



## M1 combustion test benches

### Identification of the installation/facility :

Country: FRANCE  
City: Palaiseau  
Name of the facility: M1 test bench  
Date of construction or of acquisition or of main refurbishment: 1999  
Owner: Onéra  
Contact point: [Christian.Guin@onera.fr](mailto:Christian.Guin@onera.fr); + 33 1 80 38 60 73.  
Internet site: [www.onera.fr](http://www.onera.fr)

### Technical characteristics:

#### 1 - Type of infrastructure

Wind tunnel	<input type="checkbox"/>
Propulsion bench	<input checked="" type="checkbox"/>
Structures facility	<input type="checkbox"/>
Material facility	<input type="checkbox"/>
Simulator (ex. Flight simulator, tower, ...)	<input type="checkbox"/>
Flight test bed (aircraft, embedded facilities, ...)	<input type="checkbox"/>
Supercomputers	<input type="checkbox"/>
Other	<input type="checkbox"/>

#### 2 - Main technical characteristics

The M1 test bench is a part of ATD Laboratories (Aerothermodynamics Laboratories) located in Onera Palaiseau Center. It is used for applied research testing on combustors, combustor components, single sector and injection system performances on tubular combustor (ignition limits, stability limits, pollutant emission measurements, etc...)  
There are 3 flow lines available.

Maximum Air mass flow: 4 kg/s  
Maximum pressure: 3 Mpa  
Minimum pressure: 0.06 Mpa  
Maximum temperature : 870 K  
Type of fuel : Kerosen and biofuels (maximum pressure 8 MPa) , propane C<sub>3</sub>H<sub>8</sub> (maximum pressure 1.7 MPa)

3 - Research domains which can be addressed (refer to ACARE taxonomy <http://www.acare4europe.com/docs/ASD-Annex-final-211004-out-asd.pdf>)

#### Propulsion/ Combustion

- Combustor operability
- Combustion technologies for reducing emissions produce by conventional engines configurations
- Enhance mixing design /technologies for lean combustion
- Multi-point fuel injection

#### 4 - Main (or specific) associated measurement techniques

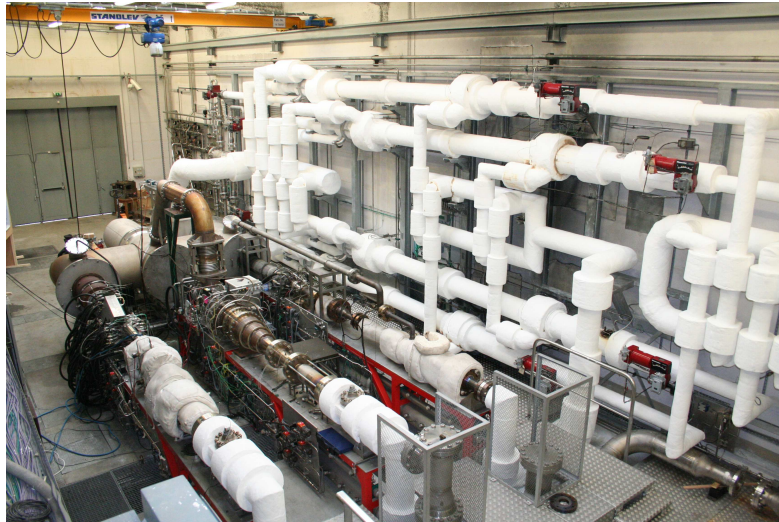


- Dedicated to the bench : pressure, temperature, mass flow rate, gas analysis
- Specific measurements : non intrusive optical measurement methods (LDV, PIV, PLIF, CARS,...)

5 - Operational status

- Fully operational (hours available in 2010): about 250h

6 - Picture



Financial elements:

Replacement cost (MEuros)

- |               |                                     |
|---------------|-------------------------------------|
| Less than 10  | <input type="checkbox"/>            |
| 10 to 30      | <input type="checkbox"/>            |
| 30 to 60      | <input checked="" type="checkbox"/> |
| 60 to 100     | <input type="checkbox"/>            |
| More than 100 | <input type="checkbox"/>            |

Practices concerning:

Access policy (contract, voucher, free access for research, etc...): Contract

Support (regional, national, European, private, ...) : regional, national, European, private (industries).

Origin of information ('signature'): author and date

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