IBISC/SIAM TEAM

Signal Image and AutoMatics

Team direction: Dalil ICHALAL et Vincent VIGNERON (✉)

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SCIENTIFIC OBJECTIVES

SIAM is an interdisciplinary team whose research revolves around the four essential stages in the general study of a system: perception, observation, modeling, and control. The two systems targeted for these methods are vehicles and biological systems. The singular and non-standard behaviors of the systems studied led the team's researchers to implement original methods in various fields of application.

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Keywords: Modeling, control, observation, diagnosis and fault-tolerant control, road safety, energy saving, energy production and transport, precision agriculture.

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Theoretical developments are conducted in response to these issues and fundamental scientific challenges and obstacles. The team's work can be classified according to (i) model-based (ii) data-based methods.

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The first category includes automatic activities, and the second activities around machine learning, signal, and image. Dynamic perception is placed at the interface, interacting with the two aspects of models and data. The team is mainly interested in scientific challenges relating to the observation and control of dynamic systems, the modeling and stability of dynamic systems, the diagnosis and fault-tolerant control, the planning of trajectories, the dynamic perception, shape recognition, image and signal processing based on their statistical properties, model-free modeling.
Three axes:

- **Axis 1: Complexity & Cyber-Physical Systems (CSC)**
  Keywords: Modeling, control, observation, diagnosis and fault-tolerant control, road safety, energy saving, energy production and transport, precision agriculture.
  Composition N. Ait Oufroukh, H. Arioui, G. Damm, D. Ichalal, S. Mammar, L. Nehaoua, N. Neji, L. Nouvelière

- **Axis 2: Analytics and representation of signals (ARES)**
  Key words: signal and image processing, learning, representation, learning
  Composition S. Lelandais, H. Maaref, J. Plantier, N. Séguy, C. Vasiljevic, V. Vigneron, D. Fourer

- **Axis 3: Dynamic Perception (Pdy)**
  Keywords: perception, dense dynamic vision
  Composition Hicham Hadj-Abdelkader, S. Bouchafa-Bruneau, Fabien Bonardi.

PEOPLE TO CONTACT

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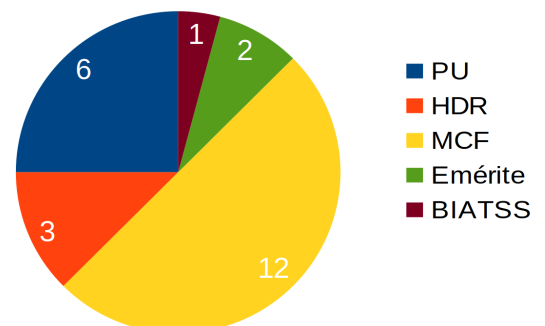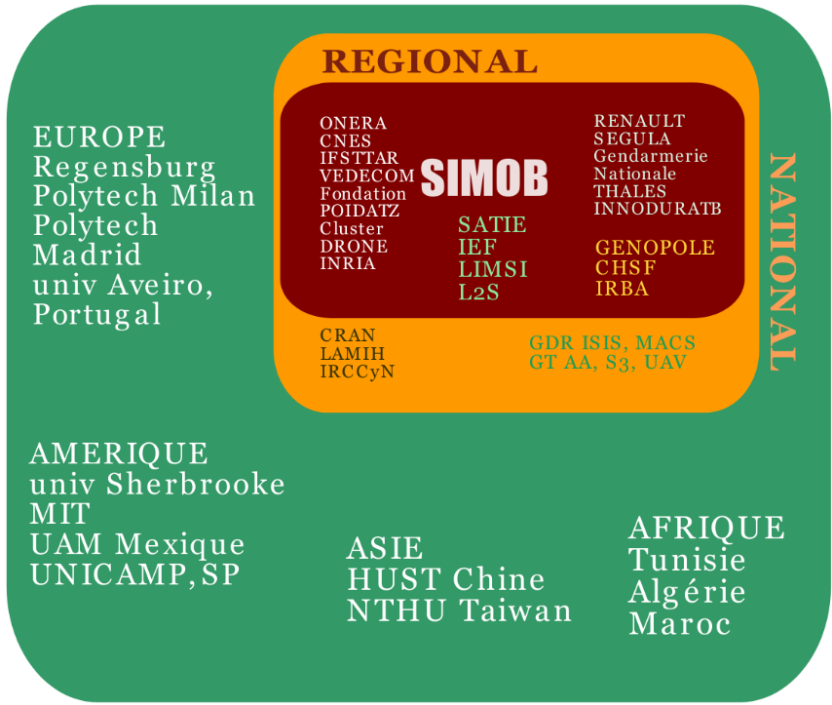CE 1455, 91020 Evry, France

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EFFECTIVES : 14

- PU
- HDR
- MCF
- Emérite
- BIATSS

ECOSYSTEM

INTERNATIONAL

REGIONAL

ONERA
CNES
IFSTTAR
VEDECOM
Fondation
POIDATZ
Cluster
DRONE
INRIA

SIMOB

SATIE
IEF
LIMSI
L2S

RENAULT
SEGULA
Gendarmerie
Nationale
THALES
INNODURATB

GENOPOLE
CHSF
IRBA

CRAN
LAMIH
IRCCyN

GDR ISIS, MACS
GT AA, S3, UAV

NATIONAL

EUROPE
Regensburg
Polytech Milan
Polytech
Madrid
univ Aveiro,
Portugal

AMERIQUE
univ Sherbrooke
MIT
UAM Mexique
UNICAMP,SP

ASIE
HUST Chine
NTHU Taiwan

AFRIQUE
Tunisie
Algérie
Maroc

EQUIPMENT

Platform 2R/4R | aviary for drones
platform | nanolaunchers

PARTNERSHIPS

CNES/PERSEUS | ENS-Cachan | UTT
Cluster-Drones | Gendarmerie
IFFSTAR | RENAULT | SATI
VEDECOM | CHSF | Poidatz
INNODUR | INRIA/TITANE

PROJECTS

ANR LOCA3D | ANR VIROLO++
ANR COOPERCOM | PICRI
MOST Taiwan | INVAHSIVE
PERSEUS | e-drones ERASMUS+
ANV

PROJECTS

- **Image and Signal Axis**:
  - diagnosis of neurodegenerative diseases (Alzheimer's, Parkinson's, Charcot), surgical gesture modeling for postural correction of children PC, EMGd, ECGf.
- **Automatic Axis**
  - Air vehicles: trajectory planning, drone fleet control (AR-drone, PARROT), monitoring of works of art, etc.
  - Ground Vehicles: training support, preventive/active support

ORGANIZATION

SIAM

Complexité & systèmes
cyber-physiques
méthodes basées modèles

2PU+1
1 PU émérite
8 MCU
7 doctorants

Perception dynamique
interface modèles/données

1 PU
2 MCU
1 POSTDOC
1 doctorant

Analytique et
Représentation des signaux
méthodes basées data

1 PU +1
1 PU Emerite
4 MCU
1 CH ASS
4 doctorants