



## PROPULSEURS AÉRONAUTIQUES

### AIRCRAFT TURBOJETS

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| Lecturers : 10.0 | TC : 4.0 | PW : 4.0 | Autonomy : 10.0 | Study : 4.0 | Project : 0.0 | Language : AN

#### Objectives

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This lecture has several objectives:

- to get deeper into the details concerning the notions of aero-energetics in the frame of open systems with compressible flows, which are essential for the understanding and the study of the performance of turbojet engines.
- to list and sort the different propulsion systems for aeronautics (turbojet, turbofan, turboprop...) with the associated aircraft.

**Keywords :** aéroénergétique, écoulements compressibles, turboréacteur, turbofan, turbopropulseur, poussée, performances

#### Programme

- Aero-thermodynamics of the steady quasi-monodimensional flows (quantification and effects of the exchanges of work, heat and viscous shear layers)
- Complements of aero-thermodynamics for open systems with compressible flows
- Characterisation of compressors and turbines (exchanged energy, efficiency, performance map, mechanical behaviour, vibrations and material)
- Aero-mechanical characterisation of the other components (combustor, nozzle, ...)
- Performance analysis of the turbojet engines

#### Learning outcomes

- To understand the operating of the parts of turbojet engines (fan, compressor, combustor, turbine, nozzle,...)
- To understand and analyse the thermodynamic cycle of turbojet engines
- To be able to calculate the performance of turbojet engines (thrust, efficiency, consumption, ...)
- To be aware of the new concepts that will drive the design of the new turbojet engines.

#### Independent study

**Objectifs :** Calculation of the performance of a turbofan engine for 2 operating points (take off and cruise).

**Méthodes :** Calculation of the performance of a turbofan engine and practical works with a mini turbojet engines.

#### Core texts

#### Assessment