L-1011-500 TRISTAR TECHNICAL PROFILE

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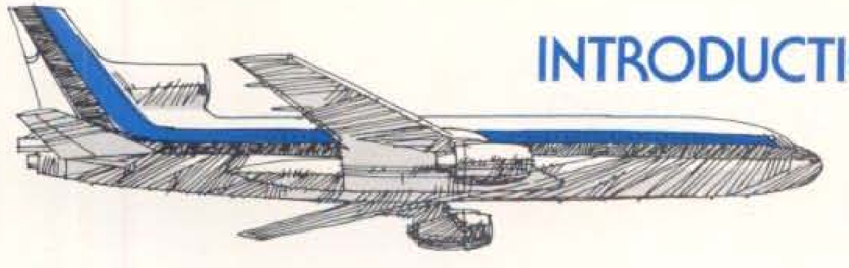


INTRODUCTION

The L-1011-500 is the newest, most advanced member of the L-1011 TriStar family of wide body jet transports designed to meet the medium to long range air traffic demands of the 1980's/1990's. Entering airline service in 1979, the L-1011-500 complements the other L-1011 TriStar models by offering increased range and payload flexibility to provide optimized service over an intercontinental airline's long haul, medium density routes.

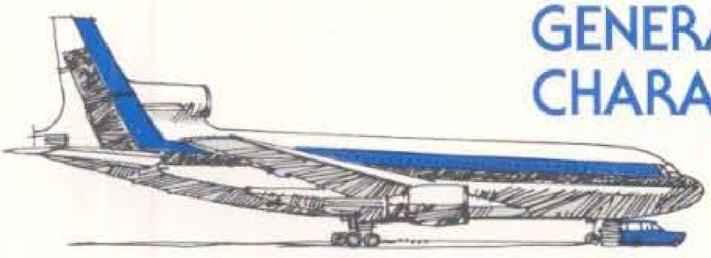
Featuring an optional maximum takeoff weight of 504,000 pounds (228,600 kilograms), the L-1011-500's outward appearance is similar to that of other L-1011 TriStar family members except for a shorter fuselage and a large cargo door to accommodate pallets, containers, or a combination of both, in the forward cargo compartment.

The basic L-1011-500 accommodates 240 passengers in a standard mix of 10 percent first class, 90 percent economy class, and features cabin level galleys, eight lavatories, and generous provisions for stowage of coats and cabin baggage.

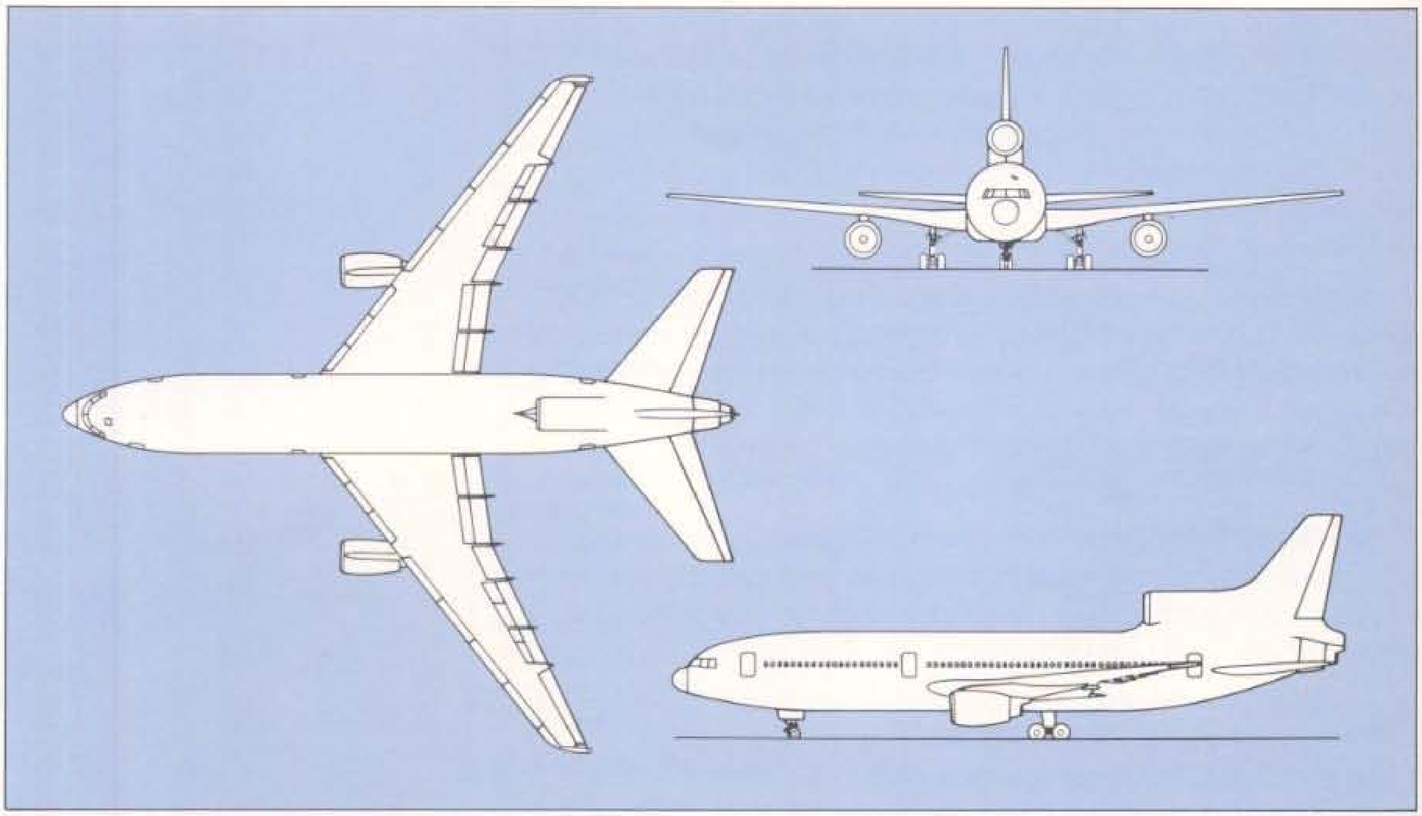
Powered by advanced 50,000-pound-thrust Rolls-Royce RB.211-524B engines, the L-1011-500 will operate efficiently over still air ranges from 500 to 5,500 nautical miles (900 to 10,000 kilometers). This capability exceeds that of the longest range B-707/DC-8 aircraft and thus will permit the TriStar 500 to serve virtually all the world's intercontinental routes.

As a result of the advanced technical features and optimized payload capacity of the L-1011-500, direct operating costs per airplane mile of competitive long haul wide body aircraft are 10 to 40 percent higher. At the same time, the L-1011-500 offers out-of-pocket seat mile costs 20 to 25 percent lower than those of narrow body equipment presently used on many low/medium density intercontinental routes. Consequently, the L-1011-500 represents an ideal choice of new flight equipment to replace aging B-707/DC-8 aircraft in airline fleets around the world.

Lockheed has a continuing product improvement program designed to maintain its established technical leadership in commercial transport aircraft design. One result of this program is the incorporation of wing tip extensions and active controls to further improve the fuel efficiency of the L-1011-500. Another result is the Performance Management System (PMS) which provides a means for automatic, accurate control of airplane speeds and engine thrust during climb, cruise, and descent to minimize fuel consumption or operating costs.



GENERAL CHARACTERISTICS



Dimensions and Capacities

Fuselage

Overall length	164 ft 2 in	50.0 m
External diameter	19 ft 7 in	6.0 m
Cabin inside maximum width	18 ft 11 in	5.8 m
Cabin floor above ground	15 ft 2 in	4.6 m
Cargo sill above ground	9 ft 4 in	2.8 m

Wing

Span	164 ft 4 in	50.1 m
Area	3541 sq ft	329 sq m
Sweep at .25 chord	35 degrees	
Aspect Ratio	7.62	

Empennage

Horizontal		
—span	71 ft 7 in	21.8 m
—area	1282 sq ft	119.1 sq m
—sweep at .25 chord	35 degrees	
Vertical		
—height above ground	55 ft 4 in	16.9 m

Landing Gear

Wheel base	61 ft 8 in	18.8 m
Main gear tread	36 ft	11.0 m

Doors

Cabin type A		
—four	42 × 76 in	1.1 × 1.9 m
—two	42 × 72 in	1.1 × 1.8 m
Forward cargo hold	104 × 68 in	2.6 × 1.7 m
Center cargo hold	70 × 68 in	1.8 × 1.7 m
Aft cargo hold	44 × 48 in	1.1 × 1.2 m

Cargo Volume

Forward hold		
—twelve LD-3	1896 cu ft	53.6 cu m
Center hold		
—seven LD-3	1106 cu ft	31.3 cu m
Aft hold		
—bulk	435 cu ft	12.3 cu m
Total	3437 cu ft	97.2 cu m

Basic Interior Arrangements

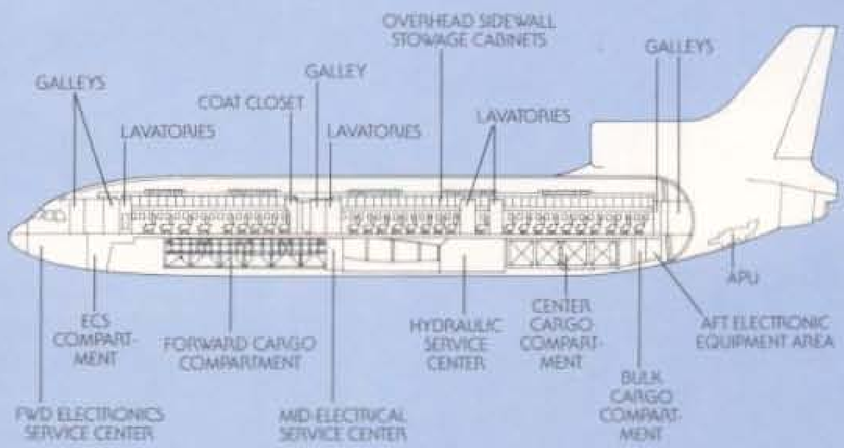
The inboard profile and interior arrangements demonstrate how efficiently space is utilized on the L-1011-500. Two extra-wide aisles run the length of the cabin and three spacious cross aisles connect each pair of cabin doors.

A basic mixed class interior with ten percent first class and ninety percent economy seating can confortably accommodate 240 passengers. However, a second basic interior is also available. This alternate places five lavatories at the rear of the cabin, which is arranged to seat 242 mixed class passengers. Optional interior arrangements include higher capacity designs accommodating as many as 330 passengers.

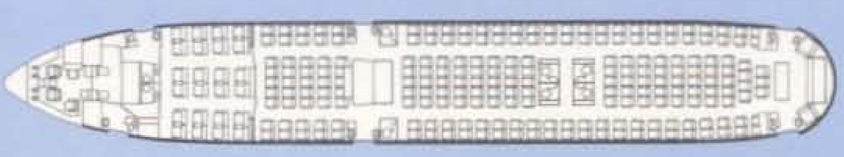
Fast efficient cabin service aboard the L-1011-500 is provided by a dispersed galley arrangement, including one first class and two economy units. Each galley location may be serviced directly by a ramp vehicle through a large passenger type door.

Both forward and center cargo holds are equipped for mechanized loading. The larger forward hold accommodates 88 x 125 inch pallets, LD-3 containers or various combinations of both. The center cargo hold accommodates LD-3 containers, and the aft cargo hold, intended for bulk cargo, has a separate loading door.

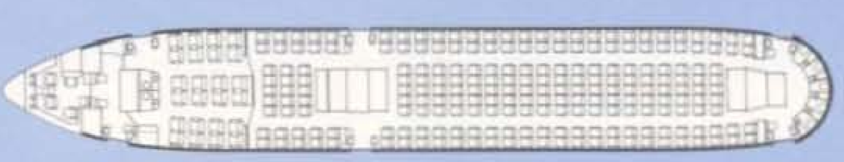
INBOARD PROFILE



INTERIOR ARRANGEMENT



240 PASSENGERS/24 FIRST CLASS/216 ECONOMY



242 PASSENGERS/24 FIRST CLASS/218 ECONOMY

Interior Flexibility

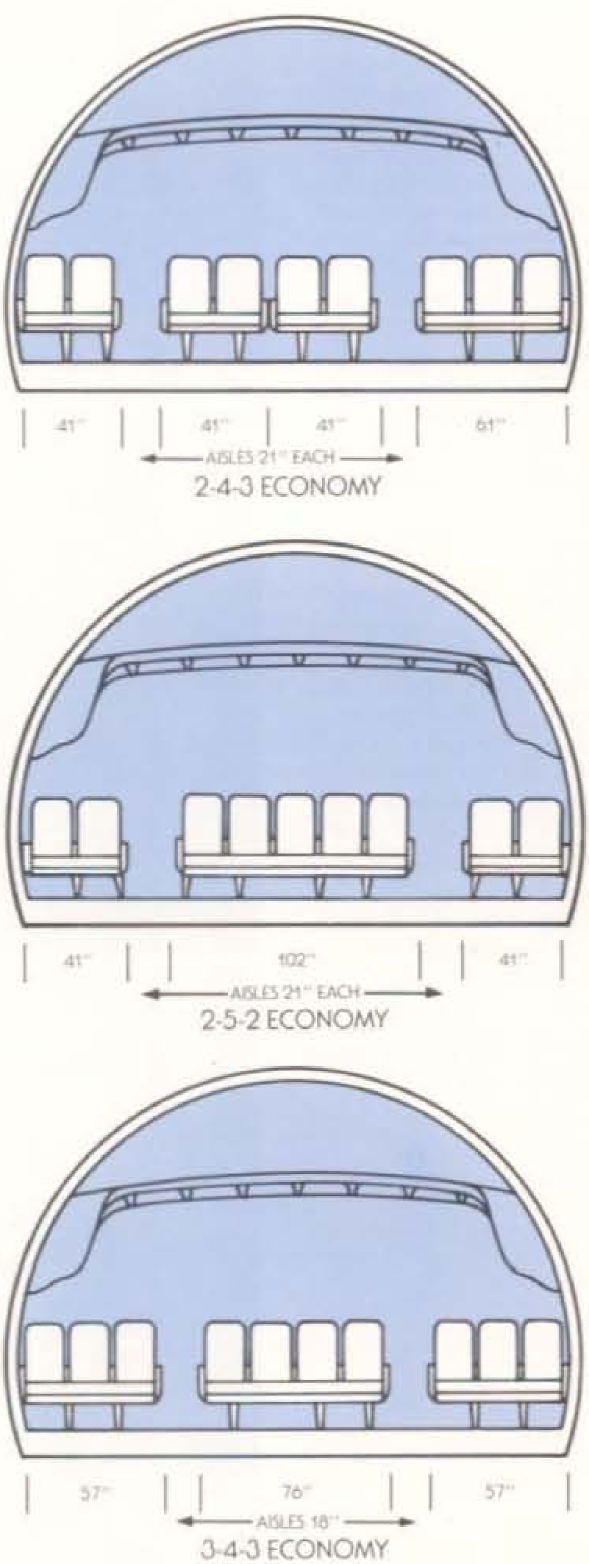
The L-1011-500 design provides an airline with interior flexibility by offering a choice of cabin interiors and seating arrangements. The inside width of the L-1011 TriStar cabin also offers more flexibility and spaciousness in the selection of aisle width, seat width and storage facilities than any other wide body jet with comparable interior arrangements.

Ceiling and sidewall treatment is uniform throughout the cabin so as not to limit various interiors. In the economy section, center row seats are staggered with respect to the window seats, providing easier access to aisles during peak traffic conditions.

The L-1011-500 offers a choice between two basic mixed class interior arrangements. Both offer an advanced food service system of high efficiency and maximum flexibility. Each provides for one first-class group of three galley units forward, plus two separate and complete economy complexes. These complexes straddle the cross aisles between each pair of large cabin doors, thus providing ease of servicing from the side opposite that from which the passengers are boarding. Altogether, these galleys can provide sufficient storage and preparation for 600 full course meals.

The major difference between the alternative basic interior arrangements is in the lavatory location. For either, the nine-abreast economy seats may be placed in a 2-5-2 or 2-4-3 pattern.

CROSS-SECTIONAL VIEWS



2-4-3 ECONOMY

2-5-2 ECONOMY

3-4-3 ECONOMY

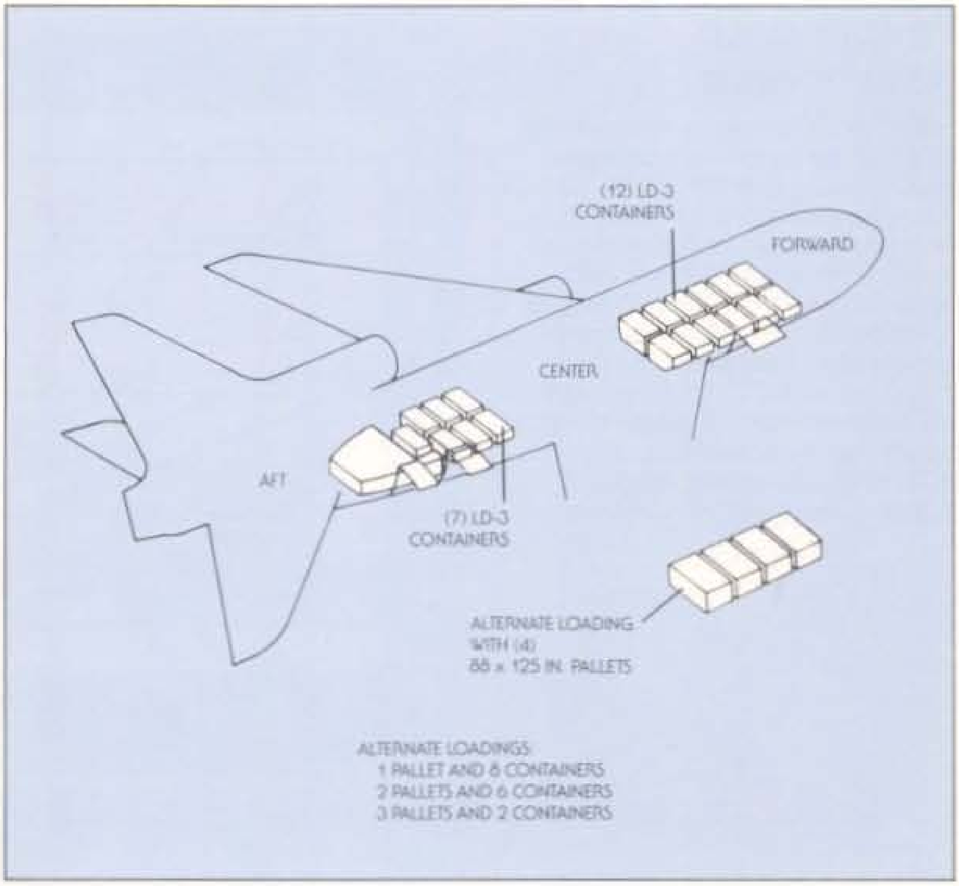
Cargo Capability

The L-1011-500 has three cargo holds, designated forward, center and aft. The forward hold has a large cargo door, permitting fully mechanized loading of four 88 x 125 inch pallets. Each pallet has a weight limit of 9,500 pounds (4,300 kilograms). Alternately, the forward hold will accommodate twelve LD-3 type containers, or several combinations of pallets and containers.

The center hold is equipped to load mechanically up to seven LD-3 containers, each with a weight limit of 3,500 pounds, (1,600 kilograms).

The aft hold can accommodate up to 435 cubic feet (12.3 cubic meters) of bulk cargo through its own door, and is used primarily for special, oversized or last minute cargo, including small animals.

The location of three cargo and three cabin doors on the right side of the airplane is such that servicing of all three cargo holds, three cabin level galley areas, and other maintenance or servicing activities can be carried out simultaneously.



L-1011-500 Cargo Accommodations

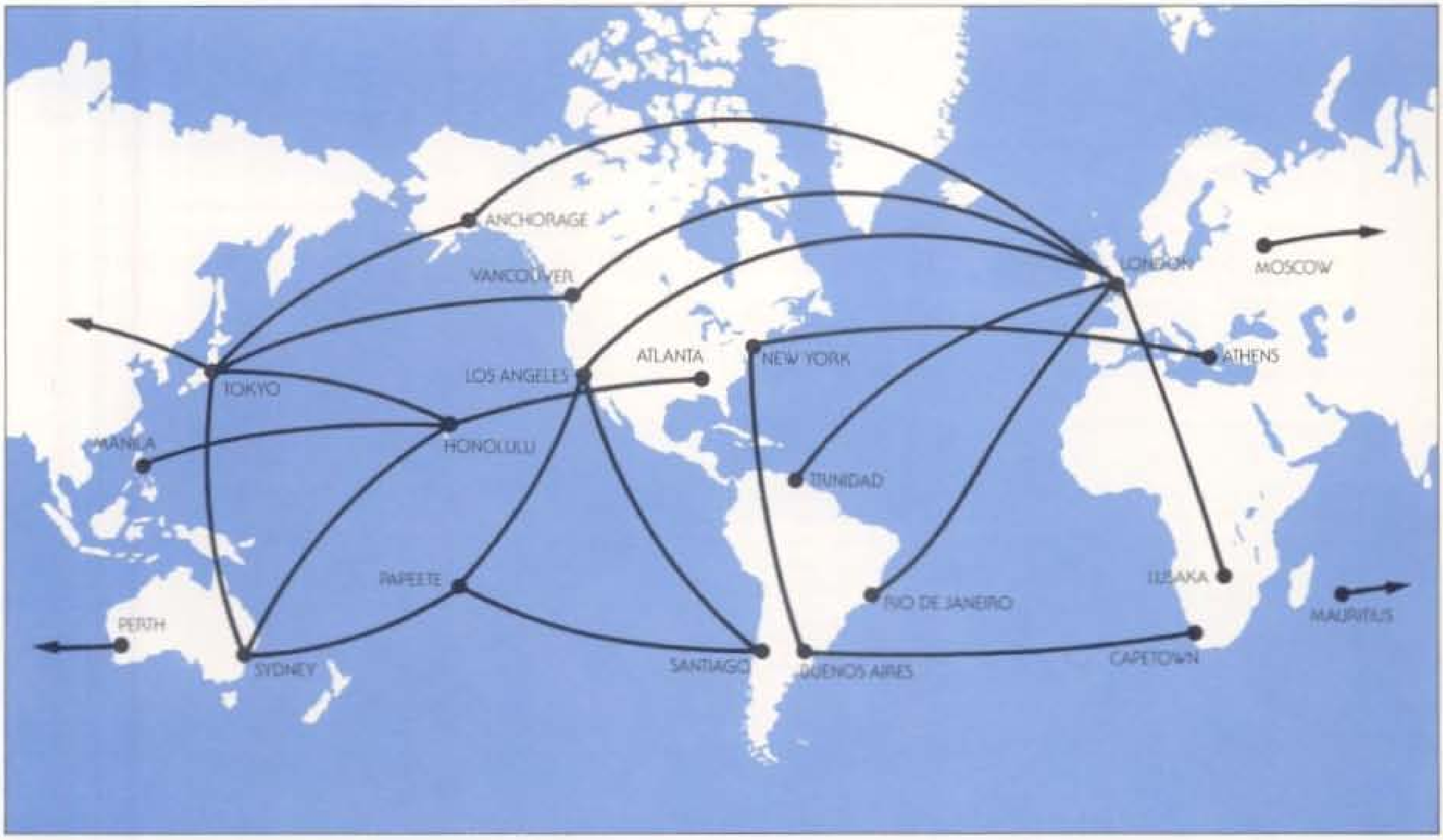
			HOLD		
			Forward	Center	Aft
CAPACITY:*					
	Pallets	Weight (lb/kg) Volume (ft^3/m^3)	14,800/6,713 4 @ 370/10.5		
	LD-3's	Weight (lb/kg) Volume (ft^3/m^3)	18,960/8,600 12 @ 158/4.5	11,060/5,017 7 @ 158/4.5	
	Bulk	Weight (lb/kg) Volume (ft^3/m^3)	24,000/10,886 2,400/68.0	14,000/6,350 1,400/39.6	4,350/1,973 435/12.3
STRUCTURAL LIMIT:		(lb/kg)	31,500/14,288	24,500/11,113	5,500/2,495
DOOR SIZE:		(in/cm)	104×68/264×173	70×68/178×173	44×48/112×122

*Weights are space limited based upon an average density of 10 lb per cu ft (160 kg per cu m) for baggage and cargo.

Worldwide Operations

The L-1011-500 is designed for optimum operations over long haul flight segments. Effective aerodynamic design of the L-1011 TriStar, combined with high-bypass ratio engines, results in a high level of operational flexibility.

The chart below indicates a few of the flight segments, world wide, that are suitable for operation by the L-1011-500. On any segment indicated, the L-1011-500 can transport 240 passengers and baggage against 85 percent probability winds.



Noise Characteristics

Airport noise levels for the L-1011-500 have been certificated as:

☐ Takeoff	98.0 dB
☐ Sideline	96.9 dB
☐ Approach	100.2 dB

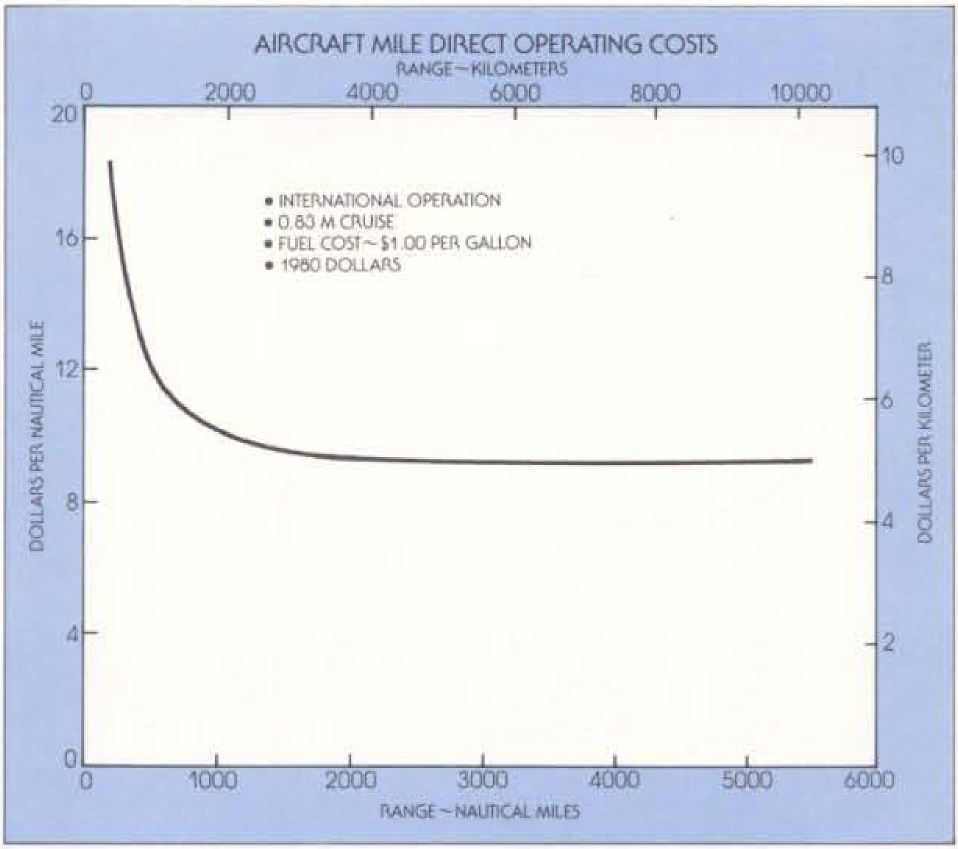
These levels are well within the limits specified for stage III, amendment 8 (1978) to FAR Part 36.

The L-1011-500 also has excellent cabin noise level characteristics. For example, aisle average Speech Interference Level (SIL) has been demonstrated at better than 62 dB, as has an Overall Sound Pressure Level (OASPL) of 88 dB.

ECONOMICS

The intercontinental range L-1011-500 offers excellent operating economics which are even further improved for L-1011 operators by the high degree of commonality with other models of the L-1011 TriStar family.

Major factors in achieving attractive operating costs and operational flexibility are high bypass ratio turbofan engines offering low specific fuel consumption, advanced structures and functional systems capable of previously unattained performance levels, with special emphasis on design for reliability and maintainability.



Reliability

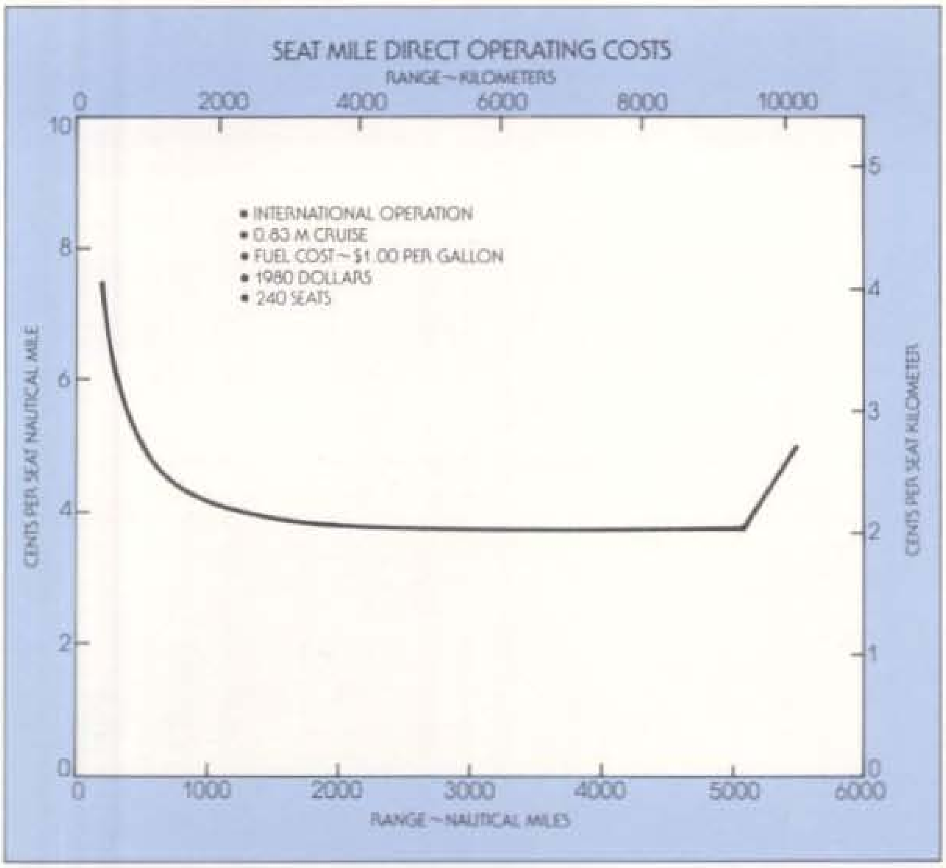
Dispatch reliability is among the most important transport airplane characteristics leading to satisfactory economic performance. Obviously, flight delays and cancellations are costly in themselves; but, in addition, the secondary or follow-on effects can disrupt the proper functioning of an entire airline system.

Thus, it is highly significant that the worldwide TriStar fleet (including the L-1011-500) has consistently demonstrated better mechanical dispatch reliability than competitive three and four engine wide body aircraft.

Maintainability

Because maintenance expense is the most important operating cost element other than fuel that can be influenced by airframe and engine designers, L-1011 maintainability requirements were defined at the very outset of the development program. As a result of these requirements being carefully adhered to, all L-1011 aircraft have the following significant maintainability characteristics:

- virtually all components on-condition or condition-monitored
- designed for overnight maintenance capability
- 98 percent of all line replaceable units (LRU) demonstrated to be replaceable in one hour or less
- most fatigue and corrosion resistant structure of any contemporary aircraft
- most effective built-in test capability of any aircraft currently in airline service
- fault reporting and isolation system generally accepted as most effective in the industry

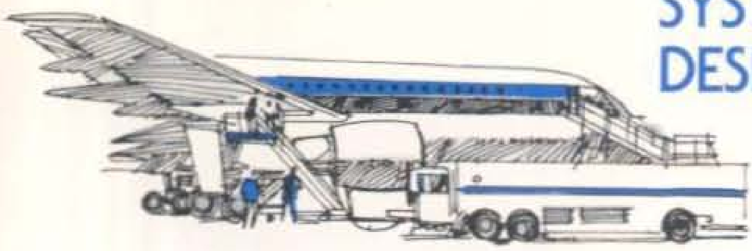


Direct Operating Costs

Because of the high order of commonality between the L-1011-1 and L-1011-500, several years' experience in operating the former has been used to provide a sound base for both specific and generalized data which follow.

The principal assumptions used to estimate the 1980 operating costs shown here include:

Flight Crew	—1967 ATA escalated 9 percent per year
Fuel Price	—$1.00 per U.S. Gallon ($0.26 per liter)
Insurance Rate	—1 percent
Depreciation	—16 years to 10 percent residual value
Spares	—15 percent total aircraft price
Utilization	—3650 block hours annually
Labor Rate	—$13.00 per hour
Maintenance Labor & Material	—Lockheed/Rolls Royce
Maintenance Burden	—200 percent direct labor



SYSTEM DESIGN FEATURES

The L-1011-500 intercontinental range jet transport uses proven L-1011 TriStar structural and functional subsystems modified and developed to provide the most advanced subsonic commercial transport system available today. This section of the L-1011-500 Technical Profile discusses and illustrates the principal subsystems, and gives an appreciation for the level of advanced technology incorporated. Every subsystem is state-of-the-art. Avionics, structures, flight controls and guidance have advanced features available only on L-1011 series aircraft. The result is a quiet comfortable aircraft offering proven on-time reliability, an aircraft that is easy to fly and maintain, and at the same time is economical to operate.

Flight Station

Comprehensive human factor considerations have been incorporated into panel arrangements, instrument displays, window design and control locations in the L-1011-500 flight station. These features provide exceptional internal and external visibility, utility, and flight crew comfort. Stations for three flight crew and two observers are fitted with fatigue reducing seats. Low velocity, conditioned air follows the contour of compartment walls and windows to eliminate drafts. Acoustic insulation and the use of a distortion free curved windshield reduce flight compartment noise. Convenient vertical and horizontal reference is provided by the side posts and horizontal glare shield for visual flight attitude orientation.

Excellent L-1011-500 visibility under all operating conditions is augmented by use of direct lift control (DLC) during landing approach. DLC maintains a relatively constant deck angle which results in an equally constant visibility range.

Flight Guidance and Control

Demand for more reliable operational performance and increased safety led to four outstanding features in the L-1011 TriStar flight control system:

- Full hydraulic power controls
- Flying stabilizer

- Direct Lift Control (DLC)
- Avionic Flight Control System (AFCS)

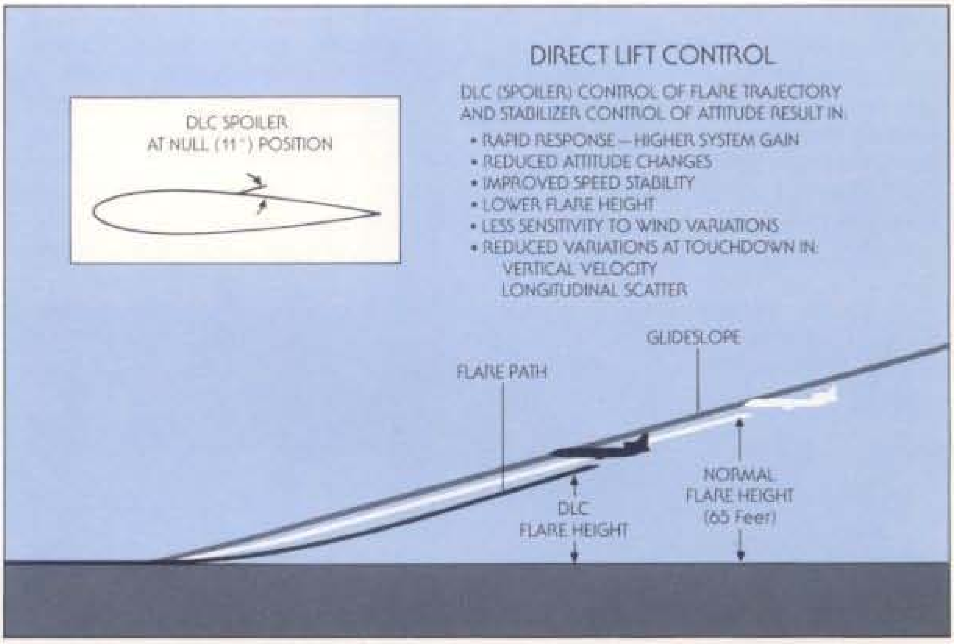
All four features have a beneficial effect on operational safety. Hydraulic power controls assure consistently good handling qualities and minimum degradation in the unlikely event of multiple hydraulic system failures. The flying stabilizer eliminates the hazards of mistrim and assures a large longitudinal control power margin. Direct lift control reduces longitudinal touchdown scatter by providing more precise vertical speed control during final approach and landing, and provides substantially faster reaction to wind shear conditions. Avionic flight controls are carefully tailored to create an airplane with superior handling qualities and increased safety due to reduced pilot workload, particularly during IFR weather conditions down to Category IIIA minima.

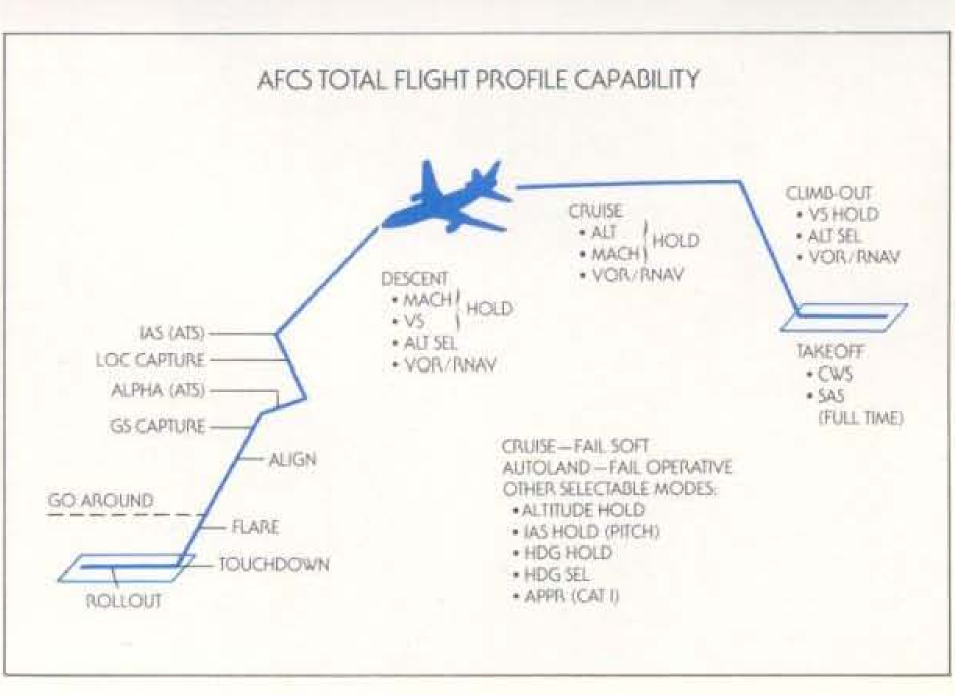
The L-1011 TriStar hydraulic system was designed as four separate subsystems. This arrangement of four continuously operating systems provides positive power availability at all times for control of the aircraft. It also provides required redundancies for safety and reliability without undue weight penalties. Simplicity in design of this power system is the basis for its exceptional reliability and ease of maintenance.

The L-1011 flying stabilizer is used to trim and maneuver the aircraft. Each of the four hydraulic subsystems provide power to one of four actuators, which move the stabilizer in unison as commanded through servos by the pilot. Any one of the hydraulic actuators is capable of moving the stabilizer and controlling the aircraft pitch. Elevator position is linked to that of the stabilizer by a mechanical drive, causing the camber of the horizontal surface to change in response to pitch control inputs.

Direct lift control is provided by symmetric deflection of the spoilers. As throttle is reduced and flaps deployed on approach, DLC automatically moves into operation. The inboard four spoilers on each wing are extended eleven degrees, and modulate about this position in response to control inputs. For example, aft movement of the control column reduces spoiler extension, directly increasing lift without significant change in aircraft attitude. DLC enables precise glide slope tracking and more accurate control of the landing flare maneuver than previously obtainable.

Meanwhile, as the aircraft descends to a landing, roll control by the ailerons is being augmented automatically by asymmetric movement of the outer spoilers on each wing. Positioning the spoilers, some of which simultaneously provide flight path and roll





correction, is done through one component of the comprehensive L-1011 TriStar Avionic Flight Control System (AFCS). This carefully integrated system also provides other electronic control, warning and indicating subsystems to assist either manual or automatic control of the aircraft, speed control through throttle adjustment, and stability augmentation. These various automatic control modes are combined with auto pilot-flight director guidance applicable through all phases of flight. The total system was specifically designed to accomplish fully automatic approach and landing. Upon entering airline service the L-1011-500 received FAA certification that it met the stringent safety and performance requirements for fully automatic operation through category IIIA landings—during which the runway need not be seen from the flight station until touchdown.

Energy Conservation Features

Fuel cost has become an increasingly important factor in airplane operating economics. Though future aircraft designs will reflect emphasis on fuel conservation, there is an immediate need to apply those technical measures that are currently available to existing product lines. Lockheed's response is reflected in the L-1011-500 by reconfiguration to reduce airplane drag, and by improving powerplant and flight profile management through automation.

Extended Wing/ Active Controls

It has long been known that increased wing span (higher aspect ratio) provides drag reduction, but in the past—when fuel prices were much lower—it was not cost effective to add the structural weight and cost required. Today, when the increased span is beneficial, adding tip extensions to existing wings causes significant increases in structural loads. This usually necessitates redesign of the basic wing structure, and increased airplane empty weight.

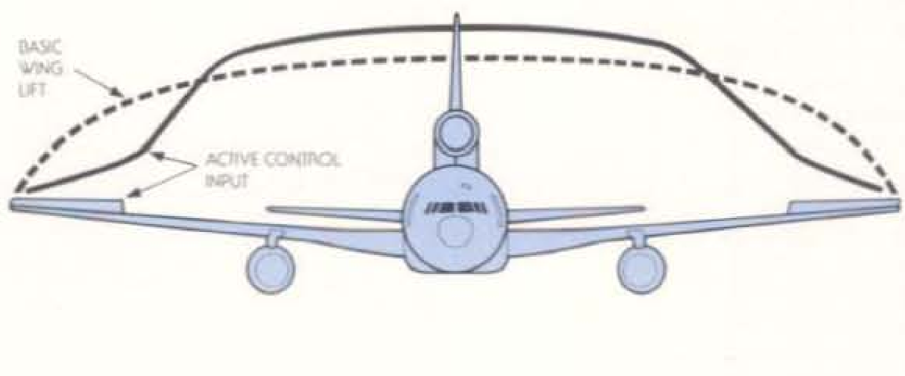
However, such redesign has been avoided on the L-1011-500 by incorporating an active control system which automatically applies load-relieving inputs to the outboard ailerons. As illustrated, when vertical accelerometers sense an increase in wing loads due to gusts or maneuvers, both ailerons are deflected upward, reducing lift over the outer wings. Total lift is redistributed inboard, reducing bending moments to the level of the previous wing structure. This system also provides the passenger a smoother ride in turbulent air, and reduced fatigue loads on the wing.

This active control system is "fail operational," and has the same redundancies as other components of the L-1011 avionic flight control systems.

Performance Management System (PMS)

Cruising at peak specific air range Mach number would appear to be an obvious energy conservation measure, and an easy one to achieve with the sophisticated autopilot/autothrottle systems available. However, an anomaly common to all modern jet transports is the lack of speed stability in the most efficient region. Holding constant air speed at cruise altitude requires virtually continuous throttle adjustment, manually or through the

ACTIVE AILERON CONTROLS



speed control system. This excess throttle movement is not only annoying to the flight crew, but can have adverse effects on engine life. The result is that aircrews tend to avoid the unstable region by cruising at a higher Mach number, gaining speed stability to the detriment of fuel economy.

The L-1011-500 Performance Management System (PMS) was developed to solve this basic cruise-mode problem, and its capability was extended to the climb and descent modes to assure the most efficient operation throughout the flight profile. Retaining infrequent throttle changes for long-term speed control, PMS will first vary pitch to achieve short term adjustment. The autopilot's altitude hold mode operates within a tolerance band of ± 50 feet for this purpose, moving to throttle adjustment only if the tolerance is exceeded, or when a new altitude is selected. PMS provides engine pressure ratio and gas temperature protection at all times, relieving the flight crew of much time consuming monitoring responsibility, especially during turbulence. The crew may instruct PMS to use minimum cost, minimum fuel consumption, maximum endurance or some other performance option preprogrammed into the PMS to satisfy customer requirements. As conditions vary enroute (wind change, fuel burn-off, cruise altitude change) the calculated optimum cruise speed is continuously updated, with appropriate control signals sent automatically to maintain this speed. For descent, PMS will "back compute" from any predetermined navigation point, instructing the aircraft to begin its descent so as to arrive over the point on-altitude and on-speed.

The PMS digital computer is integrated into the L-1011-500 digital avionic flight control system, accepting information from the engines, central air data system and navigation receivers, and supplying control signals to the autopilot and autothrottle systems. A control and display unit provides an interface with the flight crew.

An integrated automatic navigation function may be added to the PMS as an opiton. Called Flight Management System (FMS), this additional capability includes area navigation, and automatic tuning of navigation radios.

Airframe Structure

L-1011-500 structural integrity has been proven by the basic L-1011 TriStar structure, verified during a 2½ year test program on a complete full scale fatigue test aircraft and a full scale static test article. This test experience is carried forward to the L-1011-500 design thus requiring only modest additional structural testing for certification. The fatigue test program simulated airline operation, encompassing 84,000 flights representing over 115,000 flight hours—equivalent to 35 years of airline service.

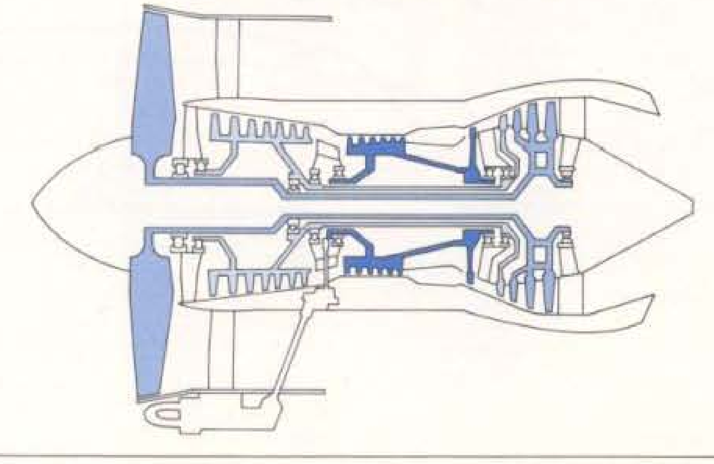
High temperature adhesive bonding is an important factor in the service life of the L-1011-500. Metal-to-metal bonding techniques are used in many structural areas to take advantage of its uniform load distribution and resistance to sonic fatigue, corrosion and crack propagation. Bonding is used to attach doublers and straps to the skin panels, and in construction of various honeycomb and beaded panel assemblies. Mechanical fasteners reinforce bonding in certain major structural joints.

Corrosion protection was a major design objective of the L-1011. In addition to bonding, this is achieved by such techniques as sulfuric acid anodizing, a special Lockheed developed epoxy primer, rivets installed wet with an inhibited polysulfide sealant and polyurethane top coating in severe corrosion areas. Use of age-stabilized 7075-T76 aluminum and high strength clad materials in appropriate areas also contributes to the high level of protection obtained for the L-1011 TriStar structure.

Propulsion

The Rolls-Royce RB.211-524B propulsion system offers the latest advances in engine technology and maintenance features. The three-shaft design for large high-bypass-ratio turbofan engines is unique to Rolls-Royce. This design connects the fan, intermediate and high pressure compressors to three separate turbines by concentric shafts. Each compressor can operate at optimum speed for maximum efficiency and more rapid throttle response. In addition, the engine is shorter with fewer compressor and turbine stages and fewer parts. The shorter engine assembly is more rigid, reducing possible case distortion and resultant performance deterioration.

The thrust reverser system on the RB.211 engine is an integral part

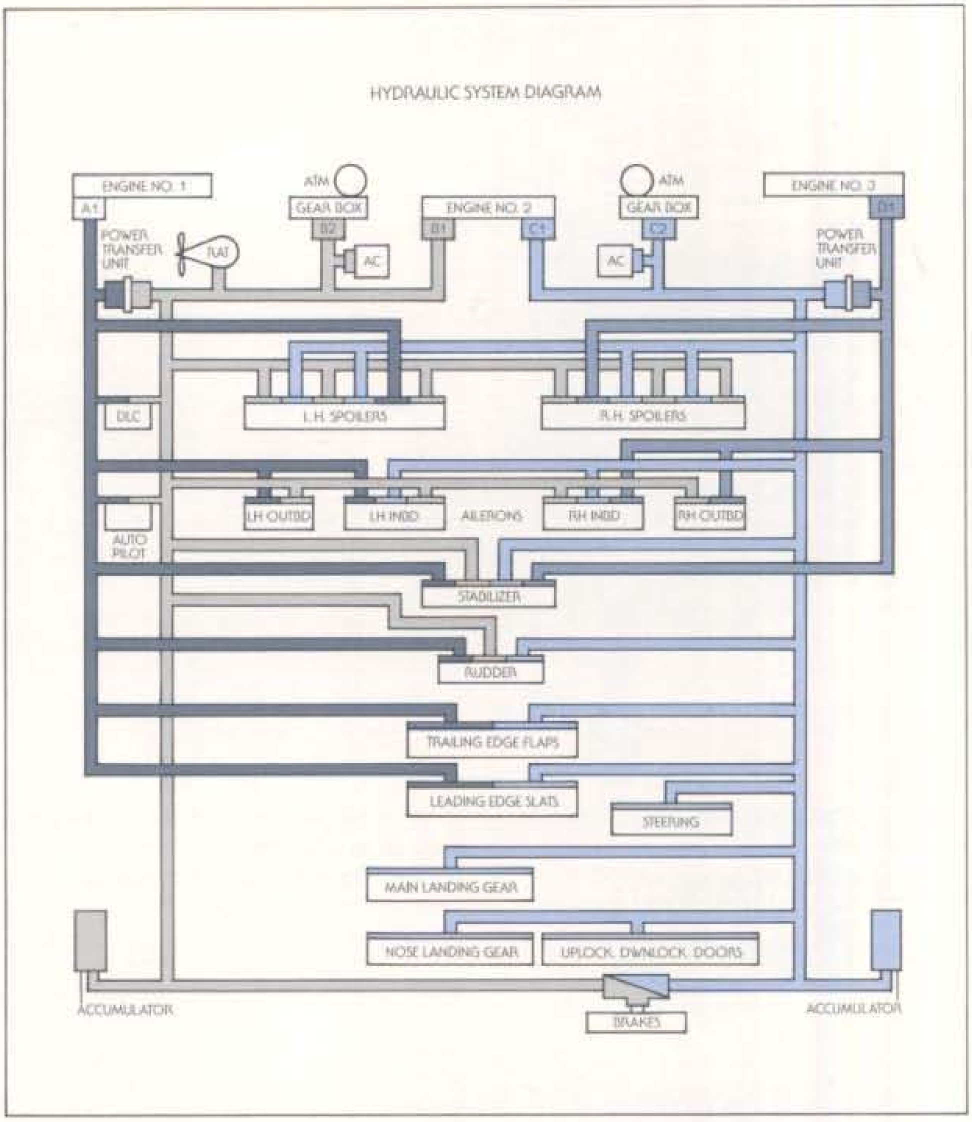


of the propulsion system—attached directly to the engine. The design incorporates a translating cowl operating with a cascade fan reverser. The direct load path to the engine avoids relative motion problems associated with airframe mounted reversers.

RB.211 engines are designed for "on condition" maintenance by providing full monitoring both in flight and on the ground. Engines are built up from a number of modules, each of which can be removed with minimum disturbance to the remainder of the engine. Module changes are possible without removing the engine from the aircraft. The accessory gear box is located on the fan case for maximum accessibility. This location places accessories such as hydraulic pumps and electric generators in a lower temperature environment, providing increased reliability and longer service life.

RB.211-524B ENGINE CHARACTERISTICS

Rated Thrust		
Takeoff, ISA + 13.9°C	50,000 lb	222.4 kN
Maximum Climb, 30,000 ft, M 0.82, ISA + 10°C	13,460 lb	59.9 kN
Maximum Cruise, 36,000 ft, M 0.85, ISA + 10°C	10,970 lb	48.8 kN
Bypass Ratio	4.4:1	

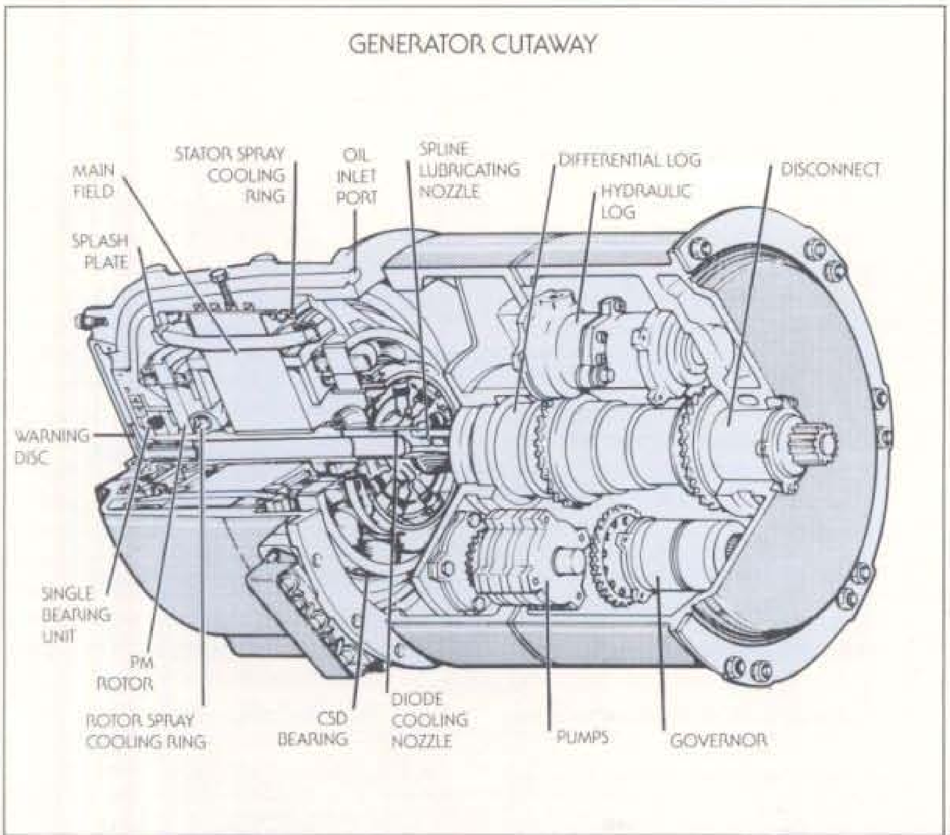


Hydraulic System

Four independent hydraulic systems provide a safe and simple method of meeting L-1011 TriStar flight control, landing gear and utility subsystem power requirements. Any one system provides sufficient power to control the aircraft.

Normal pressurization of each of the four systems is accomplished by variable displacement pumps gear driven by the engines. Each system has a second source of pressure. For two of these, an air turbine motor driven by pneumatic pressure from a crossbleed manifold is used as required to drive hydraulic pumps. Any engine, the auxiliary power unit, or a ground source may provide the air pressure. These two systems in turn provide a second pressure source as required by the other two through a mechanical power transfer unit—a hydraulically driven motor/pump which transfers power from one system to the other without any transfer of hydraulic fluid. A ram air turbine may be deployed to provide emergency power in the unlikely event of an all-engine out condition.

Corrosion resistant stainless steel tubing is used for all hydraulic system high pressure lines, and low pressure suction and return lines exposed to severe environmental conditions, weather, gear operation and fire zones; other lines are aluminum alloy. Routing of hydraulic lines takes advantage of protection by primary structure wherever possible. Hydraulic reservoirs, accumulators, filters, service panels and many other components of all four systems are conveniently located in a well protected single service center readily accessible from the ramp.



Fuel System

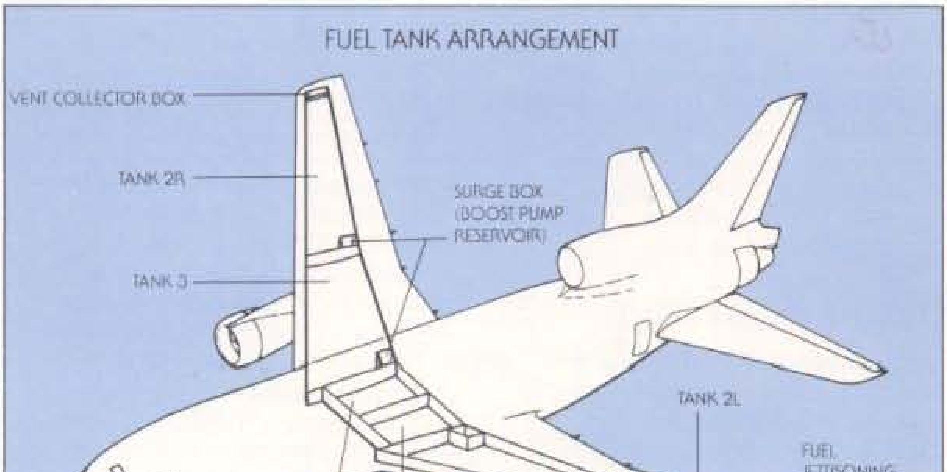
The L-1011-500 has four integral wing tanks and two integral center section tanks with a total capacity of 213,640 pounds (96,900 kilograms). During normal operation, tank 1 supplies engine 1, tank 3 engine 3, and outboard wing tanks 2L and 2R supply the center engine and auxiliary power unit. Center section tanks 1A and 3A transfer fuel to tank 1 and tank 3 respectively. Each wing tank contains two a.c. powered boost pumps; any one pump can supply fuel for two engines at takeoff power. A crossfeed system allows fuel from any tank to supply any engine or the auxiliary power unit. Fuel jettison is a standard feature.

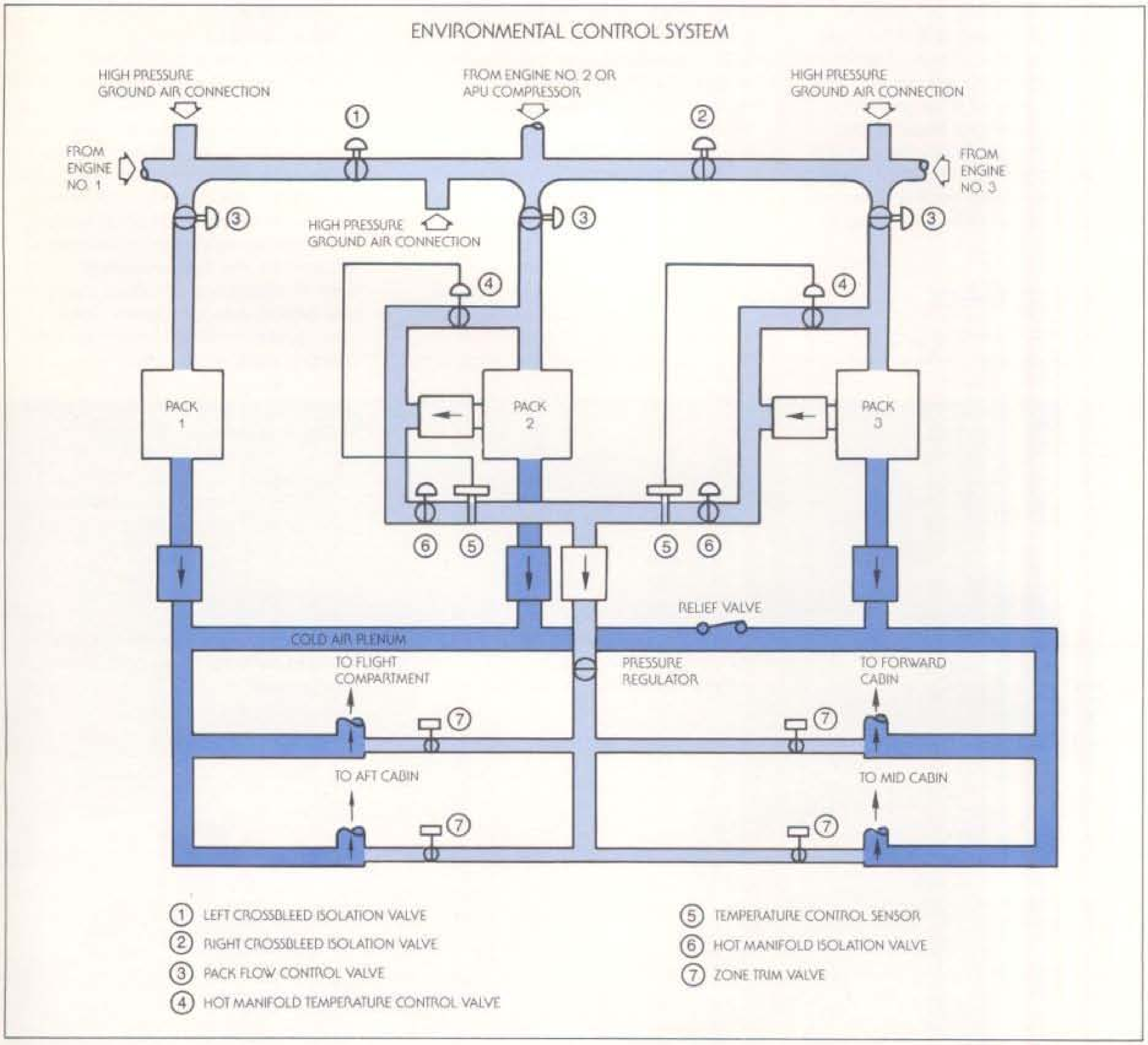
The L-1011 fuel system is designed for easy servicing and maintenance. Although the maximum quantity of fuel that can be pumped into a tank is automatically controlled, the tank vent system is sized to prevent structural damage in case of pressure fueling shutoff failure. The vent system features collector tanks and underwing outlets. A continuous water scavenger system minimizes the potential for corrosion and bacterial growth.

Electrical System

The primary electric power generating system consists of three 90 KVA, 400 Hertz generators. The generators are of advanced design, cooled by oil sprayed directly onto the windings. Each of the three engine-driven generators is equipped with a constant speed drive. The fourth generator, interchangeable with the other three, is driven directly by the constant speed auxiliary power unit. This provides in-flight backup as well as ground self-sufficiency. Although the generators may be isolated, they are normally paralleled automatically to a tie bus so that all may share the load equally. Any one of the four a.c. generators provides sufficient power to maintain continuous safe flight.

Four transformer-rectifiers normally furnish d.c. power. A battery with static inverter provides standby electrical power required to operate instruments, lights and radio for approximately forty minutes. The battery may also be used to start the auxiliary power unit.





Environmental Control System

Passenger compartment ventilation and temperature control in the L-1011-500 are provided by three independent air cycle refrigeration packs. These cooling systems operate from engine compressor bleed air and the auxiliary power unit compressor. A reasonable level of comfort can be maintained with only one system operating.

The aircraft is divided into four automatically controlled temperature zones—the flight compartment plus the forward mid and aft cabin sections. Separate networks provide fresh temperature-controlled air to ducts above each zone. With three packs operating, air flows at a rate of at least 5300 cubic feet (150 cubic meters) per minute, sufficient to give a complete change of cabin air in approximately three minutes. Walls and floors are heated to provide a comfortable cabin temperature at all times. Water separators minimize visible water vapor in the cabin.

Independent ventilation/exhaust

systems are provided at all galley units, lavatories, and at the forward electronic and mid electrical service centers. Cargo holds are heated and pressurized. Special arrangements have been made for heating and ventilating the aft (bulk) cargo compartment to provide for small animals.

A catalytic ozone control system is installed to meet FAR requirements.

Landing Gear

The L-1011-500 landing gear is a fully retractable tricycle configuration consisting of the left and right main gear assemblies with dual tandem wheels and a steerable nose gear assembly with dual independently rotating wheels. The nose gear retracts forward while the main gear retracts toward the center of the aircraft. Main gear inboard doors and the nose gear forward doors open while the gear is in transit, reclosing after gear extension.

The L-1011-500 is equipped with normal and alternate brake systems which are functionally identical. An hydraulic accumulator in each system ensures instant braking action. The accumulators may be pressurized by a.c. motor driven pumps when all engines are shut down.

Antiskid control is provided for both normal and alternate brake systems. After landing, brakes maintain a constant deceleration rate, preselected by the pilot, under control of the automatic braking system. This system also may be set for maximum deceleration in the event of an aborted takeoff. A brake temperature indicator is located on the flight engineer's console. Hydraulically actuated multiple disc brakes are completely interchangeable and self adjusting, with integral wear indicators.