

Propulsion and Space

Research Center

**Advanced technology
for 21st century
transportation**

Above and beyond

A center of excellence to take us further

For aeons, we have looked to the skies and the stars. Today, we are innovating the means to journey there, as the product of a fast-growing and ever more confident aerospace sector, in which the UAE has a long-established and pioneering role – with an automated probe already in orbit around Mars – and ambitious plans for tomorrow.

To go above and beyond, the Propulsion and Space Research Center (PSRC) at Technology Innovation Institute plays a leading role and works in partnership at the very frontiers of aerospace.

Today, backed by a well-funded team of scientists and researchers, developing breakthrough technologies that could propel humankind further and faster than ever before, around and beyond our world – and manage operations and exploration when we get there – at altitude in our own atmosphere, in orbit around Earth, and out to the planets of our solar system.

Who we are

Launched to push technological boundaries in aerodynamics, aircrafts, propulsion computational methods and space exploration, the PSRC at TII offers unique opportunities for world-class research and scientific discovery. Fuelled by a desire to create and innovate without boundaries, we collaborate across disciplines to generate real-world impact through both theoretical development and practical systems designed for tomorrow

What we do

- Aerodynamics
- Aircraft propulsion and turbomachinery
- Beyond Earth exploration
- Computational Methods and Artificial Intelligence.





Our team

Here at TII, we're bringing together a team of the sharpest minds from across the global aerospace community to investigate the toughest questions, respond to the greatest challenges - and change the world for the better.

At TII, our Propulsion and Space Research Center is dedicated to innovation at the very frontiers of aerospace – in hybrid and electric propulsion, artificial intelligence and far beyond.

Our research

Ahead of the curve. Beyond tomorrow.

Operating at the edge of known aerospace science and engineering, TII's Propulsion and Space Research Center offers limitless opportunities for research and fresh scientific discovery.

Working on a depth and breadth of research areas in both the fundamental and applied sciences, we are free to employ genuinely blue sky thinking, researching without fear or limitation, and without the burden of administration.

Our core research areas



Aerodynamics

The aerodynamics research provides solutions through physical and mathematical modeling, computational and numerical simulation, tradespace evaluation, optimized solutions, verification and validation through experimental tests in a relevant environment.

Our research domains include:

- Fluid Mechanics and Computational Aerosciences;
 - CFD
 - Experimental Fluid Dynamics
- Supersonic air-breathing engines (Ramjet technology);
- Combustion;
- Aerothermodynamics.



Aircraft Propulsion and Turbomachinery

Our research focuses on novel and disruptive propulsion concepts/architectures aiming at performance optimization, sustainability, and integration on aircraft or spacecraft.

Our research domains include:

- Hybrid/Electric Propulsion
- Innovative gas-turbine cycles, propellers and rocket engines
- Propulsion components, materials, fuels
- Aircraft and spacecraft integration



Beyond Earth Exploration

Moving to earth orbit and beyond requires a step change in technology and understanding – not only in orbital mechanics, but mission design and robotics.

Our research domains include:

- Astrodynamics:
 - Space Mission Design and Engineering
 - Orbit Determination, Trajectory Optimisation, Satellite Reorientation
 - In-space propulsion assessment
- Robotic spacecraft and landers for deep space exploration



Computational Methods and AI

Our research efforts mainly focus on the development of computationally intelligent methods and solutions for addressing existing and future challenges of air and space propulsion systems.

Our research domains include:

- Simulation and Control
- Digital Twins
- Diagnostics and Prognostics
- System Health Management

Innovation through collaboration

TII believes that the benefits of scientific discovery should be shared, and that the process of discovery is a collective one. At the Propulsion and Space Research Center, we work in partnership to grow and develop the aerospace technology ecosystem in Abu Dhabi and the UAE, and welcome partnerships and collaborations with academic and research institutes, as well as commercial opportunities – locally, regionally and globally.

The advanced propulsion and space technologies on the horizon at TII will offer benefits ranging from ultra-efficient propellers to systems that minimise the risk of space collisions.

We're aiming high from the outset, exploring not just novel means of propulsion, but advanced AI technologies to manage complex missions far from home.





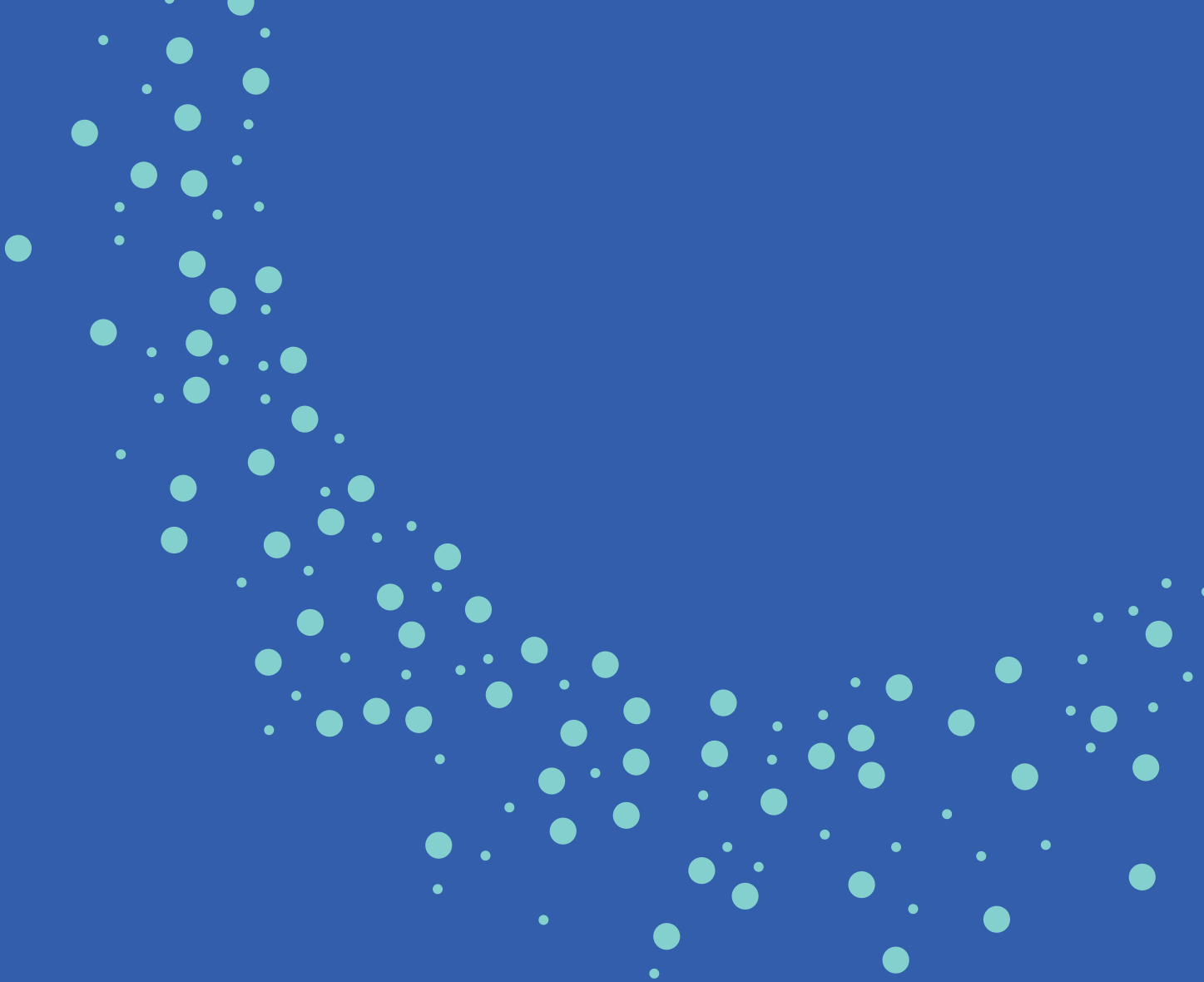


Our research

Ahead of the curve. Beyond tomorrow.

At the Propulsion Research Center, we are defining the propulsion and operational systems that will shape 21st century travel and exploration – in the atmosphere, in orbit, and far beyond in deep space.

Find out more about how we plan to get there at tii.ae



Propulsion and Space Research Center



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