

# Application Solutions for Today's Rotorcraft Industry



**ITT**

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# Applications

ITT aerospace product lines are continually expanding to provide our customers with unique solutions for applications on military and commercial rotorcraft programs. Our extensive knowledge and experience within these industries enable us to provide our customers with superior analysis, products, services and support. Our teaming and partnership approach to the customer's needs sets us apart from the competition.

## ITT Enidine Helicopter Applications/Products

- Main and Tail Rotor HCL Bearings and Dampers
- Transmission and Engine Isolation
- Hydraulic Control Devices
- Rate Control Devices
- Noise Attenuation
  - Cabin Interior
  - Gearbox
  - Accessory Gearbox
  - APU
  - Environmental Control System

## ITT Aerospace Controls Helicopter Applications/Products

- Hydraulic System Motor Operated Valves
- Hydraulic Pressure and Temperature Switches
- Landing Gear Valves and Pressure Switches and Actuators
- Fuel Control Valves and Actuators
- Engine Fuel, Oil, Filter, Pump - Pressure, Temperature and Flow Switches

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## ITT Enidine and ITT Aerospace Controls Key Customer Platforms

- Boeing AH64, V22, CH47
- Leonardo Helicopters AW101, NH90, AW109, AW129, AW139, AW149, AW169, Lynx, Super Lynx
- Sikorsky CH-53K, UH-60
- Bell 206, 407, 412, 427, 429, 505, 525
- Airbus Helicopters EC175, EC225, EC275, AS332, AS365, Dauphin, HH-65A

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## ITT Cannon Interconnect Solutions

- Fuselage:
  - FOHA/PHD
  - KPT/KPSE Series 1
- Engine & Transmission
  - 5015 Firewall
  - KJA Series III
- Cockpit & Avionics
  - BKAD Rack & Panel
  - MDM, Cable Assembly
  - Hermetics
  - Space & Specials Connector & Cable Assembly
  - MIKJ Mini-Circular
- Munitions System
  - MDM / TMDM
  - D-Sub
  - Nano



## Global Presence



ITT Aerospace Controls  
Valencia, CA



ITT Enidine Inc.  
Orchard Park, NY



ITT Cannon  
Irvine, CA

ITT is a diversified leading manufacturer of highly engineered critical components and customized technology solutions for growing end-markets in industrial, aerospace and transportation. Building on its heritage of innovation, ITT partners with its customers to deliver enduring solutions to the key industries that underpin our modern way of life.

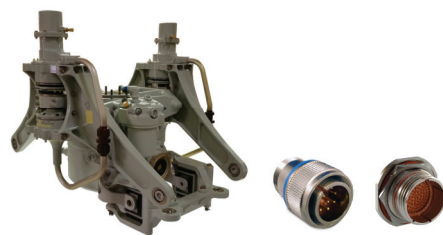
**ITT provides lightweight and reliable aerospace products to the rotorcraft industry.**

Founded in 1920, ITT is headquartered in White Plains, NY, with employees in more than fifteen countries and sales in more than 125 countries. For more information, visit [www.itt.com](http://www.itt.com).



# GROWING WITH ITT AEROSPACE

## ROTORCRAFT SOLUTIONS



### ENGINE & TRANSMISSION

- Transmission Vibration Isolation System
- 5015 Firewall Connectors: Power Trans
- KJA Series III: Signal & Power Transmiss

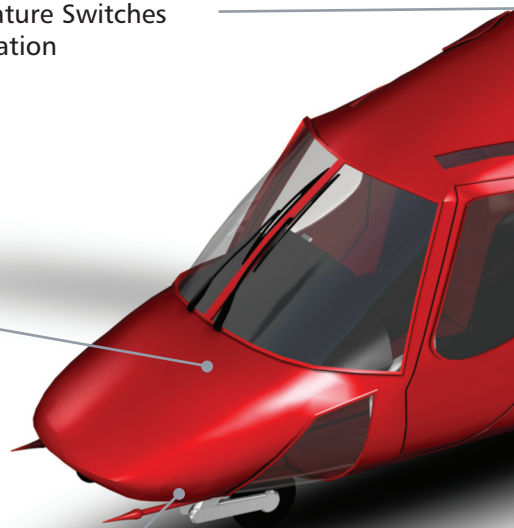


- Hydraulic System Motor Operated Valves
- Hydraulic Pressure & Temperature Switches
- Structureborne Noise Attenuation



### COCKPIT, AVIONICS & FLIGHT CONTROL

- BKAD Rack & Panel: Power & Signal Processing
- Micro Connectors & Cable Assembly: I/O for IFF Receivers & Transponders
- Hermetics: Severe environment & pressurized I/O
- Space & Specials Connector & Cable Assembly: Power & Signal Transmission
- MKJ Mini-Circular: Data, Signal & Power Transmission for Imaging Systems
- Hydraulic Control Dampers
- APU Isolation
- Elastomeric Noise Attenuation



### Frahm Tuned Mass Dampers





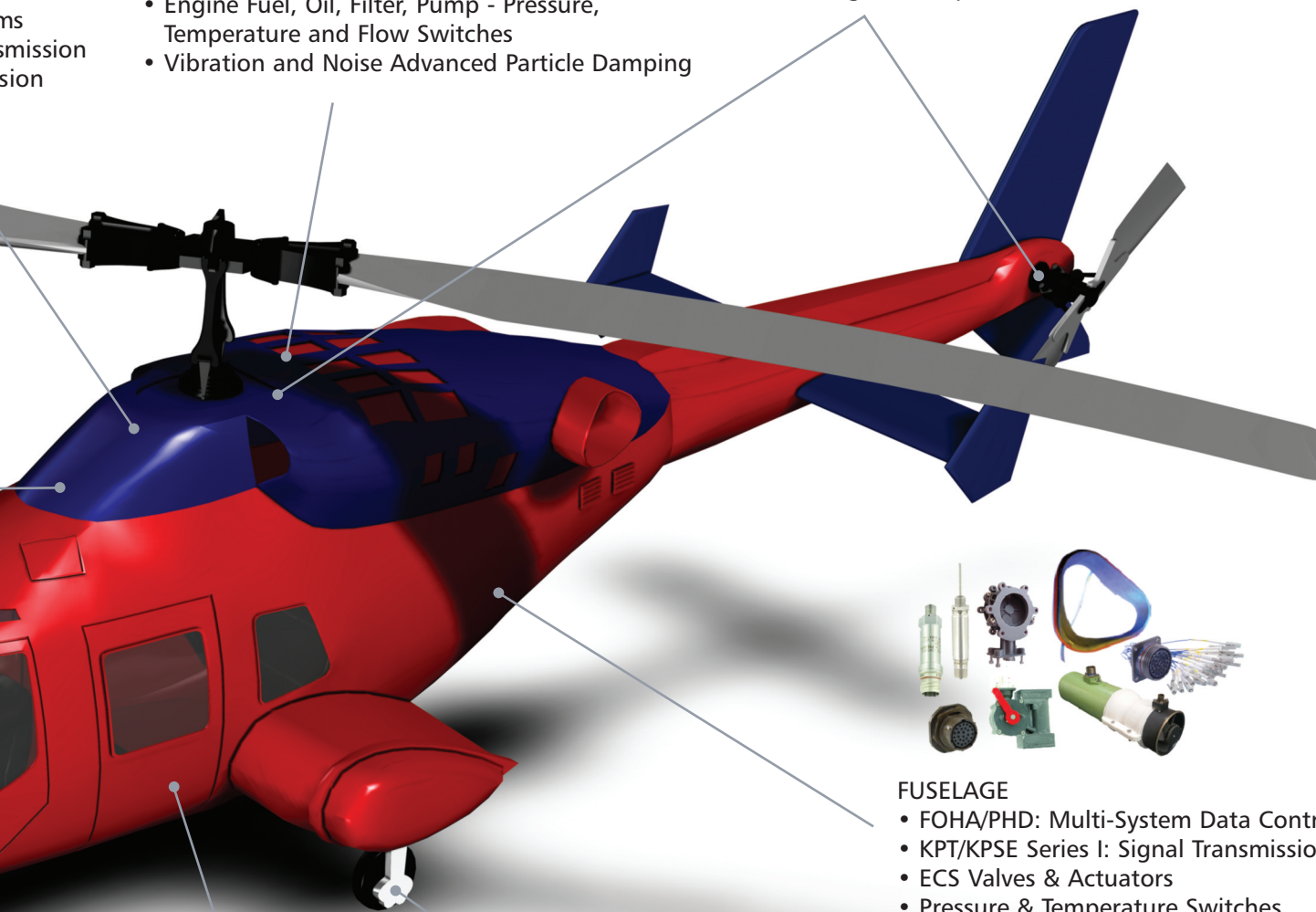
# SPACE PRODUCTS



- Fuel Control Valves and Actuators
- Engine Fuel, Oil, Filter, Pump - Pressure, Temperature and Flow Switches
- Vibration and Noise Advanced Particle Damping



Main and Tail Rotor  
HCL Bearings & Dampers



FUSELAGE

- FOHA/PHD: Multi-System Data Control
- KPT/KPSE Series I: Signal Transmission
- ECS Valves & Actuators
- Pressure & Temperature Switches

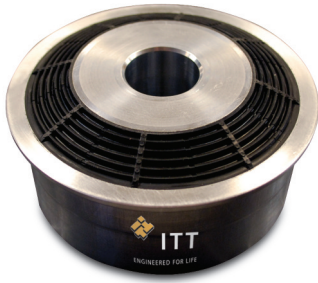
Cabin Interior  
Noise Isolation



LANDING GEAR

- Valves & Pressure Switches
- EM Actuators





## High Capacity Laminated (HCL) Bearings

ITT Enidine's high-capacity laminated elastomeric bearings are needed in transmissions and rotor systems. These devices are used to support loads in-flight critical assemblies as well as transmit loads and motion to the blades of the helicopter. These HCL bearings provide a high stiffness in one or combined directions to take loads, while lowering stiffness in other directions allowing for motion.

- Reduce in-flight vibration — Stiffness and damping are engineered for each application
- Longer life than traditional bearings — Resistant to dust, debris and fluids
- Improve the reliability of other aircraft systems
- Easy inspection — Visual inspection indicates approaching end of life
- Utilized for flapping and blade retention on the tail rotor
- Reduced maintenance — Require no lubrication



## Harsh Environment Linear Actuator

The Harsh Environment Linear Actuator is ITT Aerospace Controls' newest linear actuator design. The linear actuator incorporates a two piece machined housing to control sealing surfaces while providing a high strength structure which limits fluid ingress. All sealing surfaces were improved to provide easy assembly and the highest level of protection from Harsh elements. Additionally, the exterior surfaces are finished with a Military Specification Anodic Coating.

- PMDC motor typical, Brushless optional
- ACME or Ball Screw drive
- Force limiting capability
- Meets MIL-A-8064 requirements
- Non-jamming mechanical stops
- Integral electromechanical motor brake optional
- Two position or modular positioning
- Switched or continuous position feedback



## ARINC BKAD Rack & Panel Connectors

Designed per ARINC 600 guidelines, ITT Cannon's BKAD series connectors represent the industry standard for new avionic systems that support the air transportation market. These ruggedized, harsh environment interconnect solutions are available in 3 and 6 gang configurations and can accommodate up to 800 low insertion force contacts. Our low insertion force contacts are also interchangeable with the contacts used in ITT Cannon's DPX series and permit retrofit of existing avionic rack systems in the cockpit and fuselage.

- Rear release/rear removable size 12, 16, 20, 22 crimp contacts
- Low insertion force contacts
- Both environmental and non- environmental versions
- Polarizing posts that are removable from the mating face
- Field replaceable inserts



## Hydraulic Control Dampers

ITT Enidine is globally recognized as the preferred source for energy absorption and hydraulic motion control products. Our experience designing, developing and manufacturing an array of products allows us to utilize that experience into a variety of markets. We have over 5 decades of experience with military and commercial aerospace shock and vibration isolation in the hydraulic market. Many standard designs are capable of >1 million operating cycles without the loss of fluid or performance due to sealing technology and experience.

- Mitigate bio-mechanical feedback of helicopter collective controls
- Provide pilots with precise resistance for controls
- Prevents jamming or high-stiffness in pilot controls with fail-safe design
- Hydraulic dampers are custom designed per application requirements for opening or closing actuation or rate control of cowl and doors



## Fan/Duct Heater Assemblies

For spot heating requirements in cabin equipment or ECS bay, ITT supplies a family of plug and play integral Fan/Duct air to air heaters. By utilizing our patent pending FanFlow Adapter, the fan assembly can be mounted much closer to the heater without degrading the heater performance. The heater is derived from ITT's ECS Heater line with over 40 years of installation history and is DO-160 Qualified, Lightweight and Vibration/Shock resistant, available in 3", 3.5" and 4" diameters and various total wattages.

- This is a patented ITTAC Plug and Play Fan/Duct Heater.
- Available with up to 2000 Watts
- 115/200 3 phase or 28 VDC power
- Compatible with other ITTAC components for additional customer satisfaction
- Design based on over 15,000 installed duct heaters on Boeing Aircraft which meets required weight restriction and also low pressure drop & increased flow requirements



## MIL-DTL-5015 Firewall Connectors

ITT Cannon's Firewall connectors are designed to meet the requirements of MIL-DTL-5015 class K and allow electrical circuits to penetrate the engine firewall of the aircraft while still maintaining the integrity of the flame barrier requirements of the aircraft firewall. These robust interconnect solutions provide protection against high temperatures, emergency fire-retardant conditions, moisture and atmospheric changes, and are resistant to fuels, cleaning agents, coolants and hydraulic fluids.

- Temperature rating: +204°C (+392°F) for more than 1000 hours
- Complete moisture sealing against pressure differential to 15 psi before and after exposure to +204°C
- Rugged metal clip retention system assuring positive content retention
- Self-locking coupling mechanism





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