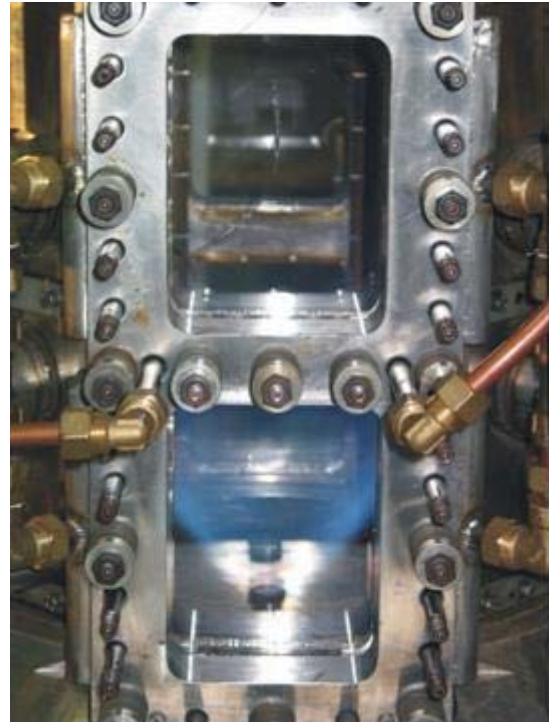
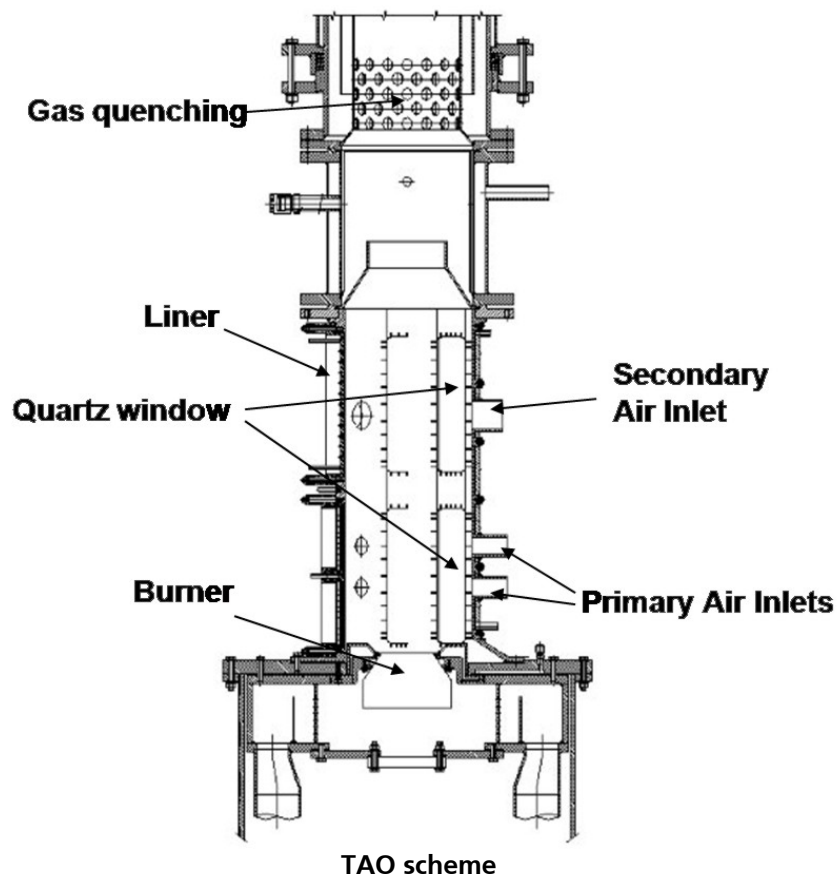


T.A.O. Test Rig

Brief description: TAO (Turbogas con Accessi Ottici - Turbogas with windows for optical analysis) is test rig for gas turbine development. This rig can be used to characterize and develop burner prototypes for gas turbines. In addition, the quartz windows and the optic instrumentation allow performing an advanced analysis of the flame radiation. TAO has been used to study combustion processes as premixing, catalytic combustion, active systems to dampen combustion oscillations in gas turbines, the development of non intrusive diagnostic instrumentation.



TAO rig



Characteristics:

- Max Power: 400 kW_{th}
- Internal diameter: 320 mm
- Length: 850 mm
- Max diameter of the burner prototypes: 120 mm
- Fuels: Natural Gas, H₂, (liquid fuels)
- Walls with optical access (quartz windows)
- Gas turbine Combustor: Scaled Fiat GT 50, Siemens V64.3A

Available measurements equipment:

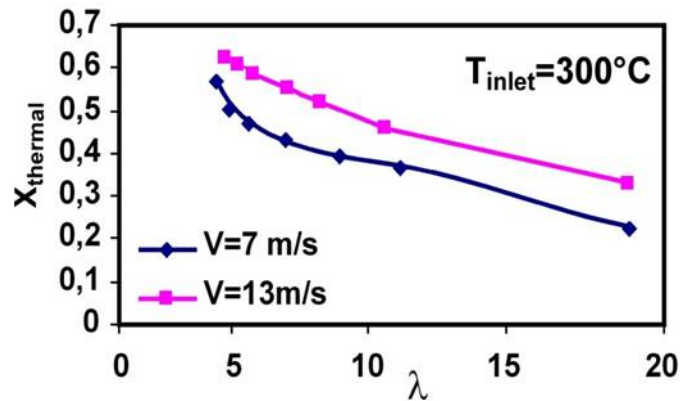
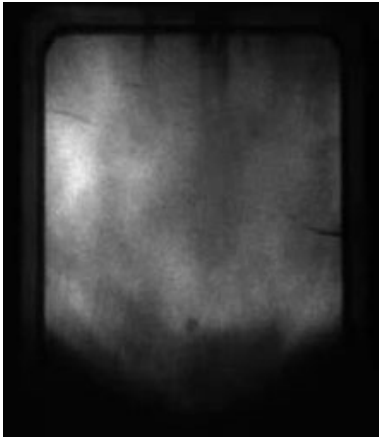
- LDV
- High speed camera
- UV photometer

Operative conditions:

- Comburent air
 - Max flowrate: 1500 kg/h
 - Max pressure: 0.5 bar
 - Max input temperature: 693K
- Gas fuel (natural gas)
 - Max total flowrate (3 lines): 100 kg/h
 - Max pressure at the burner entrance: 1.2 bar
- Dilution air for the exhaust gas:
 - Max flowrate: 4000 kg/h
 - Max pressure 0.6 bar

- Exhaust gas:
 - Max temperature at the exit of the burner: 1373K
 - Max temperature at the exit of the chimney: 743K
- Liquid fuel (gasoline)
 - Max flowrate: 150 kg/h
 - Max pressure at the burner entrance: 70 bar

Examples of typical results:



Images at 400 Hz of OH⁻ radical distribution taken using an intensified camera (left) and conversion degree as a function of air mass ratio at different mixture velocities (right)