The Versatile Airlifter

A400M

AIRBUS
MILITARY

A400M

The Versatile Airlifter

THE INTERNATIONAL NEED

In a rapidly changing world, there is no telling where the next military threat, peace-keeping need or urgent request for humanitarian aid may arise.

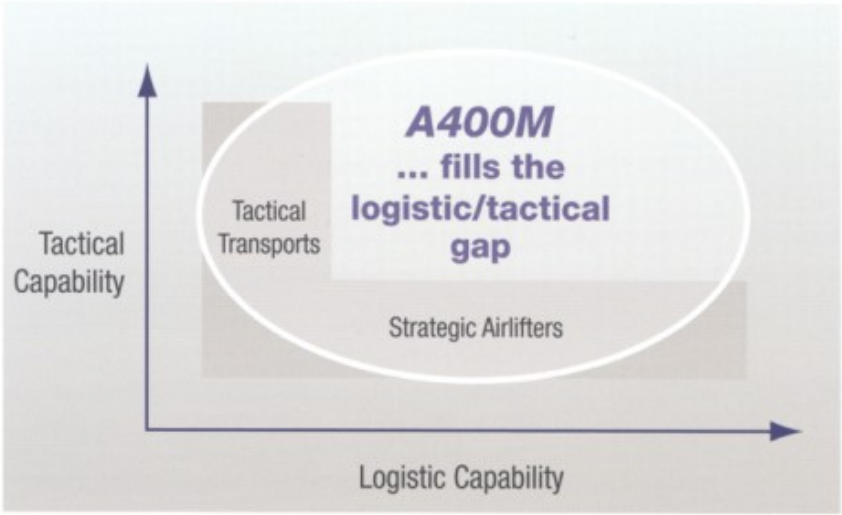
Air mobility is vital in achieving the objective of getting people, equipment and supplies to any trouble spot rapidly and efficiently.

Aircraft types currently fulfilling the military tactical transport role in the world's air forces are becoming obsolete either because of old age or because of difficult supportability.

Unable to carry much of today's heavy military equipment, they do not meet the needs of modern rapid reaction forces.

The A400M is a larger, more modern, more flexible aircraft specifically designed for today's requirements and those of the future.

This aircraft can travel further and faster with a larger payload. It is a multi-role transport, which is more economical to operate, and which exploits the benefits of state-of-the-art technology.



The current tactical transports have good tactical performance but cannot carry the outsize loads needed for disaster relief because they have too small cargo-hold.

The strategic aircraft available on the market are good outsize-load airlifters but are costly and have limited tactical capability as they cannot operate from soft fields.

THE MISSION REQUIREMENTS

The desire for a nation to participate in humanitarian relief and to support the army in remote areas implies essentials capabilities to achieve these mission requirements:

Combined strategic and tactical capabilities

- Large cargo hold and payload to match the whole range of relief equipment and modern military vehicles,
- Long range to allow deployment flexibility,
- High speed and high level flight to meet the need for rapid response and to increase fleet productivity,
- Short unprepared airfield performance to enable direct delivery to austere airfields in the final destination area,
- Autonomous ground operations to reduce turnaround times especially under arduous conditions;

Operational flexibility

- Airdrop of paratroops and cargo loads,
- Casevac from the theatre of operations to forward base or Medevac assistance from the forward to the home base,
- Hostile environment operations to perform tactical missions over hostile territory,
- Air-to-Air refuelling of large aircraft, fighters or helicopters;

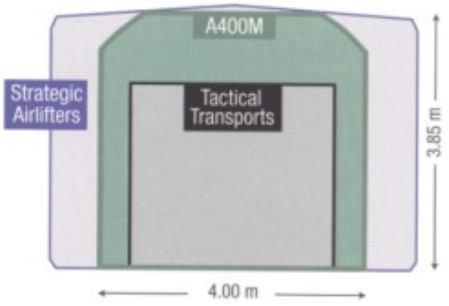
Cost effectiveness

- High reliability and availability thanks to proven supportability engineering processes and technologies,
- State-of-the-Art technology heritage from Airbus latest aircraft models.

LARGE CARGO HOLD AND PAYLOAD

The ***A400M*** carries outsize loads such as helicopters, heavy engineering equipment and armoured vehicles that are too large or too heavy for current tactical airlifters.

The ***A400M*** therefore satisfies the fundamental requirement of recent humanitarian missions and today's ongoing military operations to airlift heavy and large equipment directly to where it is most urgently needed, and thus enabling cost-effective and rapid response to crises.

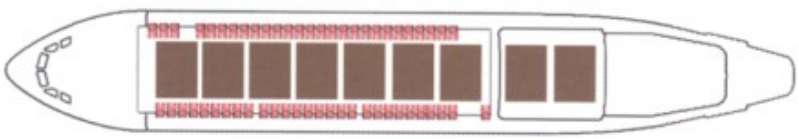


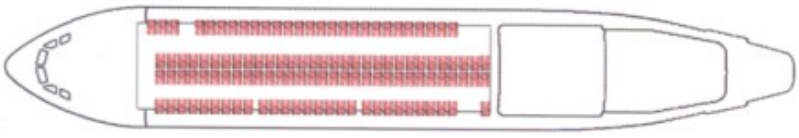
The cargo hold can be easily converted to any of the following mission configurations:

- 463L military pallets (88 in x 108 in): 7 pallets in cargo and 2 on ramp
- Civil pallets (88 in x 125 in): 7 pallets in cargo
- 116 troops/paratroops transport
- 20ft and 40ft ISO containers
- Wheeled & tracked vehicles
- Oversized loads (armoured vehicles, helicopters…)
- Mixed transport of cargo and troops

The dimensions of the cargo hold allow transportation of a wide range of loads ranging from armoured vehicles and other heavy equipment used by Rapid Reaction Forces to specialised civil engineering equipment needed in some humanitarian relief scenarios, such as cranes, excavators or large trucks.

Medium-lift helicopters such as the Super Puma or NH90 are transported in the A400M with the same level of limited dismantling that would be necessary for carriage on larger strategic airlifters.





LONG RANGE

The ***A400M*** provides a new standard of performance for tactical airlifters, able to reach any worldwide destination at high speed, whilst still retaining the capability of landing at austere airfields.

The combination of state-of-the-art aerodynamic design and a powerful new engine enables the ***A400M*** to attain high cruise speeds and high cruise altitudes. This allows it to integrate with civil air traffic patterns at speeds equivalent to those of turbofan-powered aircraft.

Thanks to large fuel tanks the ***A400M*** is able to cover long-range strategic missions without in-flight refuelling.

2 Excavators

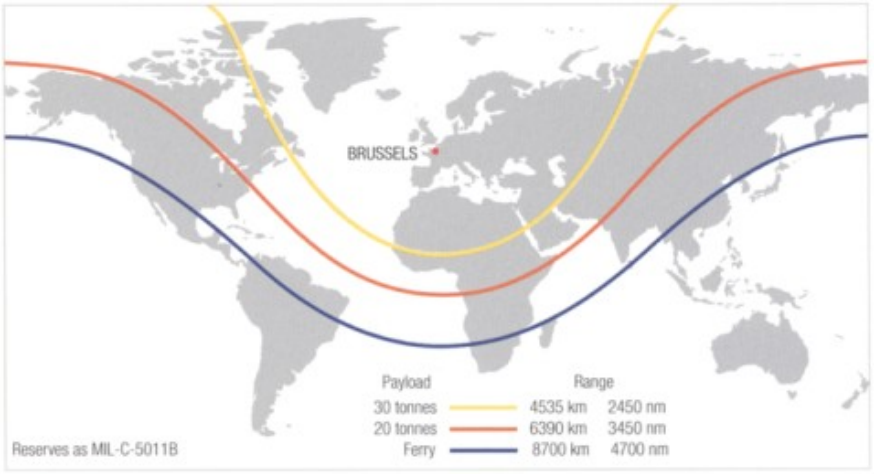
Mobile Crane

2 Attack Helicopters

Combined Strategic and Tactical Capabilities

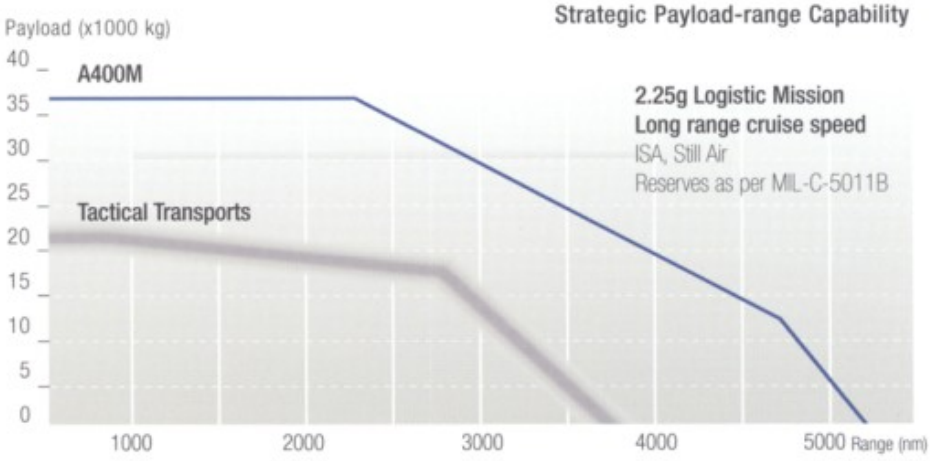
The ***A400M*** can be refuelled in flight therefore expanding its payload-range even further.

With a typical payload of 20 tonnes the ***A400M*** has an operating range of 3450 nm and thus provides true strategic range capability.



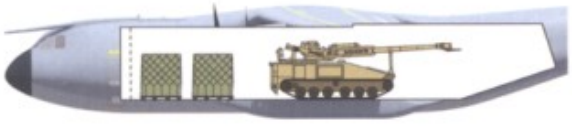
Strategic Payload-range Capability

The A400M carries the same payload as the current tactical transports at double distance or nearly twice the payload on the same distance.



Transport Helicopter

2 Stryker ICV



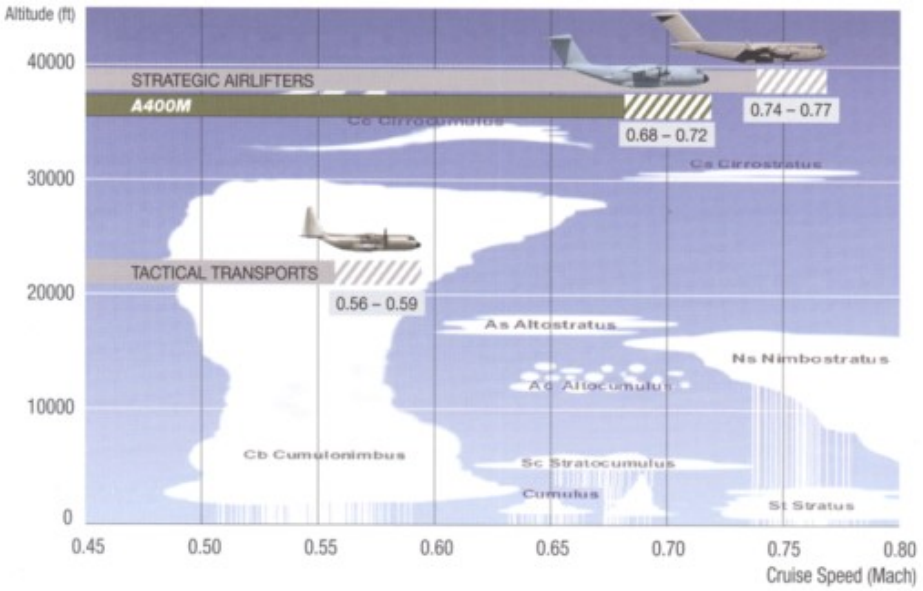
M109 Self-Propeller Howitzer

The A400M is able to transport all the vital humanitarian and military equipments required by today's disaster relief and military operations, while current tactical transports cannot.

HIGH SPEED / HIGH LEVEL

The ***A400M*** cruises as high as turbofan airlifters above turbulent cloud and at comparable cruise speeds - but in addition it has the tactical advantages of a turboprop aircraft.

This high speed and high altitude performance enables the ***A400M*** to respond more rapidly to crises because greater distances can be flown in one crew-duty day.



The tactical advantages gives the ***A400M*** greater mission versatility.

The ***A400M*** is optimised to provide the best cruise performance without compromising its tactical abilities, achieving cruising speeds of up to Mach 0.72 at 37 000 ft.

This provides several operational benefits, such as:

- More sorties per day;
- Faster response to emergency situations;
- Reduced troop and aircrew fatigue. ■

SHORT UNPREPARED AIRFIELD PERFORMANCE

Operations from austere airfields with short runways under hot and high conditions, limited space for parking or manoeuvring and no ground facilities present severe constraints for any tactical airlifter.

Good low speed characteristics and ample power allow the use of short airstrips for take-off and landing:

The ***A400M*** can deliver 25 tonnes of payload into a 750 m (2460 ft) airstrip with enough fuel on board for a 500 nm return trip.

The ability to use austere airfields close to the final destination saves precious time in the delivery of personnel or supplies and allows bypassing of intermediate airports that may be congested during times of crisis.

The tandem multi-wheel main landing gear with three independent lever type struts per side provides good response over bumps in rugged terrain and reduces ground footprint pressure, enabling the use of softer landing surfaces.

Excellent landing gear flotation characteristics allow the delivery of large amounts of payload into low-strength semi-prepared airstrips.

► Designed specifically to operate from short sandy gravelly surface: operating on a sand soft surface (CBR 6), the A400M can deliver up to a cumulative payload of 1,000 tonnes (over 2.2 million pounds) before the sand surface deteriorates.

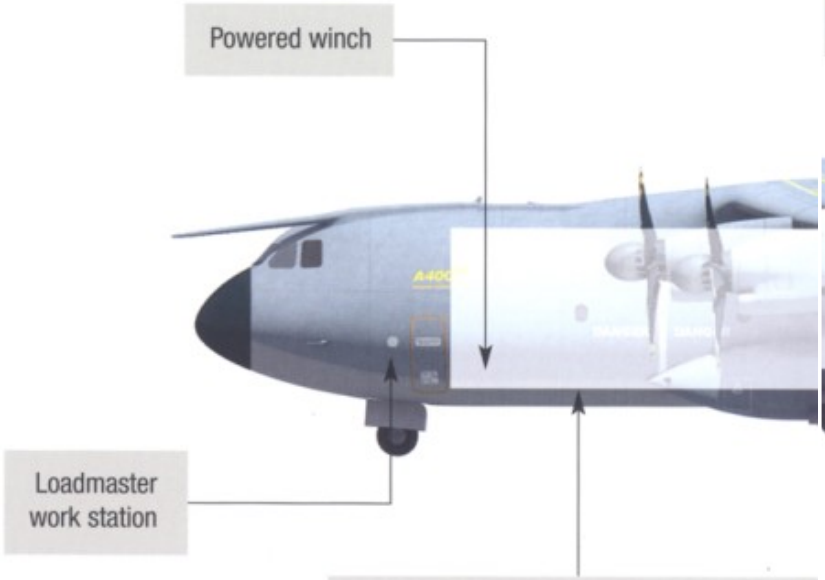
Ground Manoeuvrability

The ***A400M*** can perform a 180° turn within a runway width of only 27 meters (90 ft).

The ***A400M*** is capable, under its own power, of reversing up a slope of 2% on hard surfaces or 1% on soft surfaces, at its tactical MTOW.

AUTONOMOUS GROUND OPERATIONS

- The A400M cargo hold is designed for rapid loading and unloading without specialised ground support equipment
- The A400M's autonomous capability enables operations from remote austere airstrips. By minimising time on the ground, the A400M' systems reduces the aircraft's vulnerability to hostile action.
- The Cargo Handling System allows for pallets and containers to be loaded/unloaded by a single loadmaster without assistance from ground staff.



Cargo floor
- retractable side rails and rollers
- tie-down rings
- in-flight reconfiguration
- accommodates civil and military pallets

Heavy-duty winch able to pull a single load of 32 000 kg (70 550 lb) into the cargo hold;

5-tonne single rail crane can be installed in the rear section of the fuselage;

Three hydraulically powered toes for the loading/unloading of vehicles;

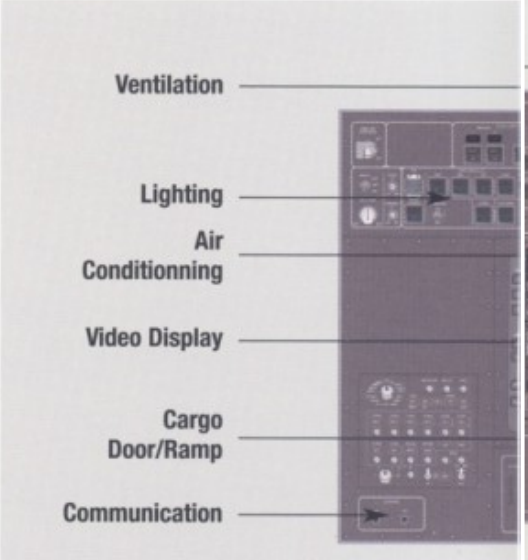
Two hydraulically actuated stabiliser struts to support and stabilise the aircraft during loading operations. They can be extended to raise the rear end of the cargo hold;

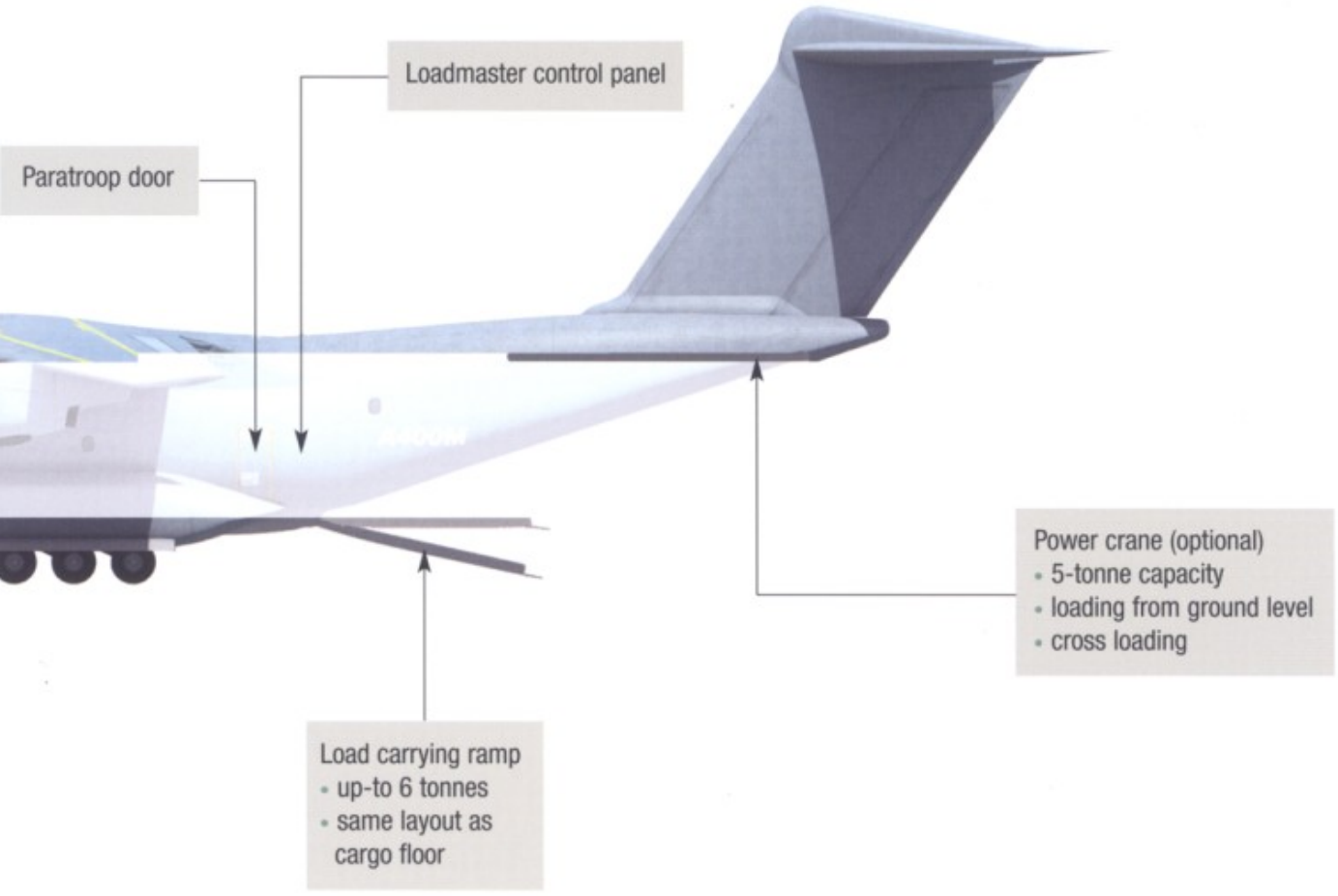
"Kneeling" of the main landing gear legs to lower the rear fuselage for facilitating the loading of large vehicles or oversize cargo.

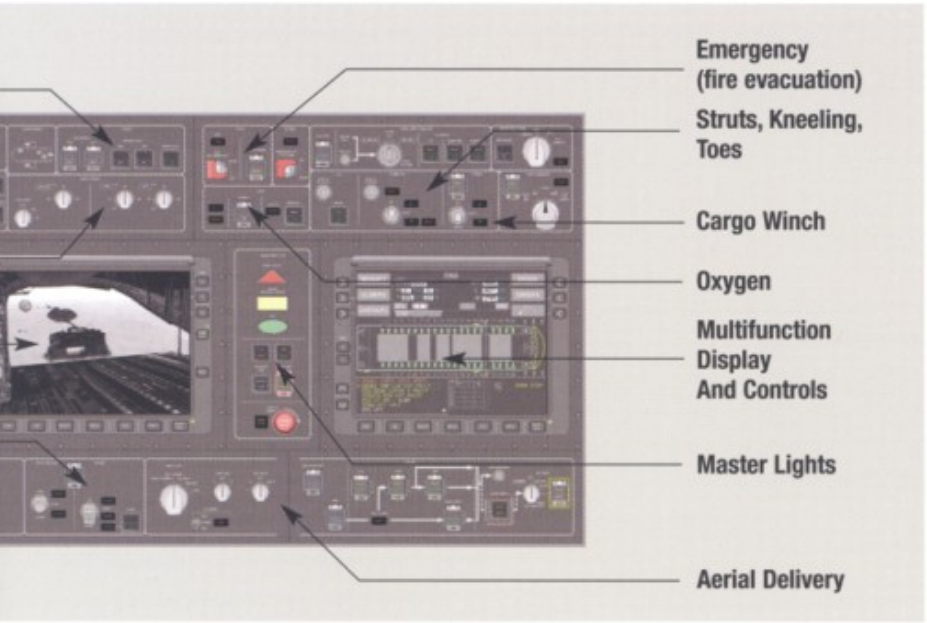
Loadmaster Work Station (LMWS)

The LMWS enables full management of the Cargo Handling System and monitoring of aerial delivery operations. It provides the following functionalities:

- Cargo load management
  - Electronic cargo load plan generation based on predefined databases;
  - Load and trim sheet calculation.
- Aerial delivery







Combat Offload

The combat off-load procedure allows very quick off-loading of pallets on the ground.

With the ramp in the horizontal position, the Cargo Handling System locks are released; full power is then applied and the wheel brakes released: as the aircraft accelerates, the pallets will roll out through the ramp to the ground.

AIRDROP

The A400M drops larger / heavier loads and more paratroops from both low and high altitudes than other airlifters currently in service. Fewer A400M are needed for a specific load or paratroops drop mission resulting in a more cost-effective operation.

High Altitude Aerial Delivery
High-level airdrop up to 40,000 ft are facilitated by rapid depressurisation and re-pressurisation system to drop Special Forces.

The Computed Air Release Point (CARP) linked to the Automated Release System, automatically computes the release point for optimum delivery accuracy, including corrections for wind effects.

Standard Aerial Delivery
As a versatile, multi-role airlifter, the A400M is capable of aerial delivery of both cargo loads and paratroops. The Aerial Delivery System can use gravity extraction modes, with the respective maximum load capabilities:

- ▶ Gravity extraction:
  - Single cargo load up to 4 tonnes;
  - Up to 24 one-tonne containers;
  - Multiple loads with a combined weight of at least 25 tonnes.

- ▶ Parachute extraction:
  - Single cargo load up to 16 tonnes;
  - Multiple loads with a combined weight of at least 25 tonnes.

HOSTILE ENVIRONMENT OPERATIONS: HARD TO FIND - HA

The A400M has been specifically designed for low detectability, low vulnerability and high survivability giving the aircraft excellent self-protection.

The A400M's advanced self-protection measures will enable it to carry out missions in the most demanding hostile environments and in which current airlifters are particularly vulnerable.

***A400M* Low Detectability: Hard to Find**

- ▶ Cockpit fully NVG compatible;
- ▶ "Clean" engines: no exhaust smoke trails;
- ▶ Reduced electronic emissions;
- ▶ Highly manoeuvrable: fly-by-wire controls for optimum handling;
- ▶ Enhanced low-level flight capability.

***A400M* Low Vulnerability: Hard to Hit**

- ▶ Engines designed to minimise Infra-Red signature;
- ▶ Fly-by-wire for optimum aircraft manoeuvrability with angles of bank increased to 120°;

The A400M is able to perform paratroops delivery from the two rear lateral doors or from the ramp, using static line or free fall technique.

Mixed aerial delivery of loads and para-troops over the ramp is possible in one pass:

- RAS WEDGE loads of up to 4tonnes,
- 320 kg bundle loads through the lateral doors and 116 paratroops.

Very Low Level Extraction

The Very Low Level Extraction (VLLE) mode enables airdrop from a height of 4.5 m (15 ft) above ground:

- Up to three loads, each up to 6.35 tonnes;
- Combined load of 19 tonnes.

CASEVAC / MEDEVAC

The tactical capability of the A400M enables rapid Casevac evacuation from the theatre to the forward base. Its long-range performance allows Medevac and special care assistance from the forward to the home base.

The standard Casevac/Medevac cargo hold configuration comprises eight stretchers provided as standard and permanently stored on board. The basic configuration accommodates up to 66 standard NATO stretchers and 25 medical personnel seated on the troop seats. It is designed for up to 125 stretchers with 7 personnel assistant for extreme situations.

RD TO HIT - HARD TO KILL

- Steep angles of descent and approach;
- Flexible and modular Defensive Aids Sub-Systems (DASS);
  - Missile Warning Systems;
  - Radar Warning Receiver;
  - Laser Warning Receiver;
  - Expendables Dispensing System;
  - Direct Energy Infra-Red Counter Measures;
  - Towed Radar Decoy;
  - Defensive Aids Computer.

***A400M* High Survivability: Hard to Kill**

- Diverse routing of hydraulic piping and electrical looms;
- Four independent computers for fly-by-wire;
- Cockpit and LMWS armouring;
- Bullet-resistant glass: up to 12.7 mm;
- Inert gas for fuel tanks (OBIGGS);
- Damage tolerant controls: electro-hydraulic.

Steep Descent

The steep descent capability is reducing the aircraft vunerability to ground fire, specially when approaching below 5000 ft.

Low Level Flight

The ***A400M*** is capable of performing tactical missions at very low level to take advantage of terrain masking, resulting in improved survivability.

Low level navigation is totally autonomous, which means that it does not require any support from ground based radio aids. It is also discrete, because no use is made of any forward emitting sensors.

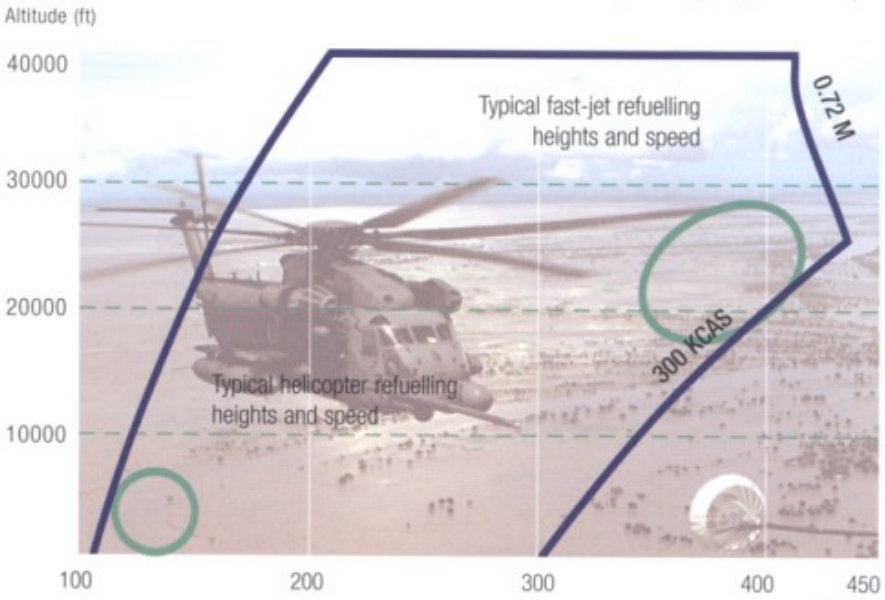
During low-level operations, the maximum speed of 300 KIAS, in conjunction with low altitude flight, reduces the probability of detection by enemy forces, as well as reducing the amount of time the aircraft is flying over hostile territory.

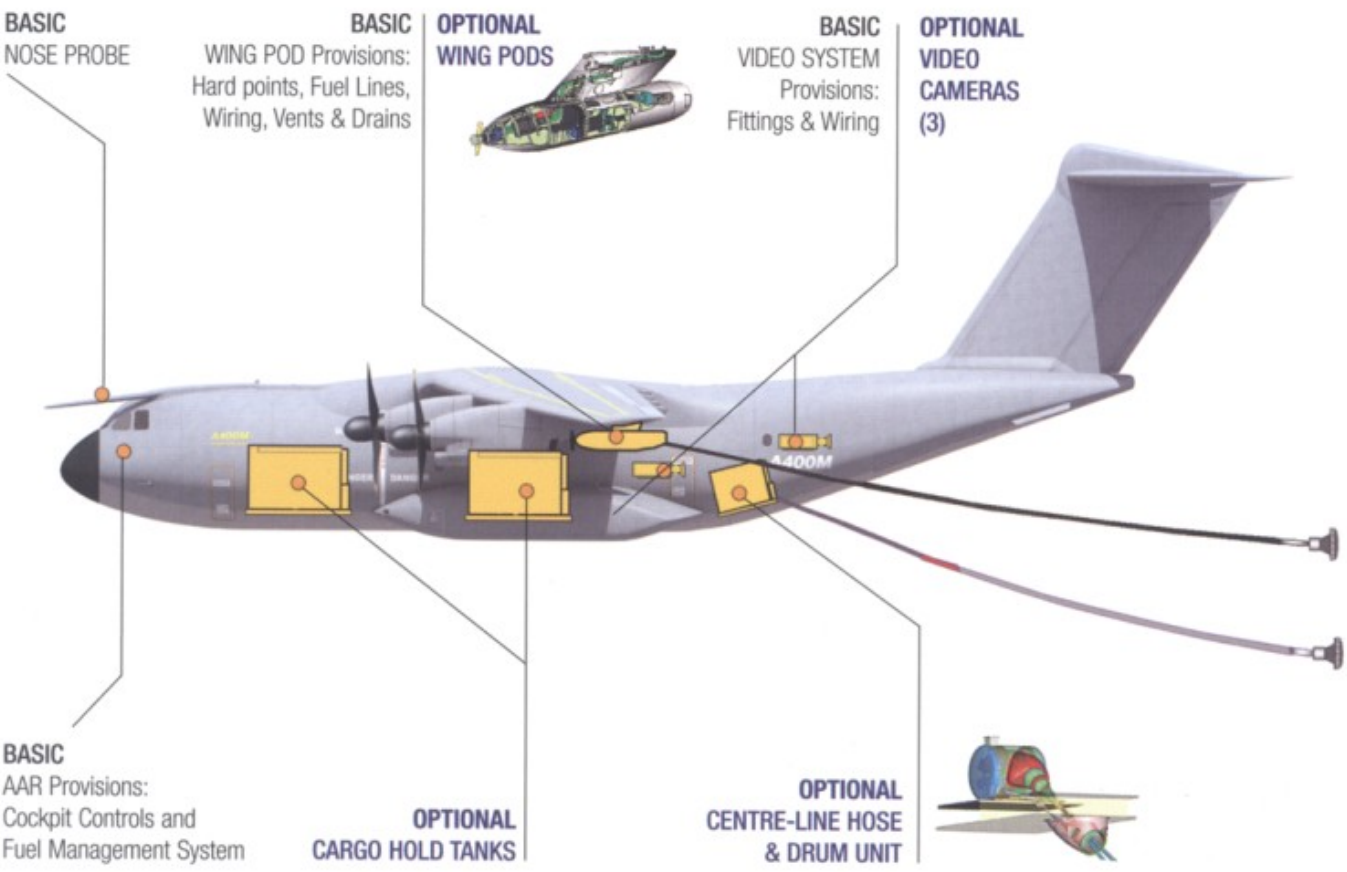
AIR-TO-AIR REFUELLING

All A400M could be rapidly reconfigured to become AAR tanker able to refuel fighters, helicopters and other large aircraft at those receivers' preferred speeds and heights. No other tanker in service can do this.

The ***A400M***'s built-in AAR capability will give a commander operational flexibility enabling him to assign these aircraft to whichever role is most needed to meet rapidly changing operational scenarios.

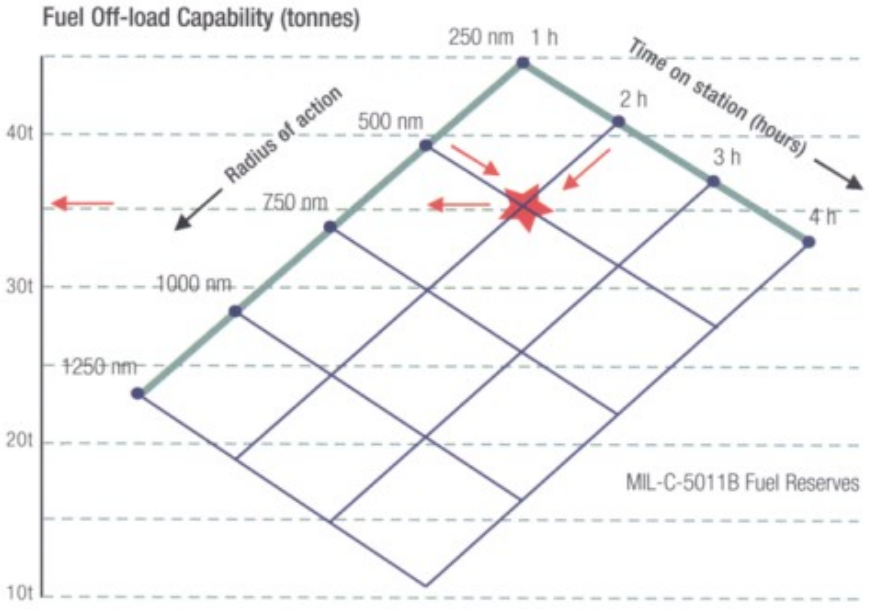
A400M Operating Flight Envelope





The fuel off-load capacities of the A400M compare favourably with those of tankers currently in service.

On a typical tanking mission where it would loiter for two hours at a range of 500 nm from base, the A400M would have a potential "fuel give-away" of more than 35 tonnes, leaving sufficient fuel for a return to base, with military reserves.



The ***A400M***'s strength as a tanker lies in its versatility and its ability to undertake air-to-air refuelling throughout the entire range of its flight envelope.

Typically, fast jet refuelling takes place at speeds of between 280 to 300 kt IAS at altitudes around 25 000 ft and these speeds and altitudes are well within the ***A400M***'s flight envelope.

On the other hand, the ***A400M***'s low speed performance enables 105 to 120 kt IAS to be achieved at altitudes at 5 000 ft for helicopter tanking. These speeds are too slow for jet-engined tankers.

HIGH RELIABILITY - AVAILABILITY

To achieve the highest availability and lowest Life Cycle Costs, the A400M In Service Support was addressed from programme start. Thus, compared to other tactical transports and strategic airlifters, the A400M will have higher availability and lower life-cycle costs.

A400M features and the Airbus Military In Service Support, are based on proven Airbus methods and procedures resulting in both operational and economic benefits:

- ▶ Autonomous operations for extended periods of time while deployed away from base;
- ▶ Purpose-designed for deployed operations: 15 days maintenance-free operating period and 150 days / 500 flying hours without scheduled maintenance;
- ▶ Scheduled maintenance: 84 days in 12 years;
- ▶ Mission reliability above 98%.

The high availability of the A400M therefore enables Air Commanders to achieve operational tasks on time; and satisfies budget holders demand for the most cost-effective fleet.

Notwithstanding the immediate challenges ahead, the ***A400M*** will meet the demanding requirements of both operational and humanitarian missions because:

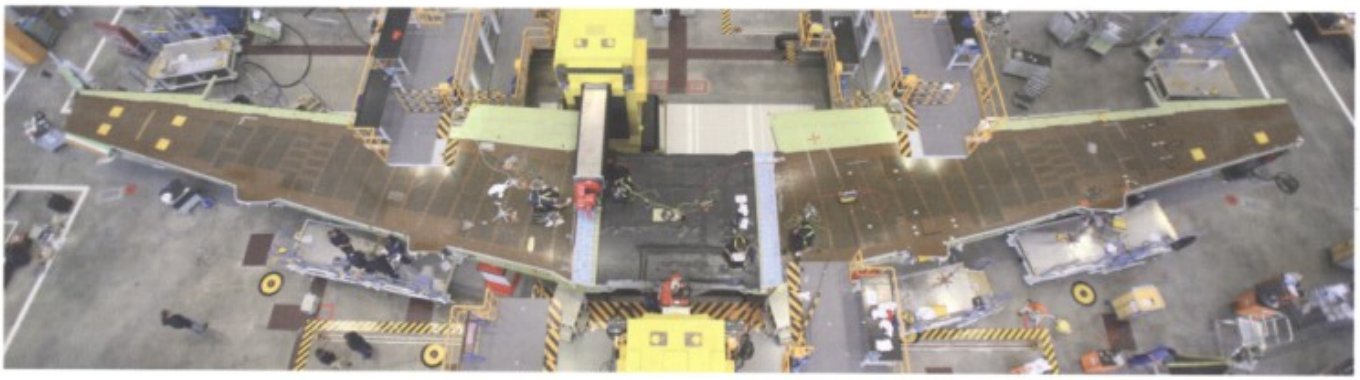
A400M provides true Logistic airlift (high cruise speed, long range, outsize load capability for both weight and volume);

A400M is a better Tactical airlift than current existing types (greater manoeuvrability, softer-field capability, better self-protection);

A400M has a built-in Air-to-Air refuelling capability (fast/high enough for fast jets, plus slow/low enough for helicopters). ■

Fly-by-Wire optimised for Military Operations

- Two independent Fly-by-Wire control systems give excellent handling qualities - such as "direct lift control" for easier Air-to-Air refuelling manoeuvres;
- Expanded flight envelope protection - such as safe manoeuvring up to 120° in roll, with no limit in pitch, and with roll rates up to 35° per second.



First complete wing of Carbon Fibre Reinforced Plastic (CFRP)

- First large military aircraft with extensive use of composite (> 30%) for wings (including main spars), cargo door and tail-plane;
- CFRP's usage reduces structural fatigue, thus maximising structural life and reduces concerns about corrosion on major components.

Engine Rotation "Down Between Engines"

- Symmetrical airflow over the wings resulting in better lift distribution and thus more efficient wing design with savings in weight;
- Improved handling qualities for "engine out" case resulting in smaller tail-plane with associated savings in weight and drag.

Cockpit Designed to reduce Pilot Workload

- Head-up Displays;
- Enhanced Vision System / FLIR;
- Low Level Flight (500 ft) in IMC on autopilot;
- Automated CG calculation;
- Automated Defensive Aids Systems;
- Simple EMCOM switching;
- Simplified switching, uncluttered screens;
- Automated Tanker and Receiver fuel control;
- Auto Fuel Tank Interting.

TP400-D6 Engine and composite Propeller

- All new 3-shaft Turboprop Engine in the class of 11 000 shp resulting in:
  - High-level cruise speeds of between 0.68 and 0.72 Mach,
  - Low-level airspeeds of up to 300 knots for tactical operations;
- Sophisticated FADEC (Full Authority Digital Engine Control) optimising power-plant efficiency and greatly reducing pilot workload;
- 8-bladed Propeller having a carbon spar and a composite shell with a polyurethane coating.

The state-of-the-art and cost-effective technologies inherited from Airbus' latest aircraft models, clearly put the A400M as an airlifter in a class of its own for the 21st century.

General Dimensions

Overall Length	45.1 m	(148 ft)
Overall Height	14.7 m	(48 ft 2 in)
Wing Span	42.4 m	(139 ft 1 in)
Landing Gear Track	6.2 m	(20 ft 4 in)

Cargo Hold Dimensions

Cargo Hold Length (excluding ramp)	17.71 m	(58 ft 1 in)
Ramp useful Length	5.40 m	(17 ft 9 in)
Cargo Hold Height	3.85 m	(12 ft 7 in)
Cargo Hold Height aft of wing	4.00 m	(13 ft 1 in)
Cargo Hold Width	4.00 m	(13 ft 1 in)
Cargo Floor Height from ground	1.60 m	(5 ft 3 in)
Cargo Hold Volume (gross)	340 m^3	(12 007 ft^3)

Weights

Internal Fuel Weight	50 500 kg	(111 330 lb)
Max. Logistic Take-off Weight (2.25 g)	141 000 kg	(310 850 lb)
Max. Tactical Take-off Weight (2.5 g)	130 000 kg	(286 600 lb)
Max. Logistic Landing Weight (sink rate 9 ft/s)	122 000 kg	(268 960 lb)
Max. Tactical Landing Weight (sink rate 12 ft/s)	115 000 kg	(253 530 lb)
Maximum Logistic Payload (2.25 g)	37 000 kg	(81 570 lb)
Maximum Tactical Payload (2.5 g)	30 000 kg	(66 140 lb)

Performance

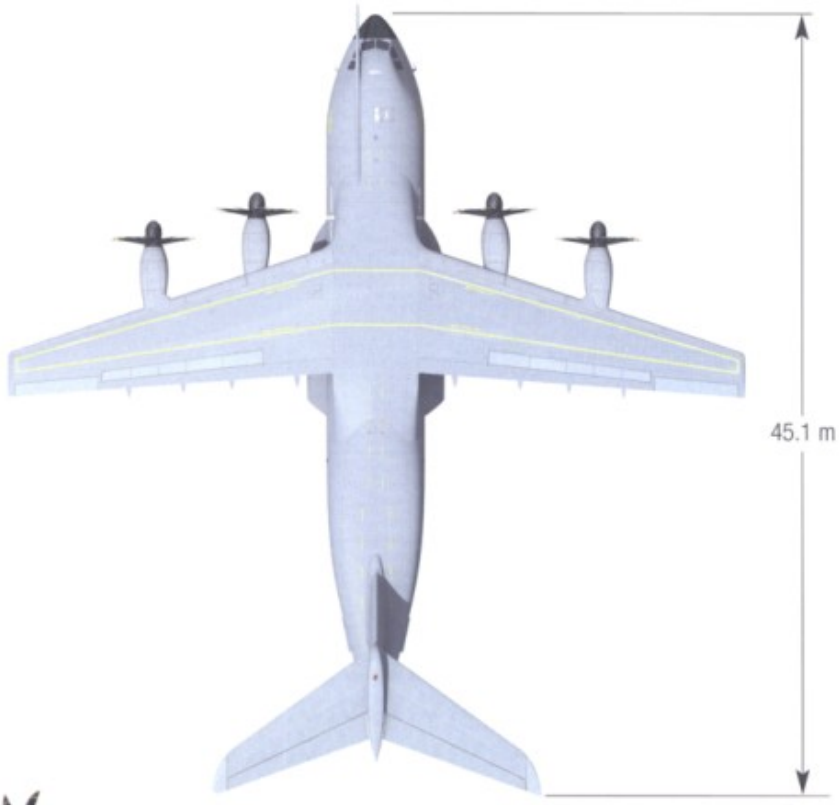
Engines	4 x EuroProp International TP400-D6	
Engine Power Rating	11 000 shp class	
Propeller	Ratier-Figeac FH386 (8-bladed)	
Propeller Diameter	5.33 m	(17 ft 6 in)

Max. Operating Altitude – Normal Operations	11 278 m	(37 000 ft)
Max. Operating Altitude – Special Operations	12 192 m	(40 000 ft)
Max. Cruise Speed (CAS)	555 km/h	(300 kt)
Max. Cruise Speed (TAS)	780 km/h	(422 kt)
Cruise Speed Range (Mach)	0.68 – 0.72 M	

Payload-Range Performance (Reserves a per MIL-C-5011B)

Range with max. Payload	1780 nm	(3295 km)
Range with 30 tonne Payload	2450 nm	(4535 km)
Range with 20 tonne Payload	3450 nm	(6390 km)

Technical Specifications



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