



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

standard topics to be Aircraft Engineer

Aeronautics & Technology

| | | | | | | |
|---|---|----------------------------------|--|--------------------------------|---------------------------------|-------------------------------|
| | Aircraft Str. Design | Aircraft design | Avionics | Engines | FAA/JAA rules | Aeronautic Business |
| ↑ | Landing gear Str. Repair Manual | Performance analysis | Guidance Navigation & control | Jet Propelled | Syt. Reliability | Project management |
| | Catia V5 | Wing & Prop. profiles | ARINC 429/ 685 AFBX | Sub and hyp. Sonic jet | Aircraft Safety analysis | Maintenance Management |
| | Pastran/Nastran | Aerodyn. models | Electrical Power | Perf. analysis | | Domains |
| → | | | | | | |
| | Structural design & analysis | Num. Model | Test & Measurement | | laws | Marketing |
| | Finite El. Model. | Atmospheric Models | Network | Therm. Engines | Human Factor | Human Power |
| | Materials & Composite | Fluid mechanics | Electronics & El. Power Sys. | Fluid mechanics | Stats. | Cost Analysis |
| | | | Auto. Cont. & Signal Proc. | Thermodynamics | | |
| | Mechanical Engineering | Mechanics Of Flight | Electrical Engineering | Engine & Propulsion | Rules & 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 Medicine
 - 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 Engineering, 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 m² 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

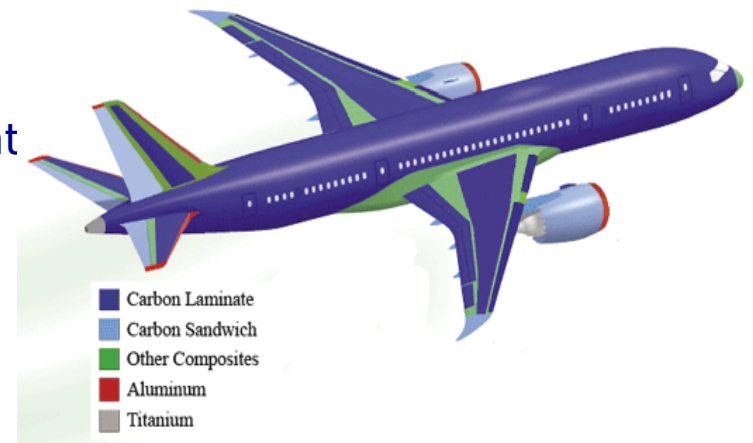
www.maintenance-aeronautique.com



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

NATIONAL INSTRUMENTS



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



Curriculum 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



EPMA General outlines

- 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



EPMA General outlines

Introductory Module

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
TUHH, Hamburg High Performance Fibre Reinforced Composite Materials
TUHH, Hamburg [Aircraft Systems](#) Technology
TUHH, Hamburg Aircraft Systems Integration

UK-Hertfordshire

UH, Hatfield CFD for Aircraft Aerodynamics

in [red](#) key input to EPMA of the region



EPMA General outlines

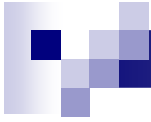
- Who is concerned ?
 - Two audiences are affected

 - 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

EPMA General outlines

| Année | 2008 | | | | | | | | | | | | Total | 2009 | | | | | | | | | | | | Total |
|-----------------------------|--------|---|----|----|----|---|--------|---|----|----|----|----|-------|--------|----|----|----|---|---|--------|----|----|----|----|--|-------|
| | Spring | | | | | | Winter | | | | | | | Spring | | | | | | Winter | | | | | | |
| Semester | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| Modules | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mandatory modules | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HAW M1 | | | G1 | | | | | | | | | | 3 | | G2 | | | | | | | | | 2 | | |
| HAW M2 | | | | | | | | | G1 | | | | | | | | | | | | G2 | | | | | |
| Introduction Module in HAW | G1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| KHBO M1 | | | G1 | | | | | | | | | | 2 | | G2 | | | | | | | | | 3 | | |
| KHBO M2 | | | | | | | | | | G1 | | | | | | | | | | | | G2 | | | | |
| Introduction Module in KHBO | | | | | | | | | | | | | | | G2 | | | | | | | | | | | |
| IMA M1 | | | G1 | | | | | | | | | | 2 | | | G2 | | | | | | | | 2 | | |
| IMA M2 | | | | | | | | | | | G1 | | | | | | | | | | | | G2 | | | |
| Introduction Module in IMA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| optional modules | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HAW O1 | | | | | | | | | G1 | | | | 1 | | | | G2 | | | | | | | 3 | | |
| HAW O2 | | | | | | | | | | | | | | | G1 | | | | | | | | | | | |
| HAW O3 | | | | | | | | | | | | | | | | | | | | | | G1 | | | | |
| KHBO O1 | | | | G1 | | | | | | | | | 1 | | | | | | | | G2 | | | 3 | | |
| KHBO O2 | | | | | | | | | | | | | | | G1 | | | | | | | | | | | |
| KHBO O3 | | | | | | | | | | | | | | | | | | | | | | | G1 | | | |
| IMA O1 | | | | | G1 | | | | | | | | 1 | | | | G2 | | | | | | | 3 | | |
| IMA O2 | | | | | | | | | | | | | | | G1 | | | | | | | | | | | |
| IMA O3 | | | | | | | | | | | | | | | | | | | | | | | G1 | | | |
| Thesis | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HAW | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KHBO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IMA | | | | | | | | | | | | | | | | | | | | | | | | | | |



- Thank you for yours attention
- Some questions ?