

SUPERIORITY AT SEA

Marine heritage

Avio won the order for the 27 propulsion systems to power the European Multi-Mission Frigates (FREMM) for the French and Italian Navies.

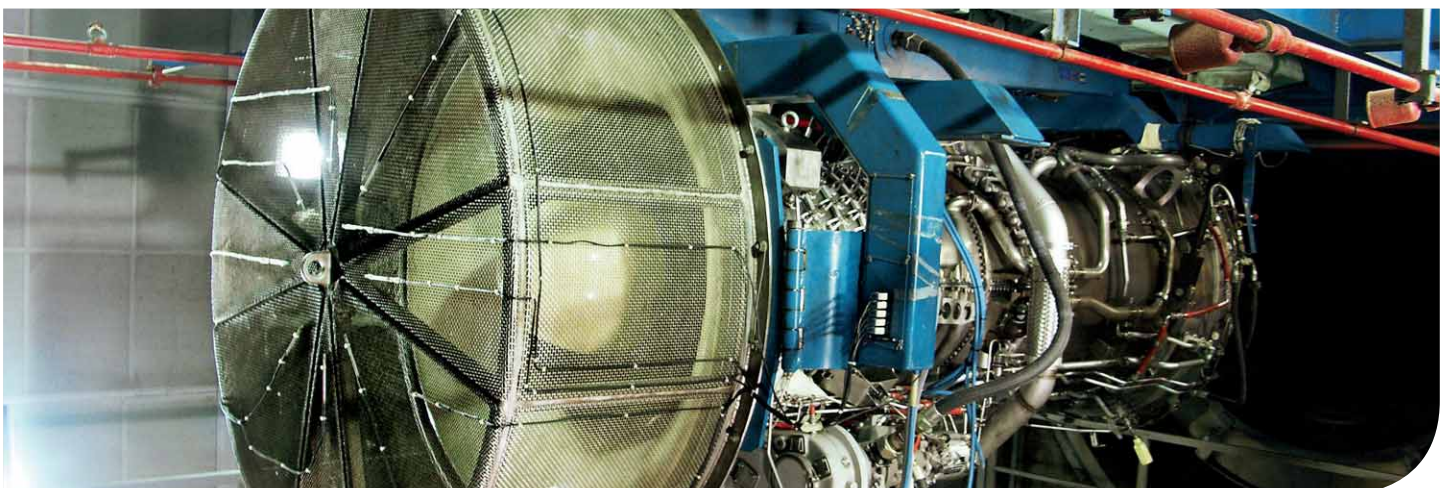
- Avio supplied 12 propulsion systems for the French-Italian Horizon class frigates and the Italian aircraft carrier, Cavour
- Avio delivered more than 100 propulsion packages: the second largest naval fleet in the world with gas turbine propulsion is powered by Avio LM2500 systems
- Avio has a record of 30 years proven experience in marine gas turbine systems
- Avio has been partner with General Electric on the LM2500 engine family since 1969 and is licensed Marine System Supplier
- Avio is global provider of integrated logistics support and maintenance for the LM2500 family of gas turbines

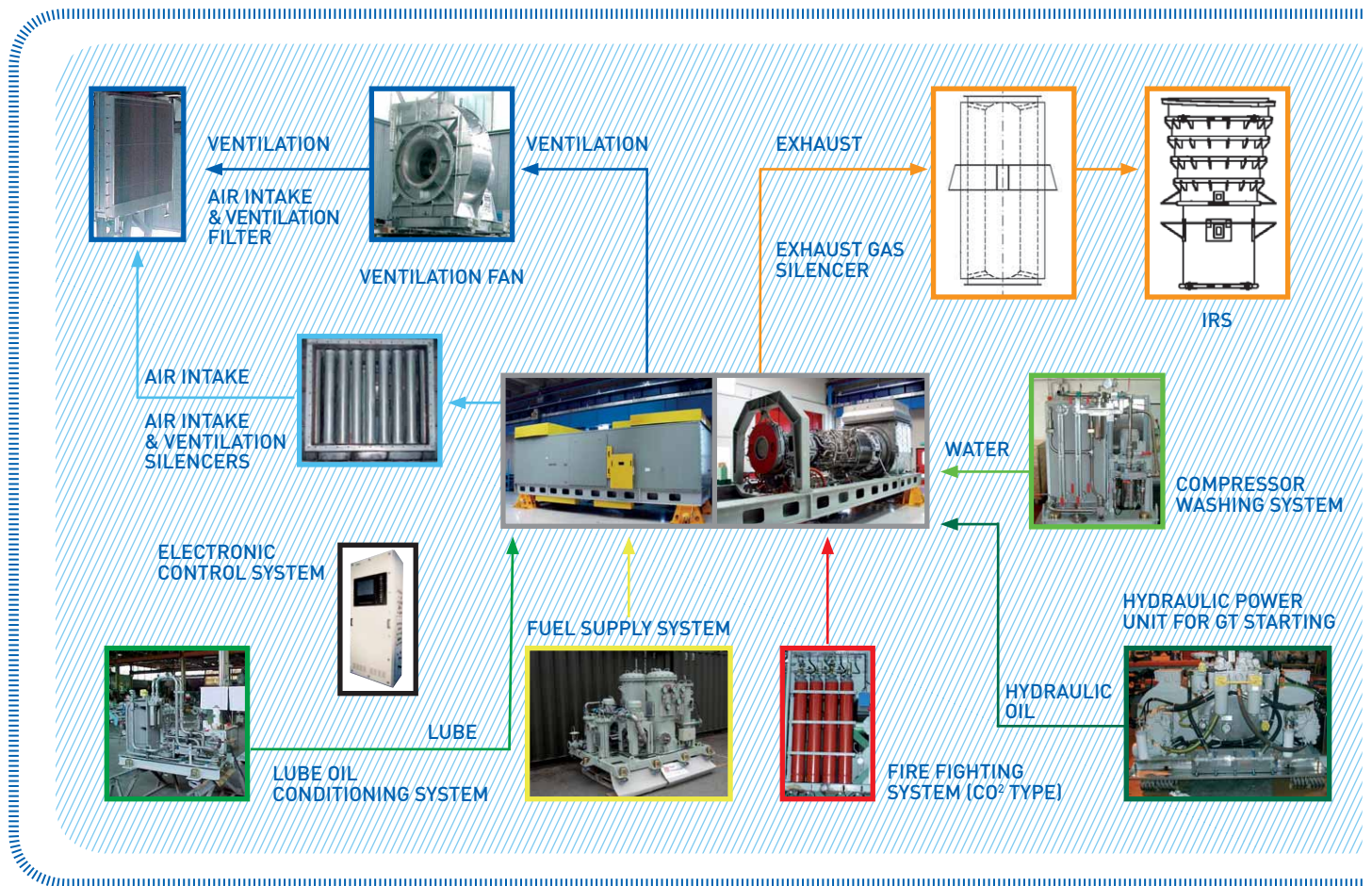
Propulsion package

Avio has an outstanding proven experience and know-how in the design, manufacture and integration of LM marine propulsion solutions. The LM2500 family of aeroderivative gas turbines: about 2,300 units have been produced for marine and industrial applications. The US Navy and the Navies of 29 countries worldwide have adopted the LM2500 gas turbine family. To date, the units produced have accumulated more than 60 million hours of service, with a reliability level of 99.6%. The Avio package includes the gas turbine, base and enclosure, auxiliary systems, turbine control unit, lube oil system, fuel supply system, starting system, fire-fighting system, compressor washing system, ventilation and air intake silencers and filters. Avio provides the Customer with the complete engineering and technical support from requirement definition to performance trials at sea.

Marine system supplier activities

- Ship propulsion system requirement definition
- Gas Turbine propulsion system design
- Components qualification
- Ship installation
- Factory, Harbour and Sea acceptance trials
- GT performance test





Gas turbine control system

Avio is a Centre of Excellence for aeroengine and aeroderivative electronic control system products. The LM Gas Turbine Control System (TCS) has a local control panel and is interfaced with the integrated platform management system. The TCS simplifies ship-handling operations and reduces maintenance time of the gas turbines, optimising engine reliability, availability, maintainability and performance.

- Fully military qualified
- Low manning
- Ancillary management
- Remote monitoring for maintenance operations

Performance at sea

Avio marine systems are based on the LM2500 gas turbine family, including the latest LM2500+G4, with an installed power ranging from 16 to 32 MW.

The propulsion system package is available in two versions to meet Customer requirements:

- Fully military anti-shock standard
- Lightweight commercial standard

Avio's technology and design provides world-class performance:

- Lightweight
- Shockproof structures
- Noise reduction
- Module accessibility
- Easy maintainability
- High availability of subsystems
- Military and civil qualifications

ITALIAN NAVY'S NEW AIRCRAFT CARRIER

The Italian Aircraft Carrier "Cavour" entered into service in 2008. The propulsion system is equipped with 4 LM2500 gas turbines for a total power of 88 MW. Avio designed and delivered the 4 LM2500 gas turbines, auxiliary systems and Turbine Control System.

EUROPEAN MULTI-MISSION "FREMM" CLASS FRIGATES

The joint Italian and French "FREMM" programme is the most important naval contract in Europe since WWII. Planned for up to 17 Aquitaine-Class French frigates and 10 Rinascimento-Class Italian Frigates, the "best in class" for each Navy will enter into service in 2011.

Avio was awarded with the order for the propulsion system thanks to the competitiveness and technology of its product. The FREMM frigates are powered by a hybrid propulsion system featuring a single LM2500+G4 marine gas turbine rated at 32MW. The General Electric LM2500+G4 gas turbine is a fourth-generation engine in the LM2500 family.

It is the most powerful and efficient to date and can deliver 17% more power than the LM2500+ with a thermal efficiency of about 42%, while retaining the same outstanding reliability.

The LM2500+G4 is a thoroughly proven enhancement of the LM2500 marine gas turbine. Avio is supplying the LM2500+G4

gas turbine in a newly designed marine package and its auxiliary systems. Avio also developed, and is supplying, high-technology components such as the Turbine Control System TCS), thanks to its experience in the field of electronic aeroengine controls. The TCS will simplify operations as regards the handling of the ship and reduce maintenance time of the turbines. Avio is responsible for final assembly and on-board installation as well as in-service support activities.

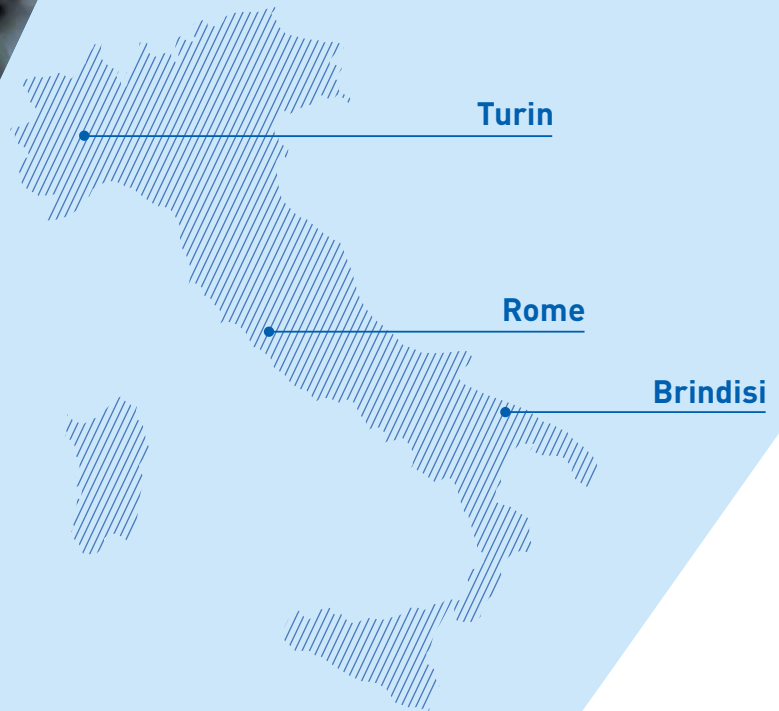
LM2500. THROUGH-LIFE SUPPORT

In order to guarantee continuous improvement in the availability of Gas Turbine operations, Avio offers a wide range of integrated logistic and product support services.

Avio is an Authorised Service Shop operating up to Level 4, carrying out repair and overhaul for the GE LM2500 gas turbine family, supporting several navies around the world. It has been operating since the initial entry into marine service of the LM gas turbines.

- [Logistic support analysis](#)
- [Training for operators and maintainers](#)
- [Technical publications](#)
- [On-board and on-shore maintenance](#)
- [Logistic and spare parts provisioning services](#)
- [On-line support](#)
- [Engineering field support](#)
- [Service bulletins](#)
- [Engine maintenance, repair and overhaul](#)
- [Engine lease contracts](#)
- [Engine fleet configuration management](#)





Shop service capability

- Cleaning
- Inspection
- Measurement
- Module disassembly
- Accessories disassembly
- Repair
- Balancing
- Investigation
- Service bulletins upgrading
- Module re-assembly
- Testing

Special repair processes

- Machining
- Welding (TIG, EBW, Arco Plasma, Resistance welding)
- Heat treatment
- NDI
- Dimensional inspection
- Stripping/Tip Grinding
- Galvanic plating
- Thermal/plasma spray
- Shot peening
- High precision static and dynamic balancing LM2500, LM2500+

Maintenance, Repair & Overhaul (MRO), and testing

The LM family of gas turbines are serviced in Avio's Military Maintenance, Repair and Overhaul Shop located in Brindisi. This facility (54,000 m² of covered area) employs around 1,000 highly skilled people and, with its modern layout, is optimised to carry out repair and overhaul of the highest quality. Avio Brindisi is a GE authorised (Level IV Depot) Service Shop for LM2500 Gas Turbines.