Research activities in autonomic Communicating Systems and Smart buildings

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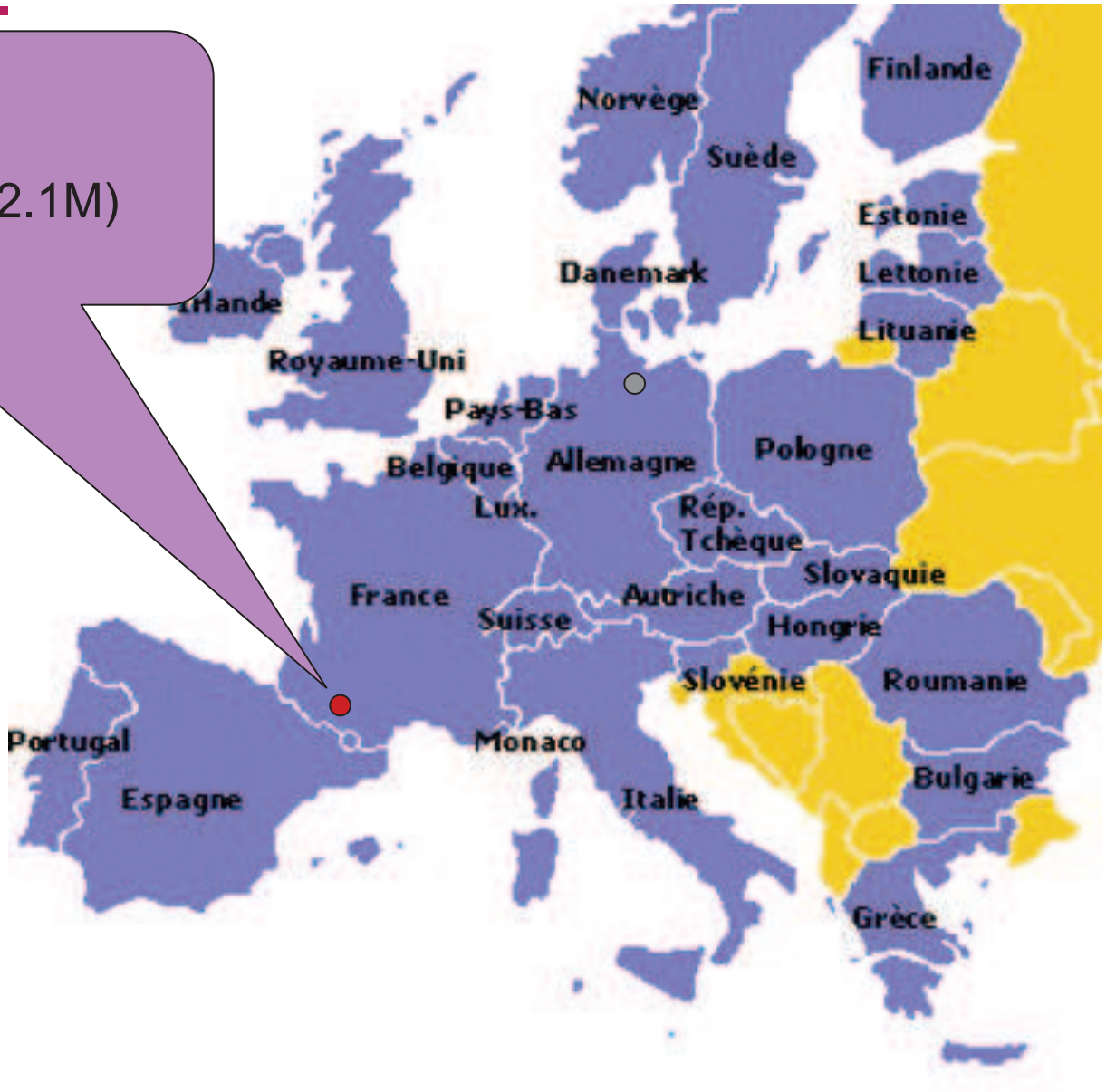
LAAS CNRS, Toulouse, FRANCE

Toulouse

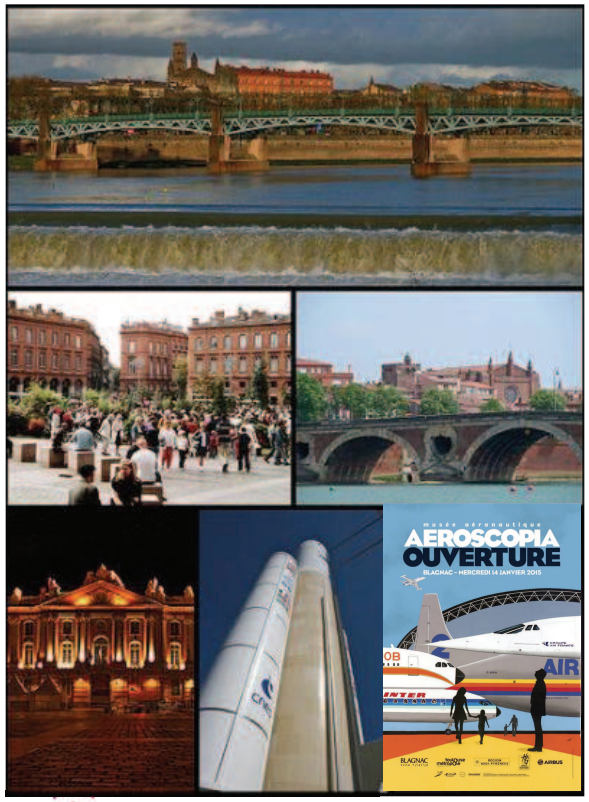
1.2M habitants
4th city in France
after Paris (12.5M), Lyon(2.1M)
and Marseille (1.7M)



TOULOUSE : “La ville Rose” (The pink city)

Cultural Activities in Toulouse

Monuments



Museums & attractions

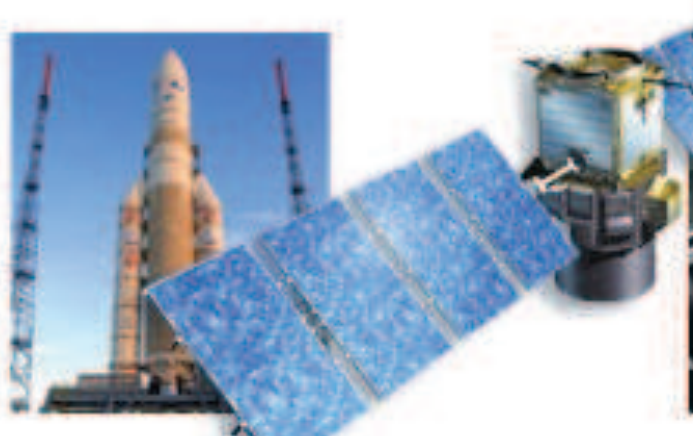
Sports

Festivals

Toulouse University

104K students,
4th rank after Paris (625K),
Lyon (140K) and Lille (107K)

Innovative activities in Toulouse



AIRBUS GROUP

cnes
CENTRE NATIONAL D'ÉTUDES SPATIALES

Aeronautic, Space, & Embedded Systems

STAE TOULOUSE

Innovation clusters

INNOV-AGRI Grand Sud-Ouest

AGRI SUD-OUEST INNOVATION

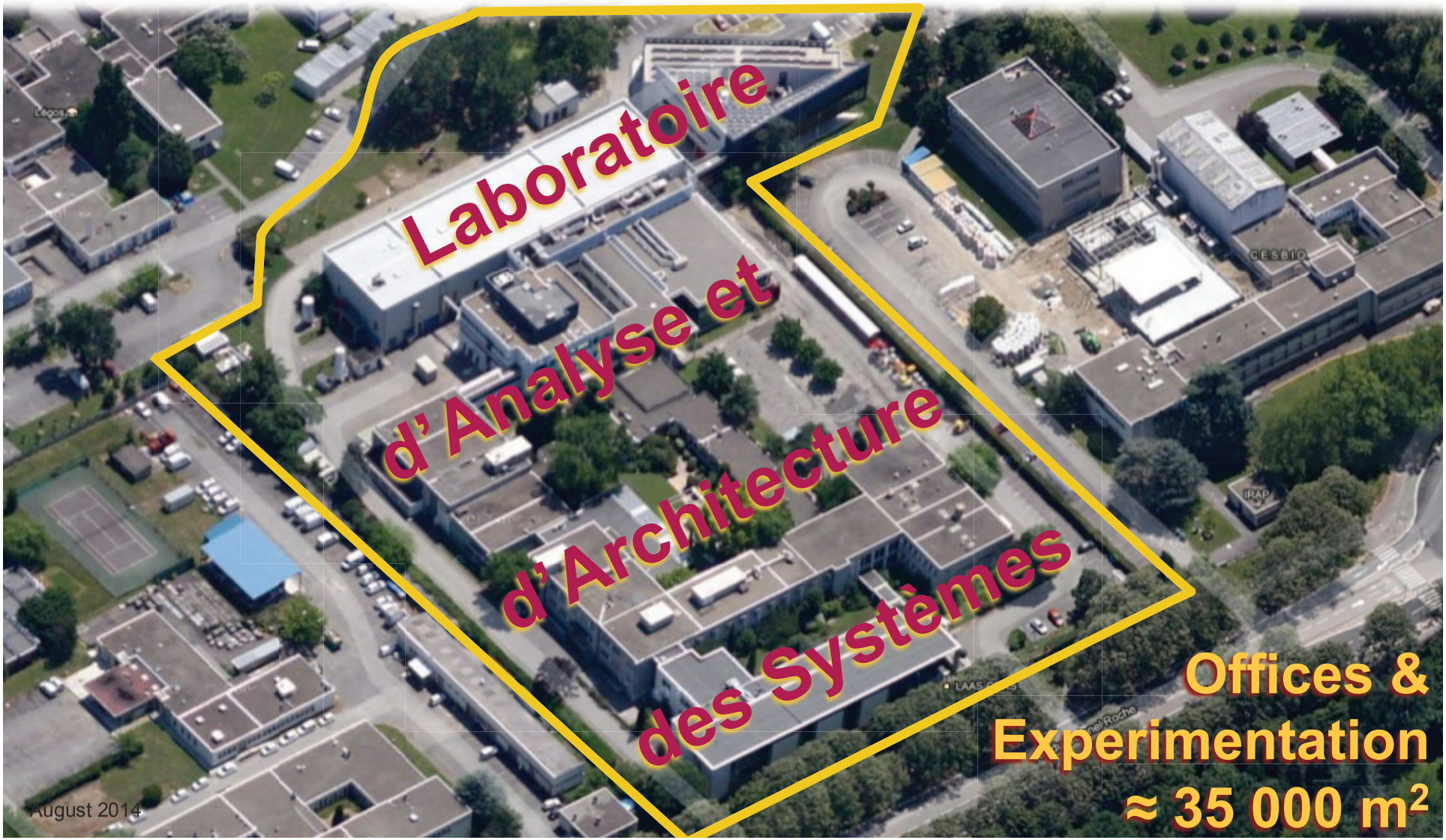
Agriculture

Health

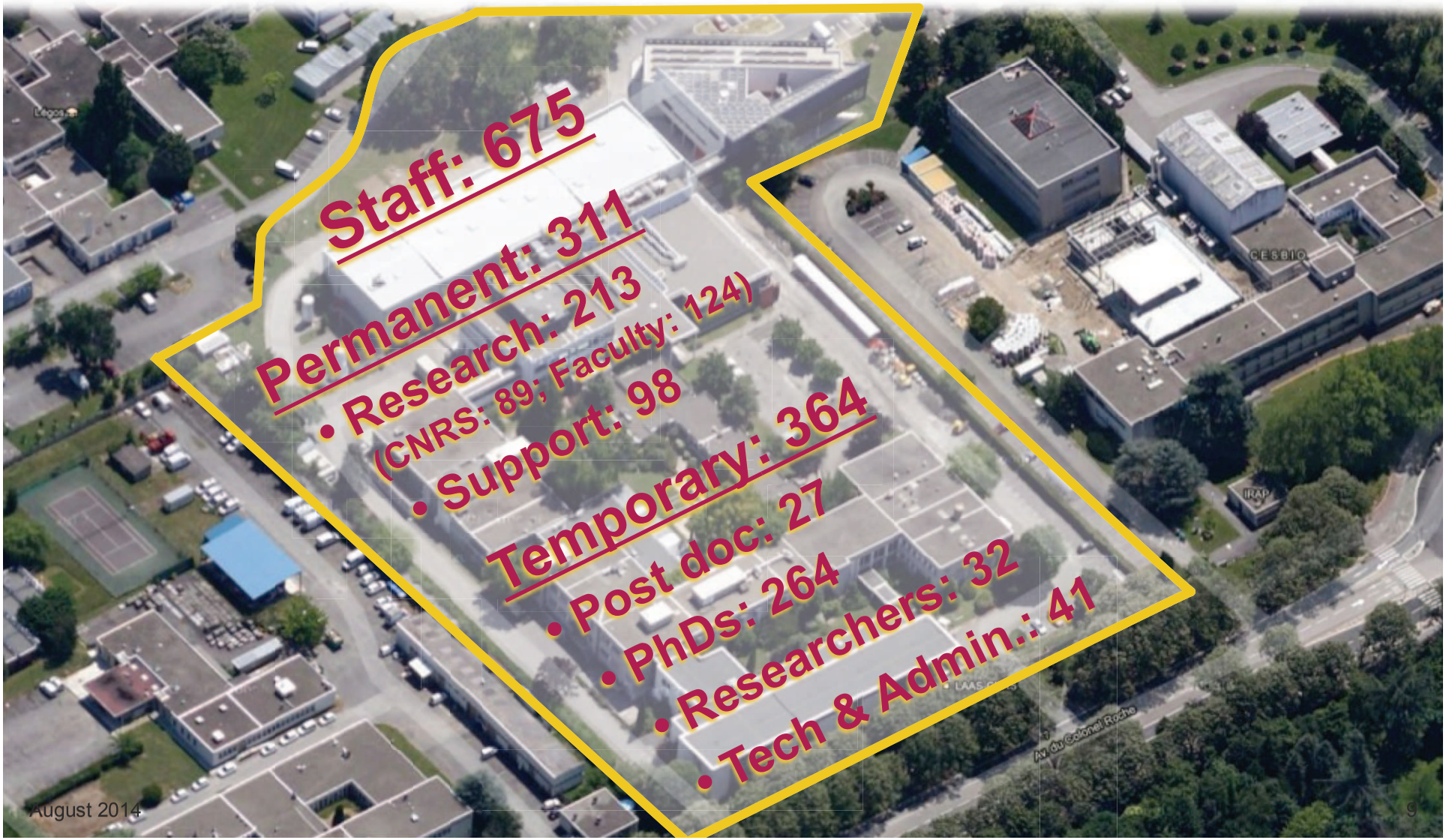
Cancer-Bio-Santé CLUSTER

LAAS: a CNRS Lab

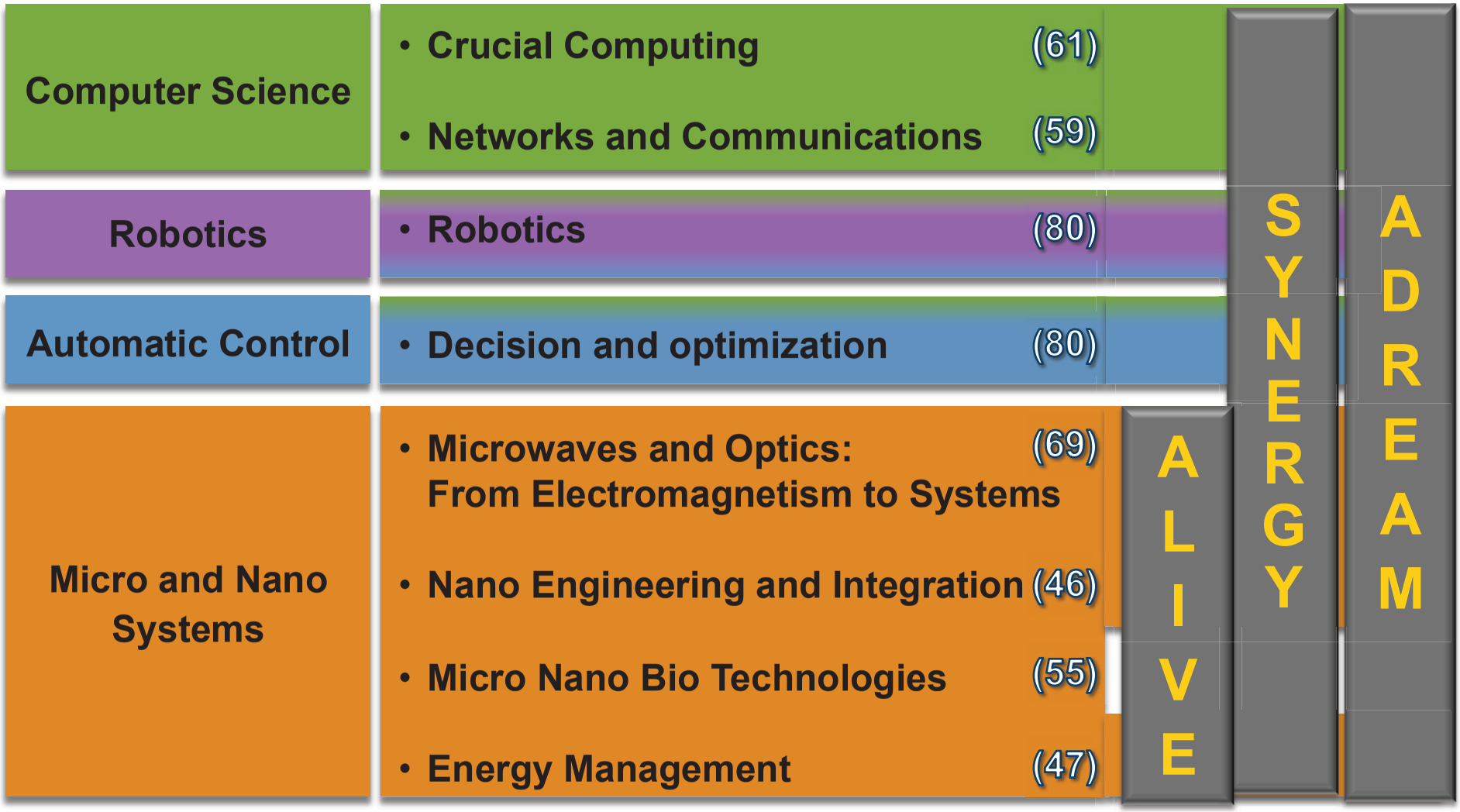
LAAS: co-located facilities



LAAS: Researchers, Professors, Engineers, PhD and Master Students, ...



Disciplinary Domains

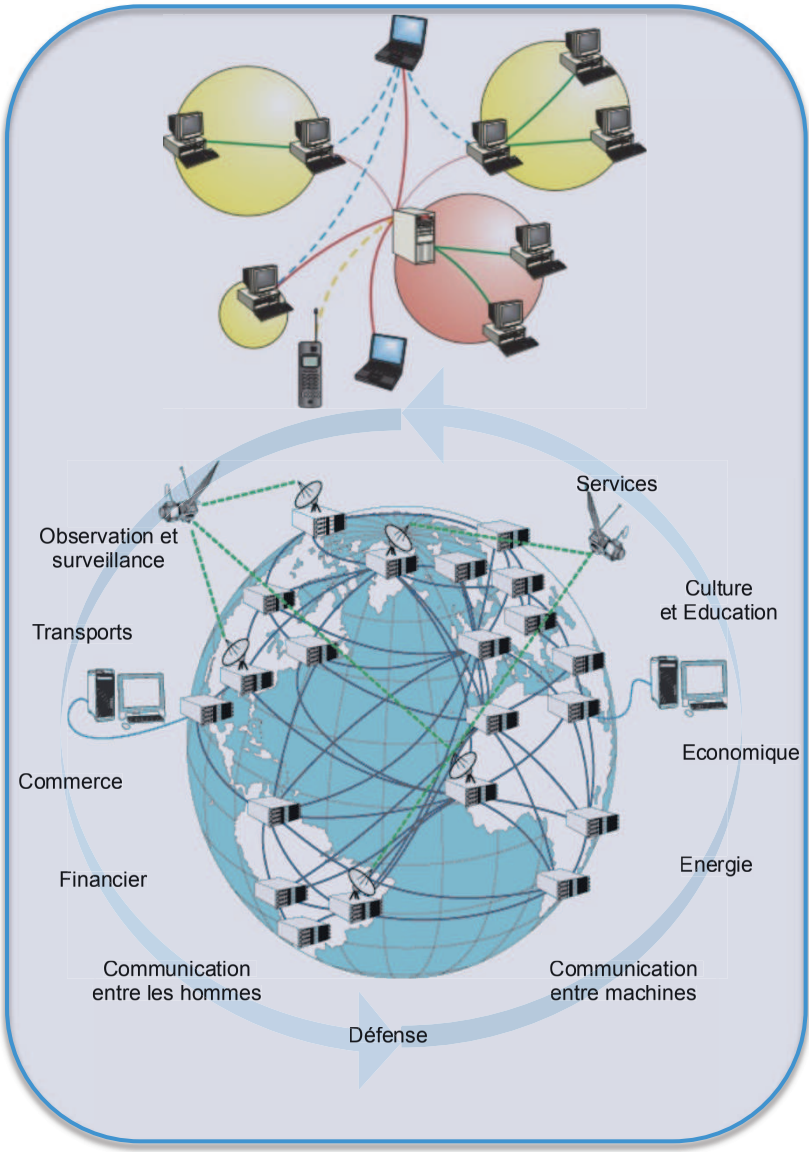


Networks & Communication department

- **CDA : Calcul Distribué et Asynchronisme**
  Distributed Computing and Asynchronism

- **SARA : Services et Architectures pour les Réseaux Avancés**
  Services and Architectures for Advanced Networks

30/06/2014: EC(14), C(7),
Post-doc(3), PhD(33)
4 visitors / year



Executive Summary

ADREAM | SYNERGY

Transversal Axis

Ongoing&continu. Starting Projects

CNES	H2020/ ENDEAVOUR	Smart Blocks	PIA/M2M	ONTIC
CIFREs	RTRA/ CYPHYS	ADN	IDEX/ CLOUD	PANACEA
AGF Grant	A2NETS	SOP	NEC	IMAGINE

Theories &Techniques

- Queuing Theory
- Stochastic Modeling
- Game Theory
- Semantic & Ontologies
- Graphs & G. Grammars

- Protocol for Adaptiveness and Guarantee
- Architectures for Communication and Services
- Distributed Algorithms and Applications

Space & avionic systems: avionic platforms [DGAC-IMAP][ANR-SATTRIMAP] satellite [CNES]
Ambient intelligence/CPS: IoT/M2M: [ITEA2-USENET], [ITEA2-A2NETS],[PIA-M2M],[RTRA/CYPHYS]
Distributed Systems: Dynamic manufacturing Networks: (FoF) [IP-IMAGINE],[ANR-Smart Blocks]
Network Monitoring Simulation & Control: [FUI-NEC],[FP7-ECODE],[FP7-ONTIC],[H2020-ENDEAVOUR]
Emergency communication systems: [ANR-RESCUE], [RTRA-ROSACE]
Virtualisation: [ANR-SOP], [ANR-DGA-ADN][CNES], [FP7-PANACEA],[RTRA-CPS],[IDEX-Cloud]

- Networks Planning and Optimization
- Traffic Monitoring, Modeling and Analysis

Experimental Platforms: Grid'5000, LAASNetExp, Renater, m2m eclipse.org, OM2M, OM2M Connecting things, ETSI, M2M, IETF

Learning PF for Education & Living Labs: OM2M Connecting things, iMAGINE

Tools & FW: GMTE, Toulouse Tech Transfer FrameSelf, GOS Design NEST

ADREAM, The building & research platform

Main building choices

- **Production of Electicity by a set of green energies**
  - Solar
  - Geothermal
  - Heat Pump
- **Large experimental room**
  - Dynamic modification of experiment room by a movie grid
  - Shared intelligent space for open demos
- **Fully accessible global wiring**

Main building choices (cont)

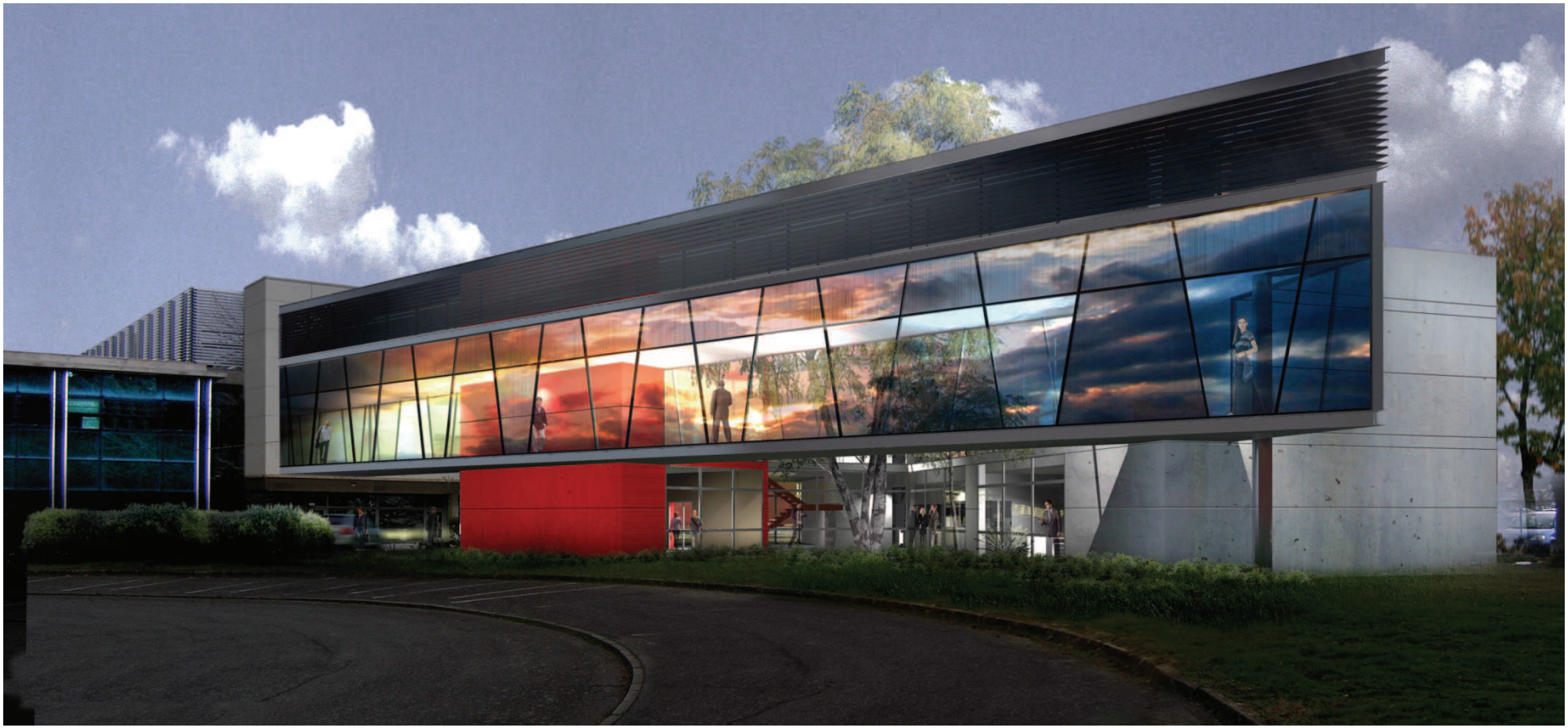
- Production by a set of green energies (Solar, Geothermal, Heat Pump)
- Sensors for environment (wind, light, temperatures, …)
- Sensors for inside lights
- Sensors for all energy production and consumption
- Sensors for checking all building system status
- Sensors for localisation (RFID, UWB, Video cameras,…)
- Sensors for monitoring all objects

Plus

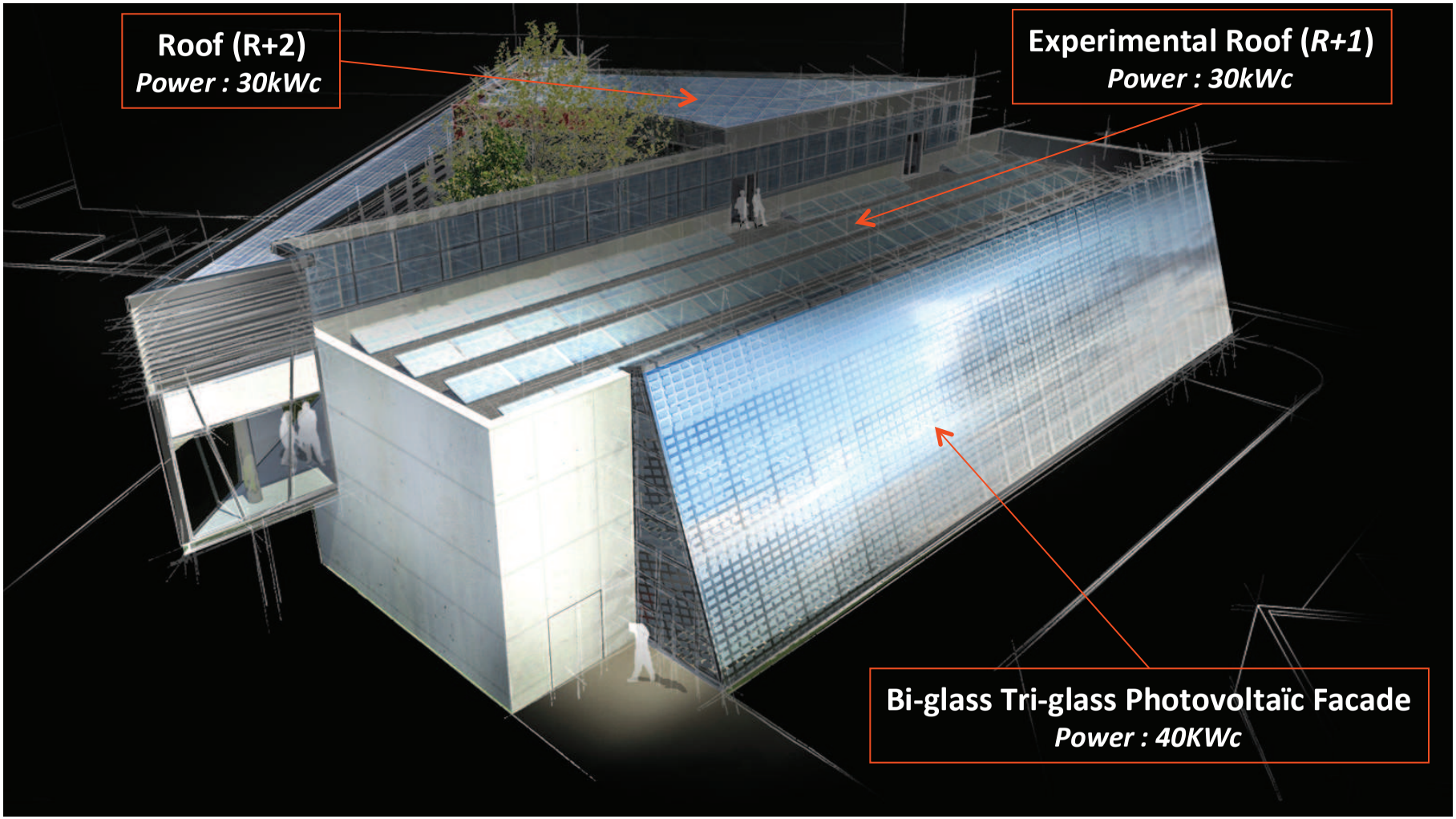
- Fully accessible global wiring
- Dynamic modification of experiment room (movie grid)

The ADREAM Building

from the Architect



Solar production



- **Building construction starts**
  - **Started June 2010**
  - **Ending July 2011**

- **Open Platform**
  - **Evaluating different solutions**
  - **Ready for multiples collaborations**