M-346 MASTER
ADVANCED JET TRAINER, AGGRESSOR, FIGHTER
M-346

ADVANCED & LEAD-IN FIGHTER TRAINER

The M-346 Master is a twin-engine, tandem-seat, next generation advanced jet trainer, and central element of an Integrated Training System designed to allow student pilots to develop knowledge, skills and practices needed for effective exploitation of modern combat aircraft.

The M-346 was purpose-built for a wide range of training capabilities, long-term reliability and cost-effective operations.

These characteristics - along with its Integrated Training System solution comprised of simulators and ground based instructional devices, including an operational Live, Virtual, and Constructive environment - make the M-346 the best solution to train the new generation of fighter pilots.
ADVANCED JET TRAINER

The M-346 characteristics contribute to maximize teaching effectiveness and to allow flight hours to be downloaded from front line aircraft (Operational Conversion Unit).

In addition, the aircraft is also ideally suited to satisfy the Companion Trainer role at a sustainable cost and for the Adversary Red-Air role, thus preserving airframe-life and training cost of front line fighters.
INTEGRATED TRAINING SYSTEM (ITS)

In its training role the M-346 has been conceived as the “core” of an advanced ITS which includes:

- Aircraft with built-in Embedded Tactical Training Simulation (ETTS)
- Synthetic Ground Based training (Full Mission Simulator and Part Task Trainer)
- Academic training (Computer Aided Instruction and Computer Based Training)
- Mission Planning (Mission Support Station to support Briefing and De-briefing phases)
- Live, Virtual, Constructive training environment
- Training Need Analysis (TNA) and Training Management Information System (TMIS)
- Integrated Logistic Support (ILS)
MAIN FEATURES

Airframe
- Damage tolerant designed structure
- Large use of composite materials

Engines & Fuel System
- Two interchangeable modular Honeywell F124-GA-200, twin-shaft, turbofan engines with FADEC
- An APU to provide autonomous engine electrical and pneumatic power (air conditioning)
- 2,500 l internal fuel and 3 external fuel tanks (630 l each)
- Single point pressure refueling/defueling system

Crew Escape
- Two latest generation Martin Baker Mk.IT16D model with “0-0” capability Ejection Seats.

Oxygen
- On-Board Oxygen Generator System (OBOGS)
AVIONICS

- Latest Generation Human-Machine Interface
- Embedded GPS/Inertial Navigation System and Radar altimeter (EGIR)
- Two V/UHF radios
- IFF transponder
- MIDCAS
- Radio-Aided mode, based on TACAN and VOR/ILS/MB
- Digital Moving Map
- Voice command
- Hands On Throttle And Stick (HOTAS) controls
- Three 5"x5" LCD Multi-Function Displays (MFD)
- Two raster/stroke type Head-Up Displays (HUD)
- Up-Front Control Panel (UFCP)
- Get You Home Display, for backup flight data
- Integrated Helmet Mounted Display (HMD) System
- Stores Management System
- Integrated central Audio Warning
EMBEDDED TACTICAL TRAINING SIMULATION (ETTS)

A comprehensive in-flight ETTS suite is a key feature of the M-346 and core element of the Integrated Training System (ITS).

ETTS enables the M-346 to offer the whole spectrum of simulated training functions in flight and provides both students and instructors with the following on-board simulations:

- A tactical scenario (digital map with threats and targets)
- Presence of realistic Computer Generated Forces (friend and foe)
- On-board sensors (such as multimode Fire Control Radar, targeting pod and active/passive electronic countermeasures)
- Weapons, including specific symbology and delivery parameters
- Live, Virtual, Constructive environment

ETTS functions can support Stand Alone (flying a single-ship mission) or Multi-Ship networked operations, with aircraft and simulators being networked via a dedicated Training Data Link to exchange Tactical Scenario data with other participants.
**M-346FA: THE FIGHTER ATTACK**

The new M-346FA version is an evolution of the M-346 Advanced Jet Trainer (AJT) to meet an increased wide range of customer operational needs. It is a radar equipped multirole light fighter and represents a highly effective, low-cost tactical solution for the modern battlefield. At the same time it keeps all the attributes of the M-346AJT ensuring maximum commonality, operational flexibility and advanced training capabilities to the air forces.

Amongst the characteristics from the AJT which make the M-346FA an effective combat platform are:

- Carefree handling in the whole flight envelope ensuring that pilots can focus on mission success
- Twin engine configuration and four channel fly-by-wire Flight Control System provide redundancy for exceptional battlefield survivability
- High fuel capacity and air-to-air refuelling capability for long range/endurance and Time on Station
- High rate of climb
- High speed and manoeuvrability, even at low altitude, when fully-armed or with one engine inoperative
- Excellent visibility from both cockpit seats, very important at low altitude
- Tandem-seat configuration well suited for complex air-to-ground missions, with the pilot on the back-seat acting as Weapons System Operators or Forward Air Controller – Airborne (FAC-A)
- High-end, net-centric communication suite
- Auxiliary Power Unit (APU) for autonomous operations
- Architecture designed to allow the integration of key systems like a Multi-mode Fire Control Radar, HMD (Helmet Mounted Display), Tactical Data Link and Defensive Aids Sub-System (DASS)
- An aerodynamic configuration that allows the integration of an extensive variety of air-to-air and air-to-ground weapons and external stores
The M-346FA is designed to have different operational capabilities, equally well suited for air-to-air (air policing, airspace control, Homeland Defence and Slow Mover Intercept) and various air-to-ground missions including CAS (Close Air Support), BAI (Battlefield Air Interdiction), COIN (COunter INsurgency), Airborne FAC and Combat Search And Rescue (CSAR), employing even Precision Guided Munitions. The M-346 Fighter Attack can be also an excellent platform for tactical reconnaissance.
M-346FA FEATURES

Key attributes of the new M-346 Fighter Attack version include:

- Multi-mode radar Grifo-M346 by Leonardo Airborne & Space Systems, specifically optimized for the M-346FA with IFF Interrogator
- 7 external hard-points for an extensive variety of weapons and external stores including:
  - General-purpose, laser and GPS guided weapons
  - Air-to-surface and air-to-air short and medium range missiles
  - Gun pod, Recce and Target Designator Pod
- Defensive Aids Sub-System (DASS) including:
  - Radar Warning Receiver (RWR)
  - Missile Approach Warning (MAW)
  - Chaff & Flare Dispenser (CFD)
- HMD (Helmet Mounted Display)
- Tactical Data Link
- Secure Comms
- Voice Command (VC)
- ECM pod
- Radar Cross Section reduction kit (optional)
Since the acquisition by Italian Air Force in 2009, the M-346 won the most important international tenders and was selected by some of the most demanding Air Forces in the World, beating the most advanced training aircraft available on the market, delivering first class training and operational capabilities, while keeping low operating costs.
Italy: “The T-346 is not just an aircraft in its own right, but part of an integrated system that is a real revolution compared to the past. The ground element of the IPTS (Integrated Pilot Training System) employs modern simulation systems [that enable us to] ‘download’ a good slice of the activities that were previously carried out at the OCU and that were previously conducted in flight, thereby bringing substantial savings.”

Col Paolo Tarantino, Commander of the 61° Stormo, Italian Air Force
March 2016 – Combat Aircraft Magazine
Italy: “The T-346 has striking performance: the generous thrust, the roll rate and, in general, the high stability at all speeds. The strength of the ‘346’ is surely the ETTS, the integrated simulation platform, which allows you to play a variety of sensors such as radar, targeting pod, [and] a suite of electronic countermeasures, to name a few. All these sensors can be employed with other aircraft of the same type as if they were real and, at the same time, also interacting with ground simulators to re-create an environment typical of that of the latest generation combat aircraft.”

T.Col. “Sossi”, instructor pilot of 61° Stormo, Italian Air Force
March 2016 – Combat Aircraft Magazine
Israel: “The new trainers have provided manifold advantages and take [pilot] training much more forward. It has met all our expectations and more. The aspects of the flight performance, its specifications, the capabilities it has, the savings in jet fuel, the safety from it being dual-engine, it has redundancy in almost every system on the plane. We are very, very, very satisfied.”

Lt. Col. Tal, Heyl Ha’Avir (Israeli Air Force) in charge of M-346 Lavi operations
July 21, 2016 – The Times of Israel website
Poland: “The M-346 aircraft really is the best, and at the same time the most economical solution, compared to the current system. When a pilot performs more work on training aircraft, he needs less hours on fighter aircraft. Hence, this increases the defense capabilities of Poland, as the F-16 will be used less for pilot training. We will continue to train outstanding pilots, but this will be much cheaper.”

Bartosz Kownacki, Vice-minister of National Defense
June 8, 2016 - “Nasz Dziennik” Polish newspaper
On-Condition and Condition Monitoring maintenance for equipment and systems. Two level maintenance concept (Organizational and Intermediate) for aircraft, equipment and systems. Structural depot level maintenance is not required.

HUMS (Health & Usage Monitoring System) enables monitoring of on board equipment and data collection, in addition to airframe structural-health (S-HUMS). The Ground Support System allows a rapid assessment of the aircraft systems status, reducing troubleshooting, scheduled and unscheduled maintenance activities.
M-346 AJT CHARACTERISTICS

DIMENSIONS

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<tr>
<th>Dimension</th>
<th>Value</th>
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<tbody>
<tr>
<td>Wing span</td>
<td>31.9 ft (9.72 m)</td>
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<tr>
<td>Length</td>
<td>37.7 ft (11.49 m)</td>
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<tr>
<td>Height</td>
<td>15.6 ft (4.76 m)</td>
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<td>Wing area</td>
<td>253.2 sqft (23.52 m)</td>
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PERFORMANCE

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<th>Performance</th>
<th>Value</th>
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<tbody>
<tr>
<td>Max level speed</td>
<td>590 KTAS</td>
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<tr>
<td>Limit speed</td>
<td>572 KEAS / 1.2 MN</td>
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<tr>
<td>Rate of climb</td>
<td>22,000 ft/min</td>
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<tr>
<td>Service ceiling</td>
<td>45,000 ft</td>
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<tr>
<td>Limit Load Factors</td>
<td>+8 / -3 g</td>
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<td>Endurance clean/3 ext. tanks</td>
<td>2 h 45 min / 4 h</td>
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POWERPLANT

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<tr>
<th>Engine Type</th>
<th>Thrust, max, sls, ISA</th>
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<tbody>
<tr>
<td>Engines, turbofan</td>
<td>2x6,280 lb (2x2,850 kg)</td>
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WEIGHTS

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<tr>
<td>Take-off (clean)</td>
<td>16,535 lb (7,500 kg)</td>
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<tr>
<td>Ramp (maximum)</td>
<td>21,165 lb (9,600 kg)</td>
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