AleniaAeronautica
A Finmeccanica Company

C-27J Spartan

The Smart Choice...
for a True Military Airlifter

Pocket Technical Guide

The material presented in this publication is provided to acquaint you with the general characteristics of our product. It is not an offer and does not constitute a commitment, a warranty or representation. The detail type specification, which is part of the purchase agreement, will define the final configuration and capabilities of the product.

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The C-27J Spartan

Conceived for the military role since its original design, the C-27J is the only true tactical military airlifter in its class.

- Loading capability at the top of its class
- High performance/assault capability
- Excellent manoeuvrability and handling qualities
- All weather day/night mission capability
- Modern cockpit and outstanding avionics
- Autonomous operations from/to unprepared remote fields
- Minimum ground support for loading /unloading
- High Survivability
- Civil & Military certification
- Military Specification Standard (MIL) design
- Flexible and versatile platform suited for special variants
- C-130J commonality
- Interoperability with heavier airlifters
- World-wide highly responsive support
- Low life-cycle costs
- Built-in growth capability to meet specific customer requirements

Introduction

Evolution of the scenario

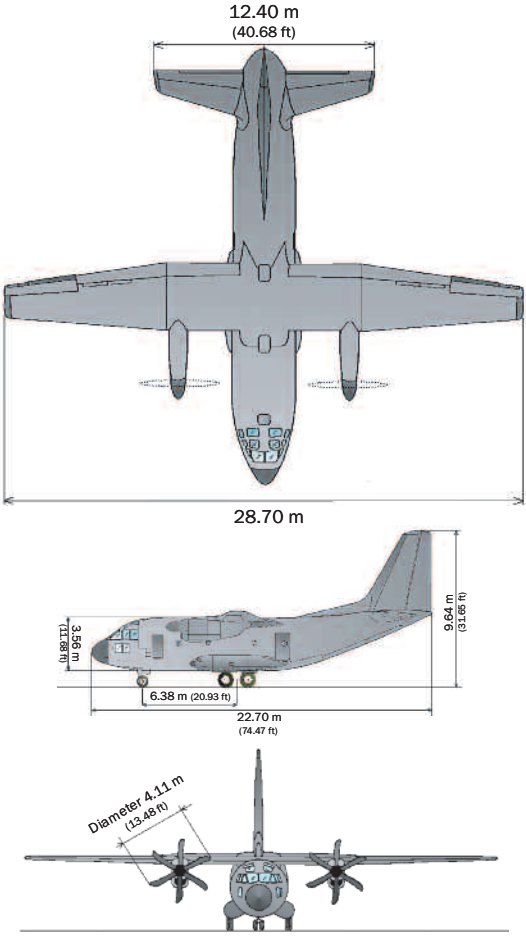
- Modifing obsolete military assets conceived to counter potential well localized and monolithic threats has been the main target for the ‘90s. Armed forces are changing towards a more flexible and lean system able to face a wide number of less predictable and asymmetric threats.
- New strategic and operational scenarios give increasing importance to surveillance, intelligence and mobility especially for out of area and peace support operations.
- Much greater priority has been given to airlift to ensure a most effective and rapid deployment.
- World military transport fleets are largely obsolete and inefficient; their replacement can’t be postponed any longer.
- Increasing operational needs and limited military budgets demand an affordable military airlifter that ensures:
  - Low acquisition and O&S costs,
  - Excellent operational capabilities,
  - High flexibility,
  - Interoperability.

The C-27J program

- The C-27J is designed to provide a superior military tactical airlift capability and represents the best and most technologically advanced solution to meet the most demanding military requirements.
- It can airlift troops, supplies, vehicles, equipment and injured personnel as well as airdrop paratroops, materiel and equipment from/to remote unprepared fields.
- The C-27J is extremely rugged and offers the most modern features that allow it to perform a full range of missions effectively, efficiently and reliably, with a high degree of survivability.
- Low operating cost and high versatility make the aircraft an affordable and smart answer for the operators.
- Avionics and Propulsion systems developed by Lockheed Martin with full C-130J commonality.
- 81 aircraft ordered by Italian, Hellenic, Bulgarian, Lithuanian, Romanian, Moroccan Air Forces and by US Air National Guard.
- The C-27J JCA Team, composed by L-3 Communications Integrated Systems (as prime contractor), Alenia Aeronautica, Alenia North America and Global Military Aircraft Systems (GMAS), has been contracted to offer the C-27J as the best value solution to meet the requirements of the U.S. Government Joint Cargo Aircraft (JCA) program.

General characteristics

Three view - Dimensions



Wing area	82 sq.m
Aspect Ratio	10

Weights

		2.25g (Logistic)	2.5g (Basic)	3g (Assault)
> MTOW	(kg)	31,800	30,500	30,500
	(lb)	*70,107*	*67,241*	*67,241*
> Max Payload	(kg)	11,100	8,600	8,100
	(lb)	*24,471*	*18,960*	*17,857*

MLW:

> (maximum @ 6 fps) 30,500 kg *(67,241 lb)*
> (normal @ 10 fps) 27,500 kg *(60,627 lb)*

Fuel Weight:

> fuel density @ 0.79 kg/l) 9,734 kg
> *(fuel density @ 6.59 lb/gallon)* *21,460 lb*

Propulsion

> Engines: Two Rolls Royce AE 2100D2A
> Take off Rating: 4,637 SHP

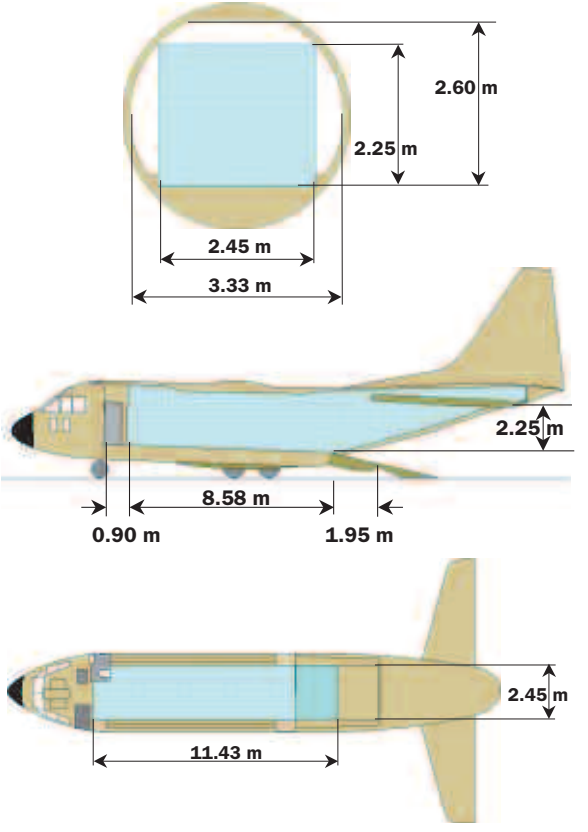
> Propellers: Two Dowty R391/6-132-F/10 Six-Blade
> Diameter: 13.5 ft

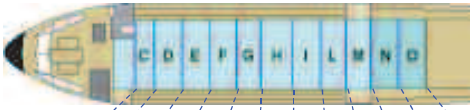
Minimum Crew

> 2 Pilots

Cargo capabilities

Cargo bay dimensions



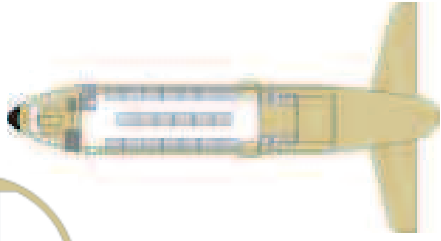


Compartments		C	D	E	F	G	H	I	L	M	N	O
Max Load Capac. of Compartment	KG	3580	4980	4980	4980	4260	5700	4960	5552	3060	2460	2210
	LB	*7894*	*10981*	*10981*	*10981*	*8393*	*12569*	*10981*	*12242*	*6747*	*5423*	*4873*
Max Superficial Load on Floor	KG/M^2	2000	2000	2000	2000	2000	2000	2000	2000	2000	1000	1000
	LB/FT^2	*410*	*410*	*410*	*410*	*410*	*410*	*410*	*410*	*410*	*205*	*205*
Max Load per Floor Length Unit	*KG/M*	*4900*	*4900*	*4900*	*4900*	*4900*	*4900*	*4900*	*4900*	*4900*	*2400*	*2400*
	LB/FT	*3290*	*3290*	*3290*	*3290*	*3290*	*3290*	*3290*	*3290*	*3290*	*1511*	*1511*

Max Load per Floor Length Unit is constant along the fuselage providing high flexibility for loading operations.

Loadability

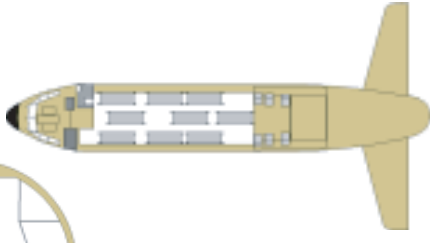
Troops and paratroops



46 equipped paratroopers (standard 20” wide seats)

Up to **60** troops can be accommodated in high density configuration (option)

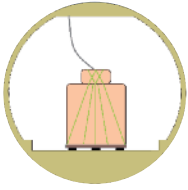
Medevac



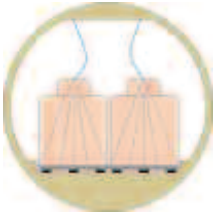
36 standard NATO stretchers (STANAG 2040) with dedicated oxygen port **+ 6** attendant seats

Dedicated pressurization schedule for high comfort

Container delivery

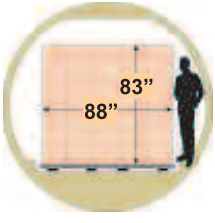


6 A22 CDS Bundles
on a single row



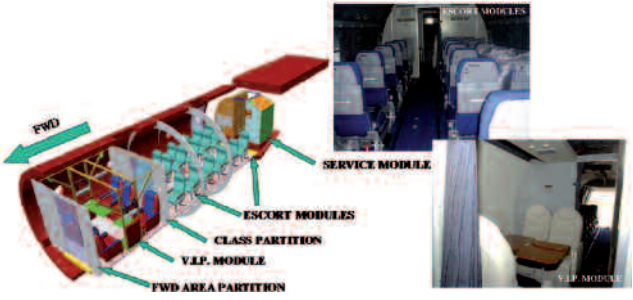
Up to **12** A22 CDS Bundles
on two parallel rows (by removing
the cargo handling system)

Pallets



463L std military pallets
3 (88”x108”) HCU-6/E +
1 (88”x54”) HCU-12/E

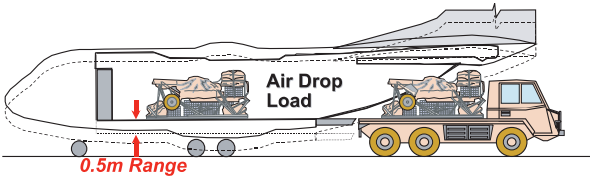
Options - V.I.P. Configuration



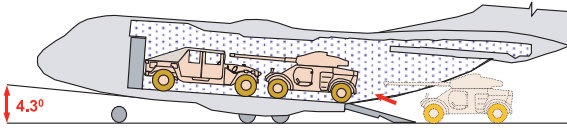
Up to **6** VIPS + 18 escort passengers and a service module with commercial type equipment mounted on quicky installable (removable) standard military pallets.

Drive on/off
Vehicle & equipment

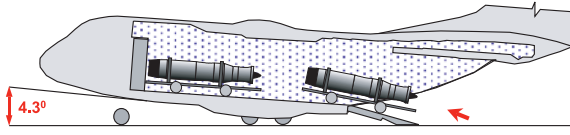
Variable Height/Straight-On-Loading
(M-101 ~ 105mm Howitzer)



Variable Attitude/Drive-On-Loading
(AML-90 / HMMWV)



Fighter Engine
(M53-Mirage 2000)



Operational capability

The C-27J offers significantly more capability than any alternative aircraft in its class. Its large flight envelope allows it to carry out the most demanding tactical missions quickly, safely and effectively.

Material Airdrop

The aircraft can airdrop up to 9 tons of materiel:

> 6 tons single platform (HCU-6/E);
> 9 tons two/three platforms (HCU-6/E);
> up to 5 tons through LAPES;
> up to 6 tons through combat off load.

Autonomous Operation

The aircraft is designed to operate on field with no support equipment:

> The APU provides the aircraft with an independent power source.
> Two 40 Ah batteries
> Adjustable cargo floor height and inclination for easy and fast loading/unloading procedures with no external support.

The aircraft can operate to/from austere unprepared strips:

> Excellent STOL capability.
> High steep descent profile (dedicated flight idle rating).
> Optimum adaptive anti-skid braking system.
> High flotation gear (CBR 4 or less)
> High wheel steering (up to 65° angle).

All Weather / Day Night

The aircraft can operate in all weather conditions, day and night:

> Precise navigation system (GPS) in conjunction with the radar and digital map.
> NVIS (Night Vision Imaging System) compatible cockpit.
> NVIS compatible External & internal lighting.
> Head Up Display (option).

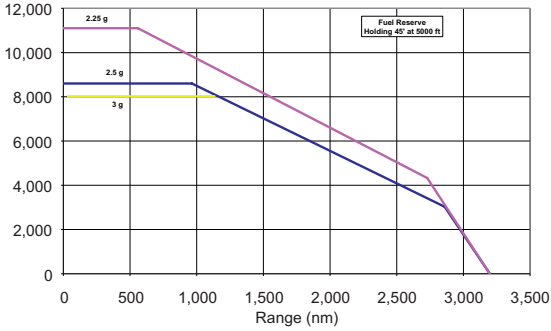
Performance

Farther and Faster

The C-27J features the best performance in its class:

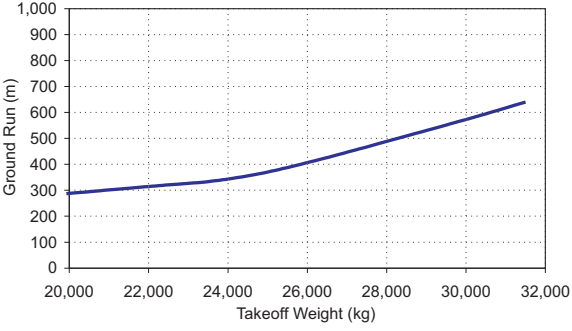
- 2,000 nm with 6,000 kg of Payload
- 3,100 nm ferry flight
- Maximum Cruise Speed 315 KTAS @ 95% MTOW
- Cruise Altitude up to 30,000 ft
- Outstanding ground performance: 580 m T/O ground run @ MTOW and 340 m landing roll @ MLW

C-27J PAYLOAD RANGE
Engine AE2100D2A



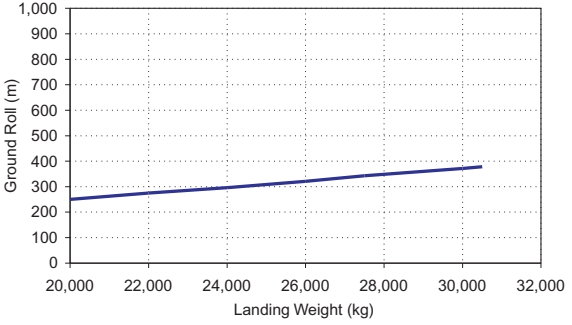
TACTICAL TAKEOFF - GROUND RUN

HARD RUNWAY @ ISA Condition, S.L.



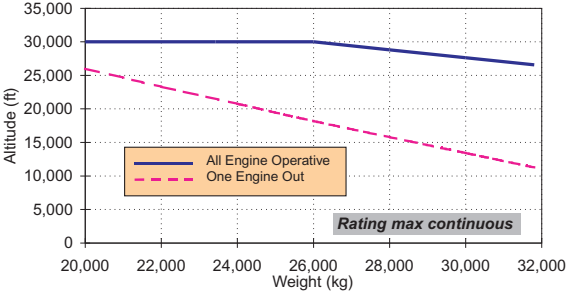
TACTICAL LANDING - GROUND ROLL

HARD RUNWAY - FULL REVERSE @ ISA Condition, S.L.



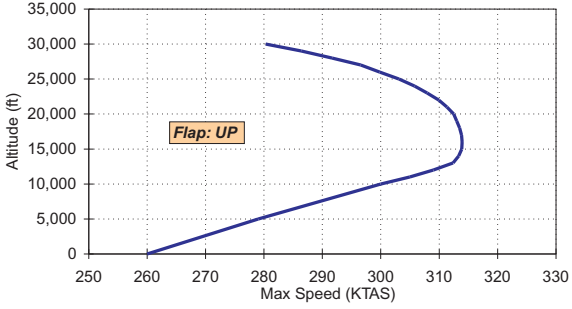
OPERATIVE CEILING

ISA condition



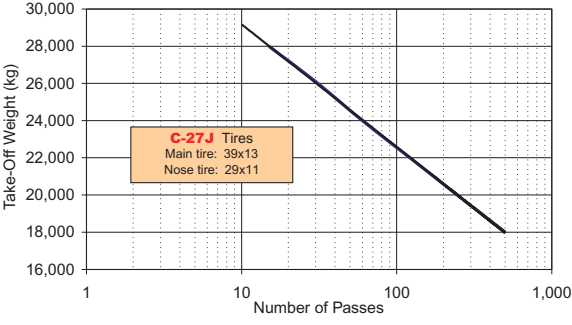
MAX CRUISE SPEED

ISA - 95 % MTOW



FLOTATION CAPABILITY

Unpaved Surface @ CBR 4



Systems

Avionics

The C-27J includes a state-of-the-art suite of off-the-shelf military equipment integrated with a redundant MIL-STD-1553B digital data bus architecture.
The avionics, directly derived from the C-130J, represents the most advanced system available in tactical airlifters and is compatible with the emerging Future Air Navigation System (FANS) requirements.
Growth capability to satisfy specific customer needs is available.

Communication

- 2 or 4 ARC-210 VHF/UHF radios,
- 1 HF radio with voice and data link capability,
- 1 INMARSAT SATCOM with voice and data link capability,
- 1 VHF/UHF Direction Finder (DF),
- Digital Audio Inter-Communication System (ICS),
- Secure Voice (option).

Navigation

- Dual redundant Flight Management System,
- 2 Embedded GPS/INS with Precise Positioning Service (PPS) (*) and Selective Availability Anti-Spoofing Module (SAASM)(*),
- 2 TACAN (DME),
- 2 VOR/ILS/MB,
- Low Frequency ADF,
- 2 Distributed Air Data Systems (DADS),
- Dual Radar Altimeter,
- Terrain Awareness Warning System (TAWS) (Aural and Visual Special Alerts),
- Digital Map (option).

Radar System

Northrop Grumman AN/APN-241 Low Power Colour Radar (LPCR) with the following modes of operation:

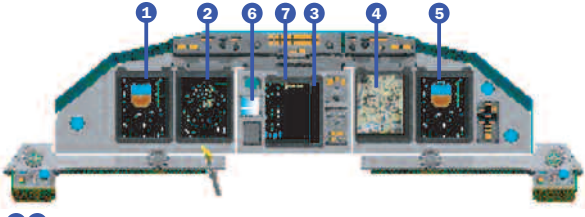
- Monopulse Ground Mapping with Doppler Beam Sharpening,
- Weather and Turbulence Detection,
- Air Target Detection,
- Windshear Detection,
- Beacon mode for drop-zone identification.

Other Equipment

- 2 Digital Autopilot – Flight Director Systems with autothrottle,
- Identification Friend or Foe (IFF) Transponder with Modes I and II and Enhanced Mode S (option: Mode 4)(*),
- Traffic Alert and Collision Avoidance System (TCAS) - II (Aural and Visual Identification),
- Recording Systems (FDR, CVR, DS-DTU),
- 5 Colour Multipurpose Display Units (CMDU),
- 2 Multifunction Control & Display Units (MCDU) with Automatic dependent surveillance – Addressed (ADS-A) functionality,
- 2 Head Up Displays (HUD) (option).

Note (*): subject to specific US and National Government approval.

Main Instrument Panel



1 5 Primary Flight Display

2 4 Navigation Display

3 Engine/Warning Display

6 Stand-by instrument

7 Autopilot/Flight Director Control Panel

Propulsion

- Rolls Royce AE 2100D2A Turboprop Engines.
  - High Power, up to 4,637 SHP.
  - Low Fuel Consumption.
- Dowty R-391-6-132-F/10 propeller system.
  - Six-blade all composite construction.
  - 13,5 ft blade diameter.
- Full Authority Digital Electronic Control (FADEC) through a ***MIL-STD-1553*** Data Bus.
- Propeller control integrated within engine FADEC.
- GKN WESTLAND modern, low drag, fail safe nacelle design.
- Removal and Replacement time for engine and propeller assembly: less than 8 hrs.
- Exterior Noise.
  - Fly-over full power 88dB.
  - Sideline 89dB.
  - Approach 95dB.

Complies with ICAO Annex 16

APU

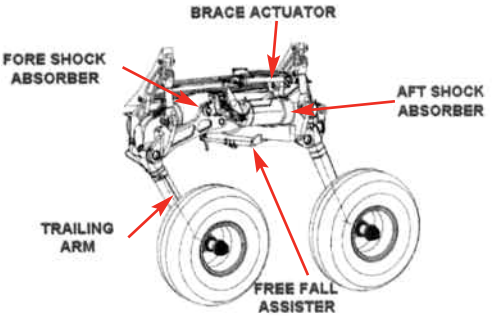
- Auxiliary Power APS1000 Model T-62T-46C16 manufactured by Hamilton Sundstrand Power Systems.
- Mechanical 150 HP class.
- APU makes the aircraft completely independent from external ground support.
- Spool compressor and turbine fully contained.
- Fully operable and reliable in the entire flight envelope.
- Engine starting capability up to 22,000 ft altitude also in hot weather conditions.
- Easy maintainability and supportability.

Certified According to JAR 25 and JAR APU TSO C77a JAR

Landing gear

> Independent Nose and main landing gear trailing arm configuration allows a good flotation capability on strips with CBR as low as 2.
> The landing gear allows variation of cargo floor height (0.5 m) and inclination (4.3°).
> Landing sink rate up to 12 ft/sec.
> Digital full adaptive anti-skid system.
> Main Landing Gear composed by two bogies with two tandem wheels each per side of the aircraft.
  - Main gear tire size: 39”x13”.
  - Main landing gear shock absorbers, actuators and sensors housed inside sponsons.
> Nose gear composed by a single axle bogie with two wheels.
  - Nose gear tire size: 29”x11”.
  - Nose landing gear is provided with door mechanism connected with L.G.

Main Landing Gear



Complies with JAR 25.721, JAR 25.723, JAR 25.725, JAR 25.729, JAR 25.745, JAR 25.1306

Environmental

Pressurization / Air Conditioning

> The **Cabin Pressure Control System** guarantees sea level pressure up to 13,250 ft flight altitude and a differential pressure of 5.8 psi up to 30,000 ft.

>The **Air Conditioning** system comprises a simple cycle system with low pressure water separation, without re-circulation. The system digitally controls temperature in two cabin zone - cargo and cockpit - with manual back-up.

Fire Protection

> Fire and overheat detection in the two nacelles, fire detection in the APU compartment.

> Fire extinguishing system in the two nacelles and APU compartment.

> Cargo compartment smoke detection (including a separate detector in the lavatory).

> Three portable bottle fire extinguishers (1 in the cockpit and 2 in the cargo compartment).

Ice Protection

> System is state-of-the-art pneumatic boots and electrical windshields with digital dual channel controller. It completely protects the wing, vertical, horizontal stabilisers, engine air intakes and propellers.

Oxygen

> 10 lt converter for flight deck with 3 distribution points.
- Up to 14.5 hrs for 3 members crew @ 25,000 ft.

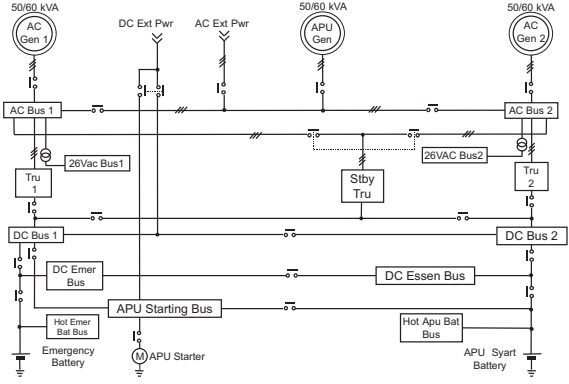
> 2x10 lt converters for passenger compartment with 46+1 distribution points.
- Up to 2.5 hrs for 46 troops @ 25,000 ft.

> 5 emergency oxygen cylinders

Conform to MIL-D-19326H

Electrical

- 60 KVA, 115/200 VAC, 400 Hz EPGS capacity.
- Three independent generators (two primaries and one APU) with the same capacity.
- DC power through three 350 A Transformer Rectifier Units (TRU).
- Two 24 volts 40 Ah, 20 Cells Ni-Cd batteries: one dedicated to emergency system and one shared between emergency system and APU starting system.
- System accepts DC and AC external power.
- With two fully operational generators the system is capable of producing 50% of additional power, beyond the maximum power required for a night combat mission in ice condition (without performance degradation).



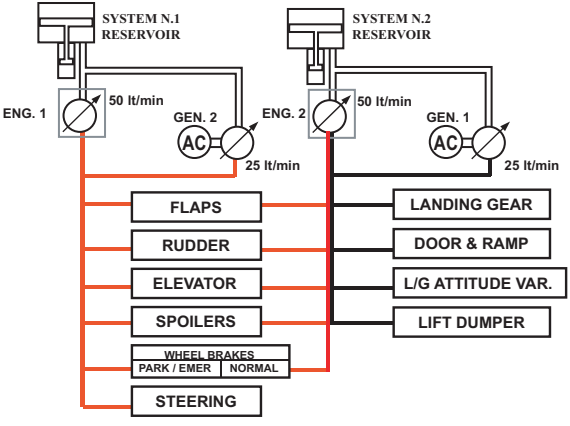
Conform to MIL-STD-704

Hydraulic

> Two fully independent 3,000 psi systems.
  - Each engine drives one system.
  - Each system provided with an Engine Driven Pump (EDP 50 lt/min) and an AC Electrical Motor Pump (ACMP 25 lt/min).
  - Both ACMP's can be powered by APU generator.

> In case of failure of one of the two hydraulic systems, the other is able to provide all the hydraulic power demand.

> All the critical Items are double provided by the two systems.



Conform to:
MIL-H-5440, MIL-H-5606
MIL-C-25427A, QPL-L-85762A

Fuel

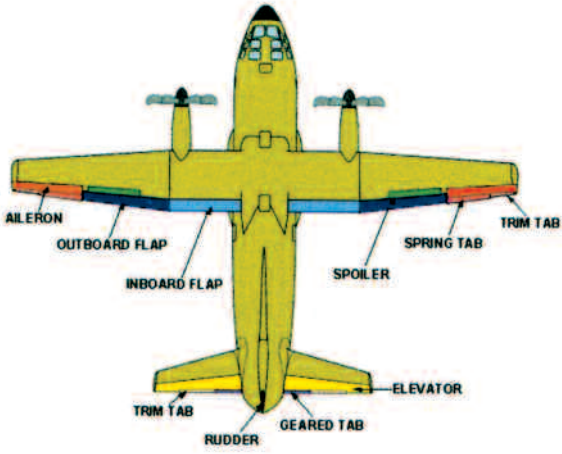
- Four independent wing tanks with cross-feed capability.
- Two independent fuel feeding systems.
  - Two electrically driven pumps for each tank.
  - Independent engine fuel feeding systems.
- Single point pressurised refuelling and four points gravity refuelling.
- Defuelling at the centralised refuelling point.
- Fuel jettison operates throughout flight envelope, nominal jettison flow rate is 266 kg/min.
- AAR probe for in-flight refuelling as an option.
- On Board Inert Gas Generating System (OBIGGS).

	Fuel Tank Capabilities	
Fuel Tank	**Gallons**	**Litres**
2 Main wing Tanks	1,775	6,720
2 Auxiliary Wing Tanks	1,480	5,600
Total Capacity	**3,255**	**12,320**

Conform to:
MIL-T-5264
MIL-T-83133
ASTM D 1655

Flight control

- Conventional type all mechanical control system.
- Fully powered elevators, state of the art Q-Feel System controlled by digital control unit.
- Disconnection between two loops by Jamming Override Mechanism (JOM).
- Hydraulic Rudder/Rudder Trim control .
- Automatic rudder travel limitation as a function of aircraft speed, controlled by a digital unit.
- Flight control system integrated with avionics.
  - State of the art digital stall warning system.
  - Digital Autopilot.
  - Take-off configuration warning implemented.



Lighting

> External lighting system.
  - Three operational modes for anti-collision and navigation lights: Normal, Covert (IR) and NVIS compatible.
  - Two operational modes for landing, taxing, formation and wing inspection lights: Normal and Covert.

> Internal lighting system NVIS compatible.
  - Cockpit lights:
    - two dome, two flood and two utility lights,
    - ability to full dim cockpit lights,
    - thunderstorm mode.
  - Cargo area lights:
    - 16 dome and 10 floor lights.
  - Night vision goggle mode available.
  - Emergency lighting.

Conform to:
MIL-L-006730, MIL-L-85762
MIL-L-6503, QPL-7788-77

Equipment - Furnishings

- Seats :
  - crew seats according with MIL-S-25073,
  - troop/paratroop according with MIL-S-27184B.
- Two independent retrieval winch for paratrops with remote control.
- Cargo winch for loading/unloading procedures.
- Electrical flushing toilet located inside the lavatory.
- Galley equipment with a hot cup: 0.85 l capacity, located inside the lavatory (option).
- Drinking water containers and dispensers: 22 l capacity.
- Emergency equipment.
- Thermal / acoustical panels composed by primary and secondary blankets.

Self protection *(option)*

- Radar Warning Receiver.
- Missile Warning System.
- Laser Warning Receiver.
- Countermeasures dispensing system (chaff & flares).
- Ballistic protection.

Reconfiguration time

Configuration changes achieved with Operational Kits installed & stowed on the aircraft for rapid & easy reconfiguration away from base.

Reconfigured in Flight by One Loadmaster Without Assistance **Time in minutes**	**All Equipment Stowed**	**Troop Transport**	**Paratroops Airdrop**	**Material Transport**	**Material Airdropping**	**Medical Evacuation**
All Equipment Stowed		6	23	10	29	25
Troop Transport	6		17	15	35	27
Paratroops Airdrop	23	17		30	25	44
Material Transport	10	15	30		22	32
Material Airdropping	29	35	25	22		48
Medical Evacuation	25	27	44	32	48	

Program schedule

> Program Launch: June, 1997
> First Flight: September, 1999
> Full Civil and Military Certification: June/December, 2001
> Additional Certification for new Specific Customer Required.
> Contracts: Italian Air Force - June 2002
Hellenic Air Force - January 2003
Bulgarian Air Force - February 2006
Lithuanian Air Force - June 2006
US Air National Guard - June 2007
Romanian Air Force - December 2007
Moroccan Air Force - August 2008
> In service since: September 2005

Highlights

> 48 months from Go Ahead to Certification
> 81 aircraft ordered
> 31 aircraft delivered
> Already in operation with Hellenic, Italian, Lithuanian, Bulgarian, Romanian and Moroccan Air Forces and with US Air National Guard
> 12 aircraft on production.

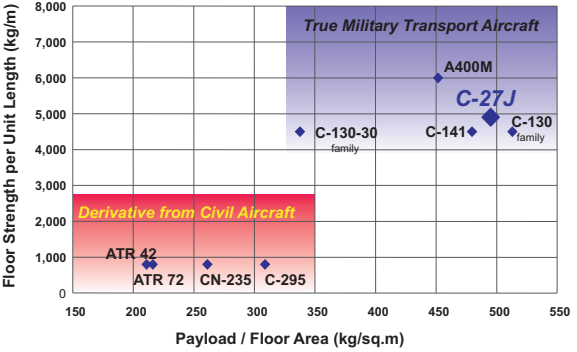
The production build-up rate is set up to satisfy all Customer needs and to introduce the aircraft in the Customer inventory with no-risk of matching the required delivery schedule.

Comparison

True Military Platform

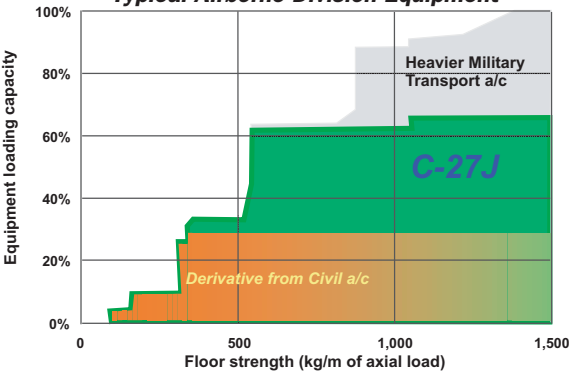
A military load has a high weight distributed on a small space. The floor strength is the best index to divide a real military aircraft from a civil aircraft.

The C-27J is a True Military Airlifter



A high percentage of equipment loading capacity makes the Airforce fleet mix more flexible and efficient. The C-27J completes up to 70% of the missions for a typical airborne division deployment.

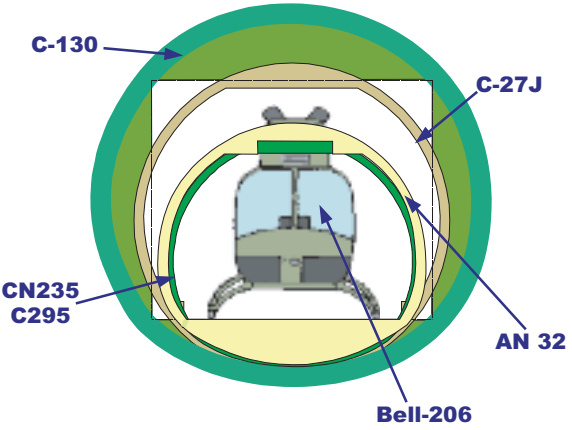
The C-27J deploys up to 70% of the Typical Airborne Division Equipment



Cargo hold optimized for military loads

Why not!

Sometimes it is very important to carry an unusual load. Who can do it?



Cabin Dimensions

More cabin volume and width makes any load/unload operation easier and faster.

Cabin Dimensions		C-27J	C-130J	C295	CN235	AN32
Max Width	(m)	3.33	4.16	2.7	2.7	2.78
Max Height	(m)	2.60	2.74	1.90	1.90	1.84
Floor Area (Excl. Ramp)	(sqm)	23.23	36.94	29.95	22.77	27.96
Cabin Volume (Excl. Ramp)	(cm)	69.48	124.90	56.48	43.08	57.91

Door Location & Dimensions

> The height of the in-flight operable doors allows an easier and safer paratroop operation.

> The hatches are the best escape way in case of ditching.

Doors Location		C-27J	C-130J	CN235 C295	AN32
Left FWD	(HxW)	59" x 26"	48" x 29" 45" x 30" (FD)	36" x 20"	55" x 24"
Right FWD	(HxW)	40" x 21" (ED)	48" x 29"	50" x 28" (ED)	NO
Left AFT	(HxW)	76" x 36" (OIF)	72" x 36" (OIF)	69" x 35" (OIF)	20" x 24" (ED)
Right AFT	(HxW)	76" x 36" (OIF)	72" x 36" (OIF)	69" x 35" (OIF)	20" x 24" (ED)
Ramp & cargo door (cross section)	(HxW)	89" x 96" (OIF)	108" x 120" (OIF)	67" x 93" (OIF)	59" x 91" (OIF)
Cockpit Escape Hatch	**(qty)**	**1**	**1**	**NO**	1
Cabin Escape Hatch	**(qty)**	**2**	**2**	**NO**	NO

(ED) Emergency Door; (OIF) Operable In-Flight; (FD) Flight Deck

Survivability features

Designed for harsh operations, the C-27J features redundant systems, Mil-Spec design, and built-in self protection provisions.

The C-27J military design includes the following integrated features for combat survivability:

> **Damage Tolerance.**

- All critical systems are redundant (hydraulic, electrical, ADS, avionics, displays and controls).
- Redundant load paths.
- Three-spar construction (wing and empennage).
- Oxygen masks permit flying at high altitudes in case of depressurization.
- Fuel jettison capability.
- Emergency landing gear extension.
- OBIGGS, anti-deflagration fuel tanks.

> **High Power-to-Weight Ratio.**

- Rapid acceleration/deceleration (2 kts/sec).
- Rapid climb capability (<5 min to 10,000 ft).
- High speed capability with ramp down (180 kts) and/or with the aircraft just above ground level 260 kts).

> **Superior outstanding tactical manoeuvrability.**

- Low stall speed (80 to 90 kts).
- Low level flight to avoid detection.
- High roll rate (45/sec @ 180 kts).
- Tight turn radius (500 m, 2.5g sustained @ 180 kts).
- 3.0g capability
- 4,000 ft per min descent rate.

> **Excellent visibility through 16 cockpit windows.**

> **In-flight operable auxiliary power unit (APU).**

> **Navigation System.**

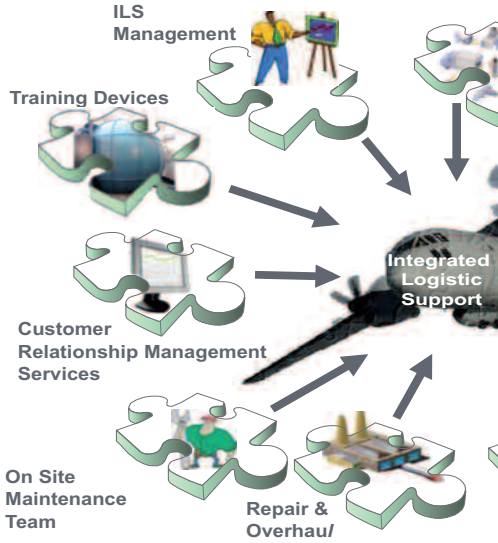
- Modern avionics.
- Redundant communications.

Optional self protection devices and use of redundant and segregate systems reduce the aircraft vulnerability when it is engaged by hostile weapon systems.

Supportability features

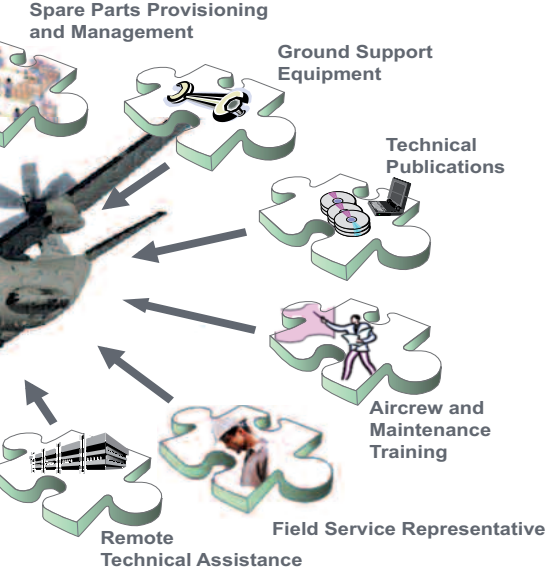
Tailored and effective Integrated Logistic Support (ILS) is a primar y element of the C-27J Program.

- **International Support Capability**
  - > Worldwide Customer Support long term experience
  - > Strategic relationship with aerospace key players as Honeywell, Rolls Royce and Dowty
  - > Effective supply chain management



- **C-27J Maintainability Highlights**
  - > Extended On-Condition maintenance approach
  - > Advanced Built-in diagnostic capabilities
  - > Engine and Structure Health Monitoring
  - > Streamlined Scheduled Maintenance Program

- **Integrated Logistic Support**
  - > Customer tailored solutions (logistic supplies and services)
  - > Prompt Customer Assistance
  - > Modular and comprehensive Training offer
  - > Cost-effective Through Life Support approach



- **Cost Savings**
  - > High Equipment Reliability
  - > Easy Aircraft Designed-in Maintainability
  - > Customer executable Maintenance Program, with reduced Aircraft downtime
  - > Extended commonality with the C-130J Aircraft for Propulsion and Avionic Systems

Notes

Notes

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