

Turkish Aerospace

R&D Collaboration Ecosystem





ANKARA – KAHRAMANKAZAN

Available Area **4,000,000 m²**

Under Roof **640,000 m²**



Turkish Aerospace Composite Facility

95,000 m²



Turkey's largest composite facility



Europe's 1st - World's 4th largest
composite facility under one roof



Capacity to Manufacture **2%** of World's
Aviation Composite Need



Engineering Building



65,000 m² total area



2,300 Engineer Capacity



SUBSIDIARIES and R&D OFFICES



MIDDLE EAST TECHNICAL UNIVERSITY



YILDIZ TECHNICAL UNIVERSITY



ULUDAG UNIVERSITY R&D CENTER



TEKNOPARK İSTANBUL



İSTANBUL TECHNICAL UNIVERSITY



HACETTEPE UNIVERSITY





PORTFOLIO

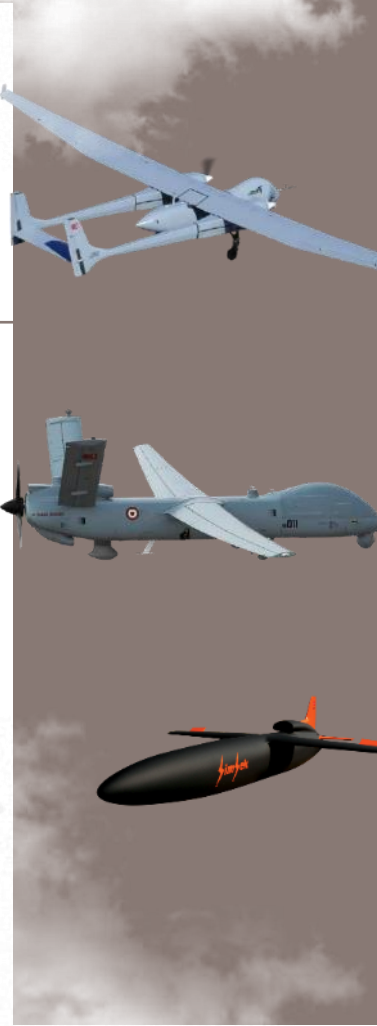
AIRCRAFT



HELICOPTERS



UAS



SPACE



AEROSTRUCTURES





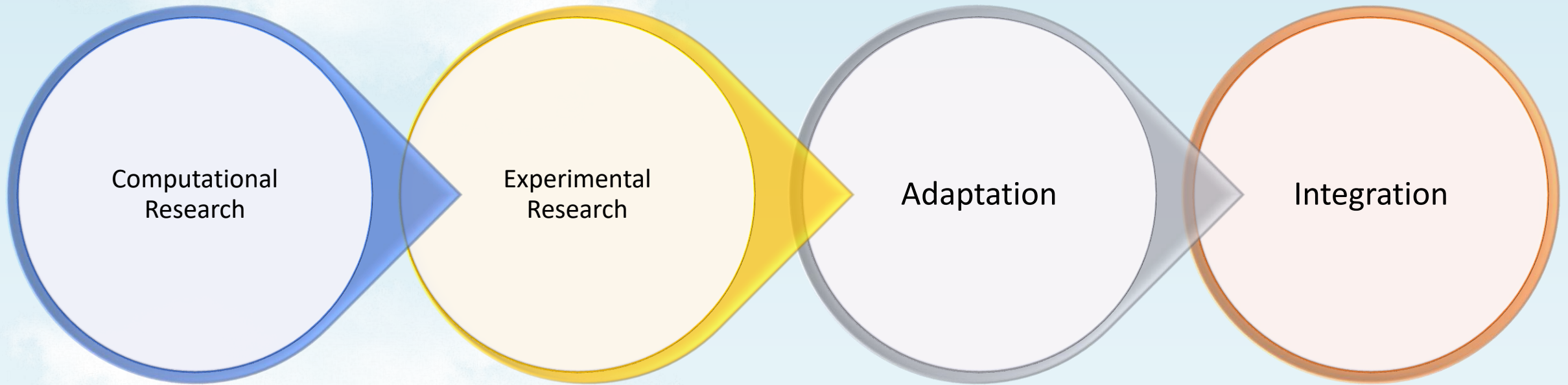
STRATEGIC GOALS

1. **SUSTAINABLE R&D ECOSYSTEM**
2. **DEVELOP HOLISTIC APPROACH**
3. **BUILD VERTICAL BUSINESS STRATEGIES**
4. **CREATE STRONG GLOBAL PARTNERSHIPS**
5. **PRODUCT ORIENTED ENTREPRENEUR R&D**
6. **WORKFORCE DEVELOPMENT; i.e. Trainings, Education, etc.**
7. **HOST EXPERT ORIENTED EVENTS**
8. **GREEN AVIATION PHILOSOPHY**



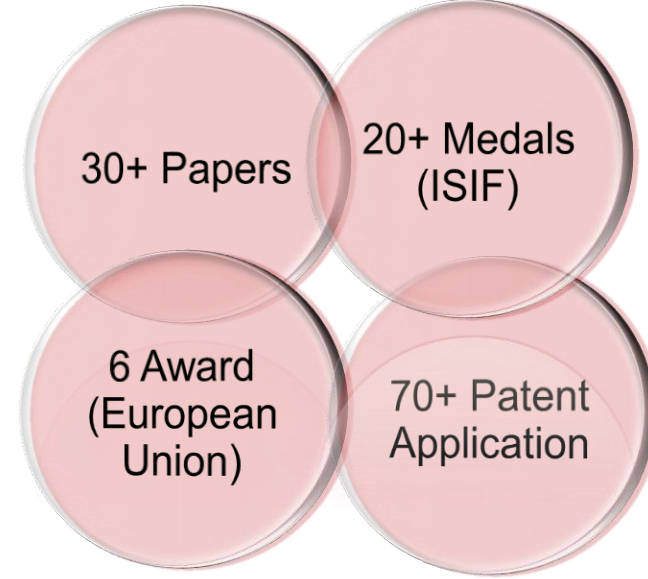
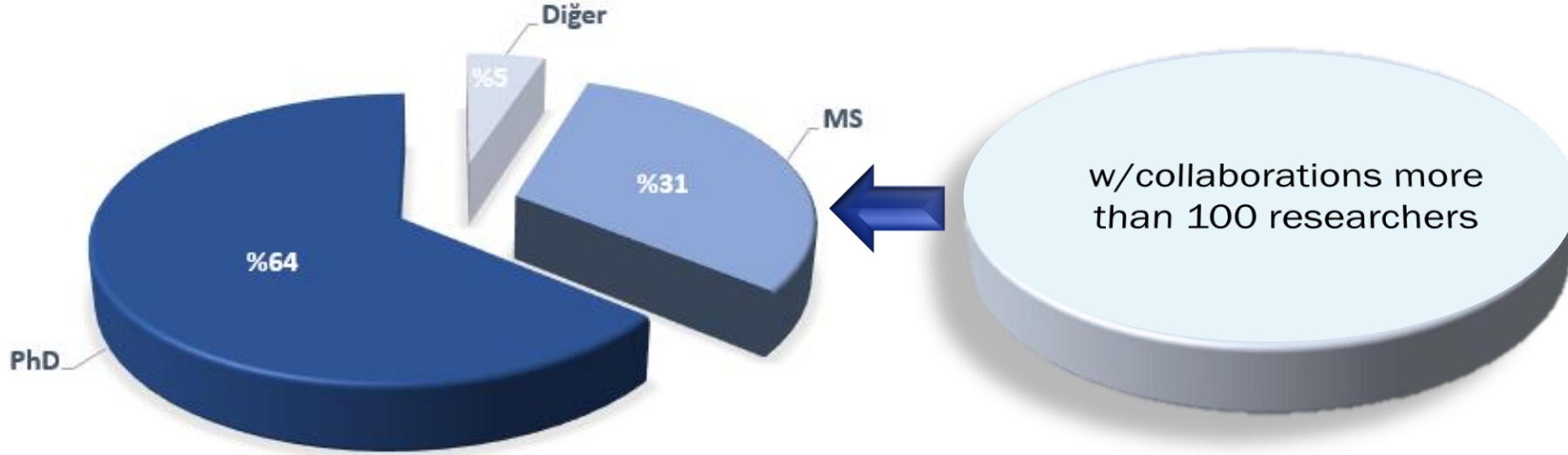


Methodology



R&D Team – Collaborations - Accomplishments

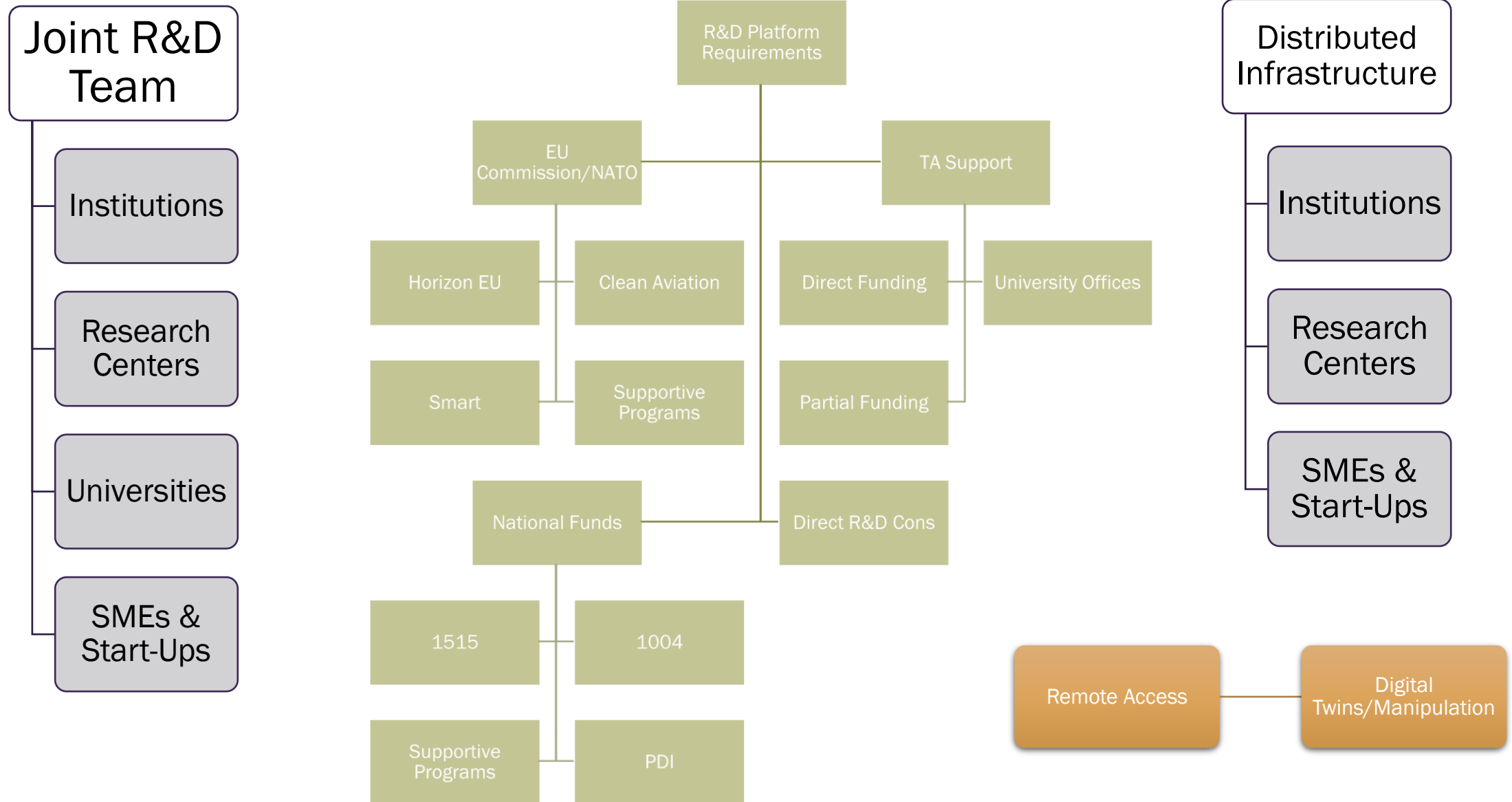
50 personnel (TA Team)



Paydaşlar:



R&D Industry- University Collaboration Tree





Research and Technology Centers

ADVANCE MANUFACTURING

- Remote Manufacturing
- Digital Manufacturing
- Additive Manufacturing*
- Support Structure Optimization
- Powder development
- Database generation

FUNCTIONAL COATINGS

- Transparent Electro-Magnetic coatings
- Anti-Corrosion Coatings with Nanotechnology
- Anti Icing Coatings with Nanotechnology

ADVANCED COMPOSITES

- Structural Nano-engineering
- Composite Materials with Electro-Magnetic Functionalities
- Composite Materials with Thermal Functionalities
- Thermoplastic Forming and Welding

SYSTEM INTEGRATION & ENERGY TECHNOLOGIES

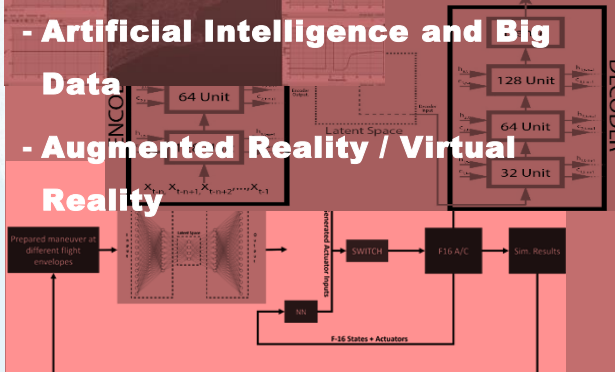
- Integration of Novel Energy Technologies
- Novel Methodologies for structural design & optimization
- Novel payload development strategies

ADVANCED AIR VEHICLE CONCEPTS

- Advance Aerodynamics Solvers
- Design Optimization Tools
- Concept Design Tool Development
- Gear Research Centre
- Future Aircraft Test Platform

DIGITAL RESEARCHES

- Digital Twin Development
- Artificial Intelligence and Big Data
- Augmented Reality / Virtual Reality





Integrated Research Partners

Research and Technology Centers Department

- METU Gear Research Center
- Joint Venture with METU



ODAM

- Nano Technology Research Center



SUNUM

- Metal Forming Research Center



**Atılım Üniv.
MŞMM**



EKTAM

- Additive Manufacturing Research Centre
- Joint Venture with Gazi University



**LAB's at
Turkish Aerospace**



Bilkent UNAM

- National Nanotechnology Centre @Bilkent University
- Test and Qualifications

- Boron Research Center



BOREN

- Material Research and Development Center



**TÜBİTAK
MAM**

www.tusas.com



International Funded – R&D Projects



- Horizon Europe (2021-2027)/M-Era.net (2023), Eureka (2023)

- Jan – Sept 2023 Proposals **11**
- Proposals' Grand Total **€ 107 M**
- TA Budget **€ 3.3 M**
- Support Ratio **%70 - %125**
- Average Project Duration **36 Months**
- # of Project Partners **110**

Accepted EU Projects:

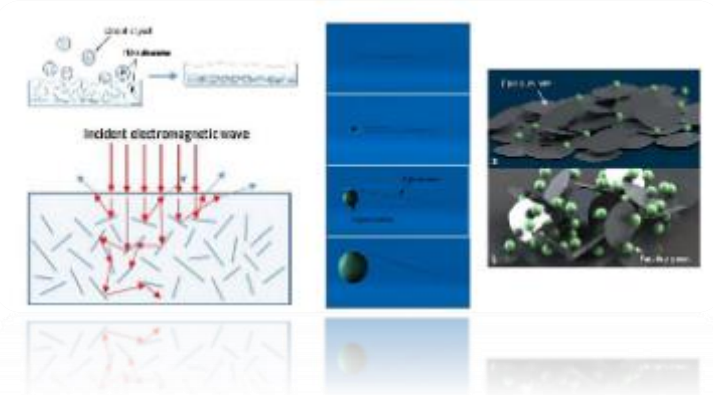
- **AILLEN - € 100 K** – Advance Manufacturing Technologies Networking & EU Coordination Activities Academia & R&D Partnership – **48 Months**
- **CREDIT – € 300 K** Advance Manufacturing Technologies – **48 Months**
- **DISTOPIA – € 550 K** Advance Manufacturing Technologies – **36 Months**



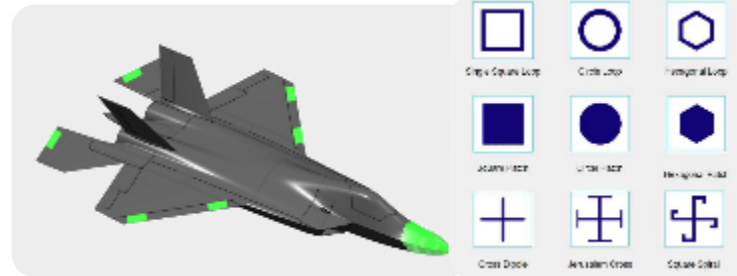
Advanced R&D Studies: Air Platforms



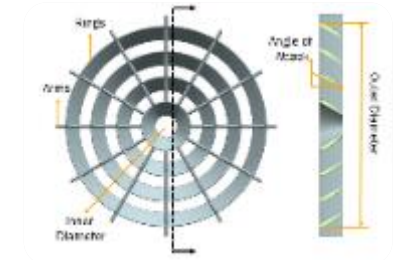
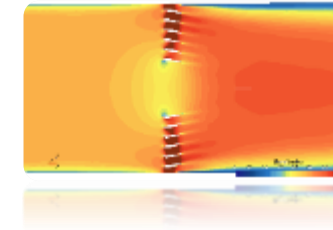
L/O- Multifunctional Coatings



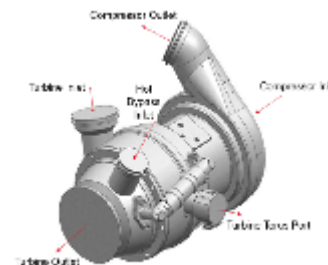
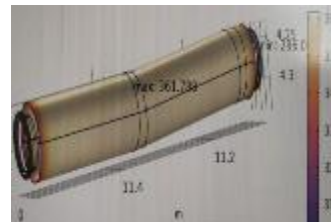
IR Paints, RF Sealant & IR Pigment Development



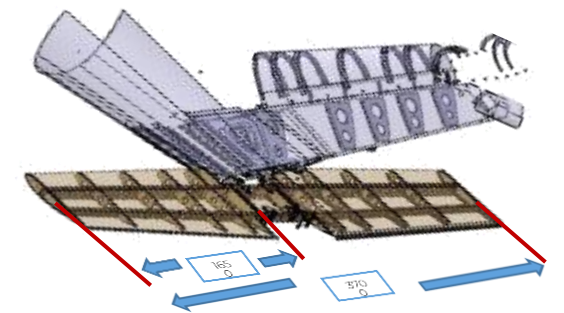
Frequency Selective Surfaces



LO Materials Development



Advance Thermal Management Systems



Structural Thermoplastic Composites

Advanced R&D Studies: Air Platforms

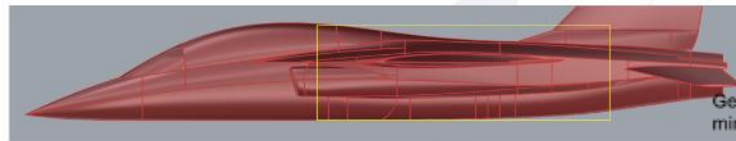
HELICOPTERS



Termoplastic System Development

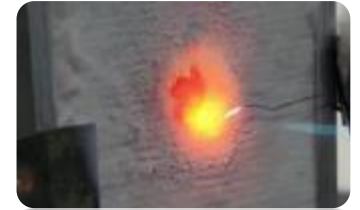


Additive Manufacturing-Flight Critical Parts



Hürjet Wing Optimization

Genelde 2 mm, min 1.3 mm



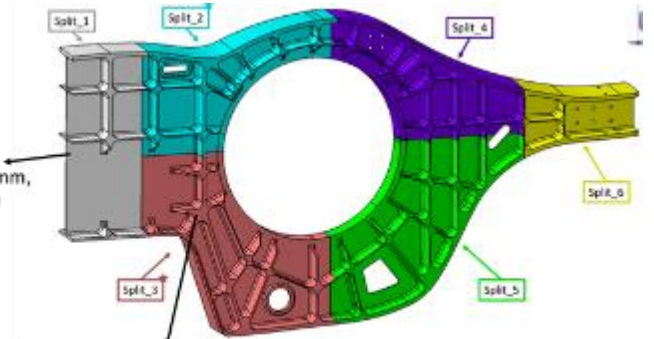
Thermal Insulation Materials



10 adet fiber kabloyu
Görünür
temperatürden/100g
57 adet FIBER
gözetim için
(FIBER sensörlerin
kıymetli parçaları
kullanılır)



Structural Health Monitoring



Birleşim noktalarında 6 - 35 mm

Advanced Repair Technologies

Advanced R&D Studies: Air Platforms

HURJET HURKUS GREEN AVIATION



1. VR Integrated Haptic Technologies
2. VR Assembly Technologies

Mal	Mal	Mal	Mal	Mal	Mal	Mal	Mal	Mal	Mal
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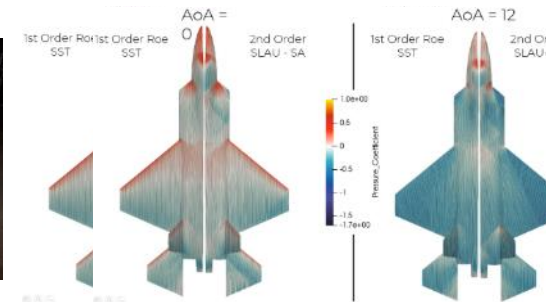
R&D HUB



Digital Twin Integration



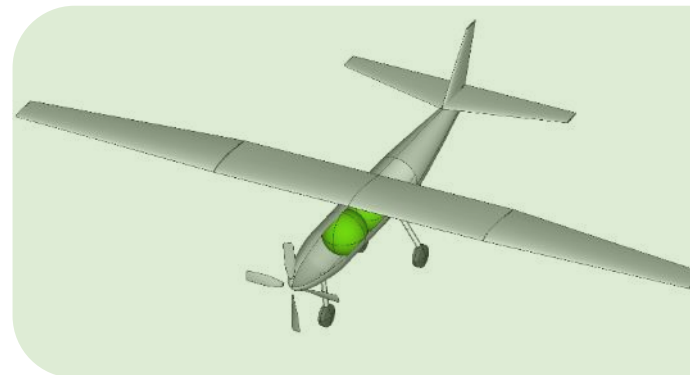
Integration of Plasma Technologies



Aerodynamics Optimization



DIMER- Fretting Fatigue

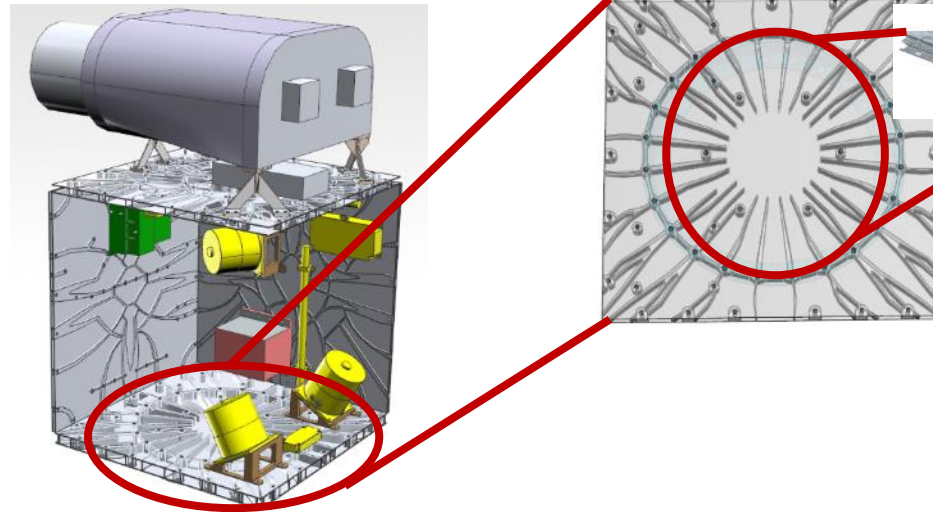
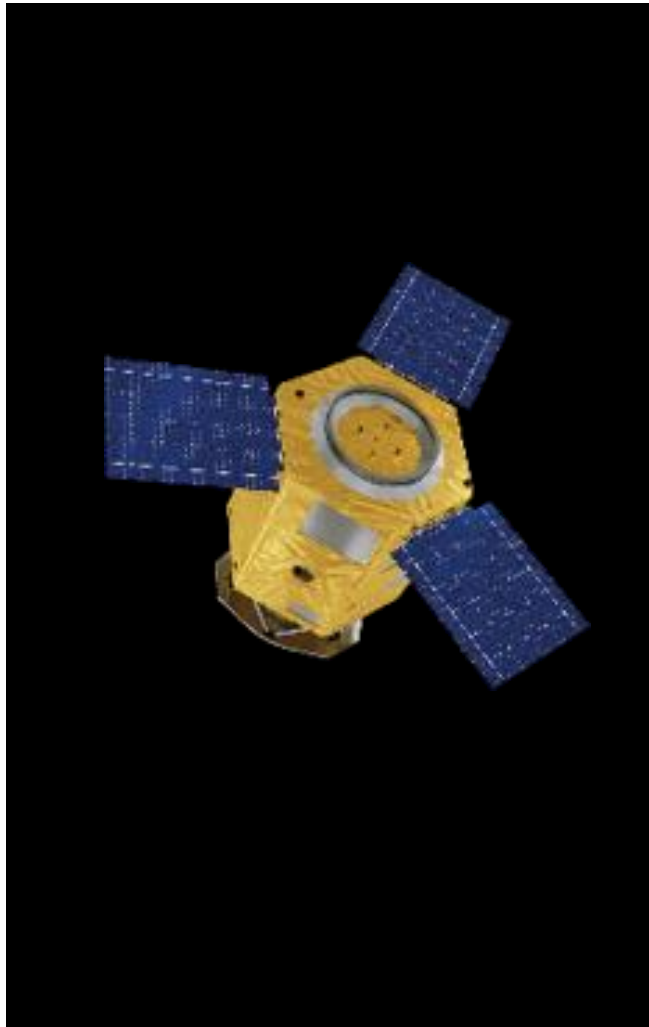


Development of Advanced Hydrogen-Powered Air Platforms

GREEN/CLEAN AVIATION STUDIES

Advanced R&D Studies: Air Platforms

SPACE SYSTEMS

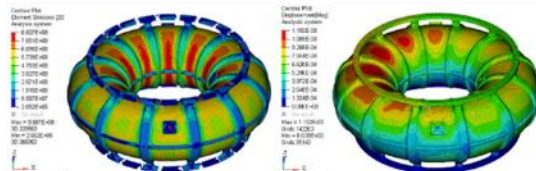
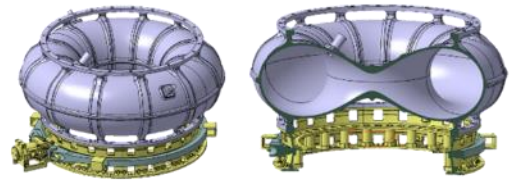


Panel design using lattice optimization
Adjustable core density for varying load cases

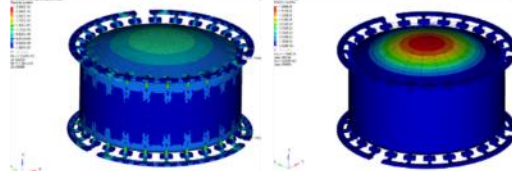
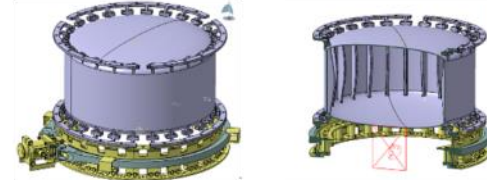
Micro-Satellite Structural Development Technologies

Cold Gas Propulsion System

1. Torus Geometry for SLM Manufacturing Method



2. Cylindrical Geometry for EBM Manufacturing Method



Strut-Based Central Cone