



July 2007

**UANL-FIME** 

# **European Postgraduate Master in Aeronautical Engineering (EPMA)** at Bordeaux 1 University





### Who I am

- Franck Cazaurang
  - Associate professor at University Bordeaux I
- 2 Mains activities:
  - Researcher on Automatic Control at IMS Lab./UBx1
    - Robust Nonlinear Automatic control Applied to aerospace systems
      - Currently Co-Supervisor of 2 PhD students
  - □ Teacher on Avionics and system at IMA/UBx1
    - Co-Director of the IMA center
    - Manager of the Master GSAT option IMA (140 students in M1/M2)
    - Local advisor for EPMA project

# r,e

# standard topics to be Aircraft Engineer

#### Aeronautics & Technology

1	Aircraft Str. Design	Aircraft design	Avionics Guidance Navigatio	Engines on	FAA/JAA rules	Aeronautic Business
	Landing gear Str. Repair Manua	Performance analysis	& control  ARINC	Jet Propelled	Syt. Reliability	Project management
	Catia V5	Wing & Prop. profiles	429/ 685 AFBX	Sub and hyp. Sonic jet	Aircraft Safety	Maintenance Management
	Pastran/Nastran	Aerodyn. models	Electrical Power	Perf. analysis	analysis	Domains
	Structural design & analysis	Num	Test & Measureme Network	nt Therm. Engines	laws	Marketing
	Finite El. Model. Materials &	Atmospheric Models	Electronics & El. Power Sys.	Fluid mechanics	Human Factor	Human Power
	Composite	Fluid mechanics	Auto. Cont. & Signal Proc.	Thermodynamic	s Stats.	Cost Analysis
		lechanics Of Flight	Electrical Engineering		ules & Safety	Economy Management

#### Science



#### The new cluster PRES Université de Bordeaux

- 58.000 students et 3.426 teachers and researchers
  - ☐ 4 Universities
    - Université Bordeaux 1 -Sciences and Technologies
    - Université Bordeaux 2 Victor Ségalen Health and Medecine
    - Université Bordeaux 3 Michel de Montaigne -Litterature, Human Sciences
    - Université Bordeaux 4 Montesquieu
      - □ (Law, Policy and Social Sciences, Science in Economy and Management)

☐ 4 "Grandes Ecoles" Graduate Engineering School

students take their Baccalauréat (corresponding to A level in UK) at the age of 18 and after two years of higher education in special classes of Advanced Maths and Physics, take the selective entrance examination.

- ENSEIRB (Electronics, Computer Science, Telecom and Network)
- ENSCPB (Chimical Engineeering, Physics, Material sciences)
- ENITA (Techniques Agricultural Science and Engineering)
- Institut d'Etudes Politiques (Institutes of Political Studies)



## Bordeaux 1 University member of PRES cluster

- Fall 2006 :Some statistics
  - □ 922 Professors, associate professors, lecturers and researchers
  - □ 572 Engineers, Administrators, Technicians and Service Staff
  - □ 10 461 students et 5 316 graduates per year
  - □ 46 laboratories with 30 Mixed Research Unit UMR CNRS/INRA/INSERM
  - □ 4 doctorates schools
  - □ Budget of 60 M€ in 2006
  - □ 235 600 m<sup>2</sup> of building
  - □ 8 geographical area in 3 Aquitain's province
  - ☐ Teaching and Research Unit (UFR):
  - Physic, Chimistry, Math/computer Science, Biology Sciences, Earth and sea Sciences, IUTA
  - ☐ Internal Graduate Engineering School: MATMECA, ISTAB



# Industrial and institutional partnerships

#### Job evolutions :

☐ Half members of the improvement council of the Master in charge of the evaluation and modification of the syllabus come from the Aeronautical sector.

### Partnerships:

- 40 speakers issue from Sogerma, Airbus, EADS, Thalès, Dassault, Air France Industrie, Turbomeca, Snecma, Safran, Eurocopter, Liebherr Aerospace, Socotec, CNES, ONERA, AIA, DGAC ...
- ☐ This lecture represents 30% of the syllabus

# IMA building in Merignac Airport Area









#### INSTITUT DE MAINTENANCE AERONAUTIQUE

# Center dedicated to Aeronautical Maintenance Engineering

260 students

40 lecturer from Bordeaux I University

40 Industrial speakers

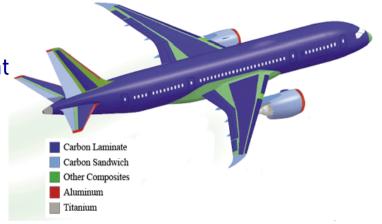
www.maintenance-aeronautique.com





# Aeronautical Maintenance in the Future Knowledge Sharing: Past, Present and Future

- Cycle of life for a Aircraft is about 40 years
- Needs:
  - Integrated all technology gaps between an aircraft developed in 70' and an other one builds in 07.
  - □ To be up-to-date with the JAA/FAA Airworthiness Directives
- Current technology's tendency:
  - □ Integrated Modular Avionics
    - Use Commercial Off The Shelf Equipment
    - Shared Time Multitask Architecture
  - Composites and Lightness structures
    - 50% of the future Aircraft weight





## Aeronautics and Advanced Technologies platform

A new tool for training and technology transfer



- Control, Repair and retrofit for Composite structures.
  - Autoclave,Drill Robot,Non Destructive Testing equipments.





- Test and Reliability of Avionics Equipments
  - Vibrations test chamber with temperature and climate control
  - National Instrument devices and Labview software environment for Automated test







■ Amount of 1,5 M€ funding from Regional Council of Aquitaine



# Curiculum development EPMA Project

- European Post Graduate Master of Aeronautic
  - □ Hamburg University :HAW
  - □ Ostende University: KHBO
  - Bordeaux 1 University : BXI
- Part time study programme
- Joint European master programme
- Awards joint/double master degree
- Funded by European Commission



- Level Bac+5 = Last year of the Master's degree
  - □ 60 credits ECTS
    - 10 modules for 4 ECTS each
    - 1 introduction module of KHBO HAW -IMA
    - 2 mandatory modules for each area
      - □ Avionic Systems and Air transport Economics KHBO
      - ☐ Aircraft Design and Design of lightweight structure HAW
      - ☐ Aircraft Maintenance Management and composites IMA
    - 3 optional modules (one in each partner University)
    - 1 module = 30 H Class, 20 H Homework, Project 50 H
    - 1 module Project/Period of training for 20 ECTS

all partners	Introduction to Aeronautical Engineering (with Aerodynamics)
BE-Flanders	
KHBO, Oostend	Avionic Systems Engineering and Flight Control
KHBO, Oostend	Air Transport Economics
KHBO, Oostend	Spacionic Systems Design
KULeuven	Noise and Vibration Engineering
KHBO, Oostend	Unmanned Aeronautical Systems
FR-Bordeaux	
IMA, Bordeaux	Aircraft Maintenance Management
IMA, Bordeaux	Composite Materials and Maintenance
IMA, Bordeaux	Aircraft Propulsion and Maintenance
IMA, Bordeaux	Reliability and Integrated Logistic Support
IMA, Bordeaux	Finite Element Dimensioning for Composite Materials
DE-Hamburg	
HAW, Hamburg	Aircraft Design
HAW, Hamburg	Design of Lightweight Aircraft Structures / Composite Technology in Aerospace Engineering

High Performance Fibre Reinforced Composite Materials

**UK-Hertfordshire** 

TUHH, Hamburg TUHH, Hamburg

TUHH, Hamburg

**Introductory Module** 

CFD for Aircraft Aerodynamics UH, Hatfield

in <u>red</u>

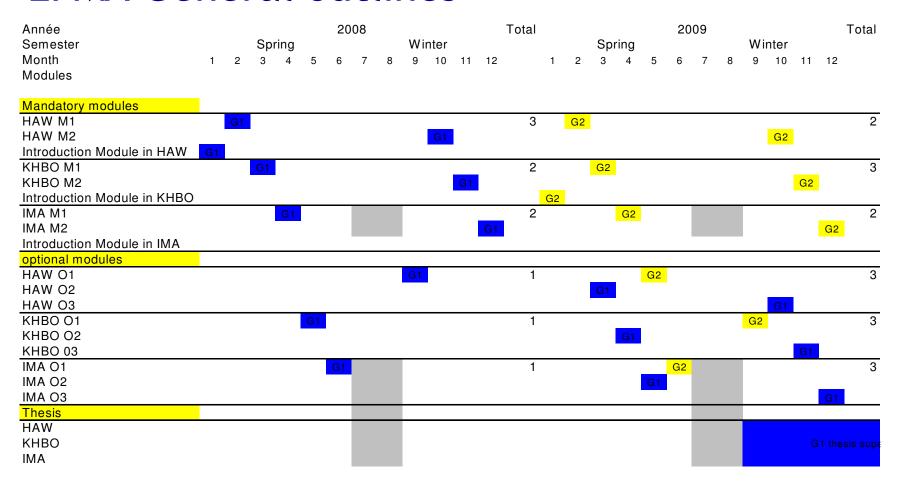
key input to EPMA of the region

Aircraft Systems Technology

Aircraft Systems Integration



- Who is concerned?
  - □ Two audiences are affected
  - □ Part time study (01-2008) distribute on 30 months
    - Industrial from the aeronautical industry level bac+4
    - Module by module or totality
  - □ Initial education (01-2009) distribute on 18 months
    - Students Bac +4 wishing an European degree





- Thank you for yours attention
- Some questions?