EWADE & READ 2018
EWADE 2018 - 14th European Workshop on Aircraft Design Education
Brno University of Technology, Czech Republic
7th to 9th November 2018

EWADE Session
08.11.2018, 14:10 to 15:50
http://Presentations2018.AircraftDesign.org

EPF
GRADUATE SCHOOL
OF ENGINEERING

Project-oriented education :

from engineering school to engineering jobs

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EPF Presentation

Create the Change, Design the Future

A UNIQUE HISTORY

- Founded in 1925 by Marie-Louise Paris, as Ecole Polytechnique Féminine,
- EPF was one of the first engineering schools in France to train women.
- It has been co-educational since 1994,

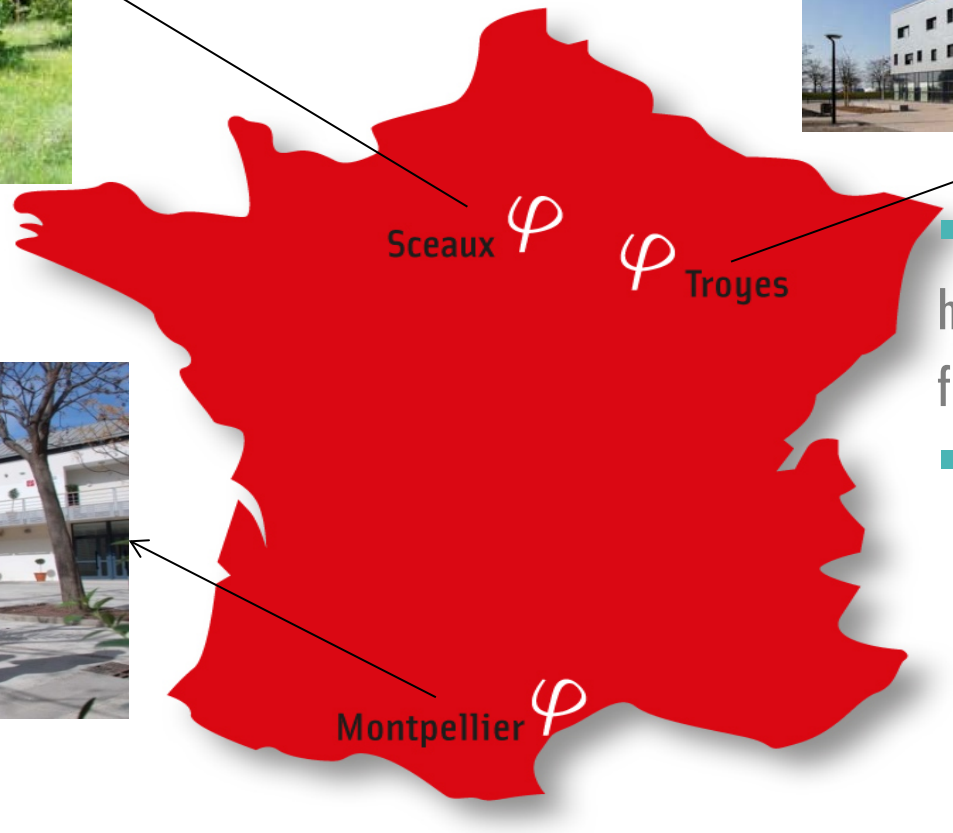
  ➔ EPF is still an active advocate for gender equality policies and remains one of the schools with the highest rate of female students (35% against 25% on average in other French engineering schools).

Focused on academic excellence, professional training and innovative teaching methods, EPF also plays a pioneering role in the promotion of diversity and equal opportunity in higher education

A L'INSTITUT ÉLECTRO-MÉCANIQUE FÉMININ (CONSERVATOIRE DES ARTS ET MÉTIERS). ÉCOLE DE FEMMES INGÉNIEURS, DIRIGÉE PAR Mlle MARIE-LOUISE PARIS. (PHOTO MEURISSE.)

Three dynamic & innovative campuses, one unique school

- 20 minutes away from Paris City centre
- 1200 students



- In Champagne, beautiful historical region (1h30 from Paris
- 300 students

- In the city centre
- 500 students

- Tech Lab on each campus

DIPLOMAS & PROGRAMMES

EPF delivers 4 diplomas :

- **Polytechnic generalist engineer diploma**
- Digital & industrial systems engineer diploma (Apprenticeship training in Sceaux)
- Digital & industrial systems engineer diploma (Apprenticeship training in Montpellier)
- Franco-German production & automatisation engineer diploma (Joint programme with Munich Hochschule)

All programmes lead to a 5-year degree (Master's Degree)

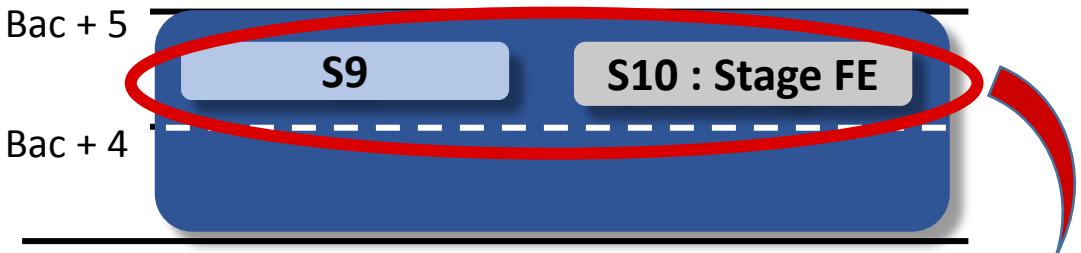
All diplomas are accredited by the CTI (French Commission for engineering qualifications)

Cti
Commission
des titres d'ingénieur

GRADUATE STUDIES

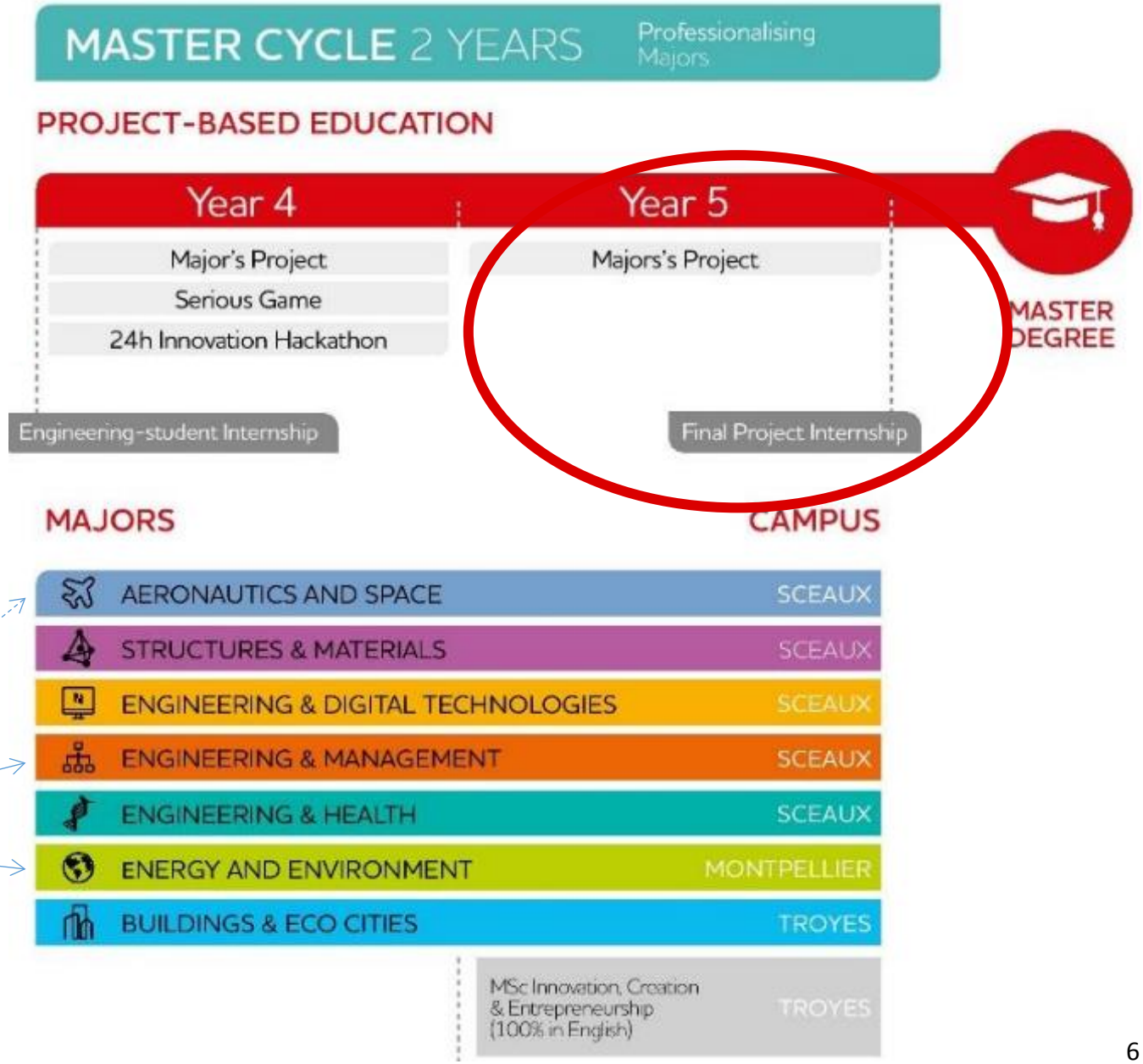
- Polytechnic generalist engineer diploma

Substitution of the 5th Year



Master 2nd year (partner university)

English Tracks



INNOVATIVE TEACHING METHODS

EPF has recently created a working group on 'Digital & Teaching Methods Innovations'

Our students are actors of their own education through :

- Serious game
- Inverted classes
- Blended learning
- Self-teaching on collaborative platforms
- Project-based education

The goal is to train responsible, adaptable and multi-skilled engineers

✓ Relational capacity and collaborative skills

✓ Ability to 'learn how to learn' throughout their whole career

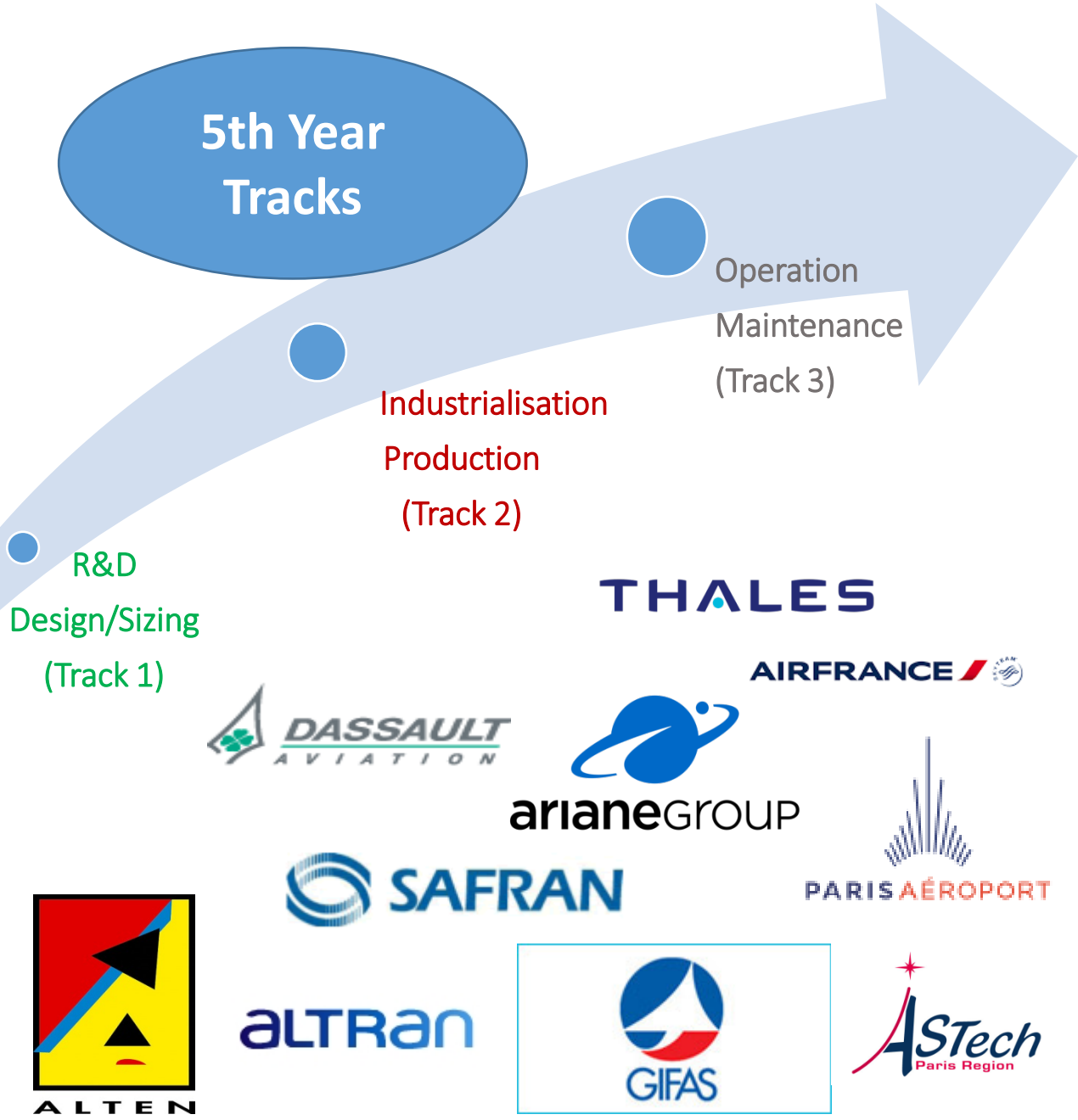
Aeronautics & Space Major

Create the Change, Design the Future

Target Jobs

Jobs

- Business Engineer
- System Engineer / System Architect
- Design Engineer (Structure, Electrical System, Control)
- R&D Engineer (…., Aerodynamics, ….)
- Integration / Test Engineer
- Industrialisation Engineer
- Production Engineer
- Operations Engineer (Space)
- Exploitation Engineer (Aeronautics)
- Exploitation Engineer (Space)
- Maintenance Engineer
- Quality Engineer



Project Presentation

Create the Change, Design the Future

Aims and stakes of the project

- Aims :
  - Design of a drone in response to a preliminary statement of needs*
  - Realization of a demonstrator of it
- Stakes :
  - Cost price ➔ increase of the distributor profitability
  - Ease of use ➔ attract customer
  - Respect of the safety and regulatory aspects ➔ compulsory

*handling in hostile environment

*zone observation with a large autonomy

*gutters surveillance

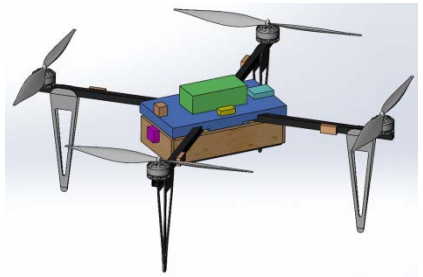
*detection of crack and quality issues in manufacturing & maintenance

*manutention in a warehouse

*drop of lifebuoys at sea to assist cost lifeguards

Project deliverables

- At the end of 1st semester (February ➔ June):



  - A design dossier

    Elements of technical definition
    - Geometry
    - Materials
    - Method of production or suppliers

  - A design justification dossier

    ➔ Every choice should be justified

  - An economic dossier
    - Cost price breakdown

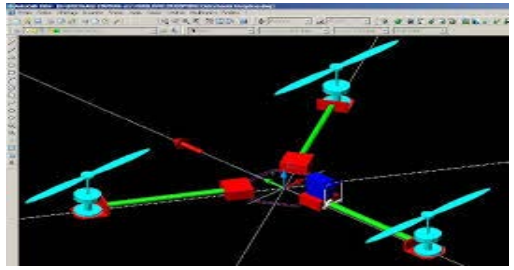
ALM

Respect of the given budget

- At the end of 2nd semester (September ➔ January) :
  - A « demonstrator » that should demonstrate the drone abilities to achieve the mission

SYSTEMS ENGINEERING

In real-life situation



- MATLAB/SIMULINK
- AMESIM
- CATIA
- ABAQUS

Application of company rules

- Same level of requirements (work and behaviour)
  - Deliverables
  - Reviews
  - Engagement

- As well as in a company, a member may be excluded from the project team by a company manager (Programme Director or Technical Director)

In a professional situation

Project Owner

Call for tenders

Response to a call for tenders

Main contractor

Engineering consultants

Programme Director

- Progress of the project
- Holding of the internal objectives

Technical Director

- Respect of technological rules
- Pertinence of arbitrations
- Relevance of the technological solutions

Customer

- Contract of Objectives
- Final deliverables

Role playing

Customer representatives :
Internal professors acting as / Forward real companies

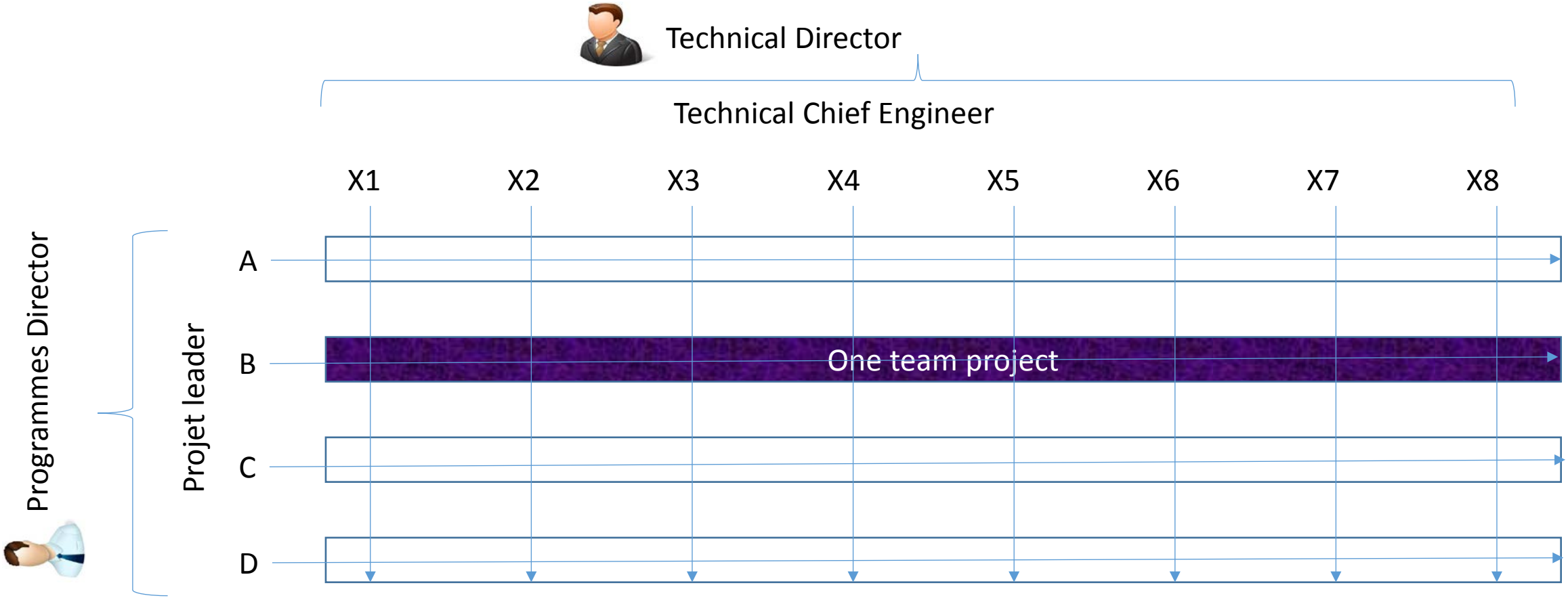
Call for tenders :
the design of a drone with preliminary statement of needs

Programme Director
Internal Professor with a Professional expertise as Design Engineer ,
and as Systems Engineering Consultant

Technical Director
External Professor with a Professional expertise in Aeronautic industry as Test Means Engineer

Engineering consultants (Flying vehicles)
- *5 Students teams / call for tenders*
- *Teams in competition*

Teams organisation



In-flight tests / Customer tests

Given to students :

- Test scenarii
- For each scenario :
  - Acceptance criteria
  - Performance criteria

’’multi-copters’’
In a gymnasium

’’flying wing’’
In an open area : a civil drone cluster
(former military air base)

Acceptance and Performances criteria

- Acceptance
  - Compliance to the current legislation
  - Respect of size
  - Respect of scenario
  - No « eliminatory » incident
    - Contact with one environmental element (in particular the ground)
    - Lost of flight control
    - Disability to stay in a flight corridor
- Performances
  - Time needed from A→B
  - Time needed from B→A
  - Energy consumption

Teaching Methods

Students → *Professionals*

- Courses :
  - Project Management
  - Systems Engineering
- Tutoring :
  - Project Management
  - Systems Engineering
  - Technical
- Videos :
  - Review preparation

- Project Reviews

- Contract documents

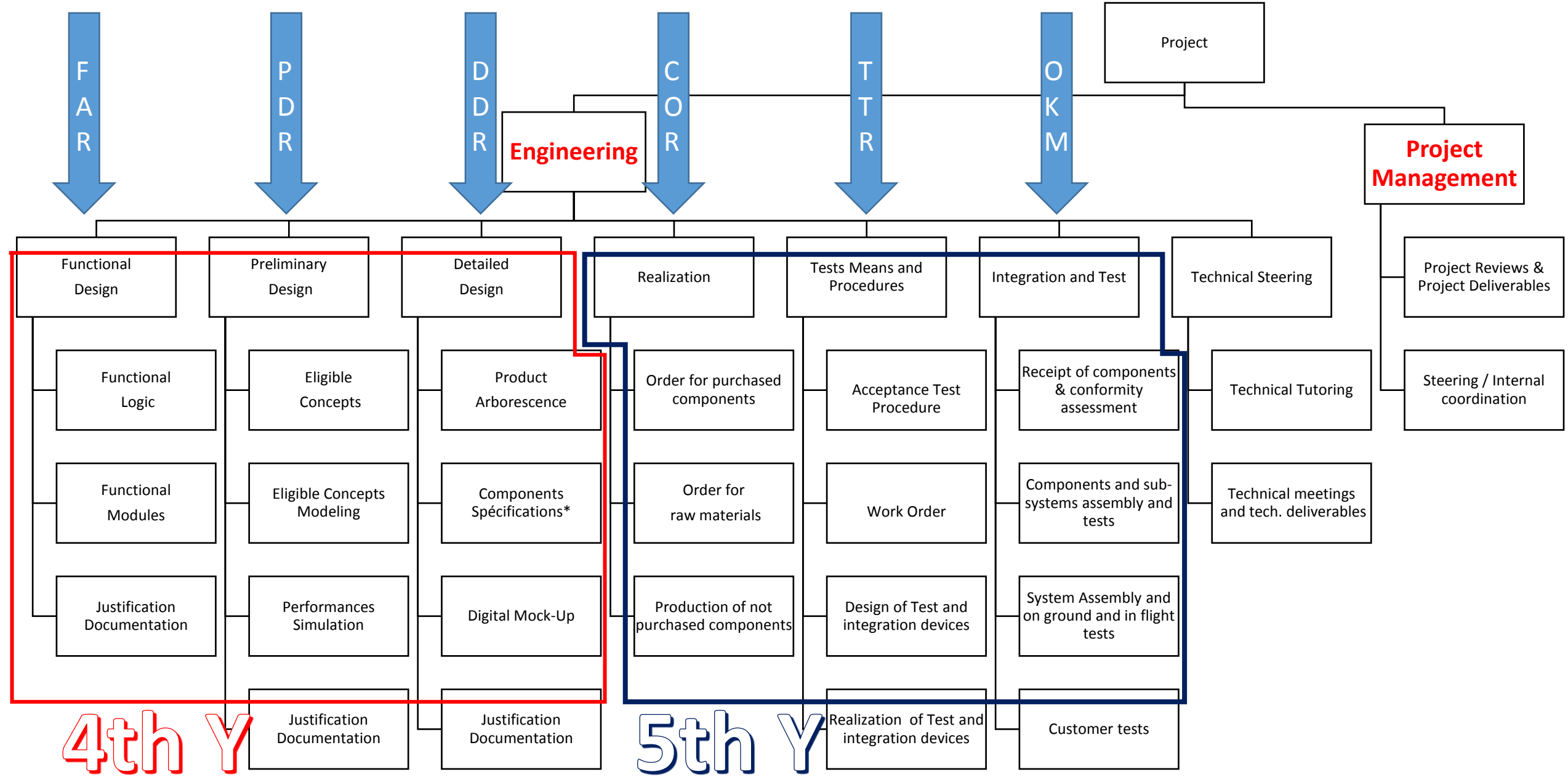
Project Reviews

- ~~Kick-Off Meeting [KOM]~~
- Functional Architecture Review [FAR]
- Preliminary Design Review [PDR]
- Detailed Design Review [DDR]
- Critical Design Review [CDR]
- Critical Orders Review [COR]
- Test Readiness Review [TRR]
- ~~Final Acceptance Review [OKM]~~

4 A

5 A

Same teams thoughout the project (4A and 5A)



* or suppliers references for ordered components

Conclusion

- Systems Engineering
- Multi-disciplinarity
- Innovation
- Professional (contract, deadlines, deliverables, budget, competitors, ...)
- A large resonance with Studies Final Internship offers

http://www.epf.fr/en/studies/majors/aeronautics-space archived as http://archive.is/IzcGO

Thank you for your attention