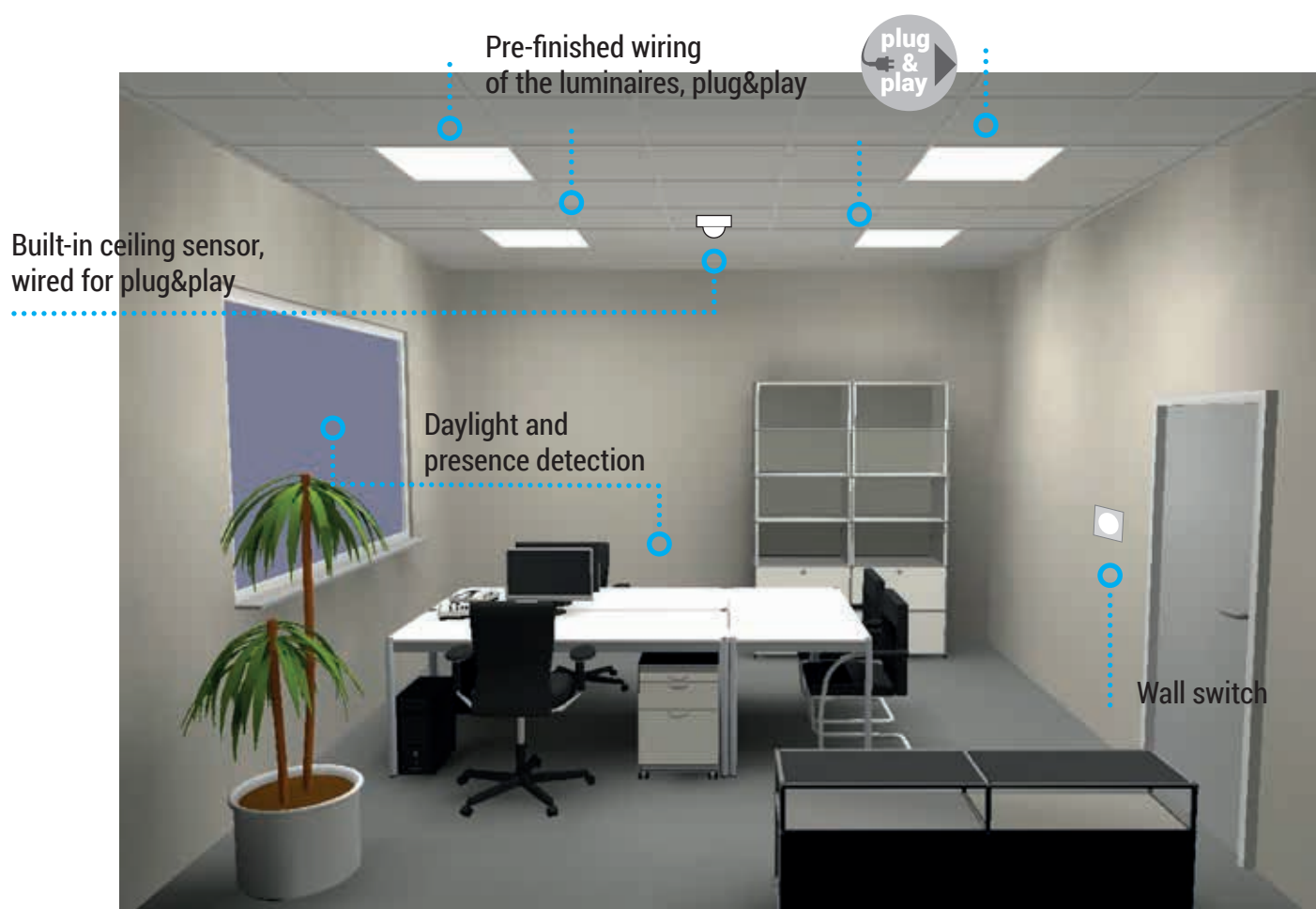
Wiring diagram
panella luminaire set for a double workstation



The Advanced Services Team informs you about extensions possible

plug&play

Upgrade the office



Planing parameters for all sets and up to 20m² floor area: double workstation with an average lighting level of 500 lux, room height 3 m, degree of reflection ceiling/walls/floor: 70%/50%/20%.

Set

panella luminaire set



1 DALI built-in ceiling sensor
1 remote control for sensor
4 panella PEMP DALI

Daylight control and
presence detection

Pre-finished cables
Plug&play

panella-Set PEMP/600 840 LC16
Item.-No. 8425 6016 650
panella-Set PEMP/625 840 LC16
Item.-No. 8425 6015 650





teno tunable white luminaire set



- 4 teno TNEMP tunable white
- 1 EnOcean-DALI controller, programmed
- 1 EnOcean switch, white, 4-channels

Manual dimming and colour changing

Pre-finished cables
Plug&play



teno-Set TNEMP/600 927-965 LC17
Item number: 8425 5081 970
teno-Set TNEMP/625 927-965 LC17
Item number: 8425 5082 970



teno luminaire set



- 3 teno TNEMP DALI
- 1 teno TNEMP LC01

Daylight control and presence detection

Pre-finished cables
Plug&play



teno-Set TNEMP/600 840 LC01
Item number: 8425 5081 670
teno-Set TNEMP/625 840 LC01
Item number: 8425 5082 670



Transfer

Enhance expertise with our help.

A comprehensive network of technical systems and processes is being created with the digitisation of industry and infrastructure. Requirements on lighting planning have thus become more and more complex. This results in the need to gain in-depth knowledge for interfaces and communication structures. If these are to be designed actively within the company, it is important that employees are well trained and qualified. Knowledge transfer at specialist seminars and workshops is one important factor that contributes towards the implementation of technical progress and new know-how in practice in construction projects. You can catch up with the latest technical developments here, no matter how quickly the challenges in the industry are changing. Informative, competent and always with the crucial reference to practice, you find out how to achieve system integration successfully in lighting planning as well. Take advantage of our know-how and what we have learned from working with our system partners.

Specialist seminars / workshops

Specialist seminar
"IOT INTERNET OF THINGS"

DALI specialist seminar
"DON'T BE AFRAID OF DALI"

DALI workshop
"PRE-FINISHED SYSTEMS"

DALI workshop
"PARAMETERISABLE SYSTEMS"

DALI workshop
"TUNABLE WHITE/HCL"

System Partners

b,a,g,



CASAMBI



favendo



Honeywell

JUNG

OSRAM



TRIDONIC





More information

Application manual

"TUNABLE WHITE - HUMAN CENTRIC LIGHTING"



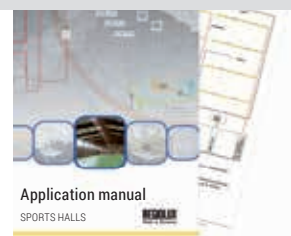
Application manual

"TOUCH DIM – CORRIDOR-FUNCTION – WIRELESS"



Application manual

"SPORTS HALLS"



Application manual

"MASTER LUMINAIRES M5S5"



Application manual

"INDUSTRIAL AND WAREHOUSE HALLS"



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