

Corporate Presentation

Fokker Technologies



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The information enclosed is proprietary and is provided to you on a strictly confidential basis.

People make the difference



100 Years of Experience

Fokker has a rich history as integrator and leaving its signature on the A&D market through breakthrough innovations



1890

Anthony Fokker born in Java Indonesia



1911

1st flight in the Netherlands in his home-built aircraft "Spider"



1919

Foundation of the Dutch Fokker Factory



1939

G1 fighter and other military aircraft



1955

F-27 Friendship maiden flight



1967

F-28 Fellowship maiden flight



1983

Launch Fokker 50 and Fokker 100



1990

Consortium partner in NH90



1995

Glare development



1996

Transformation to specialist supplier



2000

Thermoplastic wing leading edge



2002

F-35 Doors, wiring Arresting hook



2008

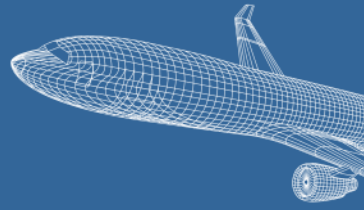
Gulfstream G650 tail

Fokker and GKN Aerospace

- Lead in our chosen markets
- Leverage our global footprint
- Technology driving margin
- Operational excellence
- Sustain above market growth



The leading global Tier 1 aircraft supplier

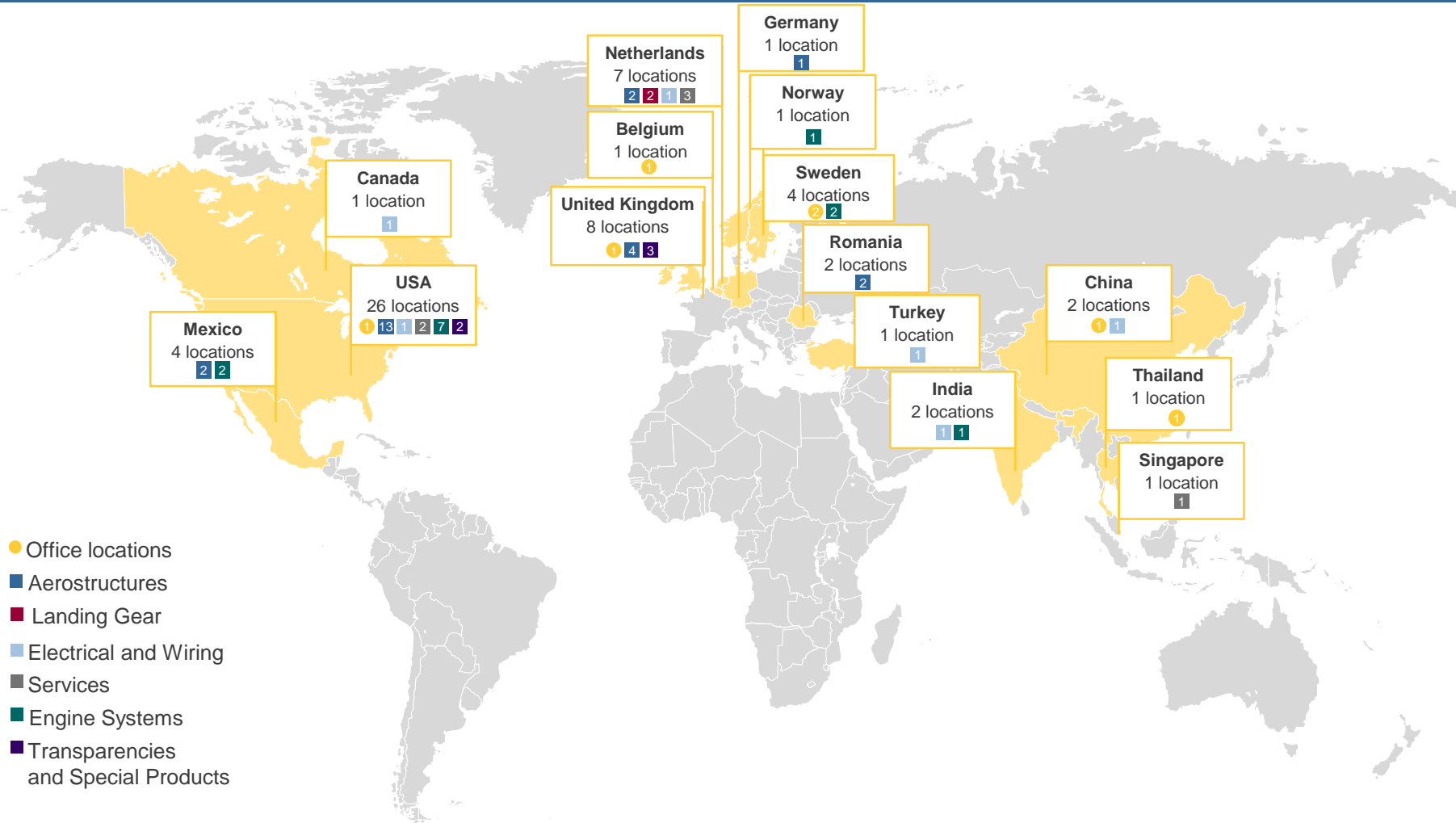


Number of employees
17,000

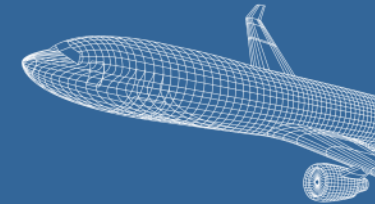
2015 sales
£3 billion*

* 2015 sales include Fokker

Number of locations
62 in 15 countries



Widest capabilities of any Tier 1



AEROSTRUCTURES



- > Fuselage, wing, nacelle & pylon
- > Inflight opening doors and empennage

ENGINE SYSTEMS



- > Static & rotating structures
- > Titanium engine inlet parts

SPECIAL PRODUCTS



- > Transparencies
- > Ice protection systems
- > Lightweight missile canisters

WIRING INTER-CONNECT SYSTEMS



- > Electrical Wiring Interconnection Systems (EWIS) for aircraft and aircraft engines

LANDING GEAR



- > Helicopter landing gear
- > Composite load carrying landing gear components (drag brace)

GLOBAL SERVICES



- > Availability services, MRO, conversion and completion for mature and legacy aircraft

GLOBAL NO. 2

GLOBAL NO. 2

GLOBAL NO. 1

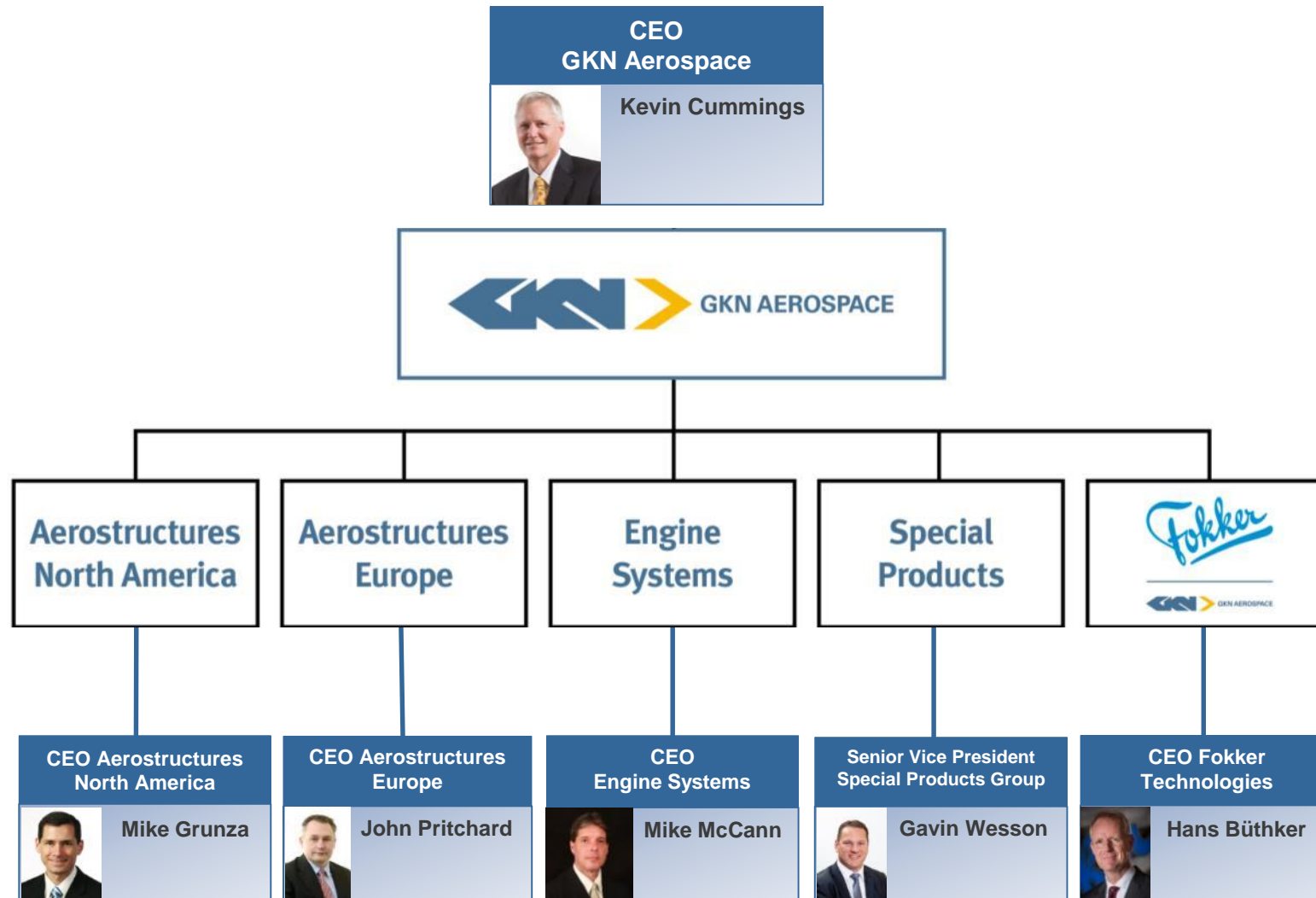
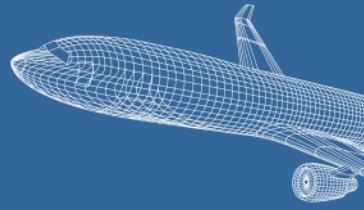
GLOBAL NO. 3

GLOBAL
BRAND

GLOBAL
BRAND

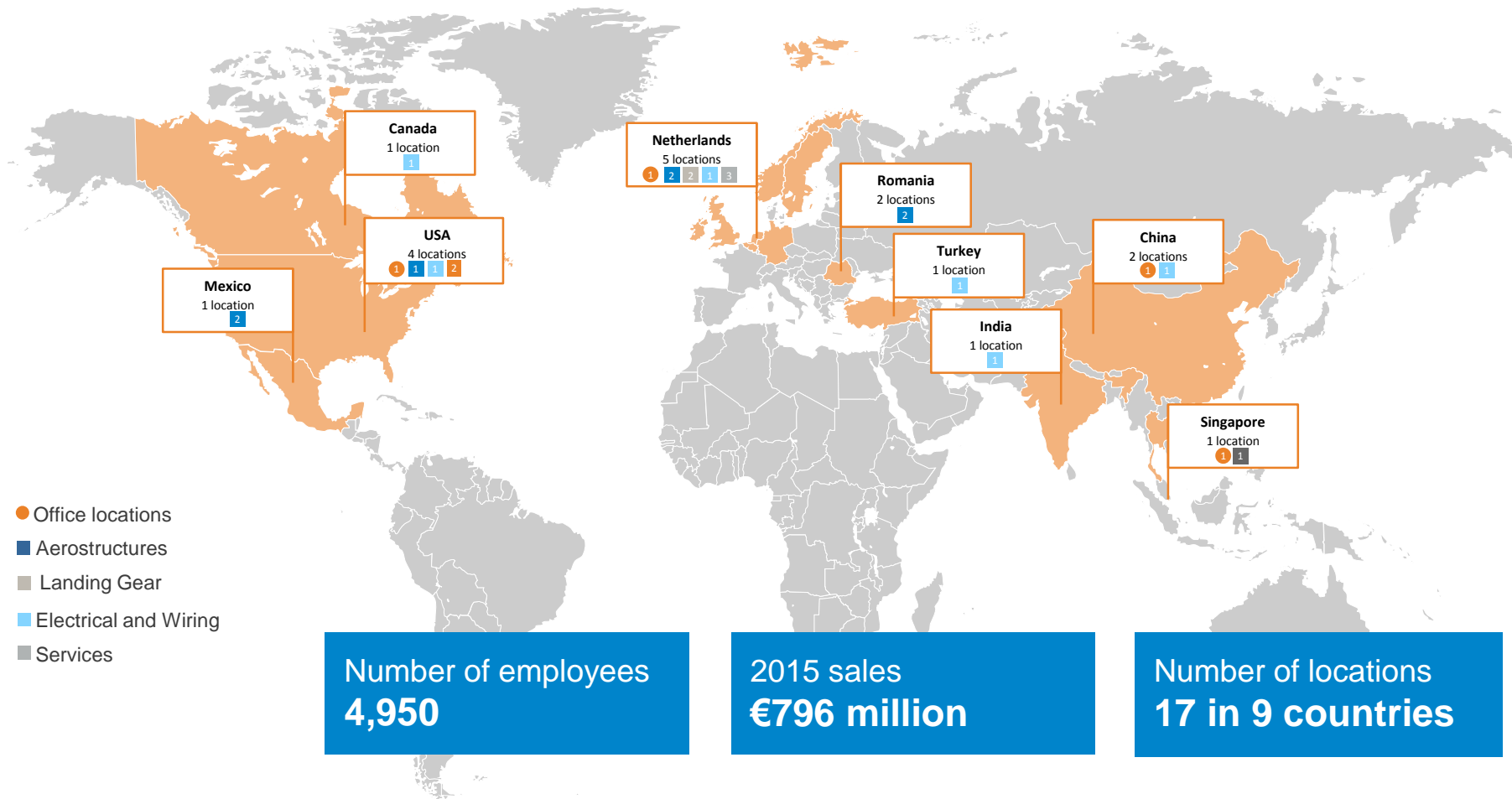


GKN Aerospace - structure



Fokker Technologies

Leading multi-technology specialist

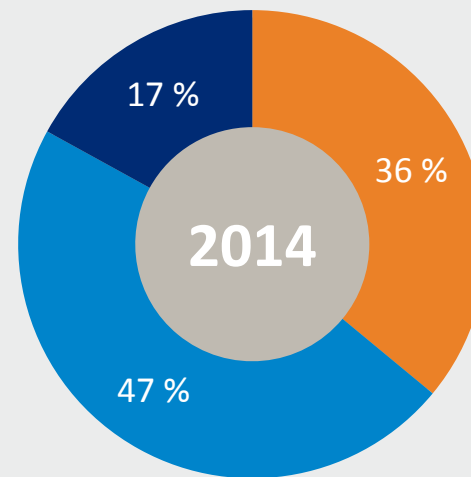
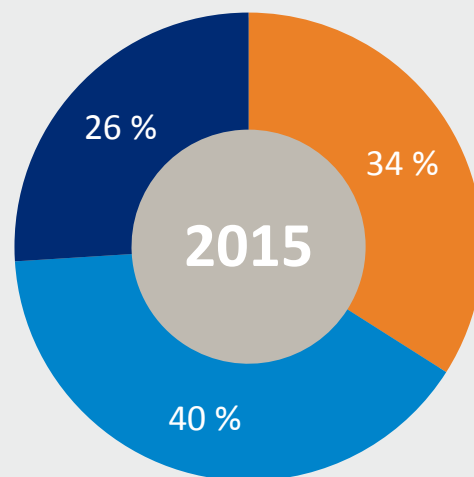


Fokker operating companies



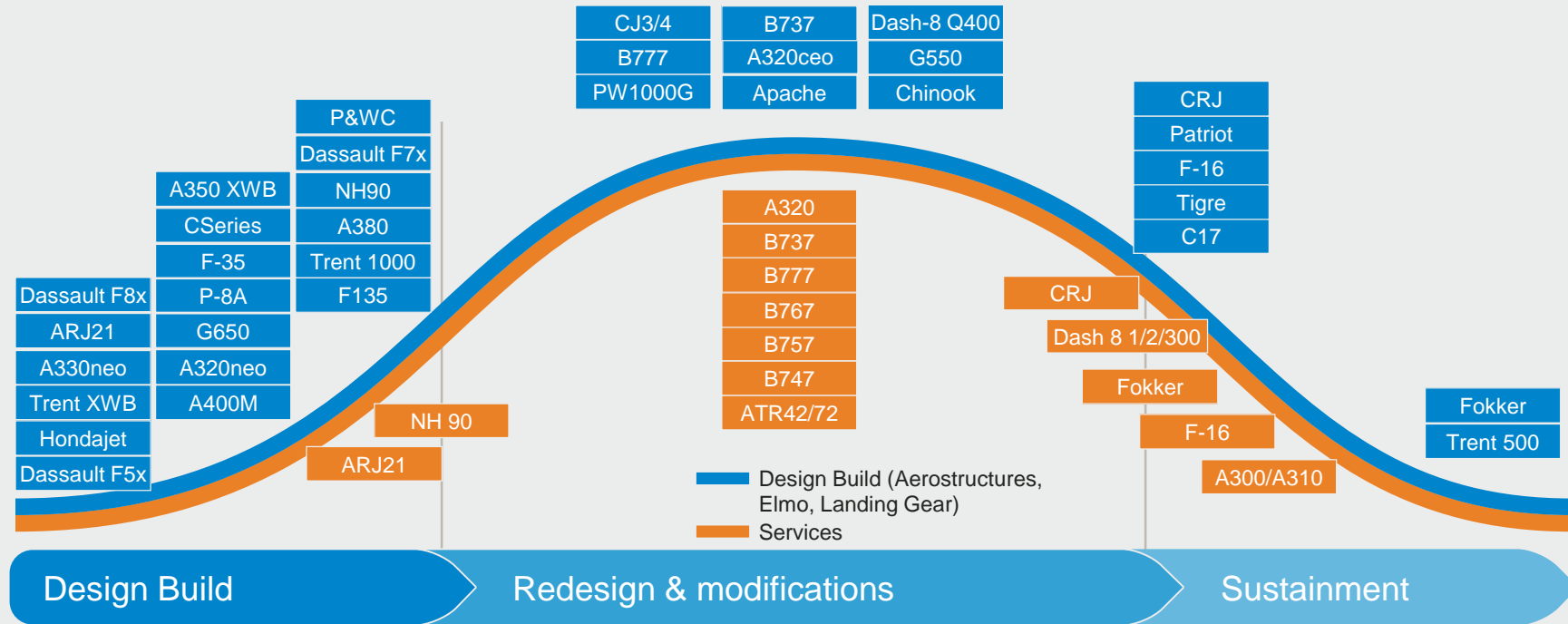
Balanced portfolio

Business Jets, large commercial and defense



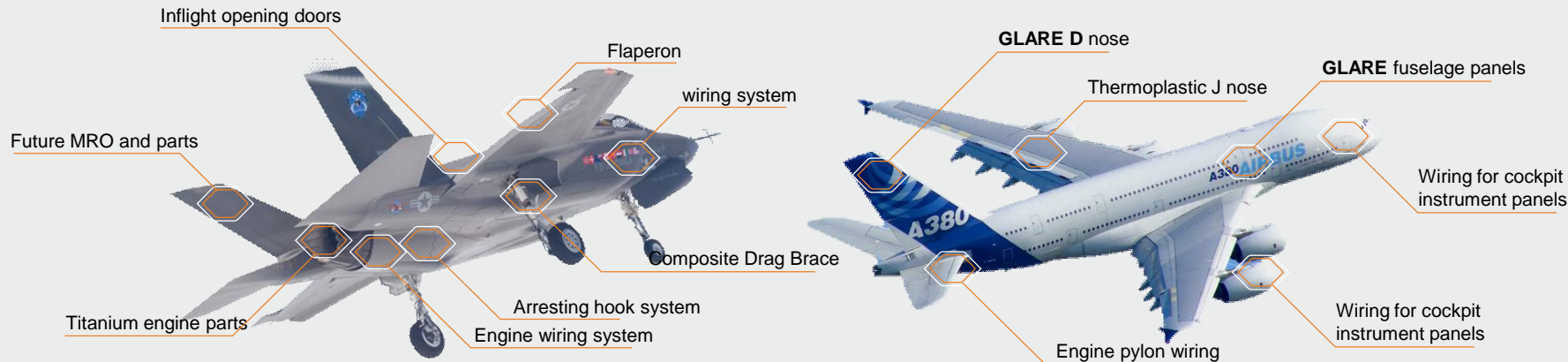
- Business Jets
- Large commercial
- Defense

75 aircraft platforms from design through lifetime support



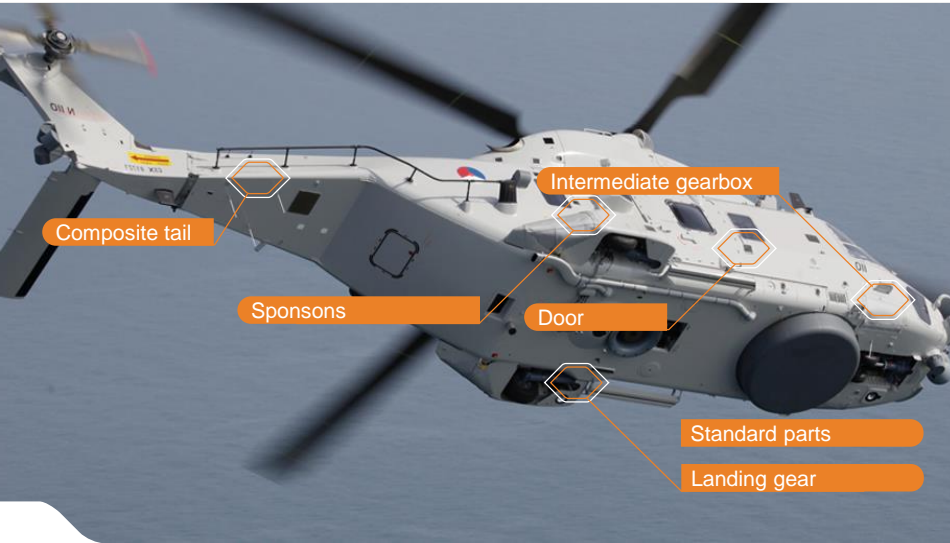
Recognised Technology Leader

Building on 100 years of unique and proprietary technologies that support our customers in developing and operating more competitive and reliable aircraft



- Commercialised technology leadership with relevant specialist positions on leading aircraft platforms
- Increasingly leveraging multi-technology solutions across platforms through strategic account management links strategy to technology and new business development
- Benefitting from strong concept and design build engineering capabilities across life time of the program positions
- Composites are a major part of total aerostructures sales

Specialist position in rotorcraft



- NH90 is an innovative European Multi-role Helicopter, selected by 14 nations.
- NH90 is a collaboration between Airbus Helicopters, AgustaWestland and Fokker.
- The AH-64 Apache is the most advanced multi-role combat helicopter for the U.S. Army and a growing number of international defense forces amongst which the RNLAf
- Fokker is a Boeing supplier since 1996.

Number 1 position in empennages for advanced business Jets



Market leader in Business Jet empennages:

- Cessna CJ3 and CJ4
- Dassault F5X
- Gulfstream G550 and G650
- HondaJet

Innovation

Our award winning technology helps our customers to reach their goals

**Carry more
passengers**



**Shorter production
time**



**Improves reliability
and length of
useful service**



**Better for people
and planet**



Composite landing gear components

Technology leader in load carrying landing gear components

Weight reduction and affordability

Shorter production lead time and automated manufacturing

Improved corrosion fatigue and impact damage characteristics

EWIS design and wiring production

Wiring Design Manufacturing System (WDMS) integrates all aspects of wiring management into one powerful online system

Unique configuration and change control

Weight reduction & optimization

Demonstrated results: 100% function & fit 1st install on 1st aircraft ie F35, CSeries

Standardisation and automation

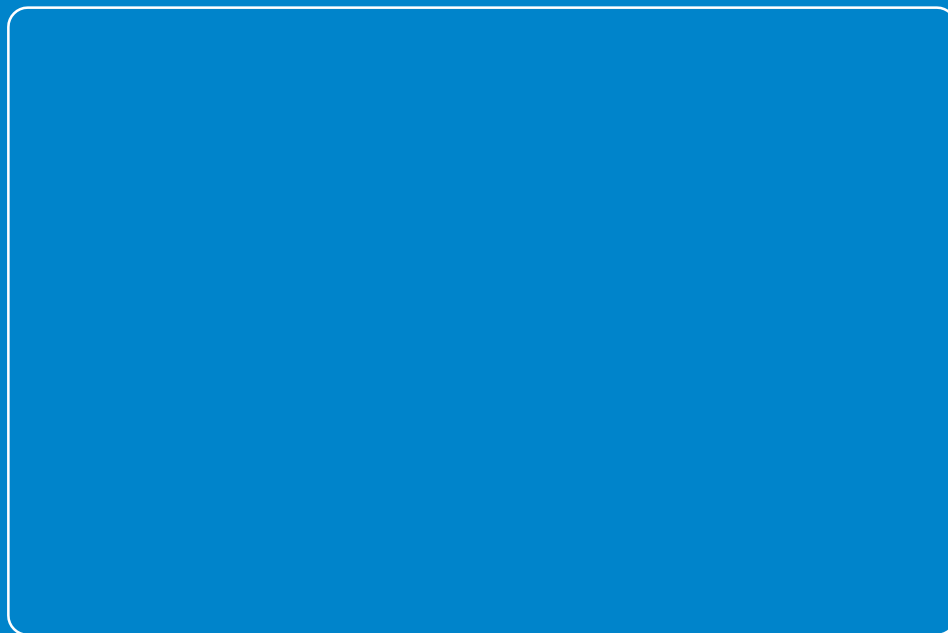
Skyview Panoramic Window

A spectacular view.

Unique passenger appeal

1.5 meter wide window

40% taller than the existing windows



FML®: Fibre Metal Laminates (formerly known as Glare)

A sandwich material constructed from alternating layers of aluminium and glass fibre with bondfilm

FML saves 30% weight on the A380's upper fuselage

FML has excellent fatigue, impact and lightning strike resistance

The future of FML is in automated production

Strategic R&D Partnership and common vision between Airbus, Fokker, Stelia, and Premium Aerotec
for the production and industrialization of Fiber Metal Laminate
in a French, Dutch and German companies collaboration.



- 27 GLARE® fuselage panels
- Total FML area \pm 500 m²
- Fuselage weight reduction: 1000 kg
- D-noses: leading edges HTP/VTP



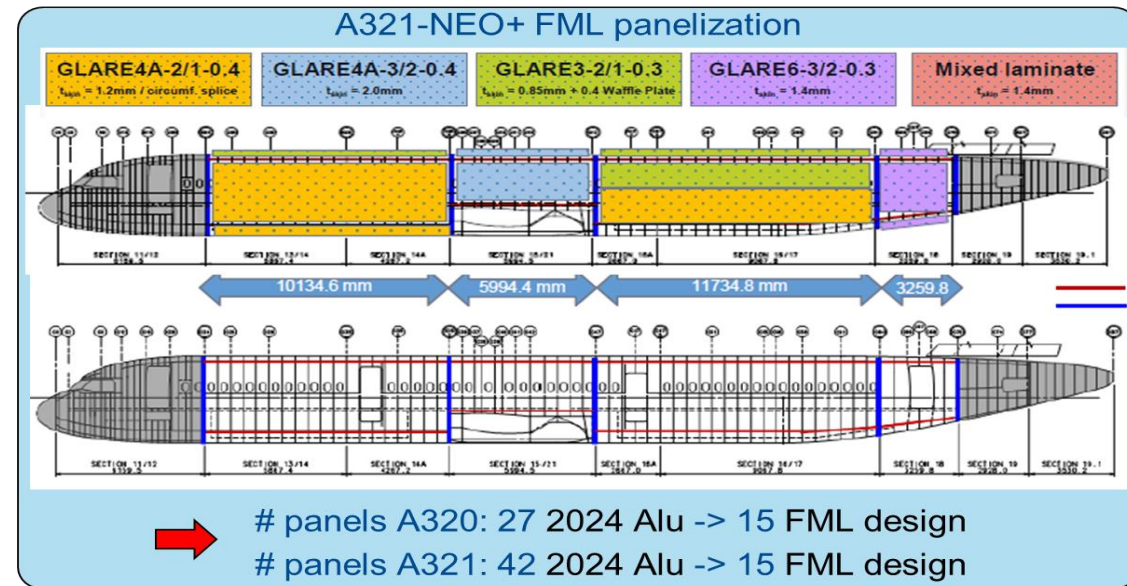
Where is FML already applied?

Around 450 m² of FML is applied on the fuselage of the Airbus A380, divided in 27 panels.

Applying FML on the A320 family means producing 10 times the current total volume per year that is produced for the A380.

- The A320 family consists of the A318 / A319 / A320 / A321 aircraft.
- The A320 build rate (50-60 per month) is much higher than the A380 build rate (of 20-25 per year)
- Applying FML on A320 will reduce the amount of panels from 27 panels for the current A318-A319-A320 to 15 panels and from 42 panels for the current A321 to 15 panels.
- This requires robust automated production of FML fuselage panels

Less weight, less costs and reduced production and assembly time



■ European Setting

- **The FML project is a Cross boarder project in a top sector with implication of OEM's , knowledge institutions on a prestigious program , the Single –aisle program of Airbus .** To be able to realize it within Europe the funding aspect is now playing a major role . The competition with Asia and USA in the development of new technologies and manufacturing process is a daily concern.
- The FML project cooperation is entering a new phase where the implication and commitment of our three countries should be integrated in the overall planning.
- **The FML project has four Parties involved:**
 - - **Airbus S.A.S.**
 - - **Stelia Aerospace**
 - - **Premium Aerotech GmbH**
 - - **Fokker Technologies**
- The FML partnership is working together with sub suppliers and knowledge institute / Universities on the follow-up on development and automation of FML applications in aircraft fuselages.
- **It is defined within an European context involving 3 Countries, France, Germany and The Netherlands with economical implications ,possibilities of knowledge transfer (in a broader context such as academics chairs, participation on research aspect) also to other industrial sectors .**
- Agreements:
 - Following the exchanges between the four partners there are already agreements and collaborations in place:
 - - A Collaboration agreement **CRA** “Development of design & manufacturing solutions for the automation of Fiber Metal Laminate production “was signed by all four partners in December 2015 .
 - - A Memorandum of Understanding **MOU** was signed by all partners the 11 march 2016 with L. Ploumen, Minister of foreign trade & development cooperation (The Netherlands) and H. Desir, Minister of Foreign Affairs & International cooperation (France) . The MOU objective is a Strategic partnership in aerospace research and technology development of design and manufacturing solution for the automation of FML
 - - A FML project in Germany with participation of Airbus – Premium Aerotec and German Research institutes such as the DLR and Fraunhofer Gemeinschaft under Sponsorship of the German Government Research Program (Lufo)

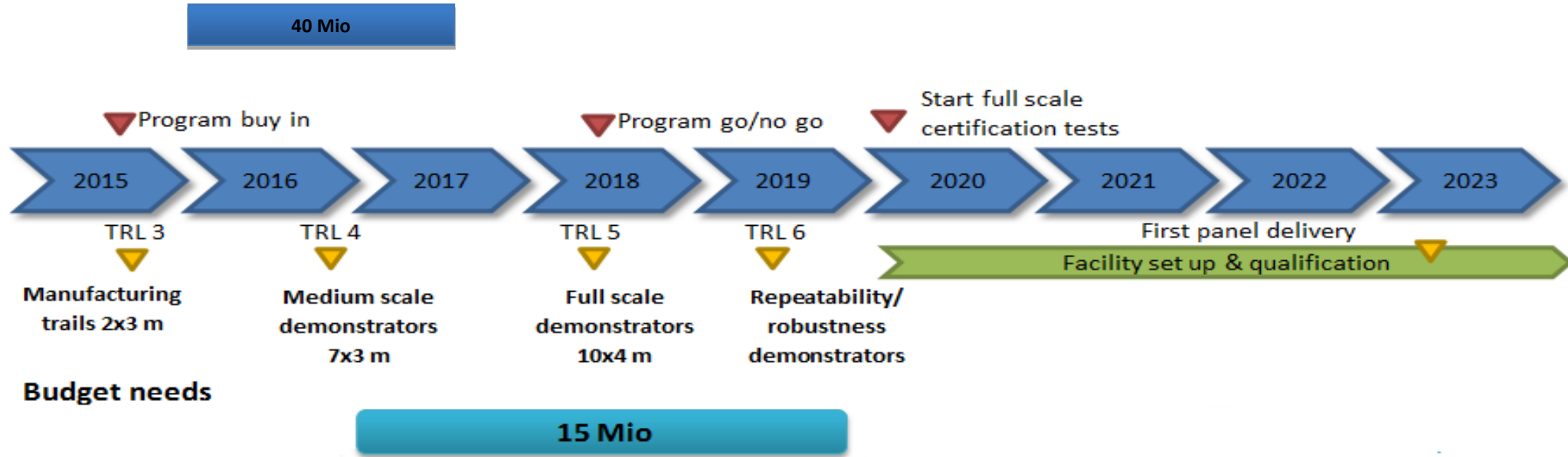
It shall be noticed that thanks to the size of the market at stake as well as the technology involved, this R&T program could lead to substantial industrial return for all three countries as well as workload and knowledge preservation and conservation in Europe.

Smart automated and robotized production technology will enable high volume production rates and increase affordability for OEM's. The focus on the industrialization process should be set up in the context of Industry 4.0 / Smart Industry as the focus is not on new material but on the ramp-up capability for a SA program.

FML – Automation project planning, Budget & funding needed

Development project characteristics

- Project is following Technology Readiness Level steps (international standard TRL)
- Total budget required for upcoming TRL steps: 40 million EURO's



Our Mission

Our signature on every advanced aircraft



Thank you for Your attention

Fokker

 GKN AEROSPACE