High-Tech on Board

Technologies for Vertical Lift
Our Contribution
Your Mission in our Focus

**Safe flight in all weather conditions**
Heat or cold, draught or humidity, rain or snow can’t stop you flying. Reliable heating, cooling and ventilation systems are indispensable to helicopter operation and mission fulfillment.

Liebherr-Aerospace develops, produces and supports oil cooling systems and air management systems for helicopters, including air conditioning with air and vapor cycle technologies, bleed air, heating, cooling, distribution and temperature control.

These state-of-the-art systems are notable for their low weight, compactness and reliable performance.

**Safe landings on all grounds**
Your mission requires to land your helicopter wherever needed. You need a reliable, shock absorbing and crashworthy landing gear allowing you to take on loads and passengers on all terrain.

Liebherr-Aerospace offers innovative, integrated landing gear systems, nose wheel steering systems, control electronics, cockpit panels and braking systems for civil and military helicopters from S to XXL.
Reliable systems when you need them most

Sometimes your mission requires special maneuvers and high precision flying. Your helicopter must be under control even in critical conditions for the safety of crew and passengers.

Liebherr-Aerospace has great experience in the development, manufacturing and integration of innovative flight control actuation systems, related hydraulic equipment and electronics for all types of helicopters.

Liebherr-Aerospace offers solutions ranging from conventional hydro-mechanical actuation up to full fly-by-wire actuation systems.

When others rely on your performance

Saving lives is one of the most honorable missions. It is of utmost importance that you can concentrate on the emergency situation fully relying on your helicopter to work as expected.

Liebherr-Aerospace has exclusive development and manufacturing capabilities for helicopter gearboxes and transmissions for both high-speed and high torque applications.

The product range includes complex gear components for main rotor gearboxes, tail rotor gearboxes and intermediate gearboxes.
Our Products
Safety Critical Applications

**Flight Control & Actuation Systems**
- Fly-by-Wire Main- and Tail Rotor Servo Controls
- Hydro-Mechanical Main- and Tail Rotor Servo Controls
- Hydraulic Power Supply
- Hydraulic System Components: Pumps/Motors, Manifolds, Filter Package Units and Reservoirs

**Air Management Systems**
- Vapor Cycle Air Conditioning Systems and Air Cycle Air Management Systems, including Bleed Air, Heating, Cooling, Distribution and Temperature Control

**Oil Cooling Systems**
- Heat Exchangers, Valves and Fans to manage the gearbox oil temperature
Main Rotor Drive Components

Hydraulic Power Supply

Landing Gear Control Panel

Fly-By-Wire Flight Actuation Control Computer

Landing Gear System

**Gears & Gearboxes**
- Power Transmission Gearboxes
- Auxiliary Power Unit Gearboxes
- Accessory Gearboxes

**Electronic Systems & Components**
- On-board Electronics for Control and Monitoring
- Cockpit Controls
- Power Electronics

**Landing Gear Systems**
- Landing Gear Systems, including Nose Wheel Steering Systems, Control Electronics, Cockpit Panels and Braking Systems
- Tail Landing Gears
Our Capabilities
Covering the Complete Product Life Cycle

02
Manufacturing
We expand and improve our manufacture and production methods for the future while maintaining necessary machinery, tools, means and skills to be able to support helicopter operations long after production has stopped.

In our manufacturing process, characteristics such as flexibility, efficiency, quality, reactivity and also sustainability are mandatory: each site commits to ambitious targets of reducing environmental impact.

03
Entry into Service
We provide reliable maintenance services structured around quality, price and lead time to offer our customers the best operating conditions.

During product entry into service we ensure transfer of in-depth knowledge about components and systems.

04
Operations
As long as helicopters are flying with our systems, our Customer Service offers an extensive product support: we analyse reliability, manage configuration and modifications, provide spare
parts and handle repairs for our whole range of products. Our teams are available to perform on-demand technical support and tailored system trainings.

05
Enhancement
Our in-service engineers work continuously on innovative repair solutions and product enhancements to reduce maintenance costs and meet new airworthiness requirements.

As a Design Organization Approved (DOA) company, we can use the wide range of test capabilities from our OE facilities to quickly develop and implement our enhancements.

06
Next Generation
The long life of an helicopter represents years of accumulated experience and knowledge of systems and equipment performance.

We channel this knowledge, compiled with innovative technologies, to push the boundaries of our future services.
Future Technologies
Innovation for More Efficiency

Hydraulic Power Packs
A solution for an optimized system architecture is the application of decentralized hydraulic power generation by electrical Hydraulic Power Packs (HPP). The HPP is sourced by electrical power and provides locally hydraulic power at the system/place where it’s needed, e.g. for Steering, Extension & Retraction and Braking of Landing Gears. The integrated design supports easy modular assembly in the helicopter.

3D Printed Parts
In 2019, Liebherr-Aerospace started serial production of 3D printed Landing Gear components to Airbus for the A350-XWB program. Already in 2017, Liebherr-Aerospace received the authorization by the German Federal Aviation Office (Luftfahrtbundesamt, LBA) to produce components using additive manufacturing. Additive manufacturing enables the design and production of high-strength lightweight structures which cannot be manufactured using conventional production methods.

Air Quality
Cabin air quality is becoming increasingly interesting for helicopter operation to maintain crew and passenger health by VOCs removal using filter technology. Liebherr-Aerospace thinks about active solutions for pollutants removal associated with sensor technologies for air quality monitoring.

Universal Control Systems
Liebherr-Aerospace has developed an universal Remote Electronic Unit (REU) for different applications. Less weight, faster final assembly, more flexibility: The ingenious concept of the REU offers plenty of advantages, thanks to digitization.
Electrical Landing Gear
Liebherr engineers have developed an Electro-Mechanical Actuator (EMA) for use in a helicopter landing gear. Like a hydraulic actuator, it ensures that the helicopter landing gear is retracted after take-off and extended again before landing. The difference is that with an EMA, a hydraulic supply is no longer required.

Fly-by-Wire Flight Controls
With the NH90 helicopter program, Liebherr-Aerospace introduced the first full authority Fly-By-Wire Flight Control System, which entered the stage of series production. Developments by Liebherr progressed even further into a "Fly-by-Light"-System installed in the ACT-FHS technology test bed based on an H135 and operated by the German National Research Center (DLR).

Improved Cabin Comfort
Improved temperature regulation through Vapor Cycle Systems (VCS) using a jet pump with variable nozzle area and with bizonal mode to serve best all sections of the cabin. Improved power efficiency by new compressor technology like a VCS scroll compressor with double capacity (asynchronous technology) or with variable speed capability (synchronous technology).
Our Legacy
Liebherr on Board in All Market Segments

Airbus
AS350/355 Ecureuil
• Environmental Control System Components
• Gears for Main Gearbox
AS365
• Environmental Control System
BK117
• Gears for Power Transmission Gearboxes
• Hydraulic Power Supply
• Main- and Tail Rotor Servo Controls
H120/H125
• Environmental Control System Components
H130
• Air Conditioning System
H135/H135M
• Gears for Power Transmission Gearboxes
• Hydraulic Power Supply
• Main- and Tail Rotor Servo Controls
H145
• Gears for Power Transmission Gearboxes
• Hydraulic Power Supply
• Main and Tail Rotor Servo Controls
• Tail Gearbox
H160
• Environmental Control System Components
• Heating Valve
• Main Rotor Servo Controls
• Tail Rotor Gearbox
H175
• Environmental Control System Components
H225/H225M
• Environmental Control System Components
• Heating System
NH90
• Actuation Control Computer
• Auxiliary Power Unit Gearbox
• Environmental Control System Components
• Fly-by-Wire Main- and Tail Rotor Servo Controls
Tiger
• Gears for Tail Gearbox
• Air Conditioning System
• Main- and Tail Rotor Servo Controls
• Tail Landing Gear
UH-72A Lakota LUH
• Gears for Power Transmission Gearboxes
• Hydraulic Valveblock/Reservoir
• Main- and Tail Rotor Servo Controls

AVIC HAIG
AC 312
• Air Conditioning System

Boeing
MH-139
• Environmental Control System
• Landing Gear System

HAL
ALH
• Heating and Ventilation Systems

Kamov
KA-226T
• Air Conditioning System

Korean Aerospace Industries
KHP
• Environmental Control System Components

Leonardo
AW109
• Environmental Control System
AW139
• Environmental Control System
• Landing Gear System
AW149/AW189
• Environmental Control System
• Fly-by-Wire Main and Tail Rotor Actuators
• Landing Gear System
AW169
• Environmental Control System
T129
• Environmental Control System

Turkish Aerospace
Turkish Light Utility Helicopters (TLUH)
• Air Conditioning System
• Oil Cooling System
Our Experience
A Reliable Partner of Aerospace & Defense Customers Worldwide

System Supplier

Liebherr-Aerospace is a world-wide approved system and equipment supplier and integrator for the aerospace industry in the field of flight control/actuation systems, air systems, landing gears, gears, gearboxes as well as electronics. It participates in various civil and military aircraft programmes as well as in research & technology developments.

The range includes: commercial transport aircraft, military transport aircraft, business jets, regional aircraft, fighter aircraft, military trainer aircraft, civil and military helicopters.

System Solutions

Liebherr-Aerospace & Transportation offer complete system solutions and components according to the individual needs of aircraft- and rail vehicles manufacturers and -operators. With the certified disciplines of development, production, qualification, integration and customer services, Liebherr combines innovative practices and high modularity to fully fit the customers’ requirements.

Air Management Systems:
- Air Conditioning Systems
- Engine Bleed Air Systems
- Cabin Pressure Control Systems
- Wing Anti-Ice Systems
- Galley Air Chillers
- Heating Systems
- Air Humidification Systems
- Cooled Air Supply for OBIGGS/FTIS
- System Electronics

Electronics:
- Control Electronics
- Power Electronics
- Remote Electronic Units

Flight Control and Actuation Systems:
- High Lift Systems
- Primary Flight Control Systems
- Flight Control Computers
- Horizontal Stabilizer Actuators
- Cockpit Controls
- Power Electronics
- Actuation Systems
- Gearboxes
- Hydraulics
- System Electronics

Landing Gear Systems:
- Main Landing Gears
- Nose Landing Gears
- Nose Wheel Steering Systems
- Tail Landing Gears
- Actuation Systems
- System Electronics

Gears and Gearboxes:
- High Torque, High Power to Weight Ratio Geared Rotary Actuators
- Transmission Gearboxes
- Helicopter Main and Tail Gearboxes
- Auxiliary Power Unit Gearboxes
- Engine Accessories Gearboxes
The Liebherr Group of Companies

Wide Product Range
The Liebherr Group is one of the largest construction equipment manufacturers in the world. Liebherr’s high-value products and services enjoy a high reputation in many other fields. The wide range includes domestic appliances, aerospace and transportation systems, machine tools and maritime cranes.

Exceptional Customer Benefit
Every product line provides a complete range of models in many different versions. With both their technical excellence and acknowledged quality, Liebherr products offer a maximum of customer benefits in practical applications.

State-of-the-art Technology
To provide consistent, top quality products, Liebherr attaches great importance to each product area, its components and core technologies. Important modules and components are developed and manufactured in-house, for instance the entire drive and control technology for construction equipment.

Worldwide and Independent
Hans Liebherr founded the Liebherr family company in 1949. Since then, the family business has steadily grown to a group of more than 130 companies with more than 46,000 employees located on all continents. The corporate headquarters of the Group is Liebherr-International AG in Bulle, Switzerland. The Liebherr family is the sole owner of the company.

www.liebherr.com