

IL-78 MKI - Indian 'Midas' & Courageous Crusaders

IL-78 MKI - Indian 'Midas' second time in Europe

After the exercise Garuda 2 in June 2005 India is seeking new challenges in dissimilar air combat techniques. After DACT exercises with the USA, France and South Africa the Indian Air force found a willing ally in the Royal Air Force. The reason why is obvious. India developed itself in the last decade into a major player in the Asian air power theatre. Some consider India this moment the fourth largest air force in the world with over 600 combat aircraft. Among these, the most prestigious types with high tech. India wants to know where it stands in the military balance and whether their capability is of the highest in the world or not. Ambitious as ever India simply could not avoid a meeting with the country of which they depended on for centuries. This year would be perfect while India is celebrating its 75th anniversary. The Royal Air Force played host at RAF Waddington in Lincolnshire for three weeks. During this period, Indian aircraft took the invitation to be present with the Ilyushin-79MKI and escorting fighters SU-30 Flankers at the Royal International Air Tattoo at Fairford, a good occasion to zoom in on this seldom seen tanker giant.

Exercise Indra Dhanush in U.K. airspace

A classic exercise for Dissimilar Air Combat Training was organised with blue and opposing red air forces under the name Indra Dhanush between July 2-12-2007. As curious as India was to practice with British fighters, so was the RAF eager to meet the Sukhoi Su-30MKI Flanker-H considered as one of the most potential fighters in the world and a real challenge and threat as opponent. In addition to this first deployment of the Indian Air Force in the UK with six Su-30 MKI of 30 squadron 'The Rhinos' from Pune air base. They also brought some of their giants. The fighters were supported by two Ilyushin IL-78 MKI 'Midas' tankers of the 78 Mid-Air Refuelling Squadron (MARS) 'Battle Cry' from Agra air base and two IL-76 Candid heavy transport planes. It was the second time for the Midas tankers in European air space and therefore a special occasion. The fuel carrier is an upgraded version of the IL-76 and provides tactical flexibility by extending the flying range of fighter aircraft (in case of the Su-30 up to 7000 km in enemy airspace) but also opened for India the way to global experiences. The Midas fuel tankers boosted the Flankers to the United Kingdom like they did before to Istres in France (Garuda-2) Eilson and Elmendorff AFB in Alaska (Cope Thunder 2004) and with Mirage 2000's to South Africa at Hoedspruit AFB (Golden Eagle 2002) and so becoming a routine long distance combination of air assets. This is also a main objective for India to explore their abilities with this combination. This time the IAF took stops in Qatar on Doha air base and in Greece on Tanagra air base. The six Su-30MKI's flew some 19.000 km each, spread over 28 flying hours and were all together tanked eight times transferring nearly 225 tonnes of fuel mid-air.

Gajraj or King Elephant

The IL-76MD was already in service with the Indian Air Force since 1985, replacing the obsolete Antonov An-12 and some 28 are currently in service under the name

'Gajraj' (Hindi for the white elephant or king of elephants). In July 2001, the IAF ordered six IL-78/78M in-flight refuelling aircraft from Tashkent Aviation Production Association (TAPO) for an estimated price of approximately 50 million dollars each. Construction and deliverance would be from the Chkalov plant in Tashkent. The first public appearance of the Midas was on the air force parade of 8th October 2003. This aircraft would enhance the operational capability of IAF fighters, especially the Su-30MKI enormously. Also this was the beginning of deployment series far abroad with the aim to engage the best fighters in the world for combat manoeuvres. The first IL-78MKI were originally actually IL-76's obtained from Uzbekistan and once the need for tankers was recognized refurbished and fitted with new avionics. The Gajraj and Midas tanker are capable of continuous standalone operations. During two months the aircraft is capable of performing combat missions far away of the base airfield being maintained by the crew only. Operations for the Il-78 are possible under all weather day and night circumstances. Tire pressure can be adjusted from 2,5 to 5 atmosphere to deal with different types of airfields. When deployed with fighters and if required with additional Gajraj heavy transport planes or medium freight planes the group is operating under command of a group captain. Such a group of six fighters and support consists of up to 120-200 personnel including pilots, flight engineers, administrative officials, medical personnel and technicians/ground crew. Support flights can also be undertaken while deployed. In exercise Indra Dhanush the group captain was K. Raghavendra, commanding officer of the MARS.

The IL-78 as a smart tanker

Three fighter aircraft (or one bomber) may refuel in flight simultaneously from one Il-78. The aircraft is equipped with refuelling pods, one under each wingtip and the third on the port side of the aft fuselage. These pods are called hose-drum units (HDU) and were built by the Zvezda organisation and designated UPAZ-1 or standard suspended (external) refuelling unit. The UPAZ-1 was basically a stock item that could also be carried by tactical aircraft for example the Su-30, including the Indian examples can use this unit for 'buddy' tanker operations. Each HDU has a conical nose, which retract inwards to admit airflow to drive a ram-air turbine for the fuel pump. The HDU's have a fuel flow rate of 900-2200 litres per minute delivered by 75-meter long hose. The aerial refuelling director directs the hose and drogue system from the tail gunner position, from which the guns and radar has been removed and service as observation post. In this way fuel can be transferred with utmost precision and synchronisation, giving fighters not only extended range but also possibility for more payload and thus provide capability for more arms and more efficient arms combinations. Fuel is held in twelve integral tanks, which are isolated from each other. All fuel tanks are divided into four groups by the number of the engines and an inert gas system is used for protection against explosion. The aircraft to be filled could be three different types simultaneously and this includes the IAF Su-30MKI, the Mirage 2000 and Jaguar while Indian Navy Sea Harriers are under study.

Special cargo

Although the UPAZ-1 could draw fuel from the aircraft's fuel system, one very large of 210 tons could be pallet-mounted inside the aircraft's cargo bay. A fuel dump system

was fitted to the aircraft to allow the tank to be drained in case of emergency. The tank is very good isolated with several layers and isolates even from fire in the cargo bay. The first variants have the ability to let the tank pulled out to allow the aircraft to be used in the transport role. A crewmember confirmed the ability to convert to troop transport aircraft for 225 paratroopers but it seems not practical to do this regularly. Troops can still be transported but limited by using folding seats alongside the Tank(s) The HDU's are controlled by a flight engineer in the cockpit called the aerial delivery system operator and he communicates with the aerial refuelling director by radio. Periscopes from an optical rear view system enable the director to keep an eye on the HDU's backwards. On the place where once the gun was fitted is an array with traffic lights for signalling the approaching fighters while the tanker was fitted with a transponder to help clients to find it. The new IL-78M has an additional cargo-bay fuel tank instead of one and the rear cargo doors are replaced by a fixed fairing. The total fuel capacity of the IL-78M is 138 tons of which 105.7 ton is transferable.

A blink inside

Very few Westerners have been inside the airplane due to few occasions and restrictions. When you enter the IL-78 cockpit, they will not tell you very much because the MKI stands for a combination for subsystems from France, India and Israel and is a quite unique combination in the world. It feels strange to look in a Russian designed aircraft and read on a panel TCAS in proper English language. The cockpit had in the first IL-76 a purely analogue lay out but since the involvement of Israel, France and the own avionics industry of India there has been some evolution parallel to improvements in Chkalov mounted on Russian aircraft in the same period. Some strips and displays are secret, and delivered by ELTA, Israel or Thales Airborne from France and are not to be photographed in detail. Two pilots are sitting in the cockpit and directly behind them is the seat of the flight engineer and in the outer corner the seat of the communications officer. The navigator is sitting separated one deck below in the glass nose. He has a chair on a rail and can move downwards under an angle to reach instruments centrally in the glass section while his normal position is something more inside. The vertical stairs between the decks give you the feeling to be aboard of a ship. The same feeling occurs when you walk through the cargo bay into the turret over rubber steps on the metal fuselage to reach the turret house.

Better avionics for all round operations

What is known about the avionics apart from the secrets? As we know, the IL-78 is at least equipped with an integrated (automated) flight control and aiming-navigation system including a compass system, ground surveillance radar, a central digital computer, automatic monitoring system, automatic flight control system short-range radio navigation and landing system, IFF-transponder optical/infrared aiming sight and a ground collision warning system installed from the factory. More specific and partly Western avionic features are distance measuring equipment (DME), dual VHF navigation/communication and X-band colour weather radar of HAL central in the nose(while the Koopol navigation radar is inside the blister under the nose). Other instruments are Traffic Collision Avoidance System (TCAS), Global Positioning

System (GPS), cockpit voice recorder/flight data recorder, Instrument landing System (ILS) and Tactical aid for navigation (TACAN), but not all features have been unveiled to foreigners. Israeli avionics are fit on Indian specifications and ELTA systems is supporting Hindustan Aeronautics (HAL) and Defence Research and Development organisation (DRDO) with co-developing of new avionics. IAF keeps up the best available abilities smartly. Recently during overhauls a new Reduced Vertical Separation Minima (RVSM)-suite is installed, a mandatory requirement if aircraft are to fly above 29.000 feet. IAF officers said the vertical separation between two aircraft flying above 29.000 feet have been reduced from 2000 to 1000 feet by an international consortium. The suite is highly accurate and gives a warning for every 300 feet change in altitude. More important is that the suite permits the aircraft to fly at higher levels and thereby consumes less fuel.

Combat ready if necessary

The IL-76M/IL-78 has a defensive counter measures system, comprising a radar warner/jammer with six antennas in small blister fairings arranged around the aircraft to give 360 degrees coverage. The antennas are located between the centre windows, at front of the navigators compartment, on each side of the front and each side of the rear fuselage and there are infra red flare cartridges with packs of ninety/six 50 mm IRCM flares on landing gear fairings and/or sides of the rear fuselage and a chaff dispenser. Of course, the best defending mechanism are the fighters in the surrounding. Being vital for them to come home, the tanker is a High Value Air Asset (HVAA). The IL-78 is in India called a 'force multiplier' and this indicates the far enhanced capabilities.

Force multiplying by tanker aircraft

Few people understand how important the introduction of the IL-78MKI in the Indian Air Force really is and how the combination with the Sukhoi Su-30MKI is influencing the military balance in Asia. The Su-30MKI is an air dominance aircraft and with the help of the IL-78 its range can be extend and can be assured that it is able to operate from any air base throughout India even as far as Andaman and Nicobar Islands which are way beyond the reach of Pakistani missiles. This worries Pakistan so much that it intends to acquire four IL-78 Midas tankers too and make sure that they equally can create a force multiplying or power projection. India however is that much content about their concept that, according a 2004 announcement they ordered six additional (other reports say eight) IL-78M to supplement the ones already in service. This time the tankers will not only be customized with the latest technologies but also with more powerful Aviadvigatel Perm PS-90A turbofan engines which are more fuel efficient and permitting the aircraft 25% increase of range. The superiority of the Su-30MKI (in India called the multi role combat aircraft or MRCA) is that obvious that Chief of the Air Staff, Air Chief Marshal S. Krishnaswamy when the first 10 examples came in operational service, called it the best Su-30 version in the world, even better than China's Su-30MKK variant. The Su-30 can be operated as fighter controller and has his own integral function in force multiplying. The superior aerodynamics of the Su-30 is not questionable. Being a large fighter, performing high alpha manoeuvres, loops

and turns with no acceleration is convincing enough once you have seen it. The thrust vectoring ability in the exhaust system makes the aircraft even more agile. Due to safety measures by the organisation this demonstration was not to be shown at the Royal International Air Tattoo at Fairford this year, a disappointment for the public, as well as for the Indian crews who were very eager to show their skills !

Who is superior is the game.

In the mutual exercises with the USAF and French Airforce there have been engagements with F-15C, F-16C and Mirage 2000 DASH-5 with surprising outcome. Not only in aerodynamics the Su-30MKI is superior but also in avionics which again have Israeli, French and Indian components installed. If not involved in beyond visual range (BVR) techniques but in classic within visual range (WVR) dogfight the Su-30 appeared better in radar capability and aiming of AAM rockets. Russian Vympel R27 and R77 (BVR) are of the best designs in the world and pilots can use helmet mounted cue sight to aim. Long time it was believed that Russian weapons were inferior to Western weapons, but time seems to be changed upon this. A Su-30 with an N011M phased array radar and R-77 ramjet missile outclasses the F/A-18A, F-15C and Mirage 2000. Some commentators from Moscow have given it a 2:1 advantage in weapons handling, target acquisition and evasive characteristics for the Su-30. Indian pilots have created their own combat techniques and proved to be very smart, flexible and adaptive. This was also not an expected fact because Western tactical experts used to stay on their vision of dealing with Russian style pilots with rigid tactics and no independent moves what so ever. All this matters combined points out the Indian fighters to a real considerable threat leaving the Western analysts and USAF Command thinking it over how credible their own weapons are. It seems that only the Eurofighter Typhoon can actually oppose in dogfight. The Typhoon is more stealthier than the Sukhoi and has a smaller radar signature. Beside this, the Typhoon has a really good ECM package and with supercruise ability it has a very good chance to stay out of the envelope of the Su-30 especially when it will be equipped with the very fast and long distance BVR Meteor ramjet AAM in future. The balance seems restored, but insiders expect that Sukhoi and Lyulka will also apply supercruise ability on the Su-30. The Indian Su-30 crews praised the Typhoon and described it like a Hunter. Amongst other aircraft believed with superior avionics is definitely the Rafale and its Spectra avionics suite (although the avionics suite of the Su-30MKI is very secret) and also the F-22A is expected to deal with the Sukhoi quickly and effectively. During the exercise above the UK next to Typhoons, also RAF Tornados, E-3D Sentry's and Harriers Gr.9 were active together with the Flankers and the Midas

IL-78 crucial in arms race Asia

In the meanwhile, the ambitions of India caused an arms race in Asia. More and more countries in the region wants to have the latest Su-30 variant while Pakistan, relying on Chinese fighters needs really good avionics with really good radars on their aircraft rather than acquiring new ones. The concept of force multiplying attracts also other players in the area. China planned 38 IL-76MD and IL-78 tankers for their Su-30MKK force, but also Teheran collaborates with Rosoboronexport for 250 Su-

30MKM and 20 IL-78MKI. Iran leaned hard on New Delhi to let them have the Israeli avionics and electronics installed on the Su-30MKI. India refused and nicknamed the attempt as 'Islamic version of Sukhoi'. The fact that Iran will have such an amount of superior fighters in future must cause at least some worrying with Israel and the United States. Another item is the advanced IL-76 Airborne Early Warning, Command and Control (AEWC&C) with ELTA 'Phalcon' active phased array electronic scanning technology avoiding a rotodome on the platform but capable of 360 degree coverage with IFF, ESM/ELINT and CSM/COMINT. With the introduction of the Phalcon AWACS, the Su-30 will ensure complete air superiority for the Indian Air Force. The Phalcon radar will greatly enhance IAF's surveillance capability against incoming surface-to-surface missiles as well as provide the means to strike deep into enemy territory. As a strategic asset, the IL-76AEW is most welcome. The concept was very attractive to China, sending two A-50's to Israel for customizing with the most advanced avionics. Under pressure from Washington, the bargain was broken. Now China prepares to get A-50 AEW systems improved at Russian Taganrog Aircraft Corporation.

High objectives in future

The Indian Mod official claimed that by 2020 the IAF would have achieved to be one of the most advanced air forces in the world with the Phalcon AEW aircraft arriving in 2007-2008, 140 Su-30MKI fighters in 2016 and a huge fleet of light quick reaction fighters including the LCA. Insiders are reporting unconfirmed negotiations with Russia for the lease of four Tu-22M Backfires, but India should like much more the reopening of the Tu-160 production line and acquiring 'Blackjack' bombers with intercontinental capabilities. In the meanwhile, an aircraft carrier with Mig-29, will predominate India's power at sea locally. This underlines India's ambition not only to be a regional superpower with strategic aim but having also the objective to go for a higher goal. By presenting itself in an equal or superior way to the biggest air forces in the world India would convince that a permanent seat in the UN security council would be a fair reflection of India's military importance in the world. Exercises and squadron meetings like in Indra Dhanush with superior outcome for India will be of great help to earn this respect.

INVASION OF THE COURAGEOUS INDIAN CRUSADERS

Relatively quietness rules when we arrive on the platform that will be our stage for today, after a welcome by amongst others the French basecommander and the Indian squadron commander who gave us a briefing and answered some questions. Outside the Mirages 2000 seem to be waiting on what their contribution will be this day, accompanied by some transport and VIP planes. In the background some French tankers seem to enjoy the upcoming sun on their frames. In the middle of this scene we find some Eye-catching-Blue-Birds of the Indian Airforce !

Suddenly the platform loses its quiet virginity and hard working Indian and French Pilots, crews kerosene-trucks, fire brigades and caretakers of about everything you can think of rule the pixels of our camera's. Inbounding huge, firm, proud machines suddenly appear, and seconds later some mighty SU-30MKI's move over the

concrete of the French airbase Istres in a majestic but easy way. The experienced pilots swing their SU-30's from the runway over the taxiway to the platform, taxi behind the Mirages 2000 and park them as if they were familiar for years already on this base. But nothing like that at all. It's the first time the Indian Flankers are hosted by the French. The 'Invasion of the Courageous Crusaders' results in a fine line with Mirages 2000 and Flankers friendly side by side. The Indian ground crews march disciplined side by side to the Fighters of which they will take care after the first flights.

The Six Indian Air Force Sukhoi Su-30MKI visited the French air base Istres (BA-125) between 17-28 juni 2005 for joint exercises under the name Garuda 2. Garuda is the name of the beautiful bird on which the Indian God Vishnu reached the heaven. When you see the mighty Su-30MKI "Flanker" in all his majesty in the air no one could ever find a more suitable name. It was the first time Indian Flankers come for exercise to Europe. The Indian Air Force is very eager to gain experience in international exercises and to discover at what point they are in modern air warfare. Recently the Indian Air Force joined the big American exercise "Red Flag" at Nellis AFB and the exercise co-operative COPE Thunder at Elmendorf AFB in Alaska. India hosted the USAF back when a detachment of the 3rd wing F-15C from Elmendorf AFB take part in exercise COPE India at airbase Gwalior. In fact these occasions where the first bilateral Dissimilar Air Combat Trainings (DACT) between the USAF and the Indian Air Force in more than 40 years. France visited Gwalior AB too in February 2003 during exercise Garuda 1 with 4 mirages 2000 RDI which resulted in the return visit now.

SHARP IN THE SKY

Objectives of this exercise was to learn from each other and find out how far interoperability could be reached. Of course every squadron is used to his own tactics and everyone is curious how it will work out. To find out where you are superior and where your weakness appears is very valuable. Occasion like this can bring many good aspects in the learning process. On the ramp "the invasion of the Courageous Crusaders" results in a fine line with Mirage 2000's and Flankers friendly side by side. In the background we see some French tankers enjoying the upcoming sun on their frames. The Indian ground crews march disciplined side by side to the flankers and prepares them for action. Another hot day has yet to come. The first day was for the Indian Air Force to do reconnaissance and become familiar with the fly zones high above South France and the Mediterranean, following the next days with Air Combat Missions (ACM) with increasing complexity. Forces were split in Blue and Red forces with constantly change of settings. Attack and defensive missions like offensive and defensive counter air missions were on the programme. Combat Air Patrols (CAP) with 2 attackers versus a sweep force of 2 defenders or even a mixed force with 2 Flankers and 2 Mirages Red Force in the CAP role and the same setting in the sweep role Blue Forces. Meetings were both in visual combat (dogfight) and beyond visual range (BVR) engagements.

Also mixed patrols together to guard no-fly zones were exercised and finally there was a French AWACS involved to attack or defend this High Value Airborne Asset (HVAA). Another important exchange was the air-to-air refuelling cross linking

exercise with each others tankers. One Boeing C-135FR from Istres served the Su-30MKI Flankers and a Il-78 Midas tanker served Mirages with new fuel.

Like the SU-30 this Ilyushin-78 is an imposing appearance. The inside of the plane is filled up with an enormous yellow painted tank. Possible to walk along but no more than that. It littuarely is a flying fuel tank ! Some 80 sorties were flown by the Mirage 2000 in different versions including the Mirage 2000 N strike version and 74 sorties by the Su-30. The AWACS was involved in 3 sorties (4 missions) and the tankers both in 4 missions.

COMMENTS FROM THE INDIAN COMANDER

The answer on the question to the Indian squadron commander Shreesh Mohan what was learned so far was both modest and diplomatic. Because everything has yet to be evaluated no specific things were there to be mentioned. Both party's learn about their own procedures and those of the opposite party. It is not that we do things wrong or they do it well. It is more we do things different and so we can learn and experience and perhaps reach new values or standards. It occurred that the USAF was a little bit disappointed in their performances with the F-15C against the Su-30MKI. The smiling answer was that we mustn't exaggerate the performances of the Su-30MKI. Only in slow speeds the aerodynamics are better, but in high speeds there is equality. In his opinion the better radar and avionics of the Su-30MKI makes the difference. On the question if the Indian Air Force reached Air Superiority on the Indian Subcontinent Commander Mohan replied; more ore less, but it will always be a political matter.

SU-30MKI CHARACTERISTICS

The Su-30 MKI was delivered from the Irkutsk factory in Russia in an initial batch of 40 aircraft. Later series are to be produced under licence with Hindustan Aeronautics

Ltd (HAL) in Nashik and will go up to 120-140 (not exactly confirmed) until 2012/14. The deal includes production of Lyulka AL-35F turbofan engine too. The Su-30MKI has the newest features like "canard foreplanes" and thrust vectoring control (TVC) which increases the agility in combat dramatically. The superb airframe/engine combination is extremely impressive and gives the plane a very high angle of attack especially at lower speeds. Early examples of the Irkutsk batch lack this features which will be fitted later on. On the avionics part there is an interesting combination of Russian, Indian (mission computer), France (HUD) and Israeli (EW suite) components combined in a "glass cockpit" which could only be viewed by us with eyes. The Defense Research and Development Organisation (DRDO) of India and Bharat Electronics where involved with system integration. The radar is a Russian BARS-29 phase array radar and one of the most powerful in the world with multimode capacity which can engage simultaneously 2 aerial targets with the R-27 (AA-10 Alamo) and 4 aerial targets with the RVV-AE (AA-12 Adder) missile. HOTAS (Hands-on-throttle-and-stick) controls and digital fly-by-wire system (FBW) gives the pilot easy handling and data-link between the Su-30's gives enhanced awareness. India is searching for a system to unify data link on different kind of airplanes to have a on-line communication network. In the nose is the latest version ofIRST with collimated laser and TV-channels for advanced PGM (Precision Guided Munitions)

guidance. The concept is always two pilots in the SU-30MKI cockpit. India has only the twin-seater version in use. Just for a simple flight for example to move an object from one base to another will be carried out by one pilot, but all the (trainings) missions and operational flights will be flown with two pilots to share the workload and accomplish the mission together. Duty's and responsibilities are assigned because they increase, complex missions more and more demand responsibility and workload to be shared. Fully qualified pilots know exactly what task is to be carried out by whom and at what time. Ofcourse within training program WSO's and younger pilots who just finished their training, as well as instructor pilots can be found in the rear-seat of the cockpit. Indian Airforce is recruiting more pilots, so the back-seat can be used if desired by other (system) officers.

The pilot can influence his missiles with a helmet mounted cue sight system. For in flight refuelling India looks at two different ways. In this exercise a massive Il-78 Midas tanker with a huge yellow kerosene tank in the cargo area was used. Some 6 Il-78 tankers are serving in the Indian Air Force and probably some more will be ordered. On the other hand is there a "buddy system" to let one flanker refuel the other. This system is known under the FR-32B-75 central-line refuelling pod and India will order some more of this too in order to increase operational ranges when needed.

WHAT IS POSSIBLE IN THE FUTURE ?

However the Su-30MKI in Istres were still the ones without Thrust Vectoring Control their performances are impressive. Exercising with the thrust vector controlled examples must be promising.

Commander Mohan couldn't predict in what European country the Flankers will show up next but he is certain that this kind of exercises will continue. ' But Gentlemen I have first to end this one and let's have a drink now'. Those were the last words to me on the press day of a very sympathetic commander who seemed to feel so well and contempt with his French hosts.

Wim Das & Kees Otten

Extern resources: Bharat Rakshak, The Hindu Newspaper, Defense Industry Daily and Tempur

Technical data:

Scroll down:

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Technical data Midas

CREW:

Six persons

DIMENSIONS

Length : 46.59m.
Height : 14.76m.
Wing span: 50.50m
Wing area : 300.0 m2
Weights: empty: 98.000 kg

Increased MTOW to 210.000 kg (Maximum Take Off Weight) (Russian variants 190.000 kg.) Maximum landing weight 151.500 kg.

ENGINES

Powerplant: four Soloviev/Aviadvigatel D-30KP-1 Turbofans producing 118 KN(26.455 lbs.) of thrust each.

PERFORMANCES

Speed: maximum 850 km/h 459 knots (528 mph; 459 knots) at 11.000 meters (36.090 feet)
Maximum cruising speed: 800 km/h 432 knots (497 mph; 432 knots)
Speed during refuelling: 400 to 600 km/h
Max. service ceiling: 12.000 metres (39.370 ft)
Range: maximum 3107 miles (5000km) with a 40.000 kg (88.185 lbs) payload.
3650 km with a 50.000 kg payload
7300 km with a 20.000 kg payload
Operational full load range: 2500 km.
Refuelling altitude: 2000 to 9000 m.
Payload fuel WINGS 9000 kg
Payload fuel FUSELAGE 28000 kg
Take Off run: 850 m.
Landing run: 450 m..
Total fuel capacity: 138.000 kg. (304,233 lb) of fuel