The LAAS-CNRS has always taken care to acquire advanced technological means. Just as it was the first French academic laboratory to invest in 1976 in a clean room for the manufacture of micro-systems, it also acquired a new experimental building, instrumented and energy self-sufficient, totally dedicated to several themes particularly cyber physical systems and energy.

THE MICRO AND NANOTECHNOLOGIES PLATFORM

The Renatech platform is a clean room whose €35 million equipment allow developing, shaping and processing materials for prototyping micro-electro-nical, opto-electro-nical and micro-opto-mechanical components, as well as micro and nanosystems. These means are used by LAAS-CNRS researchers but are also open to academic and industrial external requests. This structure is in continuous evolution for more than 40 years.

GEORGES GIRALT BUILDING

By the scale and the sophistication of its instrumentation, this building foreshadows what our living places will be in the coming years and offers, above all, to the laboratory research a setting close to the real conditions. Indeed, it deals with rapidly evolving fields like embedded systems, networks of sensors, Internet of things, communication from machine to machine, interconnections of services, companion robots, privacy and energy optimised management. The platform will gradually be enriched with new robots, sensors and networks and new energy-related equipments.

THE BIOLOGY/BIOCHEMISTRY PLATFORM

It gathers on 400 sqm the experimental means for studying and characterising micro and nano-systems dedicated to biology, health and environment. These means are essential for the works on biosensors, nano-biosystems, lab-on-a-chip (LOC), bio-inspired nanotechnologies.

THE LAAS-CNRS PLATFORMS AT THE SERVICE OF THE RESEARCH

> Micro/nanotechnologies Renatech Platform of over 1,500 sqm
> Characterization suite: over 1,000 sqm of which 400 sqm dedicated to biological and chemical analysis
> Fleet of a dozen robots
> Georges Giralt instrumented building
  - Cyber physical systems
  - Photovoltaic energy
> Design of micro and nanosystems
Within these disciplines, eight scientific departments define the future guidelines and coordinate the activities of the 26 research teams.

### Engineering science and IT researches

**OUR RESEARCHES**

The researches carried out at the LAAS-CNRS, laboratory of the CNRS, aim to gain a fundamental comprehension of complex systems while considering the usage which can be made as a result. In contrast, a lot of industrial or societal issues for instance in aeronautics, space, health, energy or communication network, raise fundamental questions which motivate the laboratory research projects. The major part of the projects is federated by strategic focuses of the laboratory, tools of prospective projection which set out the objectives of our research works. The Alive strategic focus aims to structure and facilitate, within the laboratory, a highly interdisciplinary approach, consisting in coupling the different internally developed engineering sciences with the live and environment sciences. As the material, the software, the networks and the robotics continue their high evolution, the Adrea focus, at the same time, aims to develop these fields, anticipating the future synergies between them, preparing the tools needed to this design and proposing the first experiments related to them. The Energy strategic focus aims to use the multidisciplinary competences of the LAAS to become a key player of the energetic transition and to meet the challenges, from the component to the complex systems like the smart-power grids. The Space strategic focus aims to federate the multidisciplinary activities of the LAAS-CNRS in the field of space systems, to foster the emergence of ambitious projects and help integrate them within the regional and international space community.

### SCIENTIFIC COMMUNITY

The LAAS-CNRS has an active role in the main institutions of its community: consultative and decision-making bodies (National Scientific Research Committee, scientific councils of its institutes attached to the CNRS), animation institutions (European networks, learned societies); expert body (editorial boards of journals, program committees for international conferences). The most tangible involvement is the visibility of the scientific foundations, like the RTRA investments, projects of the French National Agency of research (or in the animation of scientific foundations, like the RTA Aeronautics and Space Sciences and technologies.

### TO ANTICIPATE...

the major interdisciplinary challenges related to our rapidly changing society, the LAAS-CNRS identified strategic focuses based on the four major disciplinary fields which are the trade mark of the laboratory since its inception: automation, robotics, IT and micro and nanotechnologies.

1968 > inception of the laboratory
Jean Lagasse founded the laboratory of automatics and its spatial applications

632 > people on 26/01/2016
38% researchers, teachers-researchers, 39% doctoral students, 23% ITA

+2000 > thesis
more than 2 000 thesis since the inception of the laboratory

14 > talents distinguished by the CNRS
4 silver medals, 7 bronze medals, 3 Cristal

4 > strategic focuses
Ambient Intelligence: Dynamic reconfigurable architectures for embedded mobile autonomous systems
Alive: Analysis of interactions with the living world and the environment
Energy: Systems for energy intelligent management
Space: Space systems

5 > technologic platforms
clean room, robot platform (humanoid, assistance, exploration, drone), characterisation platform, design platform, network platform

### ...A long tradition of partnership and innovation

**FIELDS OF APPLICATION**

The researches carried out at the LAAS-CNRS are valued in many fields: aeronautics, space, embedded systems, communication, transportation, networks, chemistry, health, environment, energy, defence, services. The laboratory forged strong links with the industry and is involved in a large number of collaborative projects with regional, national and international companies of all sizes. The partnership-based research has always taken the form of research/industry common laboratories, for instance with Actia, Airbus, Astrium, Essilor, Innopsys, Lacroix, Orange or Thalès. This concept has taken shape in 1991 at the LAAS-CNRS.

**INTERNATIONAL COOPERATIONS**

The international visibility of the LAAS-CNRS is achieved through a continued willingness. The cooperations are constant with EU countries under framework programs but also exist with Latin America, USA and Asia particularly. The LAAS regularly sends its members to international joint research units of the CNRS but also hosts foreign researchers, within the framework of bilateral cooperations, excellence research chairs or sabbaticals. In addition to doctoral and post-doctoral students, the LAAS-CNRS hosts each year around ten foreign researchers for stays over three months.

### ... A philosophy of openness

**EXCHANGE OF KNOWLEDGE**

The LAAS-CNRS has been involved in European programs from their creation. Within the framework of the Horizon 2020 program, the laboratory has already participated in more than 8 projects. It is also highly involved in the national scientific life, through future investments, projects of the French National Agency of research or in the animation of scientific foundations, like the RTA Aeronautics and Space Sciences and technologies.

**TRAINING BY THE RESEARCH**

Over thirteen nationalities come and go among doctoral students, allowing acquiring an international culture of exchanges from the thesis. The LAAS-CNRS is deeply involved in the training to the research and by the research. It is a host laboratory for several doctoral schools of Toulouse. The LAAS-CNRS is finally associated to founding members of the Federal University of Toulouse Midi-Pyrénées.

**THE MANAGEMENT TEAM**

Liviu Nicu
director of the LAAS-CNRS

Florent Lamiraux
deputy director for industrial affairs

Pierre Lopez
deputy director for relationship with university partners

Pierre Temple-Boyer
deputy director for relationship with EPIC and EPST (except CNRS)

**Start-ups created by the LAAS-CNRS offer an industrial future to some of its works. Among them:**

- KineoCam, motion planning
- GoS Design, network optimization
- Tag Technologies, microsystems for motion detection in home automation
- Noonoo, 3D sensors
- Equilume, wind measurement solutions based on laser systems
- SmartCatch, capture in vivo of circulating tumor cells

**The LAAS-CNRS is leading partner of:**

- EquipEx :
  - RobotEx, national network of robotics platforms
  - LEAF, Laser processing platform for multi functional electronics on flex
- LabEx :
  - GaNEx, national Network for GaN
- IRT ST-EXUPÉRY Aeronautics, Space, Embedded Systems
- SATT Midi-Pyrénées Toulouse Tech Transfer