

# Smart Engineering



Fokker Technologies

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

*Fokker*

 GKN AEROSPACE

# Content

- ✓ Introduction GKN
- ✓ Aerospace market trends
- ✓ Response to trends
- ✓ Conclusions

# Every day at GKN...

## In numbers

- > 56,000 employees
- > Locations in more than 30 countries
- > €10 billion sales



We drive the wheels of hundreds of millions of cars...

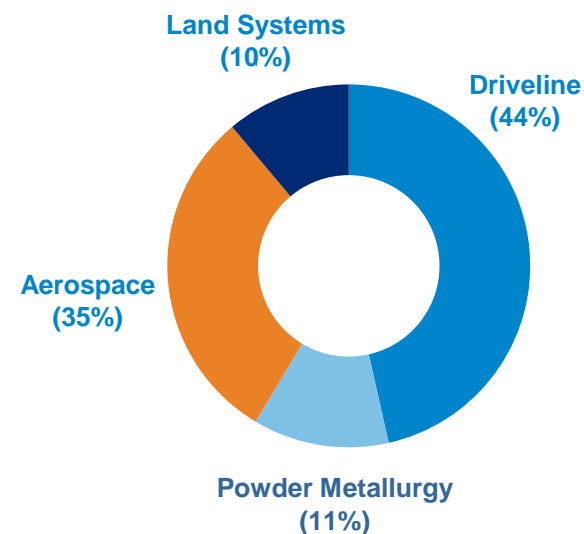


We help thousands of aircraft to fly...



And we deliver the power to harvest crops and move earth.

## Sales by division



# GKN Aerospace- widest capabilities of any Tier 1

## AEROSTRUCTURES



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

## ENGINE SYSTEMS



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

## SPECIAL PRODUCTS



- > Transparencies Ice protection systems
- > Light Weight Missile Canisters

## LANDING GEAR



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

## WIRING INTER-CONNECT SYSTEMS



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

## GLOBAL SERVICES



- > Availability Services, MRO, Conversion and Completion for Mature and Legacy aircraft

GLOBAL  
NO. 2

GLOBAL  
NO. 2

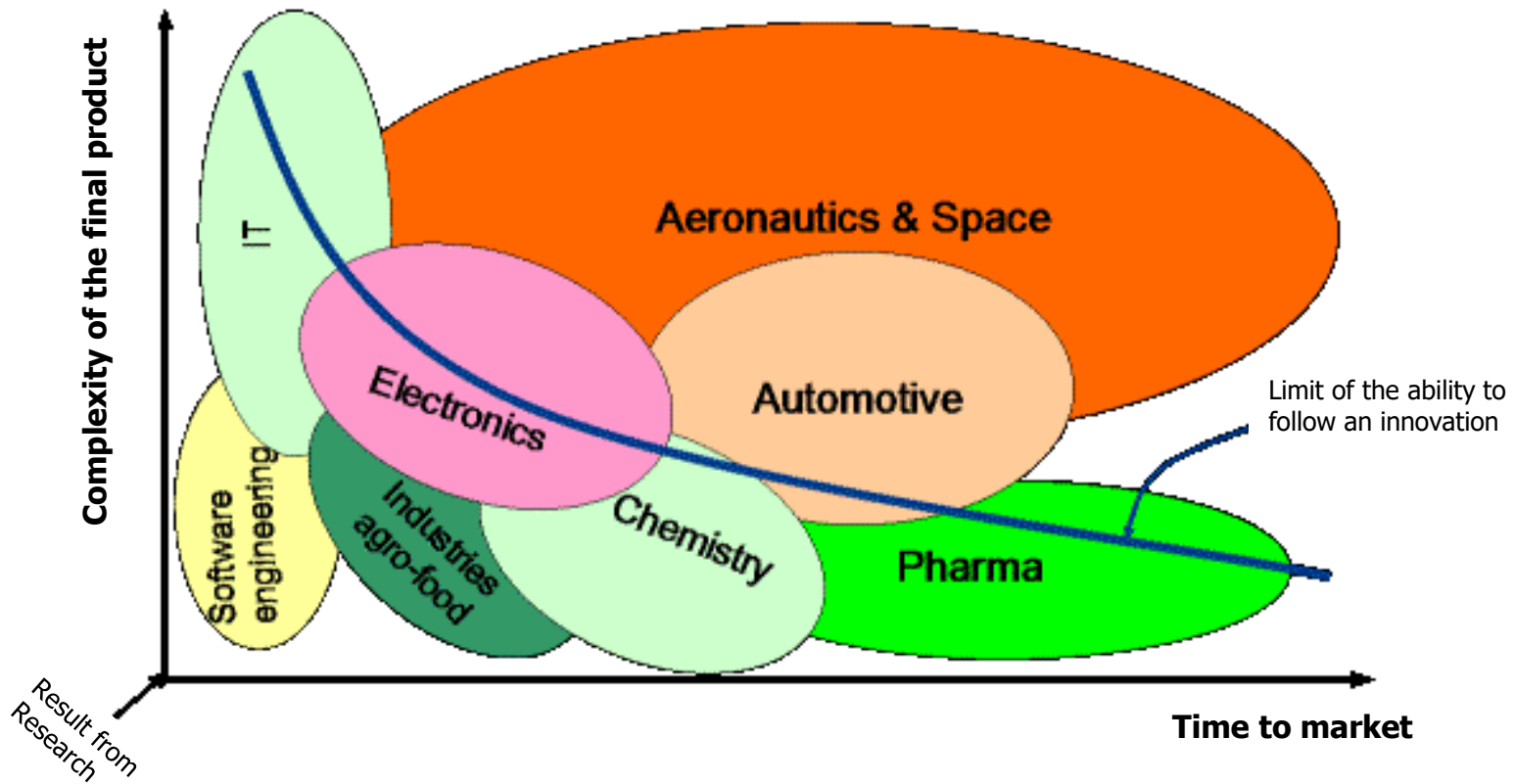
GLOBAL  
NO. 1

GLOBAL  
NO. 8

GLOBAL  
NO. 3

GLOBAL  
BRAND

# Aerospace business



Combining **longest 'time-to-market'** with **highest complexity**

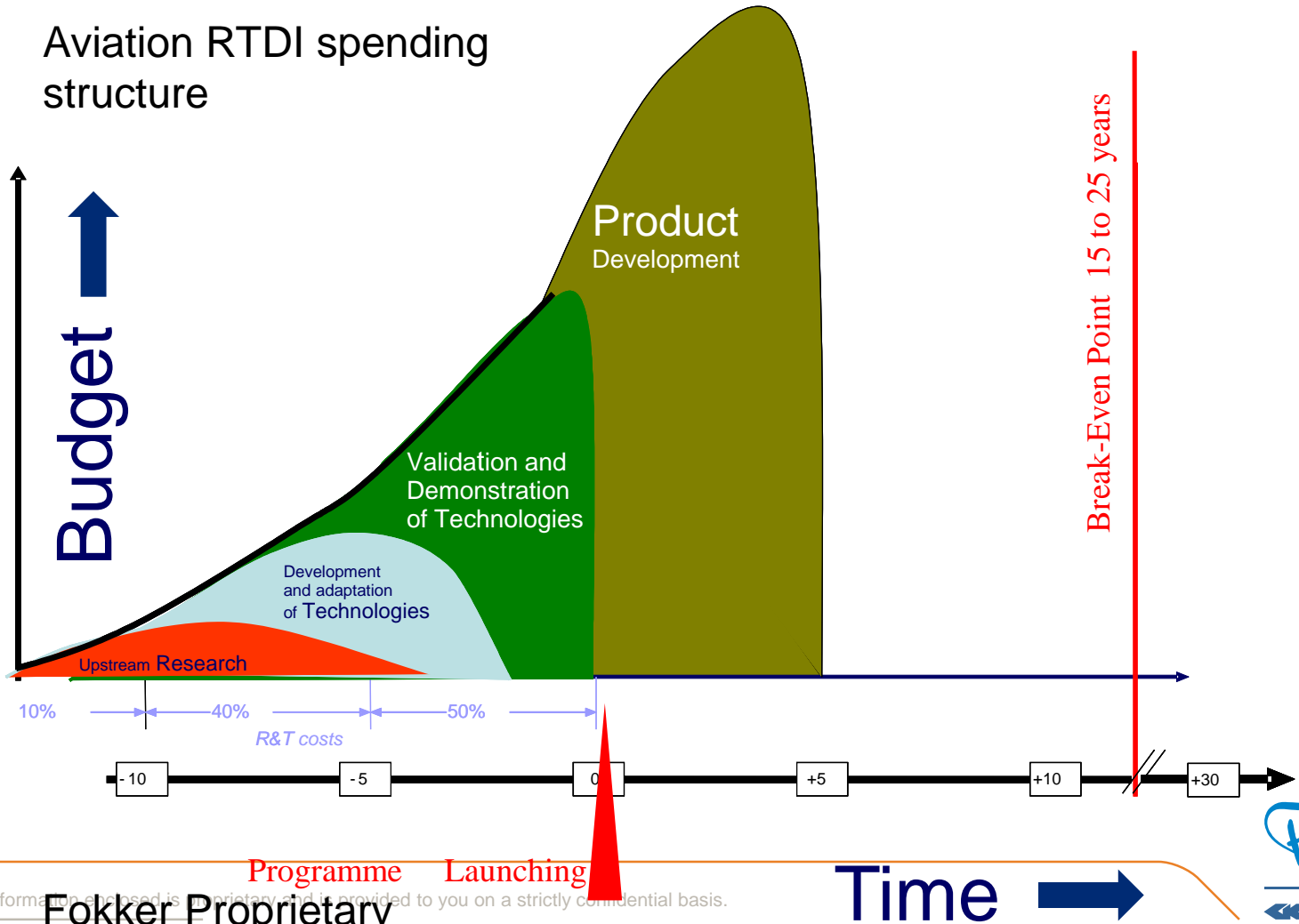
*R. Stephan, Université de Compiègne, "Which practices for universities to enhance exchanges and transfer"*



# Aerospace business

Aviation long RTDI cycles

Aviation RTDI spending structure



# Trends in the Aerospace market

## Observations

- Coming decade focus on incremental improvements of current LCA platforms (NEO, MAX), driven by engine improvements
- New platforms like single aisles require disruptive solution (EIS > 2030)
- Spectacular developments in drones and personal aviation
- China ?????
  - Large internal market potential
  - Many parties active - including Russia
- Large pressure on:
  - Recurring cost (RC)
  - Non-Recurring (NR) cost and
  - Time to market (TtM)

# Trends in Aerospace Value Chain

## 3 main streams

### 1/ Consolidation eg GKN - Fokker

- Only very large T1's can invest and bear the risk to participate in high risk in high volume programs (eg B787: only 7 T1's)

### 2/ Smart Engineering to meet lower NR cost and shorter TtM

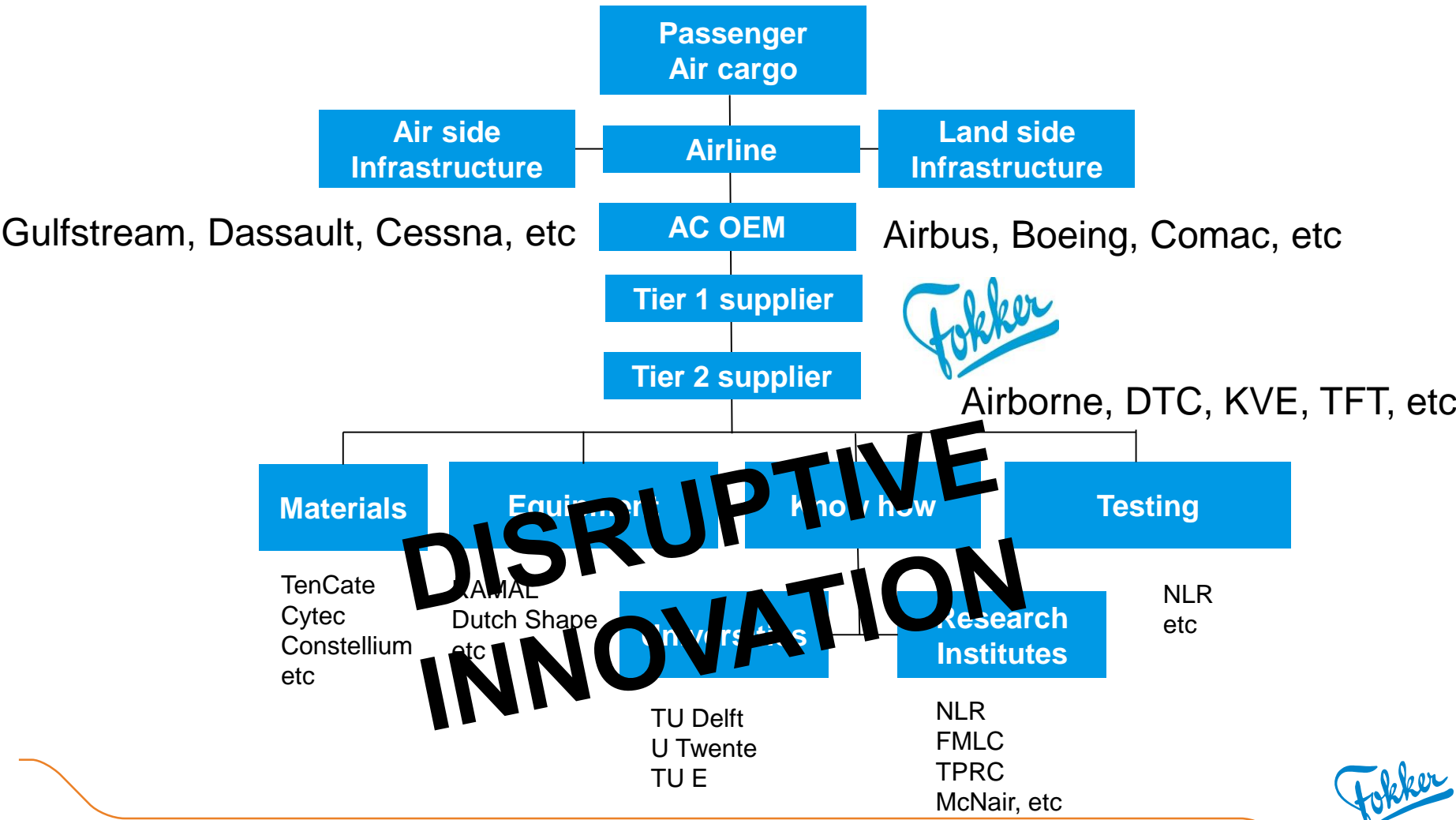
- Requirement capture and Means of Compliance plan
- Engineering process flow
- More KBE
- Collaboration in the value chain (example RIAM – Parapy)

### 3/ More, disruptive innovation required

- Additive manufacturing
- Structures, electrical and non-electrical systems integration in fuselages
- Multi-Disciplinary Optimisation
- Role for value chain for lower TRL

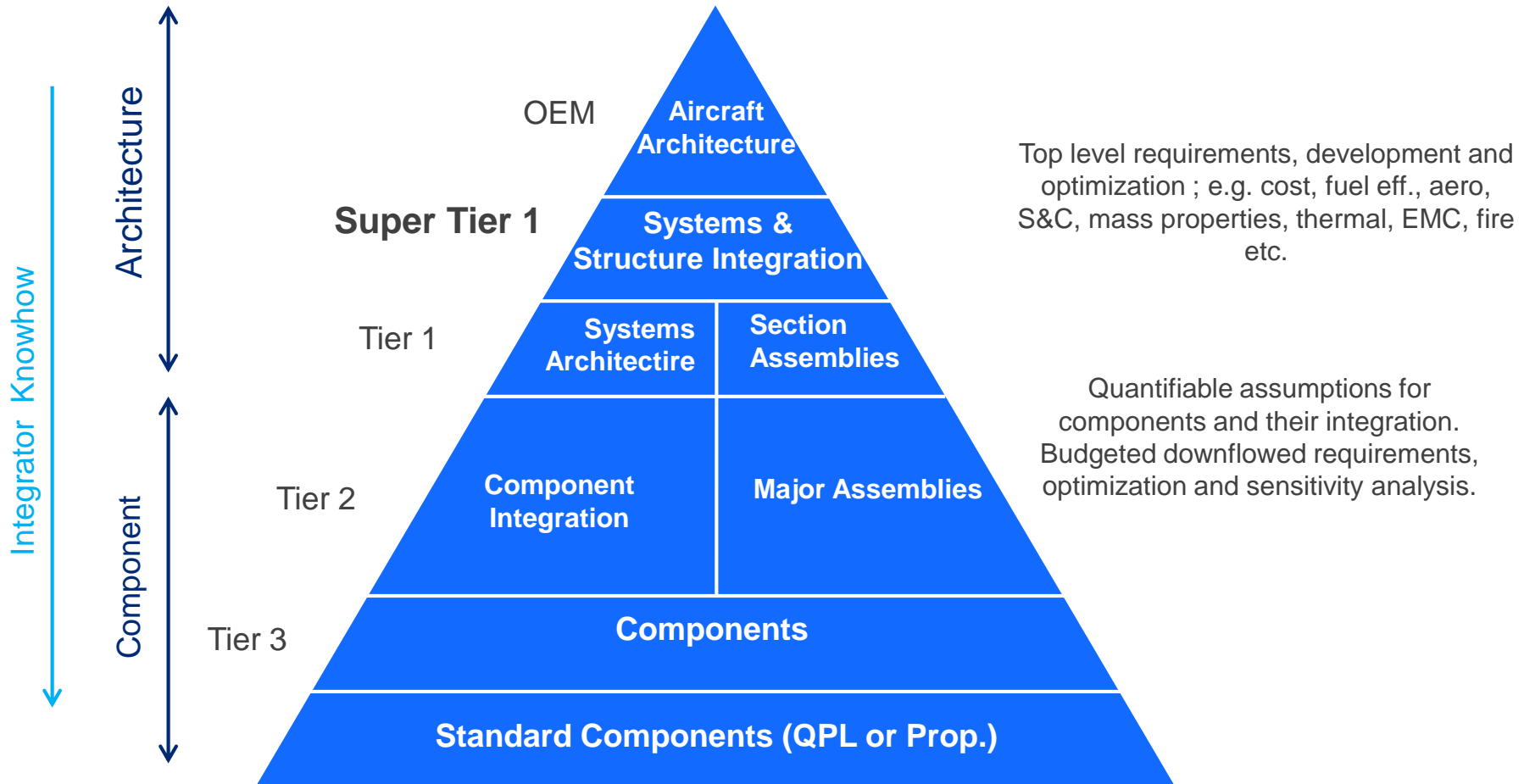


# Aerospace Value Chain



# The need for Innovation

## SuperTier 1



# Aircraft Functions and Integration

## Functional Integration as the Future

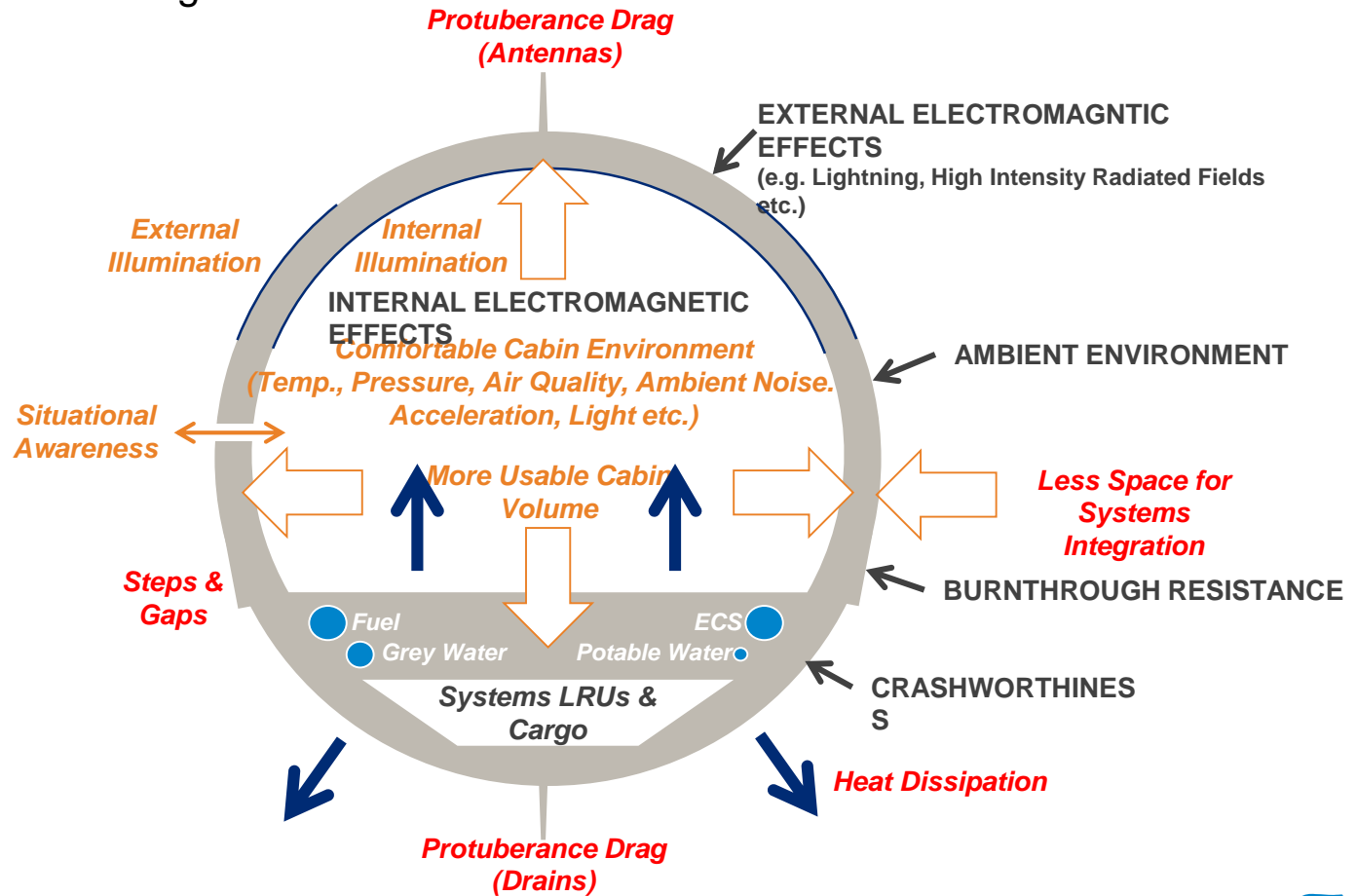
Taking a simplified fuselage cross section:

### Functions:

- 1. Provide Structural Integrity
- 4. Provide Operational Awareness
- 5. Provide a Controlled Environment

### Performance:

*Volume & Drag, Heat Dissipation, etc.*



# Conclusions

## Smart Engineering and Disruptive Innovation

### Smart Engineering:

- Requirement management
- Smart workflow
- KBE

### Disruptive innovation:

- Integration of structures, electrical and non-electrical systems
- Role for value chain to propose and develop disruptive solutions

### Multi – Disciplinary Development requires

- broad engineering knowledge and
- MD team work (good communication skills)

# Strategy to success



## Innovation is the key to our success





Thank you for  
Your attention

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