
Technologies for vertical lift

High-tech on board

LIEBHERR

Aerospace



Our contribution – Your mission in our focus



© Airbus Helicopters

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

We develop, produce and support oil cooling and air management systems 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.



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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.

We offer innovative, integrated landing gear systems, nose wheel steering systems, control electronics, cockpit panels and braking systems for civil and defense helicopters from S to XXL.



© Leonardo Helicopters

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.

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

We offer solutions ranging from conventional hydro-mechanical actuation up to full fly-by-wire actuation systems.



© Airbus Helicopters

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.

We have exclusive development and manufacturing capabilities for helicopter gearboxes and transmissions for both high-speed and high torque applications.

Our product range includes complex gear components for main rotor gearboxes, tail rotor gearboxes and intermediate gearboxes.

Our products – Safety critical applications

Flight control and 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

Environmental control and thermal 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

Gears and gearboxes

- Power transmission gearboxes
- Auxiliary power unit gearboxes
- Accessory gearboxes

Electronic systems and components

- On-board electronics for control and monitoring
- Cockpit controls
- Power electronics
- Power conversion

Landing gear systems

- Landing gear systems, including nose wheel steering systems, control electronics, cockpit panels and braking systems
- Tail landing gears



Main rotor actuator



Auxiliary power unit gearbox



Landing gear control panel



High pressure vapor cycle unit



Heating modulating valve



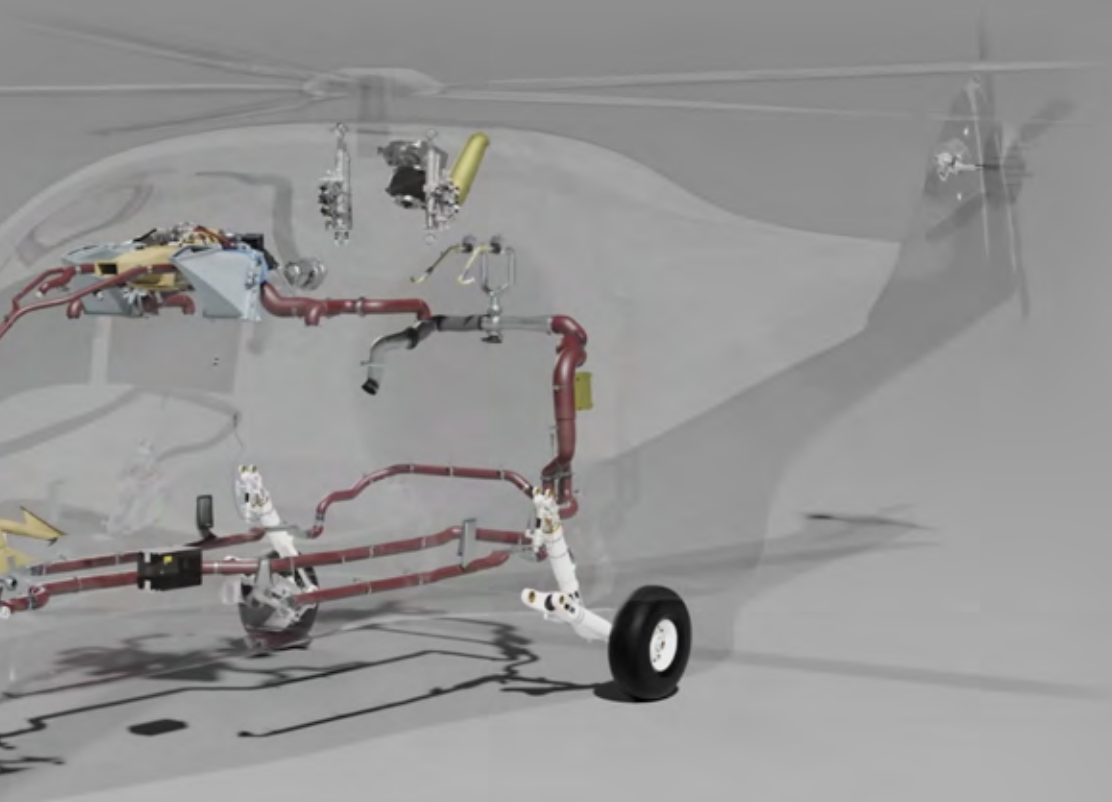
Main rotor drive components



Hydraulic power supply



Tail rotor actuator



Oil cooling system



Landing gear system



Fly-by-wire flight actuation control computer

Our capabilities – The complete product life cycle

3

Entry into service

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

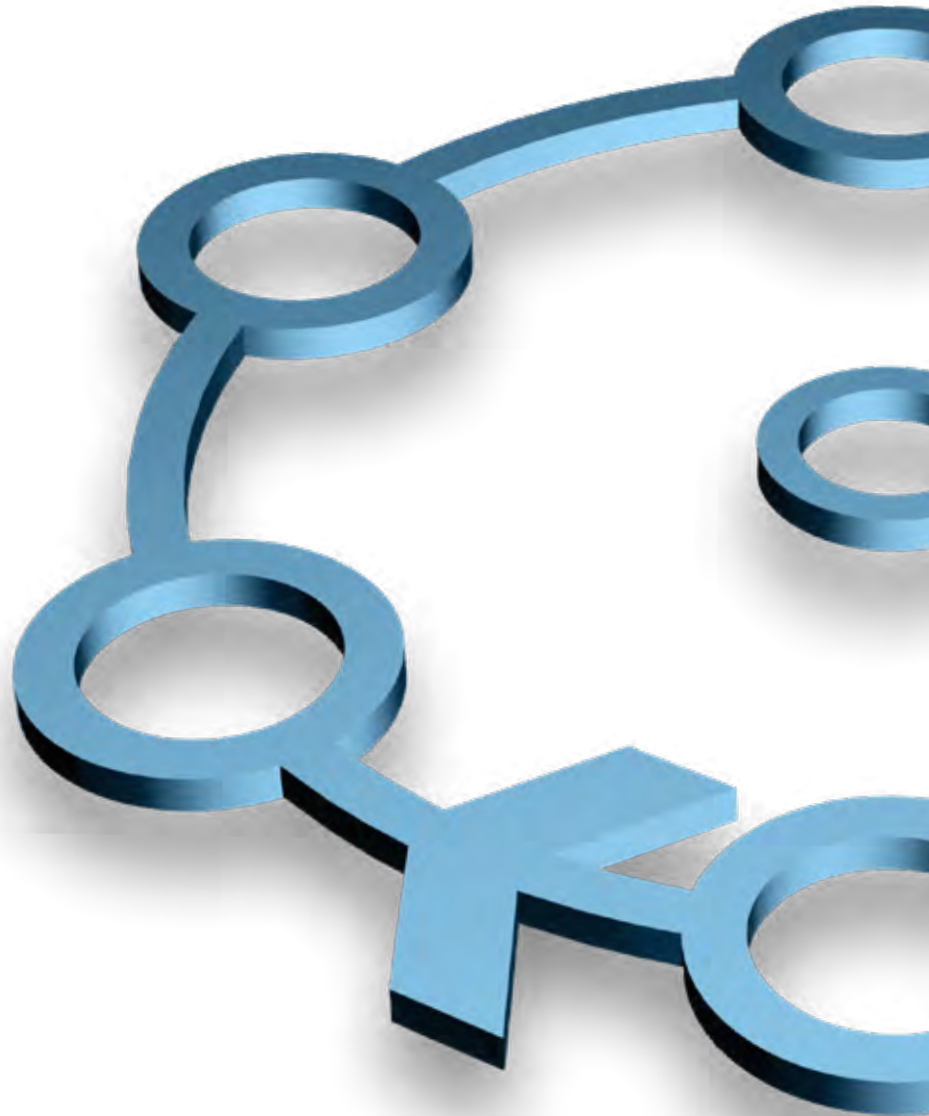
During product entry into service we ensure transfer of in-depth knowledge about components and systems.

2

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.





4

Operations

As long as helicopters are flying with our systems, our customer service offers an extensive product support: we analyze 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.

1

Design and development

Our customer support and engineering design teams are paired to combine innovative ideas with field experience to develop a cost optimized system that meets your demands and the competitive environment. Using our system knowledge, gathered through millions of hours of real life data, we create equipment that is easy to test and maintain, that is reliable and exceeds your expectations.

5

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.

6

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



3D printed parts

Already in 2017, we 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.



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 is needed, e.g. for steering, extension and retraction of landing gears and braking. The integrated design supports easy modular assembly in the helicopter.



Air quality

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

Universal control systems

We have developed a universal Remote Electronic Unit (REU) for different applications. Less weight, faster final assembly, more flexibility: The ingenious concept of our REU offers plenty of advantages, thanks to digitization.



Electrical landing gear

Our 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, we 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 – On board in all market segments

Airbus

AS350 / 355 Ecureuil

- Environmental control system components
- Gears for main gearbox

BK117

- Gears for power transmission gearboxes
- Hydraulic power supply
- Main- and tail rotor servo controls

H120

- 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

H155

- Environmental control system

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

Korean Aerospace Industries

KHP

- Environmental control system components

LCH

- Environmental control system

Leonardo (Helicopters)

AW139

- Heating and ventilation
- 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 – Reliable partnerships with customers worldwide

System supplier

We are a world-wide approved solution provider and integrator for the aerospace industry in the field of flight control and actuation systems, environmental control and thermal management systems, landing gears, gears, gearboxes as well as on board electronics. We participate in various civil and defense aircraft programmes as well as in research & technology developments.

System solutions

We offer complete system solutions and components according to the individual needs of aircraft manufacturers and -operators. With the certified disciplines of development, production, qualification, integration and customer services, we combine innovative practices and high modularity to fully fit the customers' requirements.

Environmental control and thermal 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



Global and independent: more than 70 years of success

Liebherr was founded in 1949 when, with the development of the world's first mobile tower crane, Hans Liebherr laid the foundations for a family business now employing nearly 51,000 people and comprising over 140 companies across every continent.

The parent company is Liebherr-International AG in Bulle, Switzerland, whose associates are exclusively members of the Liebherr family.

Leaders and pioneers

Liebherr is a pioneer and its forward-looking approach has seen it make important contributions to technology history over a wide variety of industries. Employees throughout the world continue to share the courage of the founder, sharing a passion to produce innovative products and a determination to provide world-leading equipment and machinery.

Diversified portfolio

The company is one of the world's biggest construction equipment manufacturers and provides high-quality, user-oriented products and services to sectors including: earthmoving, material handling, deep foundations, mining, mobile and crawler cranes, tower cranes, concrete production and distribution, maritime cranes, aerospace and transportation, gear technology and automation, refrigeration and freezing, components and hotels.

Customised care

Liebherr solutions are characterised by precision, implementation and longevity. The company is committed to technological excellence and to providing customers with solutions that match their needs exactly. That customer focus does not end with delivery of a product but continues through a comprehensive range of back-up and support services.

www.liebherr.com

Liebherr-Aerospace & Transportation SAS
408 avenue des Etats-Unis, B.P. 52010, 31016 Toulouse Cedex 2, France
Phone +33 561 35 2828 • Fax +33 561 35 2676
info.aer@liebherr.com • www.liebherr.com • www.liebherr.aero