

THALES

Commercial Avionics

Making future aircraft possible. Today



Thales at a glance



Employees

64,000



Global
presence

56 countries



Revenues in 2017

15 billion euros



Self-funded R&D*
2016

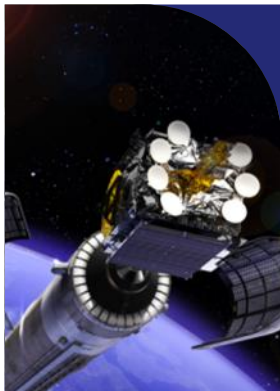
731 million euros

* Does not include therefore R&D undertaken with external funding.

DUAL MARKETS



AEROSPACE



SPACE



**GROUND
TRANSPORTATION**



DEFENCE



SECURITY

TRUSTED PARTNER FOR A SAFER WORLD

OPEN

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A unique positioning in aerospace

Serving aircraft manufacturers, airlines, airports and civil aviation authorities

- Leadership in both ground and onboard equipment (cockpit & cabin)

40% of the world's aerospace managed by Thales air traffic control centers

#2 worldwide in in-flight entertainment & connectivity

#1 in Europe in avionics



End-to-end solutions for safer, easier and more efficient flight

Solutions to

- Control and fly aircraft
- Operate, maintain and optimize the efficiency of aircraft and fleet
- Inform and entertain passengers
- Train aircraft crew, helicopter and military pilots
- Receive End-to-end connectivity

Commercial

Airbus, ATR, Boeing, Bombardier, Cessna, Embraer, Gulfstream, Sukhoi, airlines



Military

Airbus Defence & Space, Ariane Space, Dassault, Embraer, MBDA, MiG, Sukhoi, MoDs



Helicopters

Airbus Helicopters, Boeing, Leonardo, Sikorsky, MoDs, operators





Military Avionics Business Segment

We deliver trusted innovative avionics solutions for a safer world, as a global ecosystem leader





Computing Platform & Operational Functions

- Embedded Computer
 - Cyber security
- Engineering framework
 - Mission application
 - Digital Map System
- Interface box & Recorder
 - Tactical situation
- Armaments management



Cockpit & Interaction



- Head-down display
 - Head-up display
- Head worn display
- Enhanced vision system
- Interactive control panel,
 - Instrument



Navigation & Positioning

- GNSS & anti-jamming
- Inertial navigation systems
 - Air data & probes
- Stand-by instruments
 - Auto-pilot
- Flight management
 - GNSS services



Key Military Avionics Customers...



... and partners



Raytheon

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Product offering

www.thalesgroup.com

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Combat avionics offering overview

Cockpit

- Head-down display, Head-Up display, Helmet Mounted Display
- Interactive control panels, instruments

Mission & Functions

- Flight Management, Autopilot
- Tactical situation & Digital Map System
- Armaments management
- Recorders

Navigation & Flight control

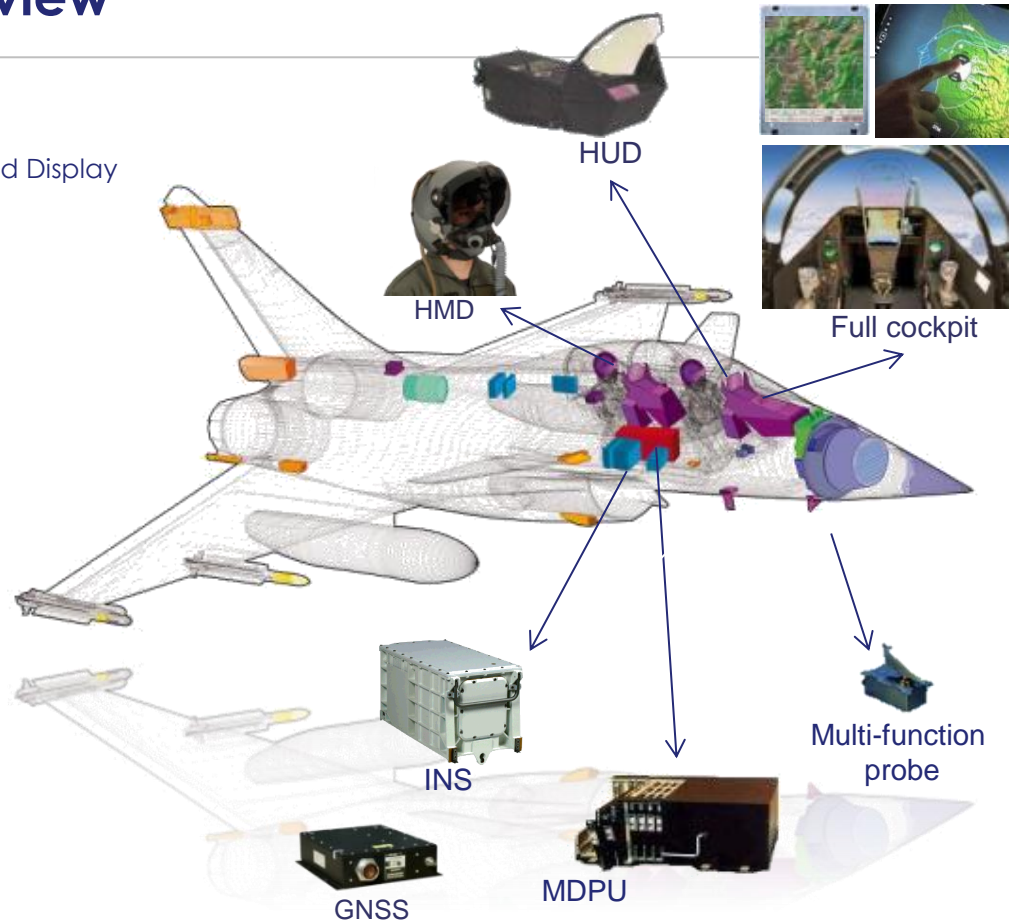
- GNSS & Anti-jamming
- Inertial navigation system
- Air data unit, Multifunction probes

Integrated Modular Avionics

- Computing platform
- Operating system tools

Electrical Power and generation

Training & Simulation



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Militarized avionics offering summary – Fixed wings

Integrated Modular

- Avionics Computers
- ARINC 664 switches
- Development Tools & IMA framework

Mission

- Flight Management System
 - Digital Moving Map
 - Mission Management

Flight Controls & Navigation

- Autopilot, FCU & actuators
- Inertial Navigation System
 - GPS, mil GPS, CRPA
 - Air Data Units & Probes
 - TACAN
 - Radio Altimeter

Communication & Surveillance

- SATCOM
 - VUHF
- Secured Intercommunication
 - IFF, ATC
 - TCAS, TAWS
- Radio Management System

Training Solutions

- Full Flight Simulators
- Procedural Training Devices
 - Training Services

Cockpit

- Multifunction Display
 - HUD & EVS
- Electronic Standby
 - HMSD
 - EFB

Integration Activities



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Helicopter Avionics

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Helicopter Avionics offering

Human/Machine Interface



Display



Control panel



Intercom System



Helmet Mounted Sight Display

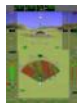
Mission & Function



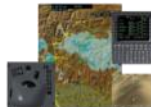
Synthetic Vision System



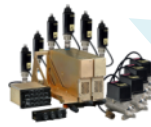
Mapping / Onboard Mission Planning



Terrain Awareness Warning System



Flight Management



Autopilot

Navigation



Air Data



Inertial System



GNSS Anti Jamming



Stand by instrument



Magnetometer

Computers



Vehicle Computer



Mission Computer



Engine Computer



Traffic & Collision Avoidance

Civil



Military



From stand alone equipment or function to fully integrated avionics

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UK MoD / Boeing – Chinook (Retrofit and New Model)



● Cockpit

HUD: NVG Head Up Display (DNVG)

High Integrity Displays: Smart Multifunction TopDeck Display 6"x8"

● Flight Management

CDNU: Control Display Navigation Units

● Navigation

Front and rear crew moving maps and connected mission tablets
Embedded P(Y) GPS

● Mission

FLIR: Integration of FLIR Turret & Display
New Tactical Data System
Dual interactive mission tablets

● Services, support

Mission planning
Training & Simulation
Support

* Core avionics

* Mission

* Service, support

Major avionics prime and system integrator for Chinook

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Avionics 2020 new-generation helicopter cockpit

Make your mission easier and safer

Crew – centric

- Simple, natural and direct interaction
- Eyes out piloting

Mission minded

- Quickly adapts to any mission type
- Aid for mission management and anticipation

Customizable

- Customers make the cockpit their own
- Scalable from a single display to a full avionics suite



Increase helicopter versatility and mission efficiency while reducing pilot workload

Thank you

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