ENAC Research

Ecole Nationale de l'Aviation Civile

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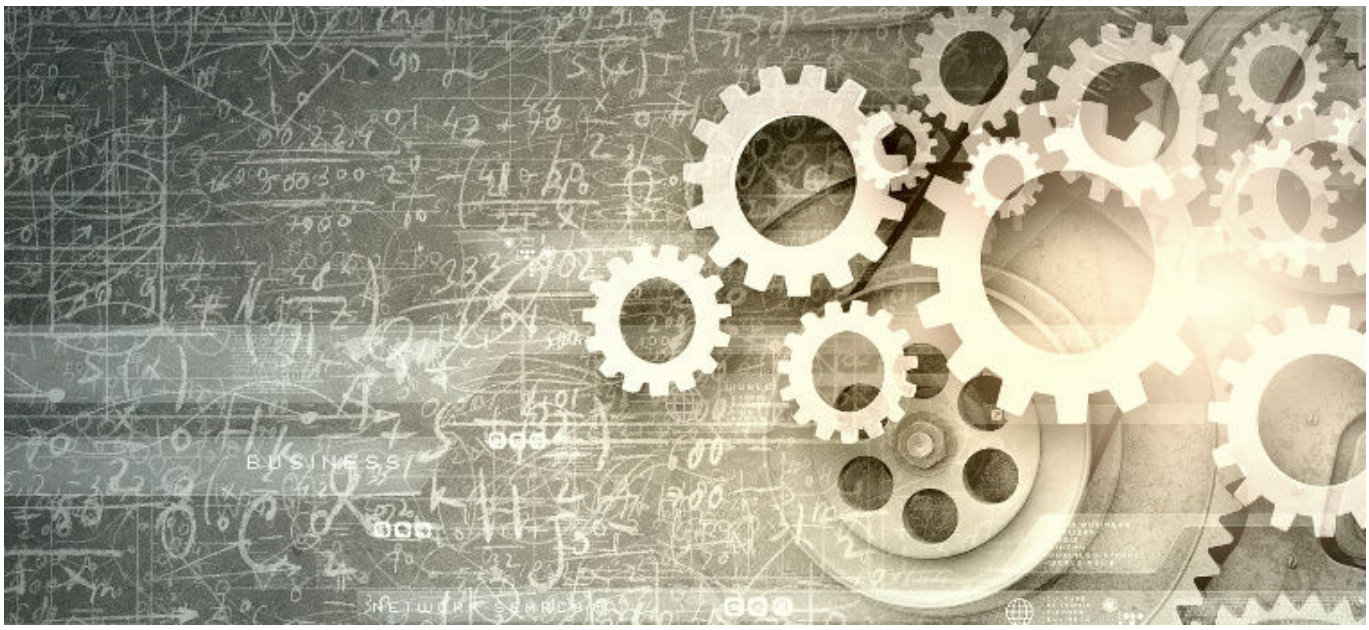
Innovating in the field of air transport means tackling complex multidisciplinary themes that require a high level of expertise and a variety of skills. The complementarity and synergy between the research laboratory and the operational and teaching departments of ENAC enable ENAC to be a unique actor in its ability to combine a very diversified spectrum of expertise in the field of Research and development, training and operational operation of air transport systems.

The strength of ENAC is also its ability to develop a scientific expertise that is always in line with the major problems and issues of the field thanks to numerous international academic partnerships and a solid anchorage in the industrial and in the implementation issues of the Single European Sky.

Inserting drones into air traffic, creating an all-electric airplane or helicopter, improving flight safety by better taking human factors into account, defining optimized air trajectories in terms of environmental impact and safety, Airport of the future, to make more robust and precise the global geolocation of the transport systems ... Here are some examples of the research themes of the research laboratory ENAC. ENAC researchers invent everyday air transport systems of tomorrow. Systems that, in response to their increasing complexity, must be ever smarter, safer and more sustainable.



Aeronautics plays a fundamental role in the structuring and development of modern societies by promoting exchanges, travel, communication ...

Thus, the development of aeronautical transport systems is today a major societal, economic and geopolitical stake covering all metropolitan, regional, national and international scales.

The acceleration of scientific and technical developments combined with the multiple societal expectations for the deployment of new aeronautical services and uses combine to foster radical changes and technological breakthroughs in the new generation air transport systems. These evolutions are conditioned by a research activity allowing them to model, analyze, simulate, characterize and validate before their integration and deployment in operational environment

ENAC, a global player in research and innovation

The air transport system is a distributed system on a global scale, with critical missions to ensure the integrity of users and to meet performance constraints (delays, capacity, safety, cost, etc.) involving a wide range of operators (Pilots, enroute controllers, approach controllers, tower controllers, etc.) and actors (airlines, air navigation service providers, airports, manufacturers ...) in strong interaction with the system. As such, it is one of the most complex system systems ever devised by humans.

Mastering the safety of this system, while increasing its performance and quality of service as perceived by users and service providers, in a context of strong international air traffic, raises numerous scientific challenges that determine the evolution of air transport And to which the ENAC research laboratory provides solutions. ENAC is characterized by a unique combination of scientific and technical expertise, operational expertise and experimental means covering all aviation professions, enabling it to be a major player in European and international research in The field of air transport systems.

Research issues arising from air transport systems often play a precursor role in the emerging needs of complex systems increasingly deployed in the public arena (autonomous transport systems, surveillance systems, security control systems, robust geolocation systems And precise, visualization of complex systems ...). This characteristic leads to a broad spectrum of applicability of the research results conducted by ENAC in the field of air transport systems.

Missions and Objectives

In response to the major stakes and challenges of air transport, the ENAC laboratory conducts a research and development activity with the following objectives:

- Conduct an upstream research activity at the service of the DGAC in order to reinforce the scientific and technical choices that will be at the heart of next-generation air navigation systems
- Develop a research policy aimed at contributing to national and European research priorities.
- Develop a strong interaction between ENAC training and research in order to ensure the precursor and perennial character of the training courses and develop the capacities of innovation and scientific valorization of students ENAC
- To be a major player in European and international research in the field of air transport systems.
- Conduct research covering in a balanced way a whole continuum from basic research to industrial valorization.
- Develop a global partnership network for research and education with the major players in academic and industrial research in the field of air transport systems.
- Contribute to the structuring and excellence of the research conducted within the framework of the Toulouse aerospace campus.

Organization

In order to meet these missions and objectives and in line with the scientific issues that play a central role in the new generation air transport systems, the ENAC research laboratory is structured in

- Four research teams for scientific excellence
    - The "Data, Economy and Visualization" team
    - The "Critical Interactive Systems Engineering" team
    - The "Optimization and Dynamic Systems" team
    - The "Telecommunications" team
- Five transversal programs focusing on business issues whose resolution requires a multidisciplinary approach. These transversal programs coordinate and lead scientific projects in the following areas:
    - General Aviation, Helicopters, Air Operations
    - Sustainable Development
    - Air traffic management and airports
    - Safety and security of the air
    - UAV systems

Two international technology platforms, open to the research community, providing research and training tools to and through research

- An "indoor" evolution platform for drones. This platform offers an important interior space for the evolution of drones equipped with instruments of location and measurement with high level of precision allowing rigorously to measure, to control, to analyze and to reproduce the conditions and experimental results (operational implementation in 2017).
- A platform for the experimentation of human factors and aeronautical human-systems interfaces covering all the operators’ positions of the air transport system (operational implementation in 2017). This simulation environment with a high level of fidelity is intended to be extended by an "augmented tower" and a flying platform implemented on the site of Muret airport.

Advanced research for high-level teaching

The research activities enable ENAC to ensure excellence and the precursor aspect of all its training

courses, integrating the latest scientific and technological advances. This positioning as a leader in aeronautical research and training offers all ENAC students, teachers and researchers a tremendous openness on topics of rich and varied studies. It also offers many opportunities for exchanges with the biggest players in aeronautical innovation around the world.

Figures

- 90 teaching researchers and research engineers
- More than 450 experts covering all the operational expertise at the heart of the air transport systems
- More than 50 PhD students and nearly 20 research theses supported each year
- More than 80 research projects in partnership with major academic and industrial players in aeronautics research in 2015
- A set of experimental and simulation platforms unique in the world in the field of training and research on air transport systems (125 aircraft, 8 aerodromes, 2 360° 3D tower simulators, 40 approach positions, 80 En-route control positions, 20 tower simulation and aerodrome control positions, A320 flight simulators, etc.)

ENAC research teams ///

ENAC research programs ///

ENAC publications ///

Documents

See as well

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