



# ISTANBUL TECHNICAL UNIVERSITY

Faculty of Aeronautics and Astronautics

Department of Aeronautical Engineering

# ITU HISTORY

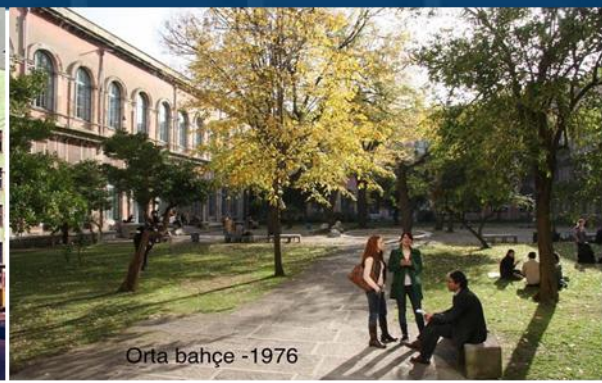
İTÜ



Taşkılla -1955



Gümüşsuyu  
1975



Orta bahçe -1976



Imperial Naval  
Engineering School  
1773

School of Engineers and  
Architects  
1909

Higher School of  
Engineering  
1944

Maritime Faculty  
Campus  
1988



İ.T.Ü Gümüşsuyu Binası



1795  
Imperial School of  
Engineering



1914  
First Engineer  
Graduates



1970  
Ayazağa  
Main  
Campus



1974  
Transition to two-tier  
undergraduate and  
graduate education



2024  
251. Yıl



İ.T.Ü Maçka Binası



## Ayazaga Main Campus (8 Faculties)

- Faculty of Faculty of Civil Engineering
- Faculty of Electricity - Electronics
- Faculty of Mining
- Faculty of Chemical Metallurgy
- Faculty of Computer and Informatics
- Faculty of Science and Letters
- Faculty of Naval Architecture and Marine Sciences
- Faculty of Aviation and Space Sciences

## Institutes

- Energy Institute
- Institute of Science and Technology
- Institute of Social Sciences
- Informatics Institute
- Eurasian Institute of Earth Sciences
- Earthquake Engineering and Disaster Management Institute



## Taskisla Campus

- Faculty of Architecture
- Institute of Social Sciences



## Macka Campus

- Faculty of Business Administration
- School of Foreign Languages
- Conservatory



## Gumussuyu Campus

- Faculty of Mechanical Engineering
- Faculty of Textile Technologies and Design



## Tuzla Campus

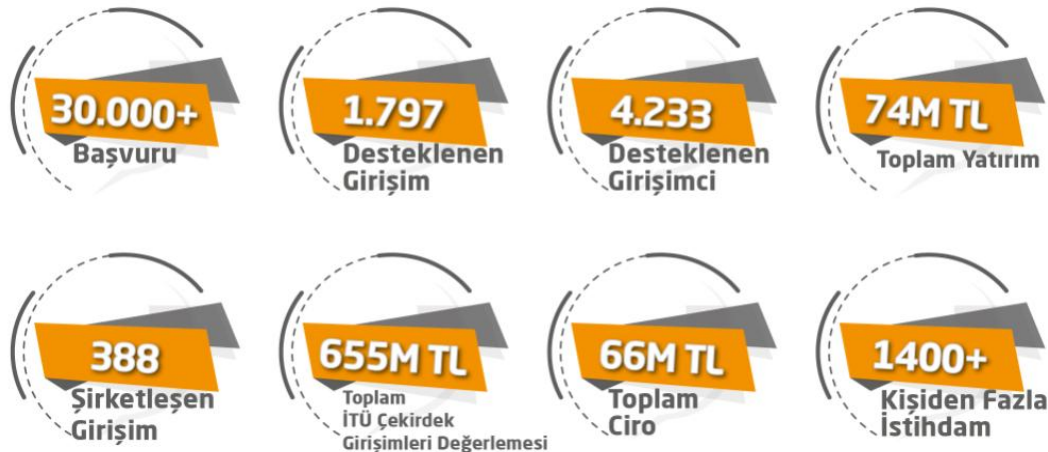
- Faculty of Maritime Studies

## ITU ARI Teknokent

- A versatile, effective and sustainable university-industry cooperation
- 2,500 successful R&D Projects (148 patented)
- 276 R&D Companies
- 752 million dollars turnover

## ITU Çekirdek Early Stage Incubation Center

- All entrepreneurs who have technological, innovative business ideas and believe that their ideas are innovative and can be turned into commercial activities



## Academic Members

- 2,330 academics

## Undergraduate Education

- 25,942 undergraduate students
  - 13 Dual Diploma Programs(SUNY)

## Postgraduate Education

- 12,345 graduate students
  - 118 Master Program
  - 71 PhD Program

## Graduates

- More than 140,000 graduates

## Foreign Recognition



University

**İstanbul Teknik Üniversitesi**

Country

**Türkiye**

Number of Accredited Programs

**26**





## Sports Facilities

- **Gated Gyms** : Areas suitable for team sports such as basketball, volleyball and handball.
- **Fitness Centers** : Modern ekipmanlarla donatılmış spor salonları.
- **Open Area Facilities** : Football, tennis courts and an outdoor swimming pool.

## Food and Beverage Areas

- **Campus Canteens** : A variety of food options at affordable prices for students.
- **Restaurants and Cafes** : Social spaces within the campus.

## Culture and Art

- **Concerts and Events** : Concerts and theater performances organized by ITU Conservatory.
- **Club Activities** : More than 200 student clubs, giving you the chance to participate in activities that match your interests.

## Social Activities

- **Festivaller**: Spring festivals and sports festivals.
- **ITU Cinema Club** : Weekly film screenings and filmmaking workshops.



## Ring Servisleri

Ayazağa Kampüsünde gün boyu ücretsiz sunulan ring servis ağını ve saatlerini görmek için tıklayın.



## Bisiklet ile Ulaşım

Bisiklet kullanımı, "Yeşil Kampüs"te ulaşımın en kolay ve çevreci yolu. Bisiklet yolları haritası için tıklayın.



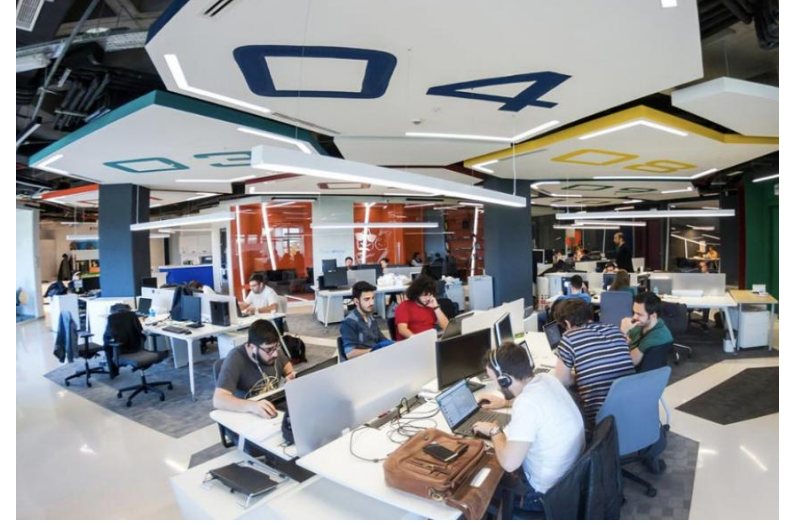
## Otopark Kullanımı

İTÜ yerleşkelerinde güvenli ulaşım ve uyumlu bir ortak yaşam için uyulması gereken trafik kurallarını görmek için tıklayın.



## Technology and Research Areas

- **Libraries** : Rich resources and workspaces.
- **Laboratories and Workshops** : Research centers equipped with the latest technology.



## Transportation

- **On-Campus Transportation** : Ring services and walking paths.
- **Connection to the City**: Public transportation options such as metro, metrobus and buses.



5300 Kişi

İTÜ Yurtlarında Kalan Öğrenci Sayısı



140 milyon TL

13100 Öğrencimize Verilen Burs Miktarı

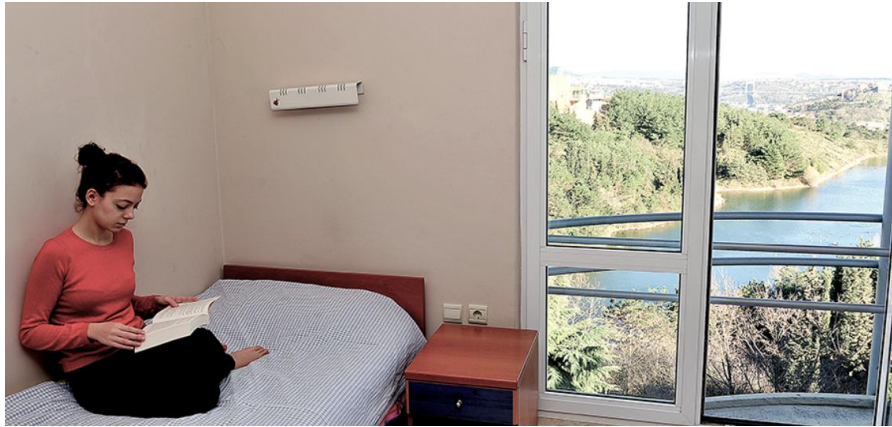


6000 Kişi

Konuk Evinde Kalan Misafir Sayısı

# LODGEMENT FACILITIES

İTÜ



- Sports Hall
- Dining Hall
- Rest room
- Table tennis court
- Study room
- Shared kitchen



# LODGEMENT FACILITIES



Red dots represent Gümüşsuyu Campus dormitories



Red dots represent Ayazağa Campus dormitories

1941

- Department of Aeronautical Engineering, It was established as a specialty branch under the Department of Mechanical Engineering.

1944

- Department of Aeronautical Engineering became a separate engineering department in the Faculty of Mechanical Engineering

1953

- Meteorological Engineering Department established within the Faculty of Electricity

1983

- Faculty of Aeronautics and Astronautics was established.
  - Aeronautical Engineering
  - Meteorological Engineering
  - Astronautical Engineering



Considering the physical force and physics-based features behind conventional and modern aircraft, helicopters, multi-rotor and rocket-powered aircraft or vehicle fleets moving in the atmosphere;

- Flight and control technologies,
- Structural and aerodynamic designs,
- Avionics systems,
- Material technologies

develops and conducts research studies.

- **Faculty Member** : 23
- **Research Assistant** : 22
- **Technicians** : 3
- **Total Students** :
  - 446 Undergraduate
  - +300 Postgraduate



## ■ Double Major Programs

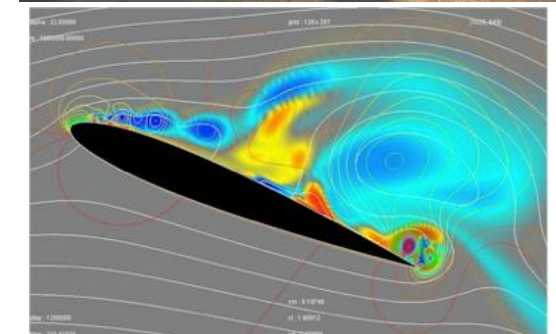
- Aerospace Engineering
- Control and Automation Engineering
- Metallurgical and Materials Engineering
- Mechanical Engineering
- Computer Engineering
- Artificial Intelligence and Data Engineering
- Electronics and Communication Engineering
- Electronic Engineering
- Electrical Engineering
- Telecommunication Engineering
- Management Engineering
- Industrial Engineering
- Mathematics Engineering
- Petroleum and Natural Gas Engineering
- Economy
- Mining Engineering
- Mineral Processing Engineering
- Textile Engineering
- Geomatics Engineering



# MAIN RESEARCH AREAS

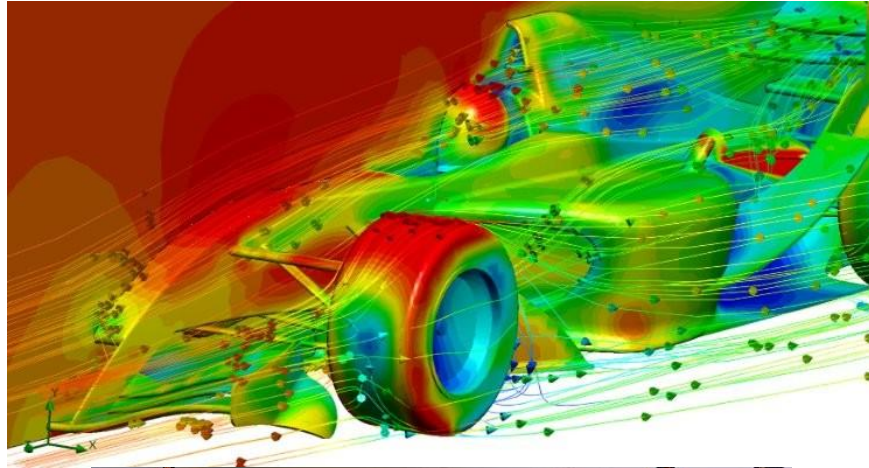
Our Aeronautical Engineering program focuses on the basic areas that will meet the research, development, design, production and operation needs of the aviation, machinery and defense industries. For this reason, our curriculum

- Aerodynamic
  - Thrust (Engine)
  - Structure and Materials
  - Dynamics, Stability and Control
- is designed to emphasize disciplines.

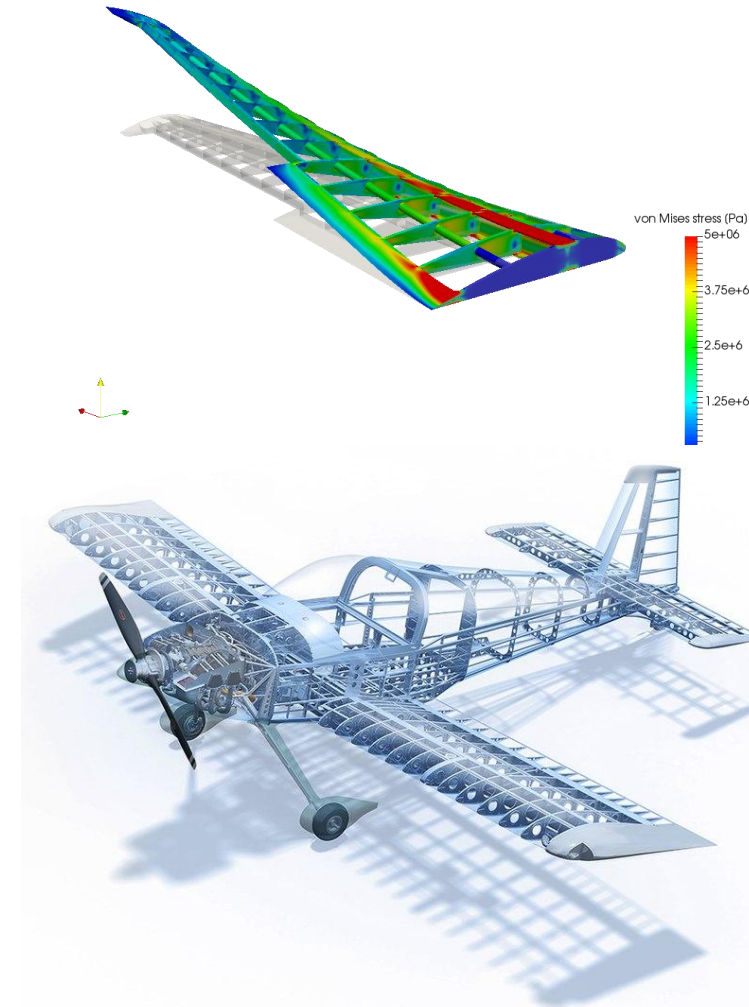


# MAIN RESEARCH AREAS

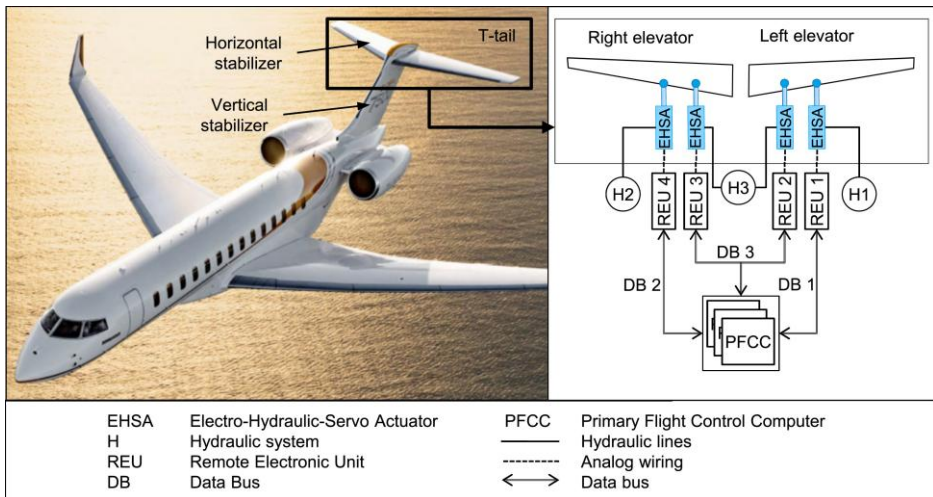
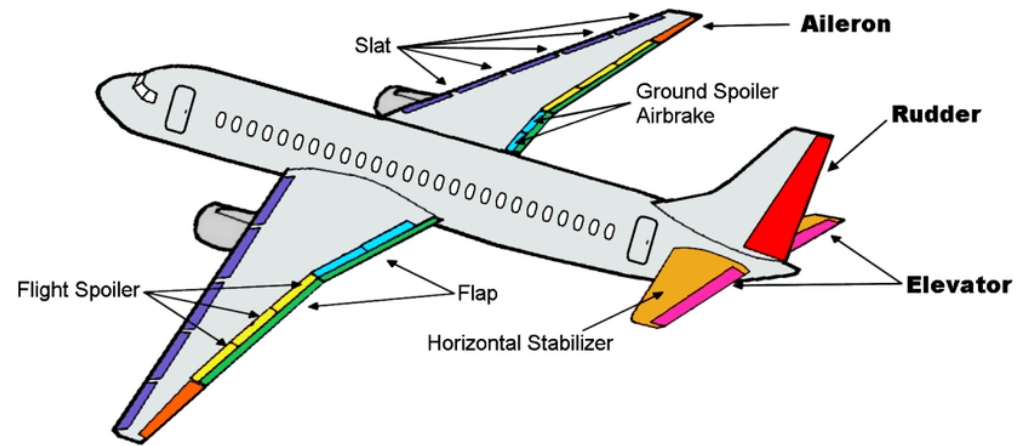
## AERODYNAMIC



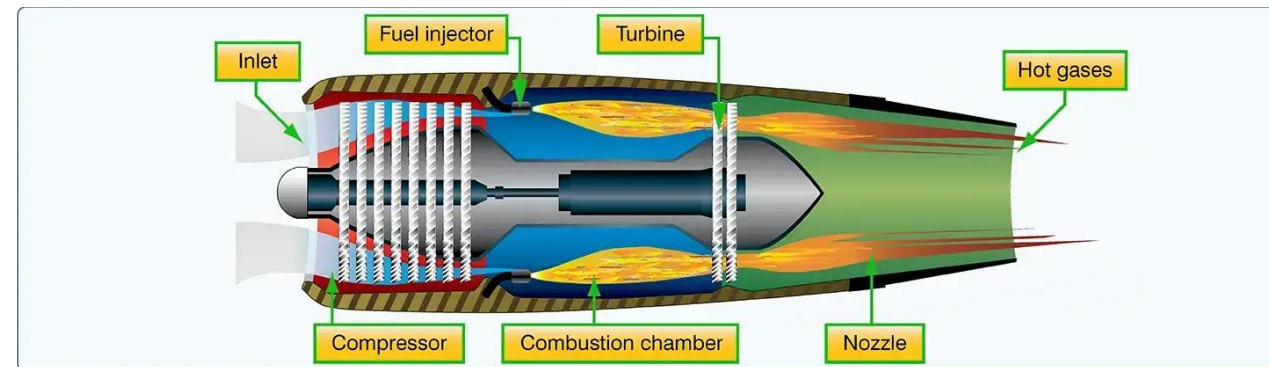
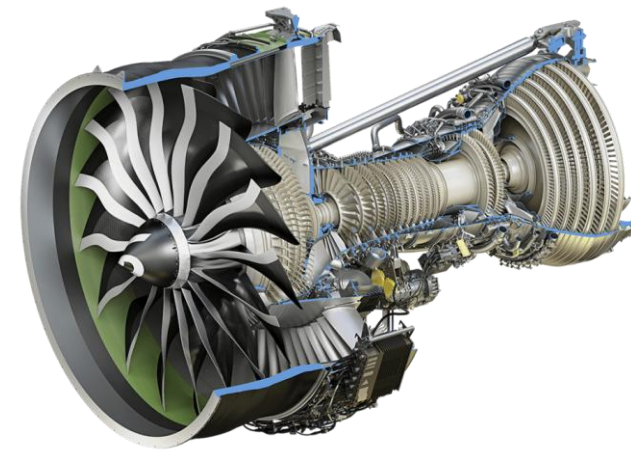
## STRUCTURAL



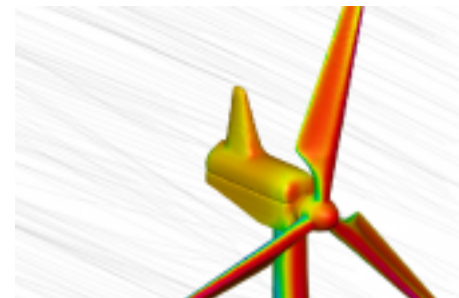
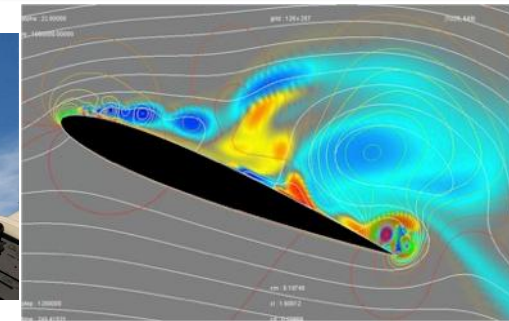
## CONTROL



## THRUST



- Theoretical, Computational and Experimental Aerodynamics and Fluid Dynamics
- Structural Design and Analysis
- Material technologies (composites, nano materials, etc.)
- Flight Control, Navigation, Avionics, Navigation and Measurement Systems
- Aircraft Engines (Jet, electric, etc.)
- Supersonic Wind Tunnel Technologies
- Flight Operations Management and Air Traffic Control Systems
- Aeroelasticity
- Unmanned aerial vehicles
- Control systems: adaptive, intelligent, digital and optimal

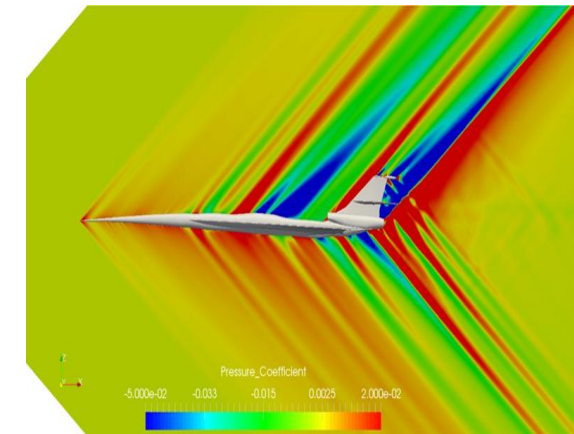
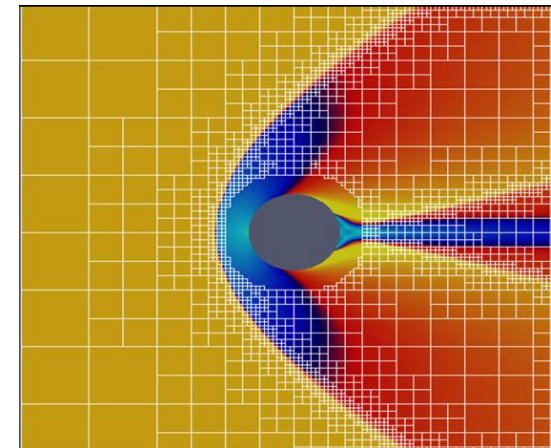
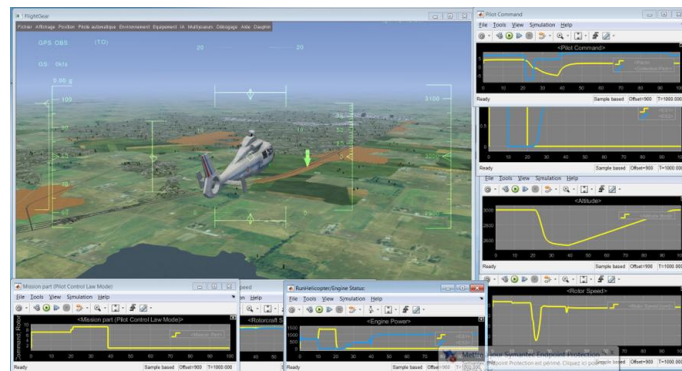
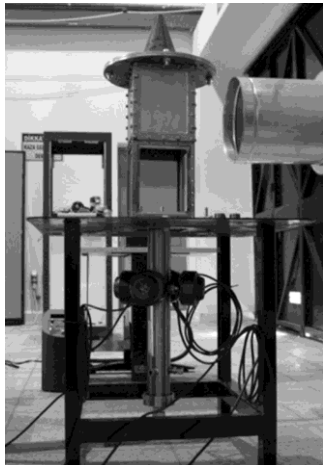


# ASTRONAUTICAL ENGINEERING DEPARTMENT LABORATORIES

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- Trisonic Laboratory
- Composite Structure Laboratory
- Computational Engineering Laboratory (HEMLAB)
- Aerospace Multidisciplinary Design Optimization Laboratory (AeroMDO Lab)
- Propulsion and Combustion Laboratory
- Model-Based Design Lab
- Aerospace Research Center
- Upper Atmosphere and Space Weather Laboratory
- Space Systems Design and Test Laboratory
- Cankut Bagana Innovation Lab (CBILAB)

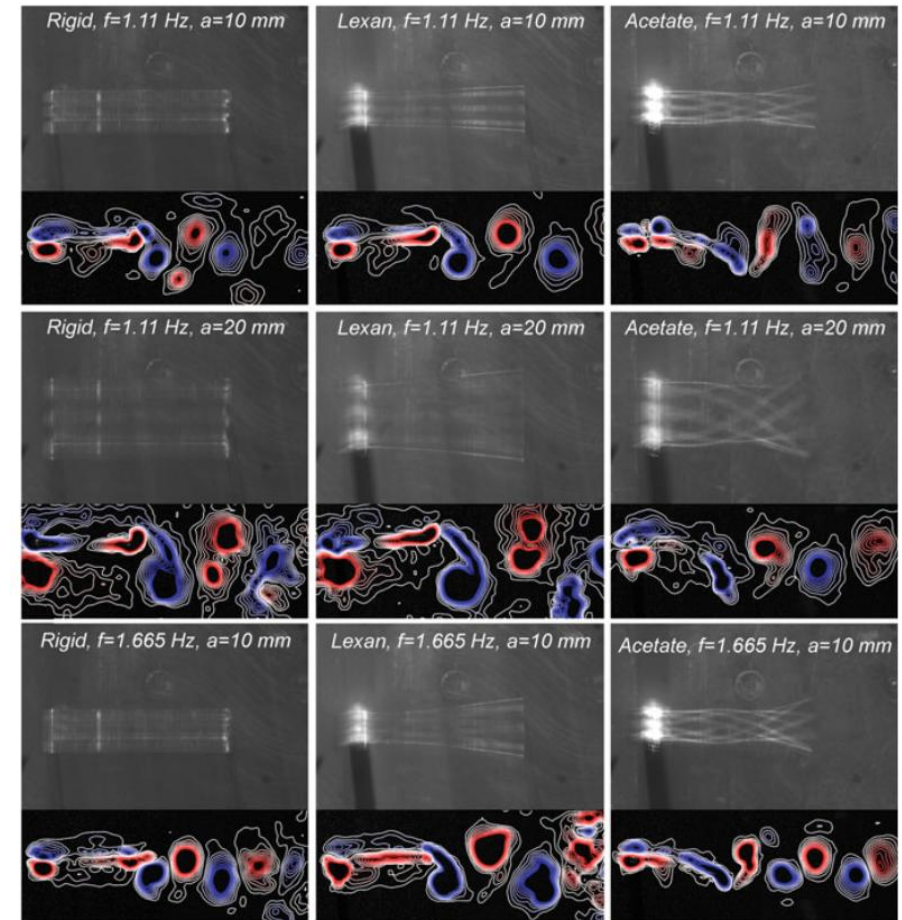


## Research Topics:

- Aerodynamic and structural analysis of objects moving in air;
- Performance analysis of aircraft, engines and engine components

## Facilities :

- Subsonic Wind Tunnel  
(0 – 40 m/s)
- Supersonic Wind Tunnel  
(0.2 – 4 M)
- Water Tunnel



Effect of Chordwise Flexibility on Flapping Wing Aerodynamics

## Research Topics:

- Testing and analysis of prototype and final design products

## Test Capabilities

- Tensile and compression tests
- Fatigue test
- Impact test



MTS testing frame: dynamical and statical testing

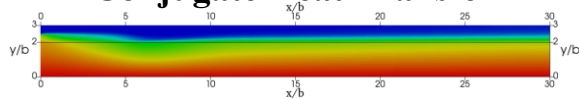


Testing a lightweight helicopter

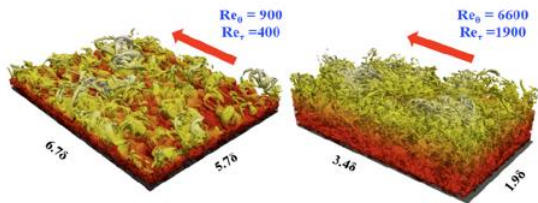


Charpy – Izod impact test system

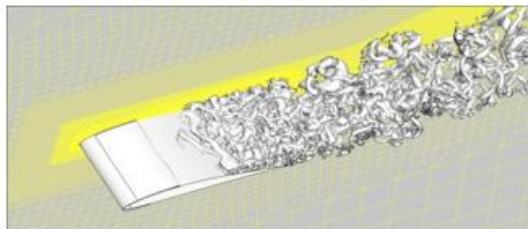
## Conjugate Heat Transfer



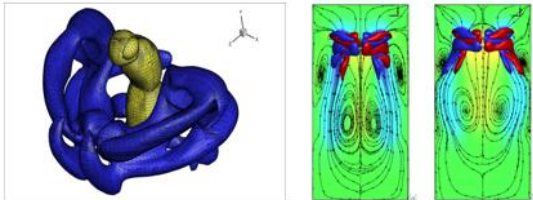
### DNS of Turbulent Flow



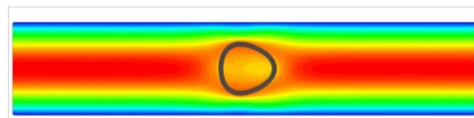
## Low Reynolds Number Aerodynamics



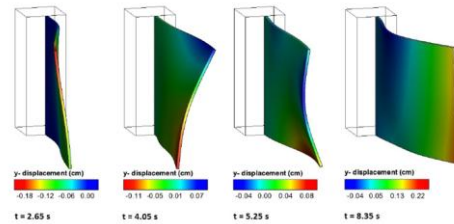
## Animal Locomotion (Flying/Swimming Animals)



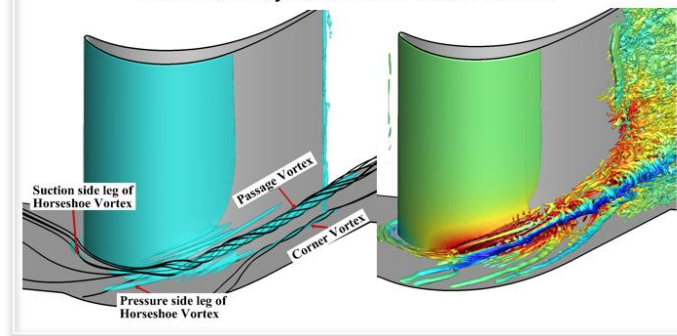
### Blood Flow



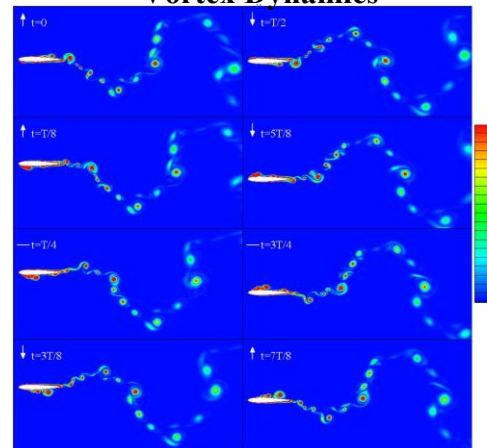
## Fluid Structure Interaction



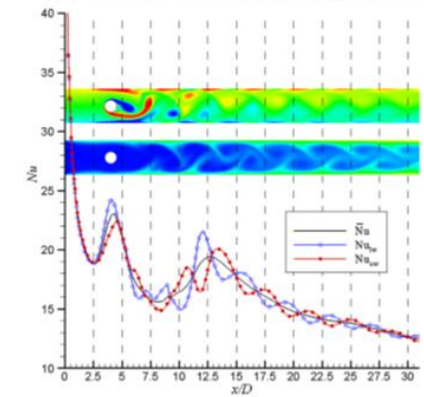
### LES of Secondary Flows in Low-Pressure-Turbines



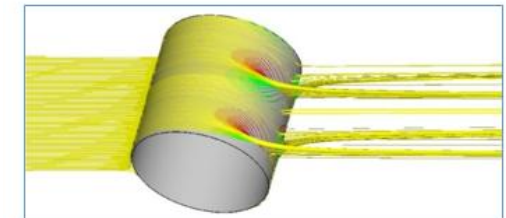
## Vortex Dynamics



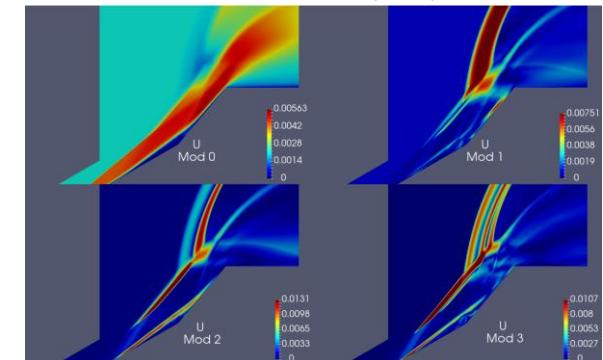
## Mixing and Heat Transfer Enhancement



## Viscoelastic Instabilities

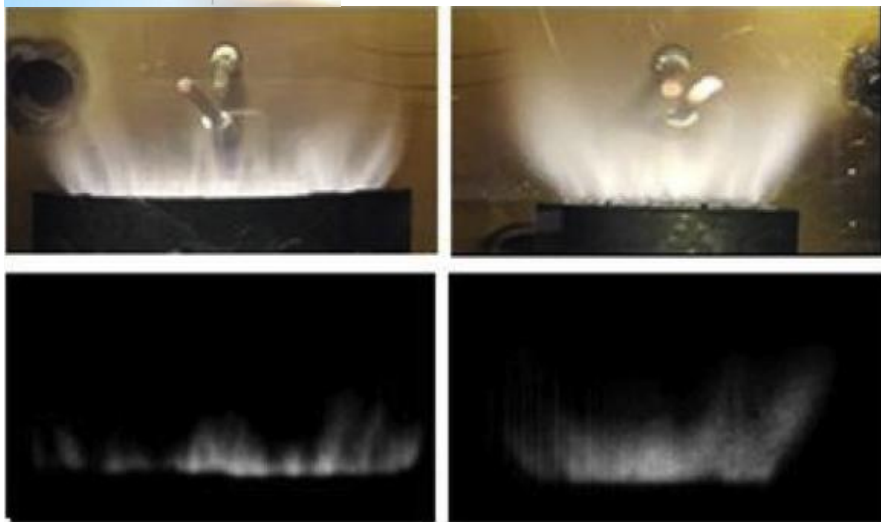


## Shock wave – boundary layer interaction

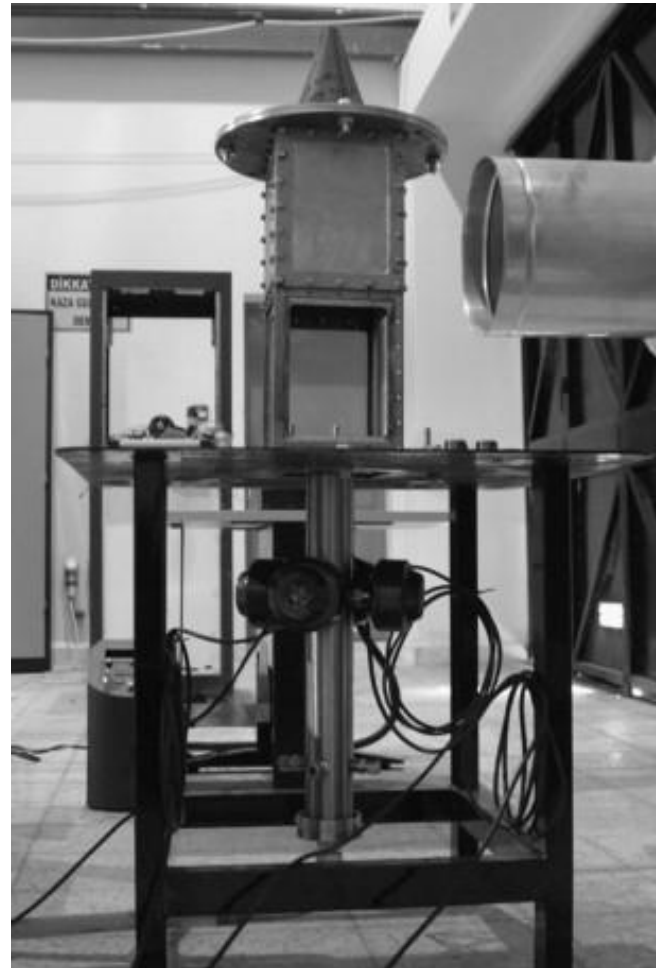


## Research Topics:

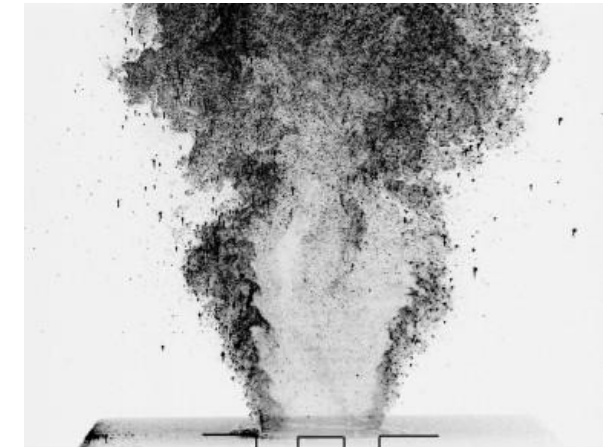
- Experimental studies on engines, reactive flows and propulsion systems
- Different types of fuel
- Combustion reactions in porous media



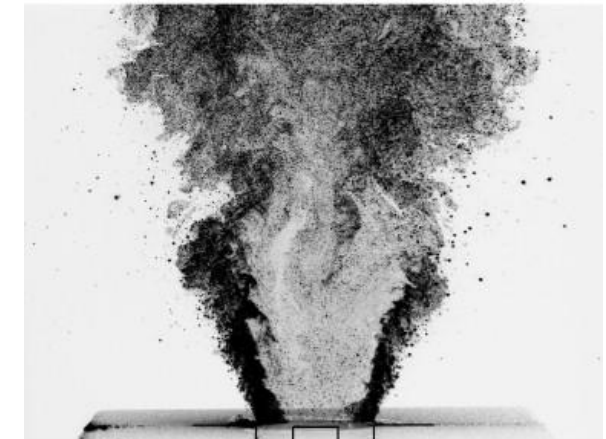
Porous medium based burner for efficient and clean combustion of ammonia-hydrogen-air systems



Preliminary investigation of a swirl stabilized premixed combustor



(a) Frame I



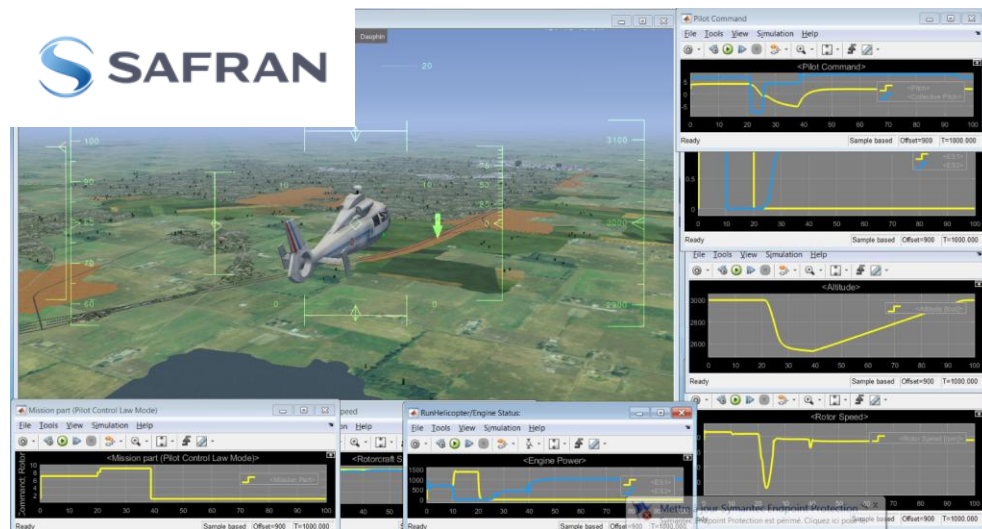
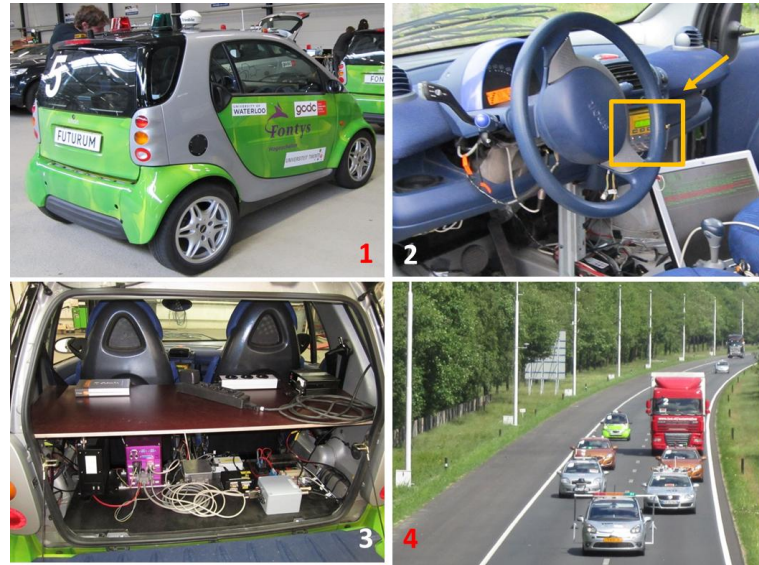
(b) Frame II

Purpose of the Lab :

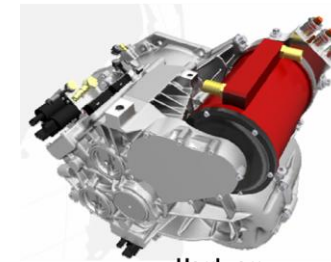
➤ Modeling, Control Systems and Vehicle software development

Research Topics:

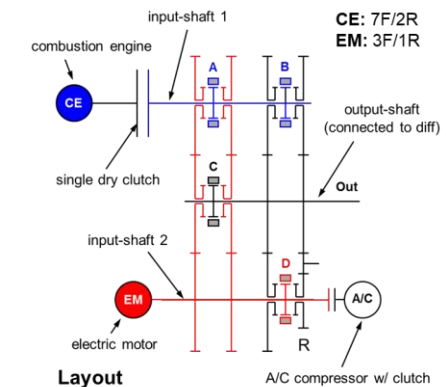
- Dynamic modeling and simulation
- Design of control systems
- Development of software for multi-physical systems
- Fixed and rotary wing unmanned aerial vehicles



Multi-Physical Modeling, System Identification and Control System Design for Next Generation VTOL Systems



Hardware



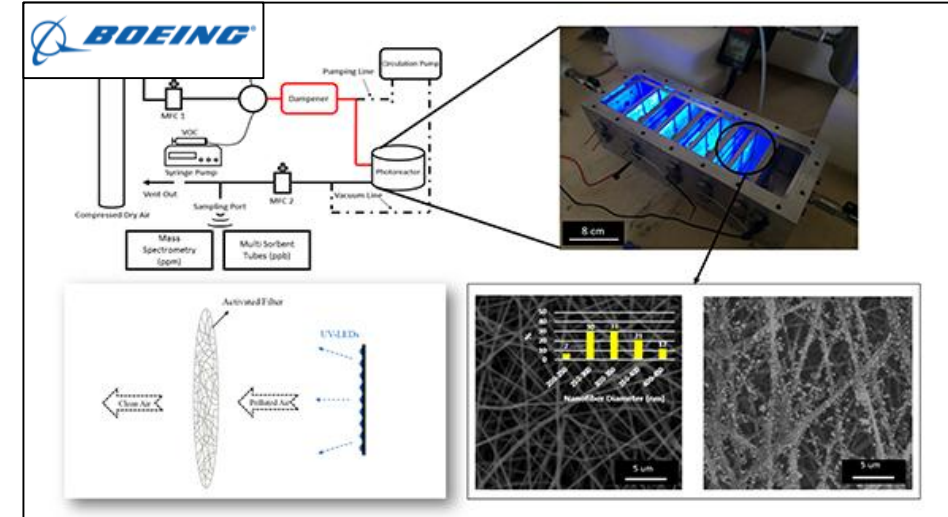
Plant Modeling of 7H-AMT

(Hybrid Automated Manual Transmission)

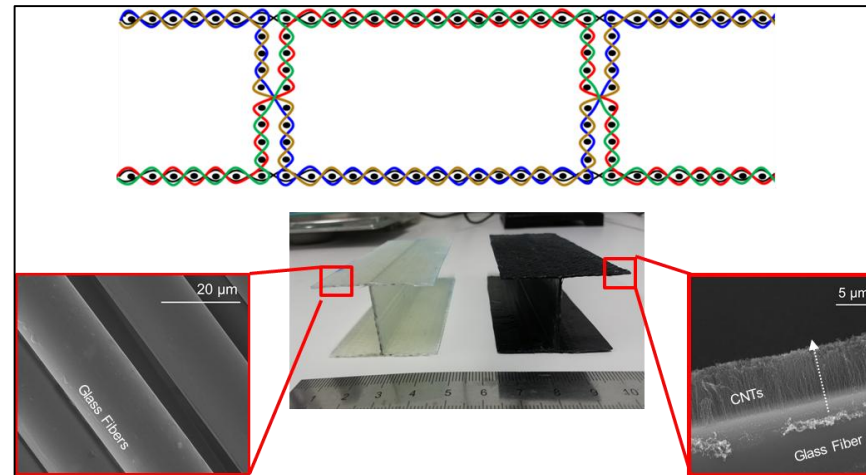
## Nanomaterials, Textiles and Advanced Composites Research Group

Research Topics :

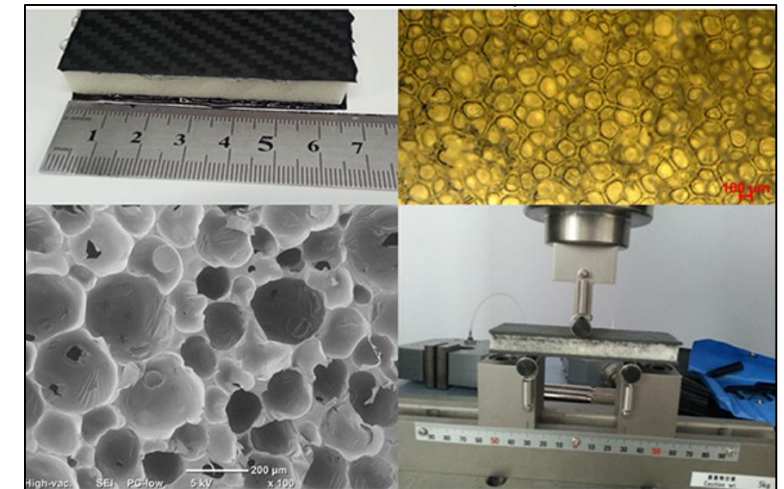
- Development and mechanical testing of nano-engineered materials
- Multiscale modeling of nanocomposites and laminated composites
- 3D printing methods of conductive structural materials
- Aircraft cabin filtration techniques
- Smart textile materials



Advanced Filtration Technology for VOC Removal



Nanoengineered Multifunctional 3D Woven Composites

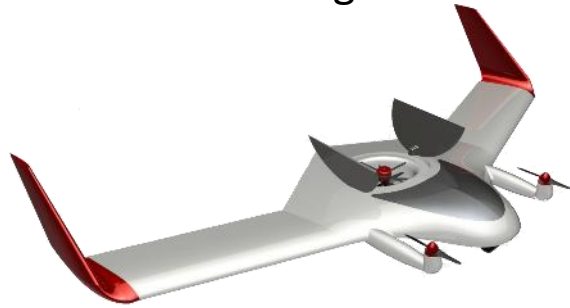


Investigation of Polymer Nanocomposite Foams for Sandwich Structures

## Control and Avionics Research Group

### Research Topics:

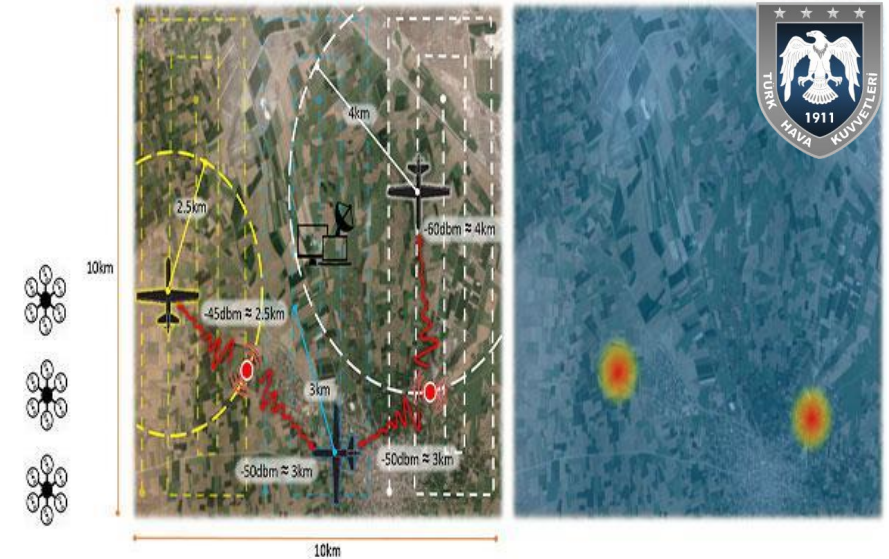
- Dynamic modeling of aircraft,
- Flight control systems design,
- Operation command and control system design and applications
- Artificial intelligence and machine learning applications



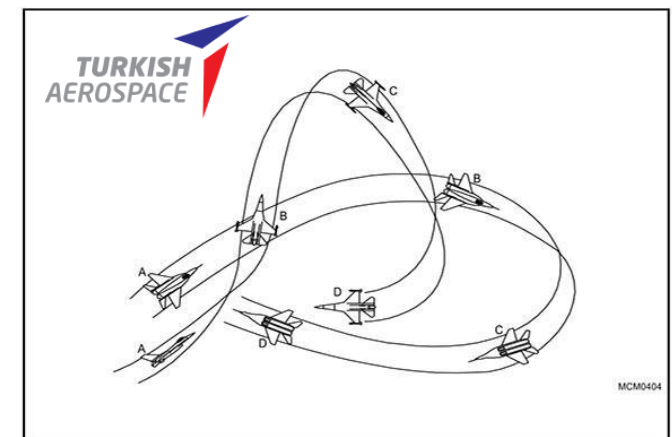
Turac – VTOL UAV



COPTRA – Combining Probable Trajectories



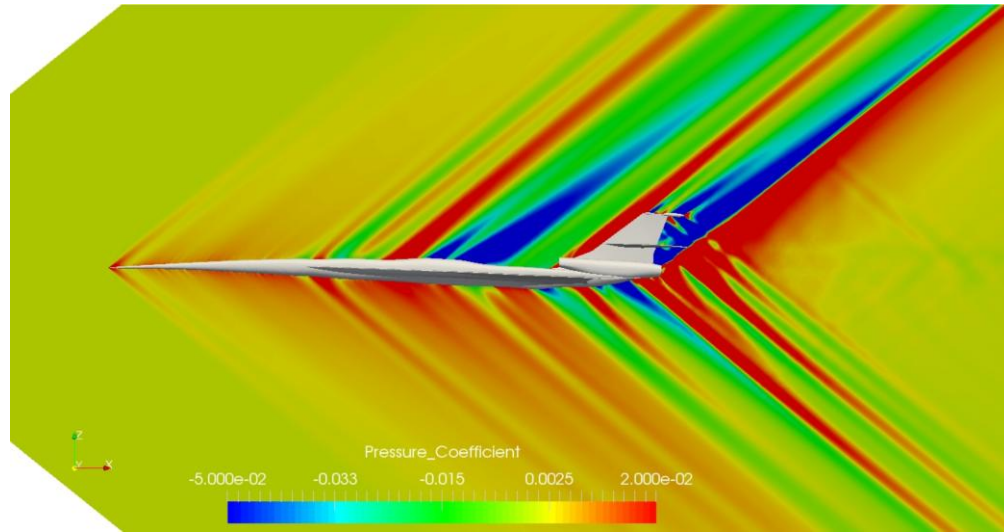
Search and Rescue Project with Multi UAVs System



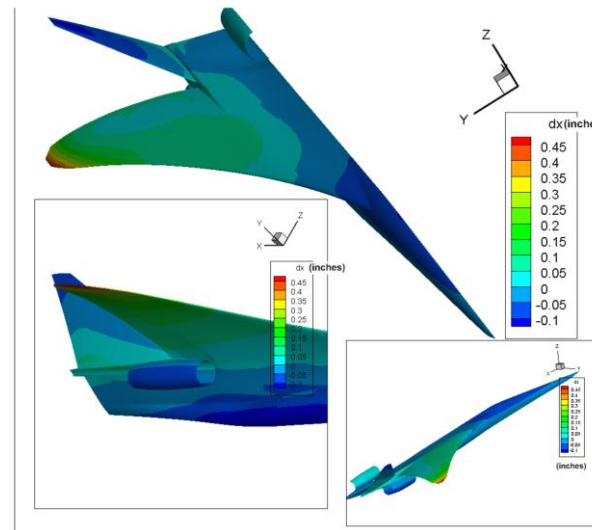
Air Combat Engagement Modelling and Simulation

# R&D FACILITIES - AEROSPACE MULTIDISCIPLINARY DESIGN OPTIMIZATION LABORATORY (AEROMDO)

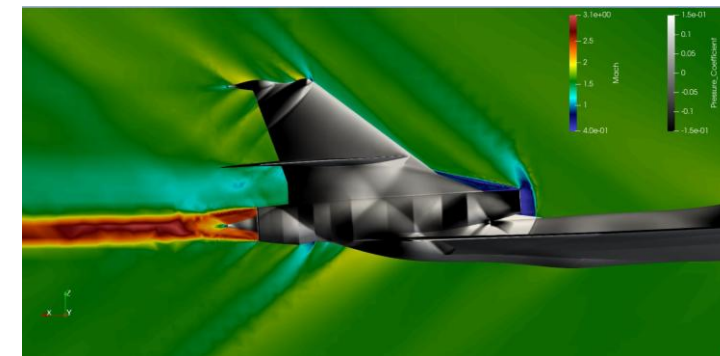
- Application and development of multidisciplinary design, analysis and optimization methods for air and space vehicles using different physical calculations such as aerodynamics, aerospace structures, acoustics, control, propulsion, reliability.
- Sonic Boom



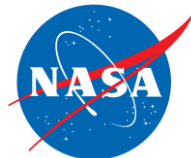
## ➤ Aeroelasticity



## ➤ Engine Operation



## ➤ Collaborations



## ➤ Optimization



# R&D FACILITIES - ROTOR TECHNOLOGY LABORATORY

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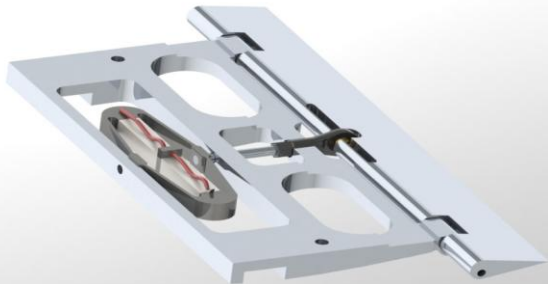


## ➤ Purpose of the Laboratory

- Next generation structural applications and smart material applications on rotary system tracks
- Experimental and theoretical studies for performance calculation
- Experimental and theoretical studies for performance enhancement and design improvement

## ➤ Experiments Conducted

- Performance Tests
- Applications of intelligent control systems with piezoelectric materials



# STRATEGIC BUSINESS PARTNERSHIPS

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- ITU-TAI Long Term (Co-op) Intern Agreement
- ITU-THY Technical Long Term (Co-op) Intern Agreement
- ITU-ASELSAN Cooperation Protocol
- ITU-TAI Very Light Aircraft Project
  - +20 Engineering Students & 11 Faculty Members



**TURKISH AIRLINES**

**aselsan**



# WORK OPPORTUNITIES

İTÜ



## ■ Defense Industry

- Turkish Aerospace Industry (TAI), Turkish Engine Industry (TEI)
- ASELSAN, HAVELSAN, ROKETSAN, TÜBİTAK SAGE



## ■ Civil Aviation

- Turkish Airlines (THY)
- Commercial Airline companies (AtlasJet, Pegasus, Sun Express...)
- Aircraft Maintenance Companies (Turkish Technic, ATS Team, MNG Technic)
- Airport Operations (TAV)



## ■ Automotive industry

- Mercedes, Fiat Tofas, Isuzu, BMC, Renault, Hyundai, FEV



## ■ Air Supply Maintenance Centers (ASMC)

## ■ Industry (Arcelik, Beko, Infotron, AEG, Bosch, Momentus)

## ■ Foreign companies

- SAFRAN, NASA, Boeing, JAXA, EUROCONTROL



## Teams Operating within the Faculty

- APİS
- PARS Rocket Group
- Lagari Thrust Roket Team
- High Altitude Balloon Team
- Ata Team
- İTÜ Albatros İHA Team
- Boomerang
- Nursat
- Simurg
- İTÜ Rota Team
- İTÜNOM İHA Team
- Savroket
- İTÜ BEECOPTER
- İTÜ Kovan
- İTÜ Target Team
- İTÜ SKY-UAV (S-UAV)
- İTÜ SUNGUR İHA (SİHA)
- SAVSAT Satellite Team
- METEO CODING Team
- Aerospace Engineering Club
- Meteorological Research Club
- Aviation Club
- Defense Technologies Club



IMEchE's UAS Challenge 2018 – 1<sup>st</sup> Place



AIAA's CanSat Competition 2019 – 1<sup>st</sup> Place

# PROJECT TEAM ACHIVEMENTS - 2025

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## 2025 Achievements:

Team Name	Competition	Award
Lagari Thrust Rocket Team	IREC 2025	World Second



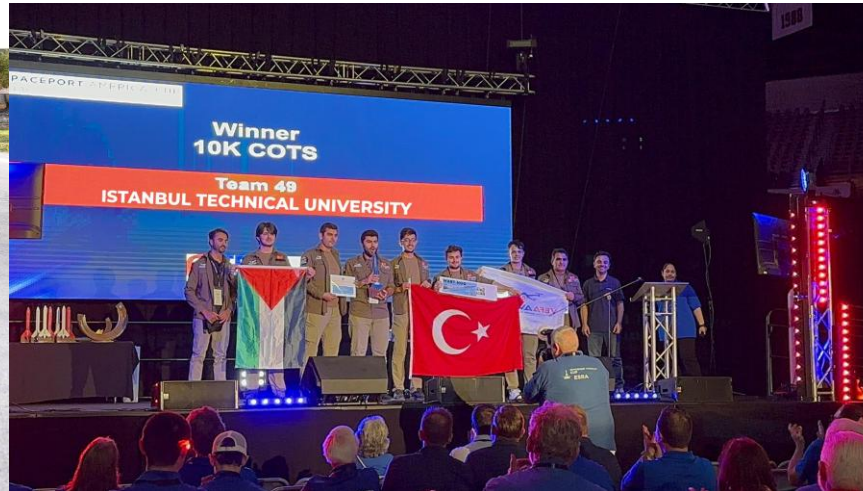
# PROJECT TEAM ACHIVEMENTS - 2024

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## 2024 Achievements:

Team Name	Competition	Award
İTÜ VEFA Team	Spaceport America Cup'24	World Champion
İTÜ ATA	Fighting UAV	Honorable Mention Second Place
İTÜNOM	Fighting UAV	Design Award
İTÜVERSE	AIAA Space Design Competition	Third place
İTÜ Bellatrix Space Team	NASA HERC 2024	Artemis Educator Award



# PROJECT TEAM ACHIVEMENTS - 2023

İTÜ



## 2023 Achievements:

Team Name	Competition	Award
İTÜ ALBATROS	Fighting UAV	Design Award
İTÜ ATA	Fighting UAV	Third place
İTÜNOM	International UAV	Second place
İTÜ SKY UAV	International UAV	Performance Award
İTÜ GÖKBÖRÜ	International UAV	Performance Award



# PROJECT TEAM ACHIVEMENTS - 2022

İTÜ




## 2022 Achivements:

Team Name	Competition	Award
ITU Beecopter Team	Helicopter Design Competition	Gold Medal
Vefa Aviation Team	International UAV	Bronze Performance Award
ITU TVC Rocket Team	Vertical Landing Rocket Competition	Best Team Spirit Award
Albatros Team	International UAV	Incentive Award



*Thank You*

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 İTÜ Uçak ve Uzay Bilimleri Fakültesi