

Welcome to AES
We create solutions.

AES 

*»It is possible to fly without motors,
but not without knowledge and skill.«*

Wilbur Wright

At home in Northern Germany.



We are an international company with over 140 highly qualified employees who serve our customers in the aviation, space and maritime industries.

We have come a long way since our inception a quarter of a century ago with just seven employees in Bremen. Founded in 1997 with the vision of efficiently and skilfully implementing our customers' needs in the rapidly changing aviation industry, our products can be seen in numerous passenger aircraft and VIP jets.

Our headquarters are located at the business technology center next to the Bremen Airport. In 2005 we designed and had our headquarters built in the shape of an aircraft wing. In 2013 we added another wing to the main building which doubled our

floor space, creating more production capability. In 2022 we dedicated our new warehouse facilities and put it into operation. In May 2010, we opened a branch in Hamburg which specialises in lighting, communication and control systems for business and VIP aircraft. Our Hamburg division develops unique and custom-made solutions. They focus on the development of versatile, multifunctional electronics and tailored solutions. In 2021 we repositioned our Hamburg division at ZAL-the Centre of Applied Aeronautics Research.

Creating solutions for challenging environments.

The tough requirements of the aviation industry continually push the limits of technical feasibility, creating major challenges for us. Our technical knowledge, high quality product standards and services, and an uncompromising focus on customer requirements have made us a reputable international product and service provider for the aviation industry.

We create electrical and electronic smart solutions for aircraft interiors, areas with compact and limited space. We make sure our solutions adhere to our customers' individual requirements. Our extensive design and engineering capabilities are the groundwork for our integrated aircraft products for lighting, power management, control, and telecommunications systems. We are a valued partner for aviation product and system designs, offering a vast portfolio of services and long-term support. These include planning and project management, development, production, integration, and other services. We design custom, target-oriented solutions for both our commercial aviation and VIP/private jet customers, along with, our space and maritime clients. Our reliable in-house production completes the final assembly of our components and systems. Furthermore, straightforward product maintenance helps prevent malfunction and costly downtime.

As systems have become more and more complex over the years so have our designs. Our lighting systems have been complemented by digital control and in-flight entertainment systems. Many new electronics components have made way to our portfolio: Network technology, communication equipment and power management systems. Our aim is to design tomorrow's aircraft cabins digitally, with systems working mutually, using our innovations and technologies. We have already started working on tomorrow's aviation technologies because we keep our eyes moving forward.

Our products and systems can be used throughout an entire aircraft cabin, from galleys and lavatories as well as seats. We provide you with support, to help you create a solution to suit your requirements, or find that one special part to complete your existing system.



Aviation



Space



Maritime



Controls



Light & Mechanics



Power

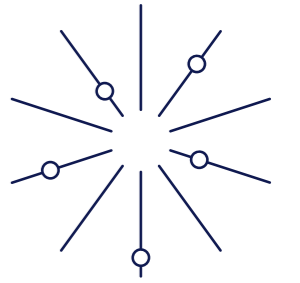


Cabin Networks





Everything under control.



Over the past 25 years we have developed numerous products, some of which are controlled with a microcontroller and others using programmable logic (e.g. FPGA). We employ these products throughout a broad range of applications.

Our move to digitally controlled products began with our RGB spotlight for colour lighting applications. This spotlight features a 32-bit microcontroller, which regulates and monitors light output while software compensates for colour deviations caused by operating temperature and ageing. We developed and documented its embedded software in accordance with the RTCA DO-178B standard. A major show-piece from our lighting systems is the configurable RGBW Light Controller, developed and approved for various types of aircraft. We tailor the functions within our light controller to meet customer requirements, using

application specific software and parameter configurations. We designed and developed the hardware and software of a complex component for a customers' inflight entertainment (IFE) system. The next generation of this component will feature optical 10 Gigabit Ethernet ports to support high-bandwidth IFE backbone connections. In another project, we designed and developed a custom water control system for a VIP aircraft. Present and future projects address the areas of power management and digitally controlled power supplies. Our highly efficient galley Power Management System is a power source, digitally controlled fuse box, light controller, and management tool - all in one.

Moreover, we are currently working on equipping an increasing number of our products with gesture control, thus our lamps and switches will not require any direct physical contact.



Light up your cabin.



Primarily, we develop and produce aircraft lighting for a variety of uses, focusing in more detail on LED aircraft lighting.

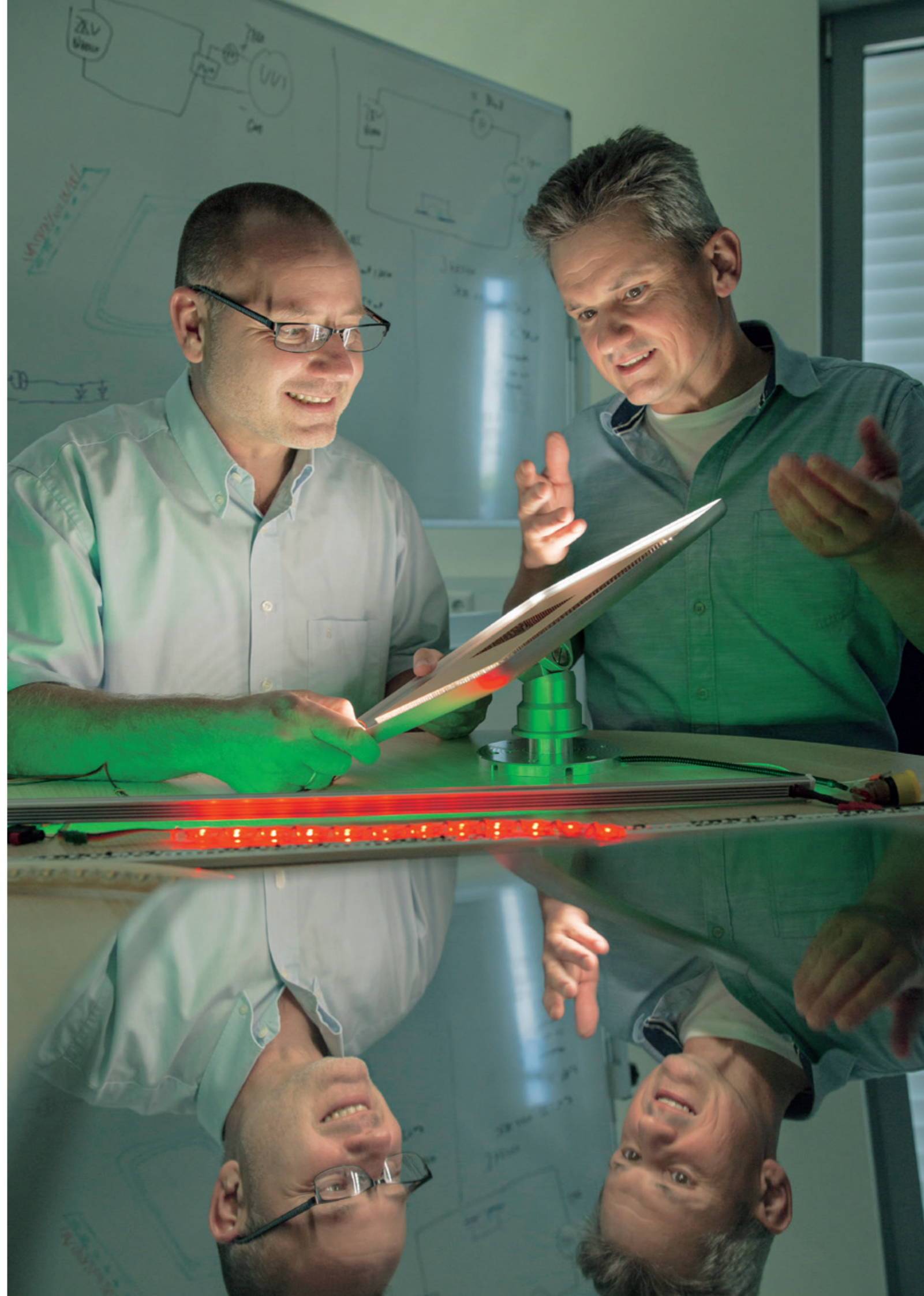
Our work has evolved over time resulting in close working relationships with some prominent LED manufacturers. This allows us access to the latest data and LED developments. As a result, we have extensive knowledge about how LEDs behave in diverse operating and environmental conditions. Today, we are able to create durable lighting with consistent light quality, incorporating these advantages into other product developments. Naturally, our materials and their attributes meet the requirements of the major aircraft manufacturers. These include corrosion resistance, resilience to aggressive media, and flammability levels. This means our engineers prepare design

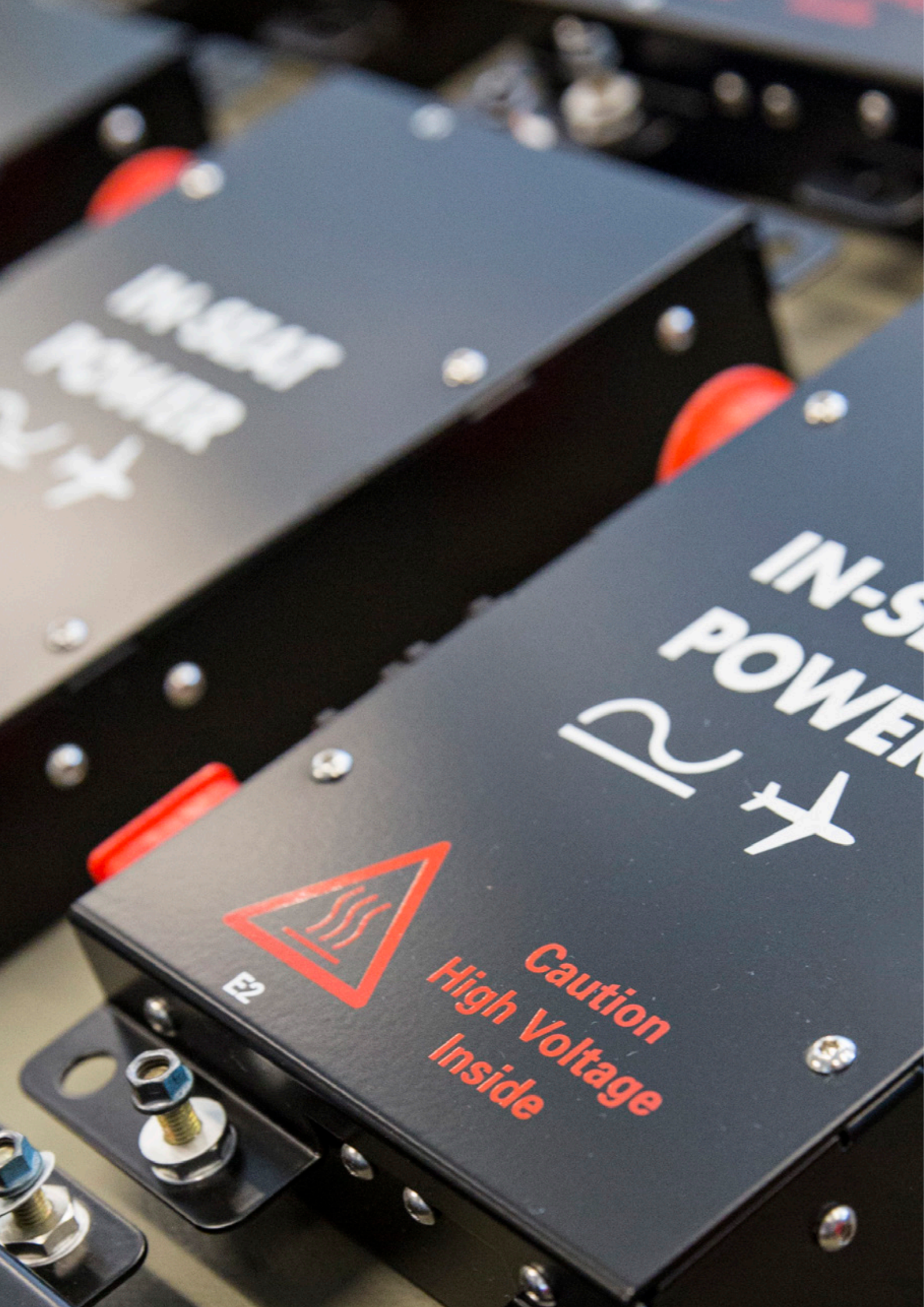
calculations and conduct analyses, to ensure sound construction. The Lights & Mechanics Competence Centre is responsible for our lighting development, mechanical design and prototype construction.

The members in this team accompany our products during all phases of their life cycle. Our lighting laboratory verifies optical calculations using general and extended endurance tests guaranteeing optimum outcomes.

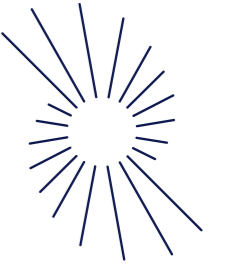
We benefit with rapid prototyping thanks to our in-house circuit board equipment and 3D printer. This allows us to develop and test all kinds of solutions, from simple enclosure designs to complex slide-in systems with moving parts.

Our other services include solutions for luminaires with special effects, logo lighting and backlit mirrors.





We've got the power.



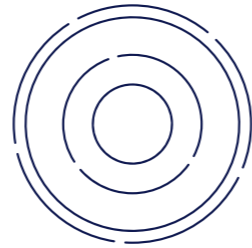
Designing and developing power supplies is just one of our main skills. We benefit from over 25 years of experience in this field.

The first series of our classic power supply products are transformer rectifiers. Our second generation power supply products are switch mode power supplies. They are approved for various types of Airbus aircraft, respectively. They function with variable, in addition to, constant frequencies. These are far lighter and more efficient than the classic transformer rectifiers. Further-

more, they automatically shut down in the event of overheating and restart only when reset. We use the modern technology of resonance transformers for our newest generation of switch-mode power supplies, „Cool & Green Power“. This highly efficient product ensures only minor dissipation losses, which preserves low temperatures. As a result, the „Cool & Green Power“ source does not require an internal fan. Our current research and development projects focus on digitally controlled power supplies.

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Stay connected.



We have consistently met the rapidly changing technical demands of the aviation industry since the early 1990s. At the same time, we have continued to meet our VIP, governmental and corporate customers' requirements.

Our products are used in various aircraft models including the Airbus single-aisle (A318-A321) aircraft, the long-range and wide-bodied Airbus A330 and A340, as well as, the Boeing Business Jet (BBJ) 737-200 to 800, and the Boeing 777, 747- 200,

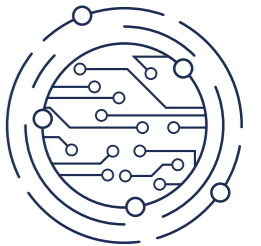
400 and 8 aircraft. Today, our cabin network products include an Ethernet switch unit, a corded VoIP telephone, a touch controlled display panel and a multi-purpose control unit.

Our newly developed multi-purpose core unit can be used as a cabin controller, cabin management system or entertainment bridge interface. It is software controlled with numerous exchangeable modules. The system can be navigated via our PCAP touch display.





Electrical Engineering.



Electrical engineering services are a fundamental part of our business. Our Electrical Engineering Competency Centre has years of experience developing electrical systems, test equipment, wire harnesses, service bulletins and more. We meet the high demands of the aviation industry, both in long term sustainability and ongoing development. In addition to aviation, customers from the space, maritime and ground system industries trust us with their electrical engineering needs. You can find more information about our electrical engineering services in our corresponding brochure.

Nevertheless, some of our services are listed below:

- + Feasibility Studies
- + Specification
- + System Analysis
- + Configuration Management
- + System Definition
- + System Integration
- + Engineering in 2D and 3D
- + Engineering Support
- + Production Support
- + Installation Support (on-site)
- + In-Service Support (Service Bulletin)
- + Customer Service



Additional services.



In addition to supplying hardware products and electrical engineering, we also offer our customers a wide range of services. Thanks to our experienced electronics development team, with its broad range of skills, we can design customer-focused solutions for both components and complete systems. For instance, the teams in our competence centres design new aircraft components and work closely with our Quality Assurance Division to meet all of the certification standards. In addition, our testing services ensure that technical components continue to function without failure, even under the toughest aviation conditions. This involves testing how humidity, temperature and electrical fluctuations affect components and other equipment during flight.

Furthermore, we offer advice about certification and documentation as well as qualification services. We also organise training programmes to help airlines better understand the intricacies of aviation legislation. **We are certified!**

AES is an EASA approved production (Part 21G) and maintenance (Part 145) organisation. Our quality management system is EN 9100 certified.

- + Products developed by AES
- + Products developed by customers
- + Complete or partial qualification processes
- + Household appliances custom made for aircraft use [e.g. refrigerators or ovens]

Documentation services:

- + QTP (Qualification Test Procedure)
- + QTR (Qualification Test Report)
- + ATP (Acceptance Test Procedure)
- + ATR (Acceptance Test Report)
- + ASR (Airbus Supplier Requirements)
- + Qualification tests in accordance with RTCA (DO-160, DO-178 and DO-254), ABD and Boeing requirements





*»Quality is never an accident ...
it represents the wise choice of many
alternatives.«*

William A. Foster

Production at AES

AES - Reliable in-house production

Customers worldwide value the quality of our products:

- + LED-Lighting Solutions
- + Light Controllers and PWM Dimmers
- + Transformer Rectifiers
- + Switch Mode Power Supplies
- + Telecommunication Systems
- + Cabin Management Systems
- + Galley Power Management Systems
- + Commercial off-the-shelf products for VIP e.g. ovens, refrigerators, faxes and refinements
- + Maintenance and repair services

Approved and Certified

AES GmbH is an EASA [European Aviation Safety Agency] approved production organization [EASA Part 21G] and EASA approved maintenance organization [EASA Part 145].

Our quality management system is certified according to EN 9100. Our EASA Part 145 certification authorises us to service our products. We build our products ourselves - As a result, we are able to offer genuinely seamless after sales support. Continual improvement means down to the last, smallest detail, while meeting tough standards. Our philosophy is consistent quality and sustainability - quality over price. This distinguishes our company and solutions in the aviation industry - **make it simple and do it right!**



A competent partner since 1997!

We have a close working relationship with our customers, who in turn have placed their trust in us.

Our focus is based on continual improvement down to the smallest detail. We work in collaboration with our customers, specifying a project's requirements together, a connection, which makes us a more effective service provider. We listen closely, clarifying your needs, thinking ahead for you systematically. We combine flexible, competent decision-making skills with decades of experience. Our customers worldwide appreciate the quality of AES products and services:*

Our Key customers

- + Airbus Defence and Space
- + Airbus Operations
- + AMAC Aerospace
- + AMECO
- + Bucher Leichtbau
- + Deutsche Telekom
- + Diehl Aviation
- + EFW – Elbe Flugzeugwerke
- + HAPPICH Group
- + JAMCO Corporation
- + Lufthansa Technik
- + OHB
- + RECARO Aircraft Seating
- + Safran Cabin Group
- + Thermo Fisher Scientific

*in alphabetical order

*»All the calculations show it can't work.
There's only one thing to do:
make it work.«*

Pierre Georges Latécoère

25 YEARS AES Timeline



AES

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