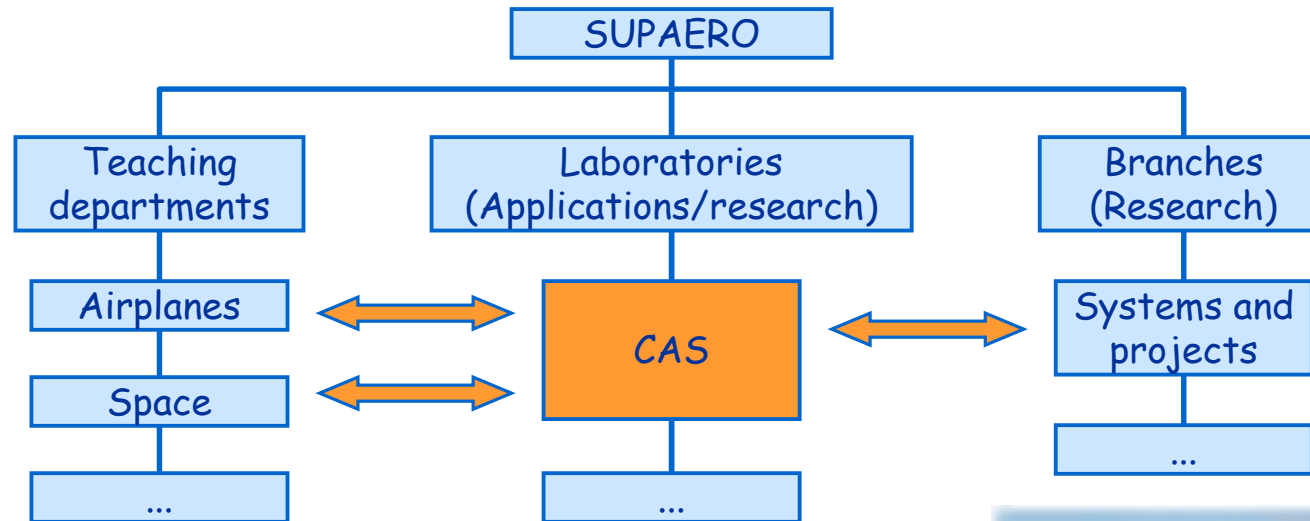


# *Le Centre Aéronautique et Spatial*



## *Activity*



### Aéronautics ...



- Airplane design
- Simulation
- In flight activities
- UAV development

### ... Space



- Space system and satellite design
- Orbitography, mission analysis
- Ground stations
- Spaceraft simulator



***Aeronautics...***

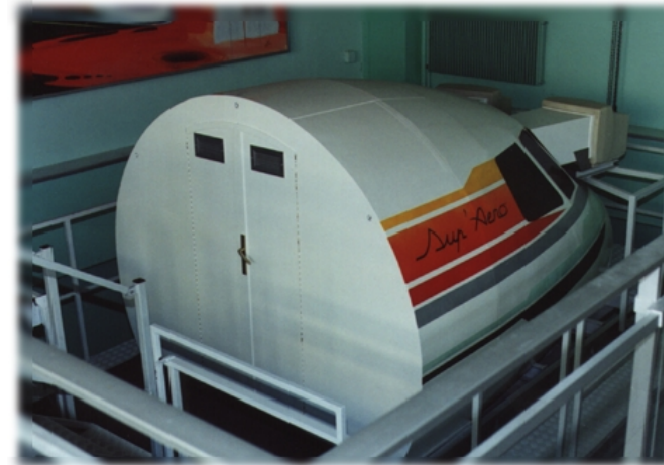
# *Simulation*



- Flight simulator "CASPER"\*
- 3 axes motion
- Versatile
- Easy to configure



- ...for
- Teaching
- Research (Ghost)



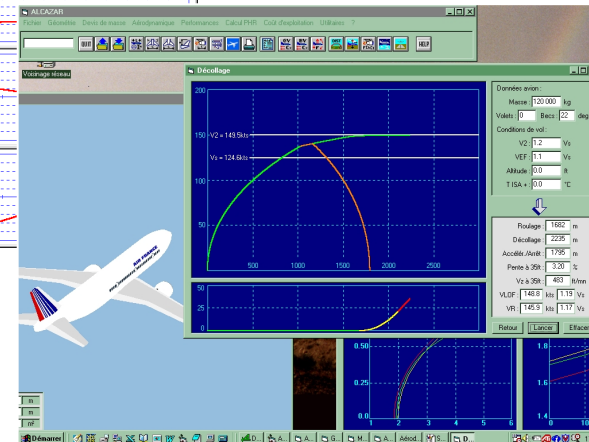
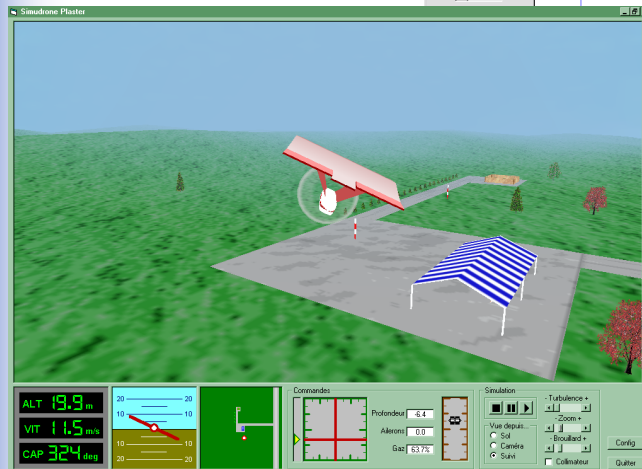
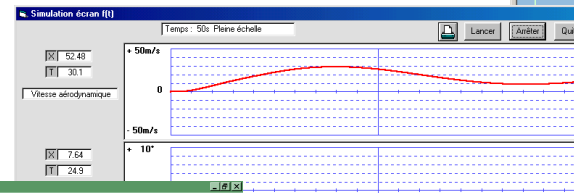
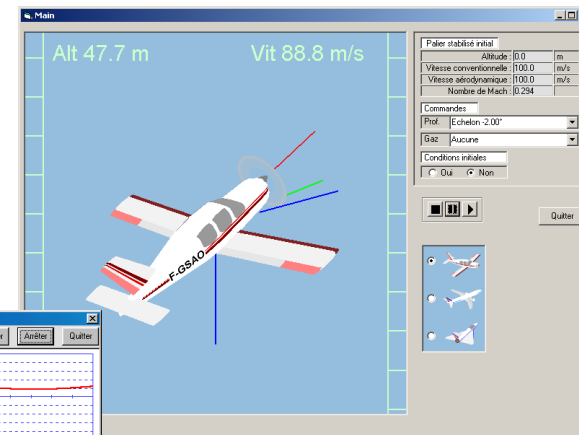
\* Centre Aéronautique et Spatial Plate-forme d'Enseignement et de Recherche

# Airplane design and flight dynamics



*(Software development)*

- Airplane design (ALCAZAR)
- Simulation (LONGISIM, TRANSSIM)
- UAV Simulation (SIMUDRONE)



## *In flight activity*



- Means ...
  - 6 light airplanes
  - 1 teaching aircraft
  - A maintenance unit
  - A team ...



- Used for ...
  - In-flight teaching
  - Optional activities
    - Aircraft flight (20/24 pilot's licences/year)
    - Gliding, parachuting, aerobatics, etc...





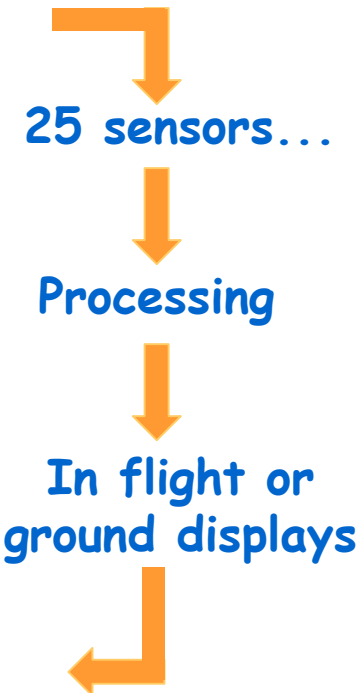
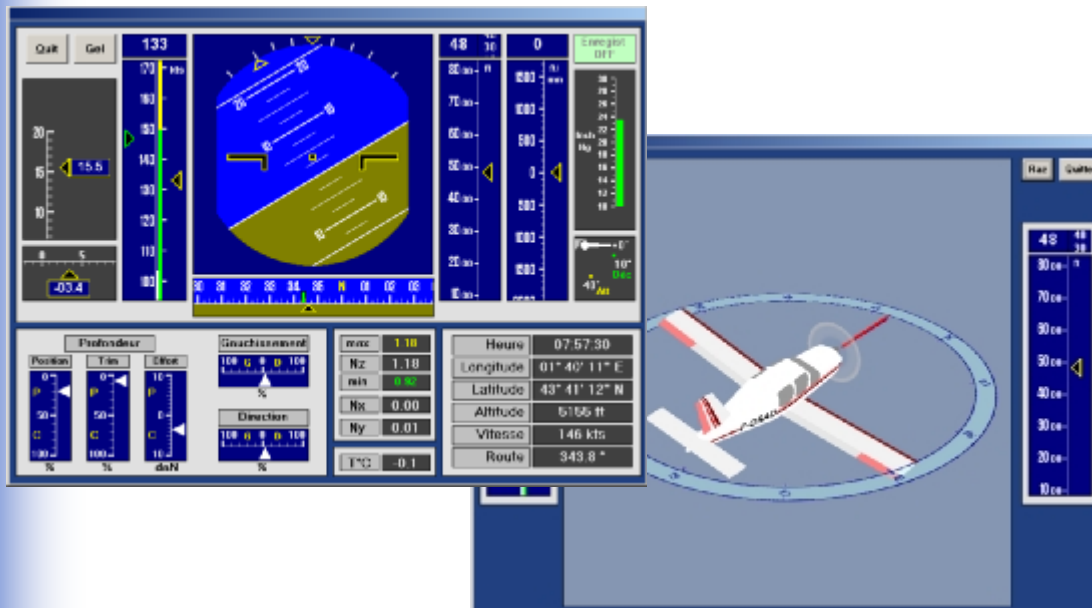
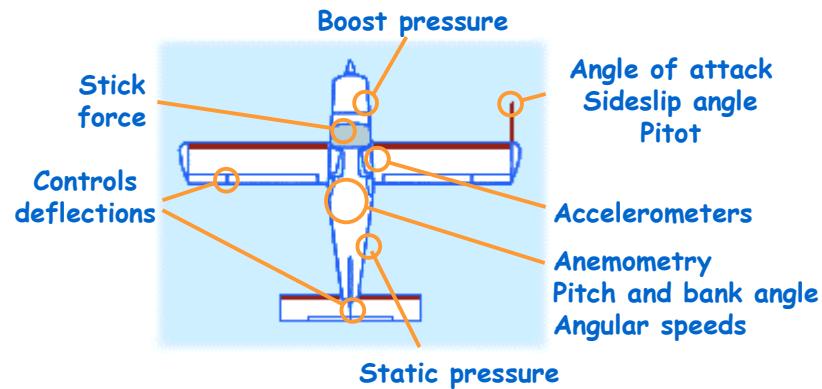
## ***The "TB20 system"***

### ***An airplane for in-flight teaching***

- An airplane
- Air and ground measurement means
- Analysis and displaying means
- A team ...



# TB20 global layout





## *The users ...*

- SUPAERO
  - Flight dynamics practical works
  - Experimental tests
  - Individual projects
- ENSICA
- Training courses for outside auditors
  - Introduction to flight dynamics
  - Flight testing
  - Navigation systems
- Training for Airbus flight tests engineers

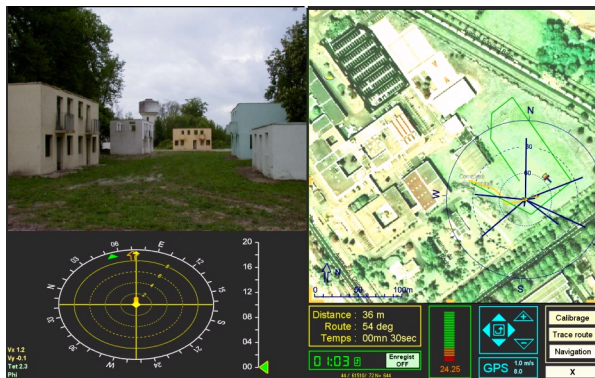


# UAV design



## → UAV design (SATOORN)

- Observation mission
- Stationnary flight
- 4 contra-rotating rotors
- OBC, GPS, Inertial unit
- Camera, WIFI RF link
- High level control laws



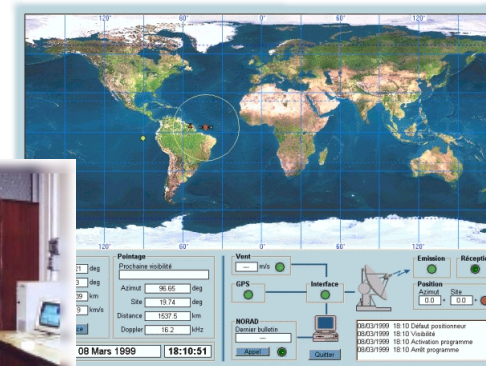
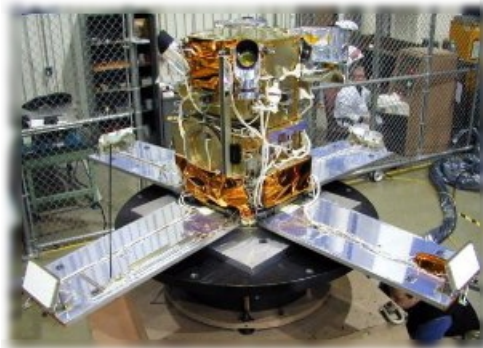


***... and Space***



## Ground stations

- 1993 Arsène
- 1996 HETE
- 2000 HETE 2
- Radio amateur satellites

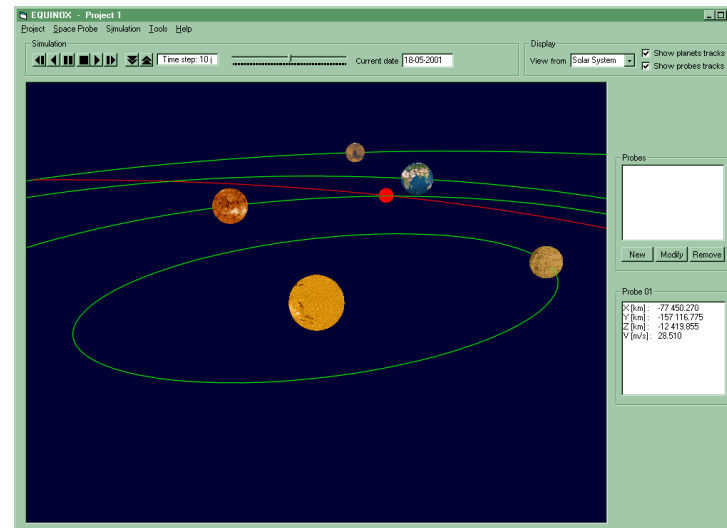
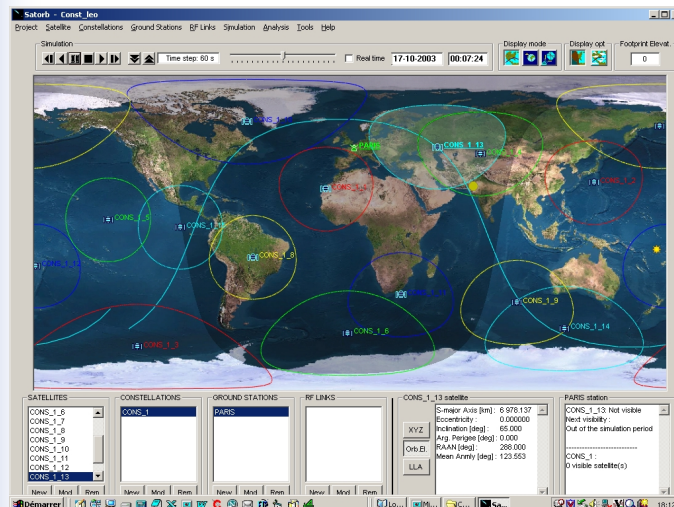
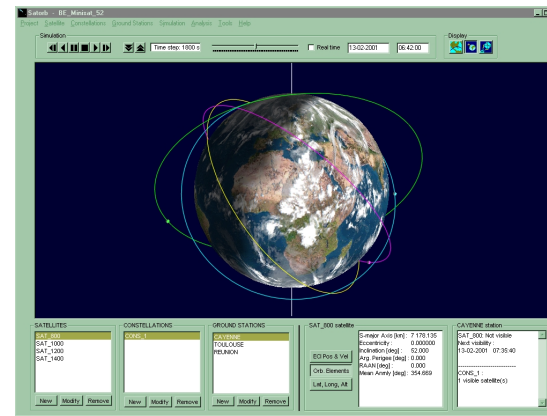




# Space systems design

(Software development)

- Orbitography, mission analysis (SATORB)
- Interplanetary Missions (COLUMBUS)
- Earth-moon missions

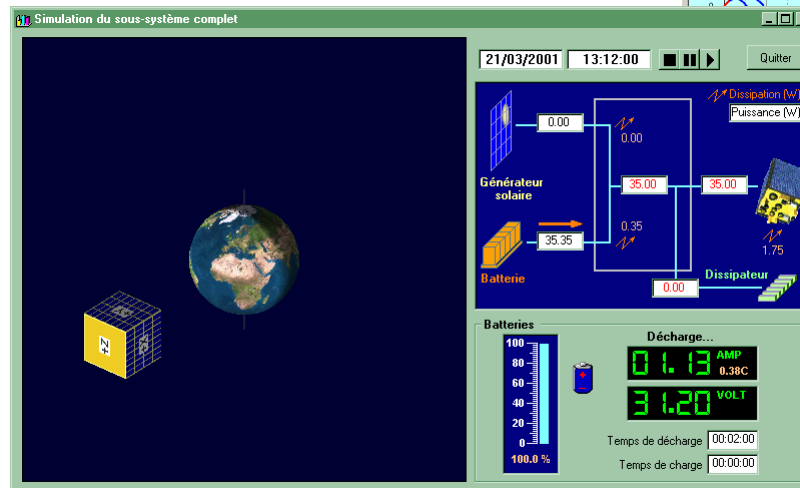
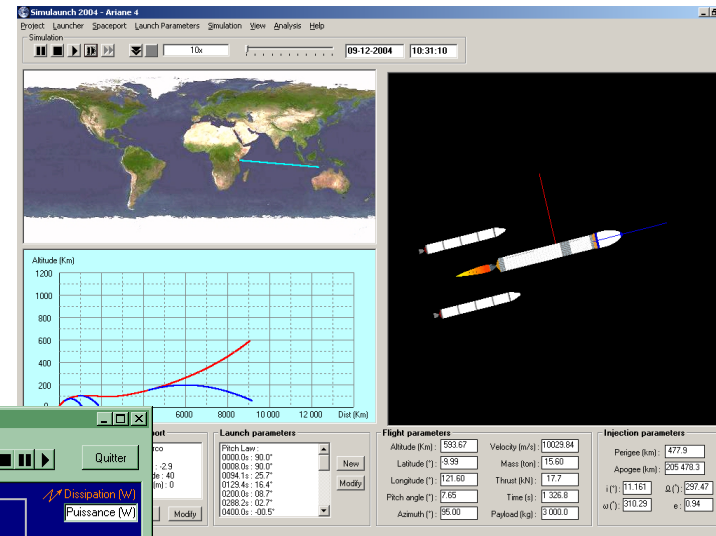




# Space systems design

(Software development)

- Satellite simulation (SIMUSAT)
- Launchers simulation (SIMULAUNCH)



# Satellite workshop



## → Energy system

- Semi-regulated 28v, 40w
- 4 solar panels silicium
- Li-ion battery 11Ah
- Solar simulator 100000lux 20kW

## → Attitude control system

- Inertial wheels
- Magneto torquers
- Cold gaz nozzles
- Sphere on air cushion

