

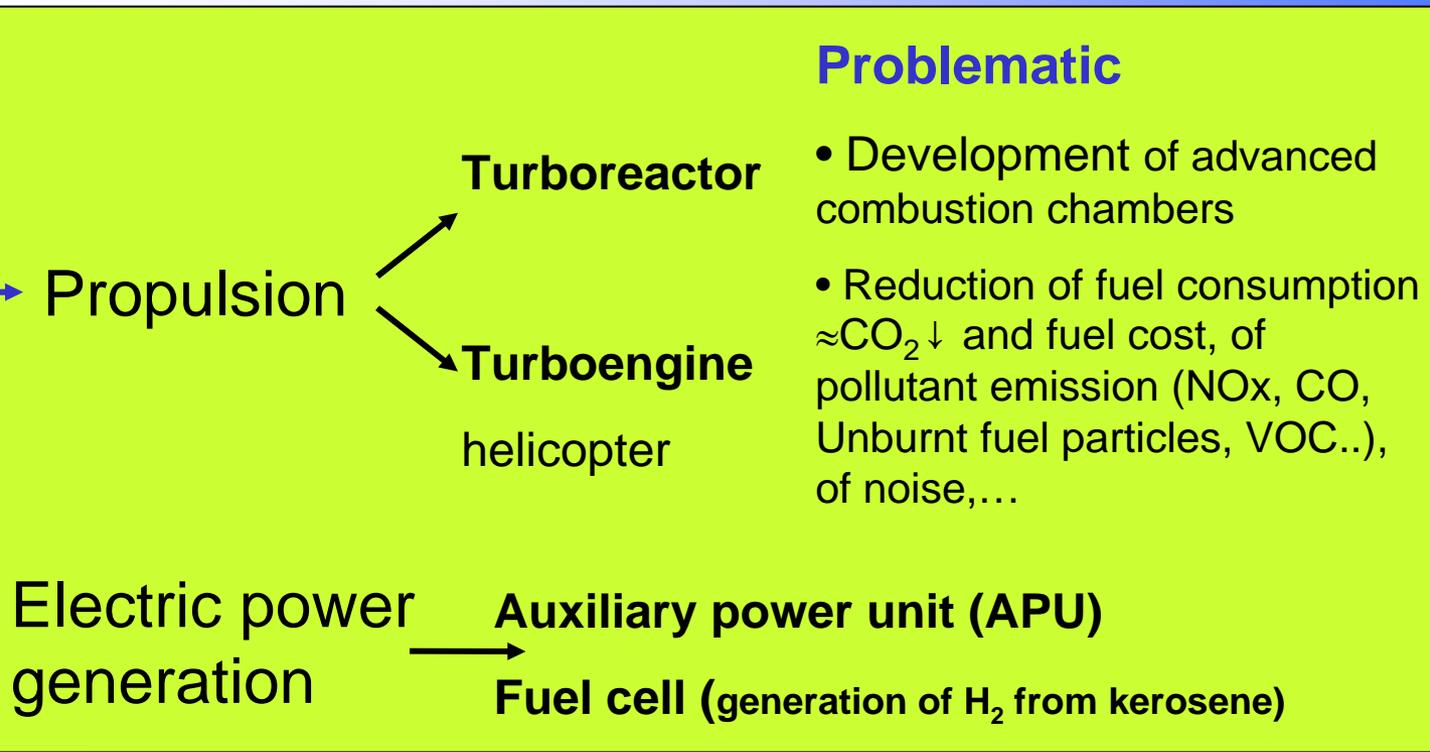
## Aircraft Fire

## Fire Safety

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## New combustion modes in aeronautical turbines

**Combustion**



### Problematic

- Development of advanced combustion chambers
- Reduction of fuel consumption  $\approx \text{CO}_2 \downarrow$  and fuel cost, of pollutant emission (NO<sub>x</sub>, CO, Unburnt fuel particles, VOC..), of noise,...

**FIRE PROTECTION**

## Fire safety researches in aeronautics

- Great differences in comparison with **building fires**  
scenarios of fire development, detection, *flashover*, *back draft*,  
materials, structure behaviour, ...
- Risk is weak  
but not acceptable { **Prevention**: avoid fire triggering  
**Protection**: to minimize fire consequences

## Why the fire risk is increasing?

- Full electrical plane (cable fires, ...)
- Increasing of electronic systems onboard (TV, electronic games, internet)
- The increase of composite materials and magnesium alloys
- The use of halon is soon forbidden (fire development in hidden zones)
- Post-crash fire

Evaporation and ignition

## Fire prevention

- **Passive**: Non flammable and **non toxic** cabin material, hot surface insulation, double skin for **drainage**
- **Active**: forced ventilation, hot air leak detection

Flame stabilization processes

⇒ Hazardous flammable fluid quantity

## Fire protection

- **Passive**: firewalls (composite?), cargo liners,...
- **Active**: Extinction systems (water mist, inerting systems), smoke detection and propagation

Detection / extinguishing / inerting systems in hidden areas

## Conclusion

**Aircraft fires are specific fires, where the risk is not acceptable**

**Main criteria:** to satisfy the regulations and to manage a problem

## Needs of

- **Experimental studies:** better understanding of tests results
- **Flow Modeling** (evaporation, ignition, flame stabilization, fire development, flame-material heat transfer)

**High scientist potential, research networks already exist in Europe**

**Adaptation of the knowledge to specific aeronautics problem**

**A project was proposed at the two first calls of  
FP7**