MB-339CD

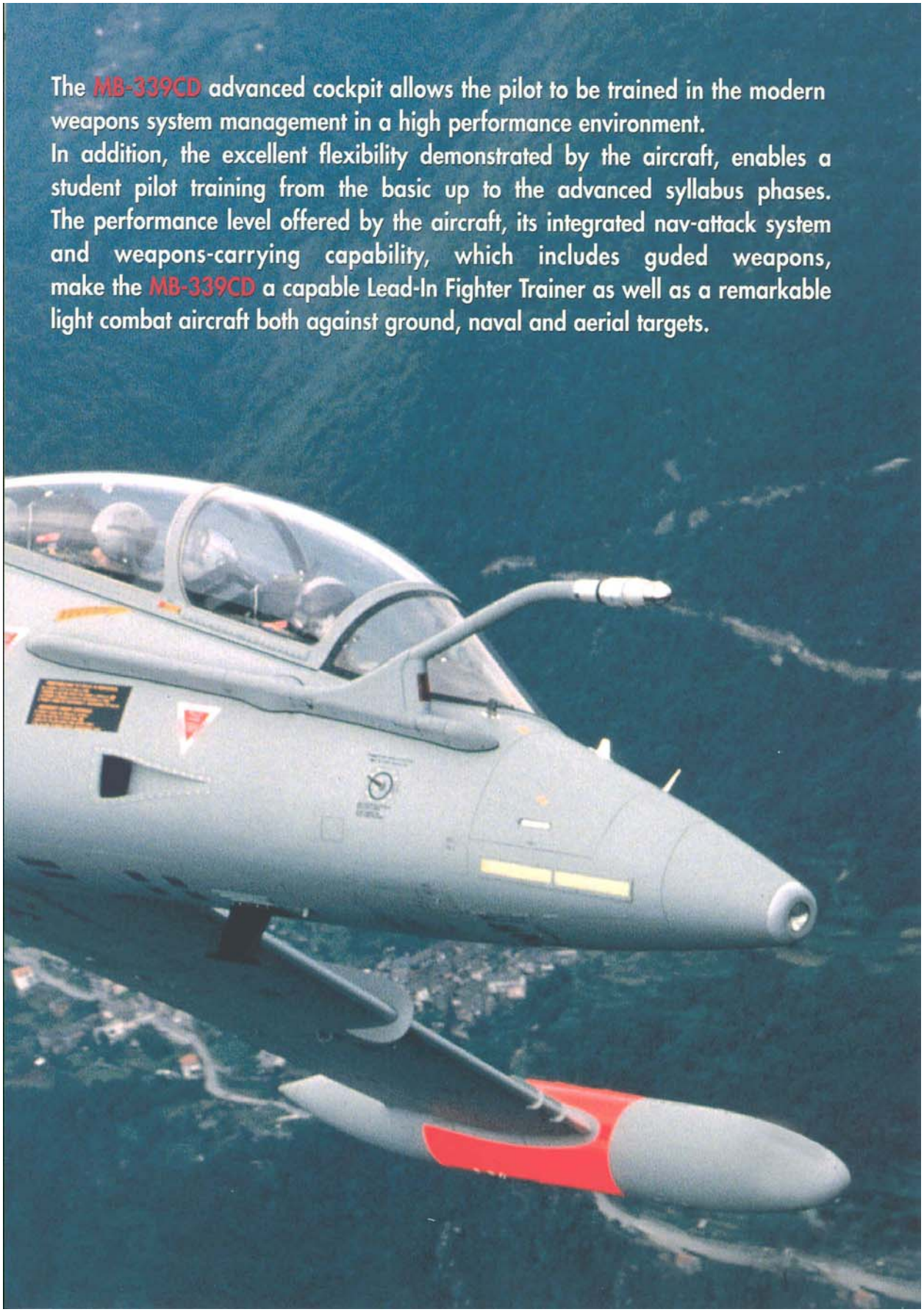
A Finmeccanica Company

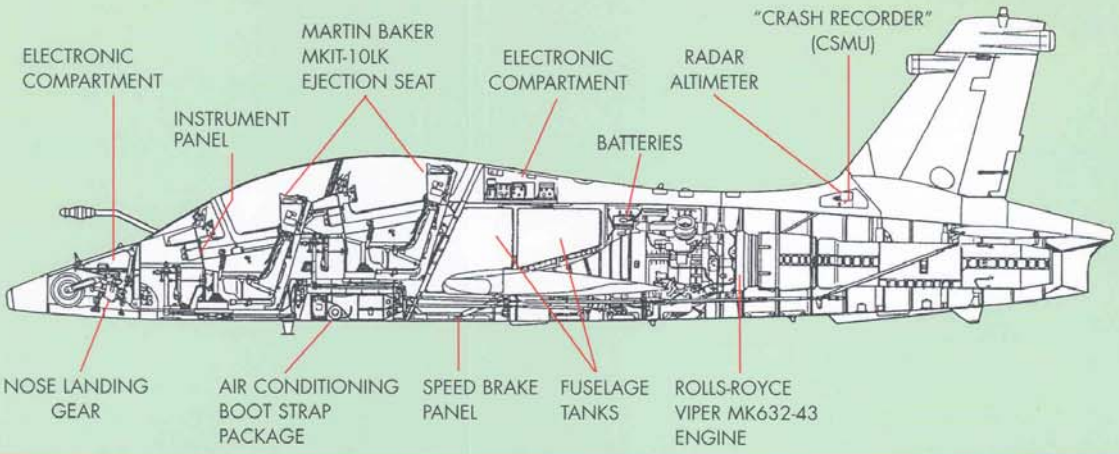
MB-339CD

The MB-339CD is the latest, full digital cockpit, variant of the classic Aermacchi basic/advanced/lead-in fighter trainer and light attack aircraft.

The MB-339CD takes advantage of the experience gained in about 500,000 flight hours flown by the various MB-339 versions, in service worldwide with nine air force, in very different operational and climatic environments.

The MB-339CD advanced cockpit allows the pilot to be trained in the modern weapons system management in a high performance environment.
In addition, the excellent flexibility demonstrated by the aircraft, enables a student pilot training from the basic up to the advanced syllabus phases. The performance level offered by the aircraft, its integrated nav-attack system and weapons-carrying capability, which includes guded weapons, make the MB-339CD a capable Lead-In Fighter Trainer as well as a remarkable light combat aircraft both against ground, naval and aerial targets.





Flight Control System

The primary flight control surfaces are moved by simple push-pull rods, only the ailerons being provided with an hydraulic servo-control. In the event of a hydraulic failure, the system reverts automatically to the manual mode. The ailerons are provided with servo tabs and an artificial feel device. The elevators are provided with balance/trim tabs. A trim tab is fitted also to the rudder. Three-axis trimming is electrical. The secondary flight controls, flaps and speed brake, are hydraulically operated, the latter being located under the fuselage.

The aircraft **Structure** is an all metal construction. Damage tolerance concepts have been used throughout the airframe design, while corrosion protection criteria follow the most advanced aeronautical practices. Structural design criteria are in accordance with the requirements of the MIL-A-8860A series specifications.

Maintenance is easy thanks to the simple and proven systems and airframe which ensure an intrinsically rugged aircraft easy to maintain also by personnel with medium skill levels. The long service experience gained with the previous versions of the aircraft has allowed a further improvement of the MB-339CD maintainability characteristics.

Fuel System. Fuel is contained in a two-cell (optionally self-sealing) fuselage tank and in two wing tip tanks for a total usable fuel capacity of 1781 l. Two auxiliary 330 l droppable tanks can be carried underwing.

Fuel transfer from wing tip or pylon tanks to the fuselage tank is obtained by the system pressurization via engine bleed air. Fuel is supplied to the engine from the fuselage tank by an electrical boost pump.

For inverted flight, an inverted flight sump supplies fuel to the engine for about 20 sec at full throttle.

Refueling is of the single point pressure type. Gravity refueling is however possible. The aircraft can be equipped with an air-to-air refueling system, with removable (30minutes required) probe and an internal and external lighting system for night missions.

The tricycle **Landing Gear** has single wheels mounted on levered suspension. The main wheels are equipped with brakes and anti-skid system.

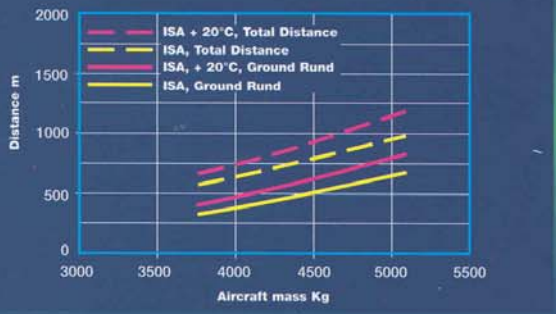
The nose wheel steering system is hydraulically operated. It is engaged by switches located on each control stick grip. In the event of main hydraulic system failure, the emergency hydraulic circuit provides for operation of the brakes and landing gear extension. The nosewheel tire is provided with deflector chines to prevent air intake water ingestion.

The **Power Plant**, a Rolls-Royce Viper MK632-43, is a single-shaft, eight-stage axial compressor engine with a two-stage turbine and an annular combustion chamber. Engine starting is electrical and can be performed either an aircraft batteries or on external power source.

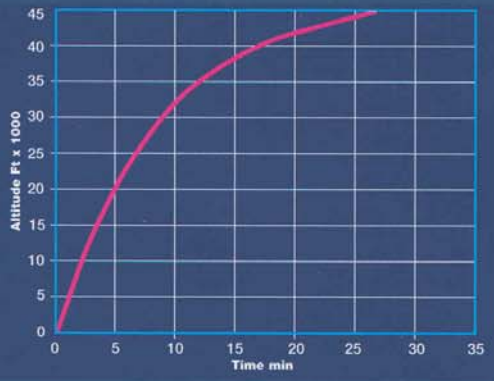
The fuel control system allows unrestricted handling of the engine in quite all aircraft operating envelope:

TAKE-OFF PERFORMANCE

SEA LEVEL



CLIMB PERFORMANCE



airspeed, altitudes and angles of attack. For ice protection the air intakes and the ducts are eletrically heated, while the compressor inlet vanes are heated with compressor bleed hot air.

An optional Engine Life Recorder can be fitted. A special jet pipe ejector with modified tailcone for noise reduction is available as an option, to reduce engine noise level well within FAR 36 Stage III requirements.

The **Oxygen System** is of the OBOGS (On Board Oxygen Generating System) type, with individual seat-mounted regulator, oxygen analyser and status indication system. The OBOGS offers reduced logistic and maintenance support.

The emergency oxygen system consists of a bottle of gaseous oxygen, fitted with a pressure regulator, located on each ejection seat. It is automatically activated in the event of ejection. A manual control however permits this emergency oxygen supply to be used for a limited time in case of main system failure.

The **Avionics** architecture is based on a dual-redundant digital data bus conform to MIL-STD-1553B and a central main processor. Significant growth potential has been incorporated to cater for future needs. The standard Communication/Identification subsystem includes:

- VHF/UHF transceivers
- IFF transponder

Navigation subsystem operates in both autonomous and radionav modes:

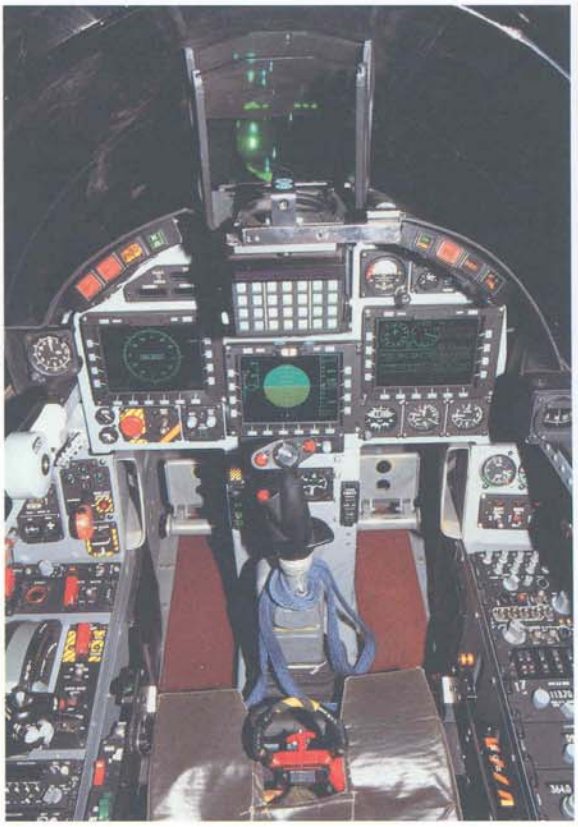
- IN/GPS, based on a laser gyro inertial platform with embedded GPS receiver
- TACAN and VOR/ILS/MB
- ADF/LF (provision)

An Emergency Locator Transmitter is installed at the fin base. Optionally an underwater Acoustic Beacon can be provided.

A Health and Usage Monitoring System (HUMS) can be installed.

A Crash Data Recorder and an Airborne Strain Counter are standard equipment.

The aircraft **Man-Machine Interface** is representative of the cockpit environment of the latest generation combat aircraft, each crew station including:



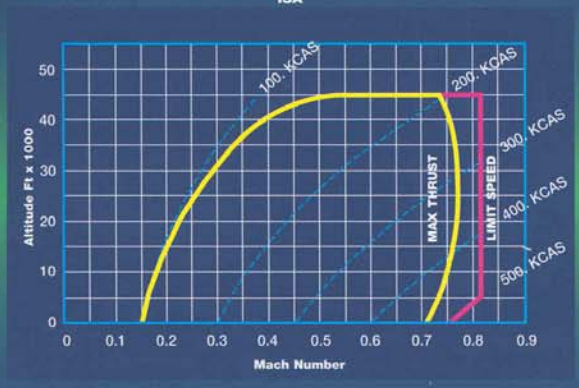
- Head-Up Display. A raster/stroke HUD is under development
- Multi Function Displays (three), color, liquid crystal, active matrix type
- Night Vision Goggle compatible instrumentation
- Hands On Throttle And Stick controls

The **Ejection Seats** are two Martin Baker MK IT-10LK zero-zero fully automatic seats. The ejection can be commanded in sequence from the rear seat or independently by the two pilots.

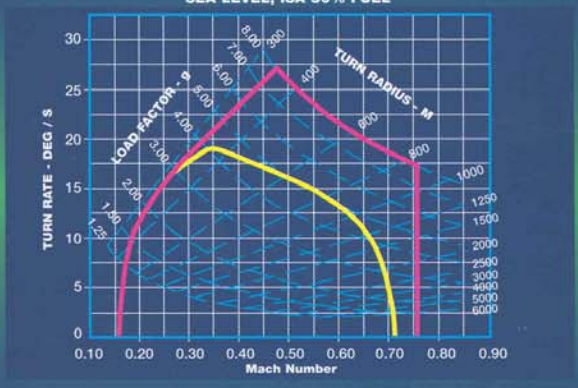
The **Environmental Control System** provides air conditioning and pressurization of the cockpit, ventilation and cooling of the avionics compartments and equipment. An automatic control system maintains the temperature according to pilot selection. The air required for the ECS operation is bled from the engine.

The pressurization system automatically maintains a differential pressure of 3.5 psi. It also supplies the necessary pressurized air for anti-g suits inflation under g forces.

FLIGHT ENVELOPE
ISA



TURN PERFORMANCE
SEA LEVEL, ISA 50% FUEL



The **Armament** is carried by six external store pylons equipped with ejector release units. The four inboard pylons feature a capacity of 454 kg (1000 lb), while the two outboard pylons show a capacity of 340 kg (750 lb). Total maximum capacity is 1815 kg (4000 lb). Any MFDs, in each cockpit, can display the stores management system data and allow the selection of the different stores.
HOTAS commands enable selection of several weapon system functions. Weapon aiming function is provided by the central main processor, the aiming data being presented to the pilots through the HUD.

Embedded Training Systems

represent a built-in growth potential and allow, among others, the following systems to be incorporated:

- Embedded generation of simulated images, or presentation of the images provided by external sources via data-link, to perform various flight activities, tactical missions in a simulated operational environment.

- Internally mounted ACMI (Air Combat Maneuvering Instrumentation) to ensure an effective training in ACM (Air Combat Maneuvering).

For the Lead-In Fighter Trainer role, all the **Self-Protection System** functions are simulated. On the MFDs is presented the tactical scenario, while the threats evolution is also monitored.
For the actual operational roles, the aircraft can be fitted with radar warning receiver, chaff & flares dispensers and active electronic countermeasure system.

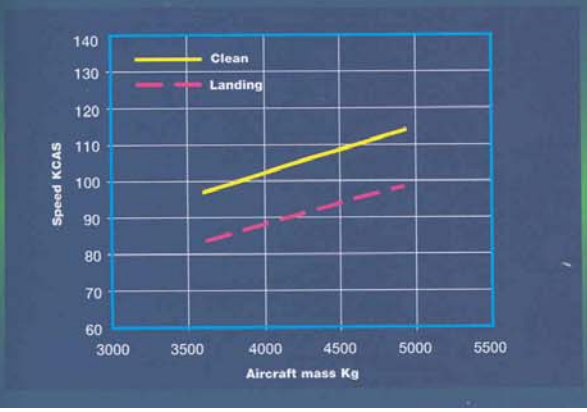
WEAPONS CARRYING CAPABILITY

WEAPONS CARRYING CAPABILITY	340 750	454 1000	454 1000	kg lb	454 1000	454 1000	340 750
GUN POD DEFA 30 mm GUN (120 ROUND PER POD)			●		●		
BOMBS AND FLARES	●	●	●		●	●	●
ANTI-RUNWAY BOMBS BAP-100 OR TACTICAL SUPPORT BOMBS BAT-120	●	●	●		●	●	●
ROCKET LAUNCHERS FOR 50, 68, 81 mm AND 2,75 IN ROCKETS	●	●	●		●	●	●
LAU-10A OR TB-100-4 ROCKET LAUNCHERS	●	●				●	●
MAVERICK A/G MISSILES (UP TO 2)		●	●		●	●	
MATRA 550 MAGIC OR AIM-9 SIDEWINDER A/A MISSILES	●						●
OTO MELARA MK-2A MARTE AIR-TO-SHIP MISSILES			●		●		
ECM POD	●						●
BOMB-ROCKET DISPENSER	●	●	●		●	●	●
U/W TANKS WITH 330 l OF FUEL		●				●	
BAGGAGE CONTAINER		●				●	
SMOKE OR SMOKE/FUEL TANK			●		●		

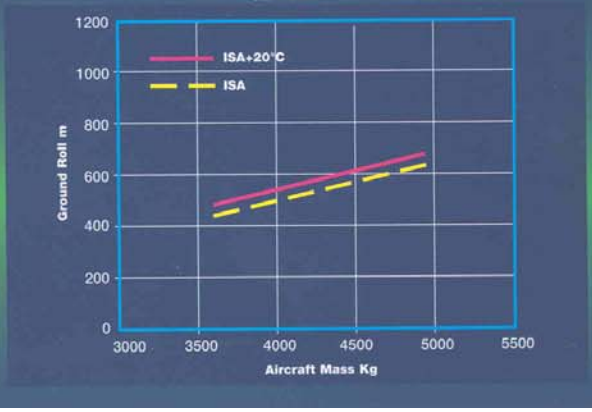
The DC **ELECTRICAL SYSTEM** is supplied by two engine-driven 28 VDC generators and two batteries. The two 9 and 6 kW generators are connected in parallel, the former operates also as a starter.
DC power distribution occurs via five 28 V busses. A standard receptacle for external electrical power connection is provided for ground operations.

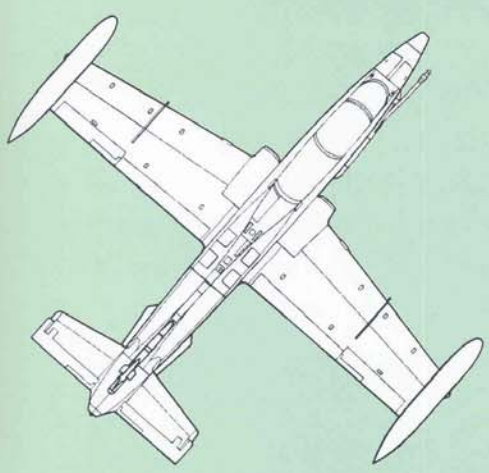
HYDRAULIC SYSTEM based on two circuits, main and emergency.
The main circuit provides hydraulic power to actuate: landing gear, wheel brakes, aileron servo-control, wing flaps, speed brake and nose wheel steering.
The emergency circuit, with its own independent accumulator, provides hydraulic power for emergency landing gear extension and wheel brakes operation.
Two ground test fittings enable operation of the system using external hydraulic ground source.
A hand pump is also available to operate the hydraulic utilities on the ground.

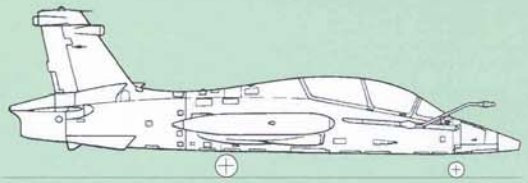
STALLING SPEED



LANDING PERFORMANCE
SEA LEVEL







TECHNICAL DATA

Dimensions

Span	11.22 m (36.81 ft)
Length	11.24 m (36.88 ft)
Height	3.94 m (12.94 ft)
Wing area	19.30 m² (207.74 ft²)

Weights

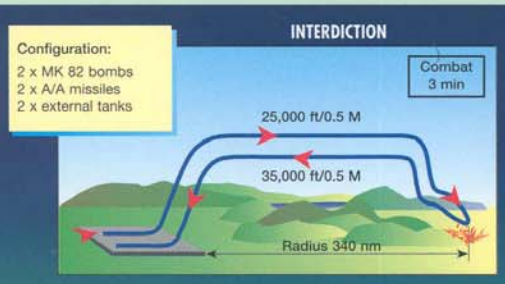
Empty	3335 Kg (7350 lb)
T. O. (trainer)	4950 Kg (10,913 lb)
Weapon load (max)	1815 Kg (4000 lb)
T. O. Max (armed)	6350 Kg (14,000 lb)

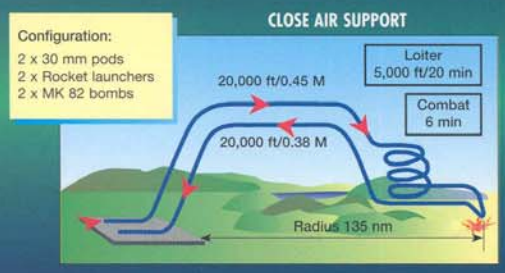
Power Plant

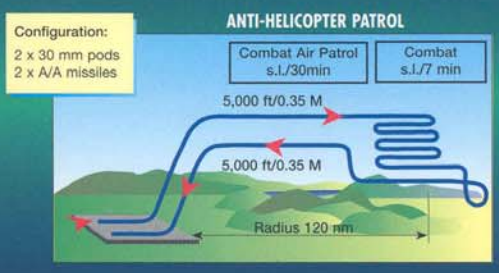
Rolls-Royce, turbojet	Viper 632-43
Thrust	1815 Kg (4000 lb)
Internal fuel capacity (usable)	1430 Kg (3154 lb)

Performance (clean, ISA)

Max level speed (sea level)	470 KTAS
Limit speed	500 KEAS/.82 MN
Rate of climb	5350 ft/min
Stall speed (landing, 20% fuel)	86 KCAS
Service ceiling	45,000 ft
Range (clean, (10% reserve)	1120 nm
Max sustained load factor (sea level)	5.1 g
Max sustained turn rate (sea level)	19 deg/sec
Take off ground run (s.l.)	620 m (2035 ft)
Landing ground roll (s.l., 20% inter. fuel)	480 m (1570 ft)
Limit load factor	+ 8/-4 g







AEM-FINMEC 05/04

A Finmeccanica Company
Via Ing P. Foresio, 1 - 21040 Venegono Sup. (VA) Italy
COMMERCIAL DEPARTMENT
Tel. + 39 0331 813111 - Fax + 39 0331 827595
e-mail: aem@aermacchi.it - web site: www.aermacchi.it