Cargo Aircraft

British Cargo Aircraft
Canadian Cargo Aircraft
Generic Cargo Aircraft
International Cargo Aircraft
Israeli Cargo Aircraft
Italian Cargo Aircraft
Japanese Cargo Aircraft
Russian Cargo Aircraft
Spanish Cargo Aircraft
US Cargo Aircraft

Short C-23 Sherpa

Notes: This light transport is used by a number of countries, most notably Britain and the US, where they are mostly operated by the Air National Guard, though some are used by SOCOM, and a few are used by the US Army's Golden Knights parachute demonstration team. The Sherpa A and B were based on the Short 330, while the C-23B+ was based on the Short 360 with the rear ramp and tail of a Sherpa. It is a simple aircraft that is easy to maintain and fly, and can be safely flown at a very slow speed. The US Army is phasing theirs out; the Philippines and Djibouti have retained theirs in service. Former users include Thailand, and the Sherpa is used by several governmental and relief organizations worldwide.

The aircraft has a rear ramp and two doors just behind the cockpit; it has no ejection seats and is not capable of in-flight refueling. It does, however, have a toilet. The fuselage is boxy and squared and catered towards cargo hauling. The C-23A and B are powered by a pair of Pratte & Whitney Canada PT6A-45-R turboprop engines, each developing 1198 horsepower. There is a baggage compartment in the nose of the aircraft, able to hold 500 kilograms of the total cargo capacity; on the rear ramp, 600 kilograms more can be secured. The C-23B+ Super Sherpa is similar, but has more engine power and is larger; it is powered by PT6A-65AR turboprops with 1424 horsepower each. The A and B are similar to each other, but the C-27B, however, has cabin windows, which the C-27A lacks, and has inward-opening paratrooper doors; for game purposes, they are otherwise identical to each other. 18 C-23As were built and 16 C-27Bs were built, while 28 C-27B+ have been modified from Short 360 aircraft. The C-23C is a C-23B or B+ with a flight deck avionics upgrade, mostly in the area of MFD panels and new instruments. The C-23D is the same as the C-23C, with the addition of the Safety Avionics Modification package. Both are the same as the C-23B or B+ for game purposes.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-23A	$2,874,914	AvG	3.3 tons	11.59 tons	3+30, or 27 paratroops, or 18 stretchers	13	None	Enclosed
C-23B+	$5,532,338	AvG	3.82 tons	12.83 tons	3+36, or 32 paratroops, or 22 stretchers	18	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-23A	597	166 (80)	NA 45 6/3 60/30	2235	1058	8230	FF4 CF4 RF3 T3 W4
C-23B+	638	177 (80)	NA 48 6/3 60/30	2351	1268	6100	FF4 CF4 RF3 T3 W4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	Secure Radios	500/400m Primitive Runway	None	None	None

De Havilland Rapide

Notes: The Rapide appeared in 1934; it was intended to fulfill the same role as the Douglas DC-3, being a general-purpose cargo aircraft able to fly heavy (for the period) cargoes at a decent speed and capable of fairly high-altitude operations. The Rapide design is an evolution of earlier designs, most notably the De Havilland DJ-83 Fox Moth (appearing in 1932) and the heavier DH-84 Dragon. (The Rapide was essentially a scaled-down version of the Dragon, thus the Rapide was often called the “Dragon Rapide.”) The Rapide did not fall victim to the problems that its predecessors displayed, such being underpowered, having balky controls, and poor maneuverability; its pilots praised the Rapide as an aircraft that was easy to fly (though it often struggled in bad weather due to its light weight). They had an illustrious World War 2 career, with most Rapides belonging to Commonwealth countries being pressed into military service. While the Rapide’s design did not lend itself to high-volume paradrops, the British often used the Rapide for the delivery of OSS agents and other small-unit insertions. However, these operations led to high casualties among the Rapide, and of 205 at the disposal of the British Commonwealth at the beginning of World War 2, only 81 survived the war. The Rapide was manufactured for a few years after World War 2, but were quickly made obsolete by new designs. By 2000, only five airworthy Rapides remained: two in New Zealand, often used for sightseeing, one flown by the Military Aviation Museum in Virginia Beach, one privately-owned in Yolo County California, and two operated by Classic Wings in the UK, used primarily for sightseeing and short hops over to Ireland. In addition, it is possible that the Rapides at Museum of Science and Industry at Manchester, the Rapide on display at Old Warden Airfield in the UK, and the Rapide at Duxford Aerodrome, are also in flying condition; their care is quite meticulous and thorough, but they have never actually flown since the late 1950s.

Design work on what would become the Rapide began in 1933 after a request from the Australians for a medium transport with good low-altitude speed and the ability to land on unimproved surfaces, such as the Australian Outback. This led to an aircraft similar, but smaller and less powerful than, the DH-89 – the DH-86 Dragon Express. Few DH-86s were built, though a few did serve in the 1930s and early 1940s, so I have included stats for them below. The head of the design team at De Havilland, AE Hagg, quickly realized that a more powerful version of the engines intended for the Dragon Express recently made available could support a larger and more powerful version of the DH-86. This aircraft was at first designated the DH-89 Dragon Express, but by 1935, the name of the aircraft had changed to the Dragon Rapide. Shortly later, this was simplified to the Rapide. The British, oddly, were one of the last to jump on the Rapide design; nearly 20 countries ordered at least a few Rapides in the 1930s, and the British actually ordered very few. Most British Rapides were those pressed into wartime service of built during the short production run after World War 2. Military Rapides used by the British Commonwealth were renamed to “DH-89 Dominie,” though production of military versions dated back almost to the beginning of production. The Italian Breda BA-44 was derived directly from the Rapide, so much so that in many cases parts were interchangeable.

The Rapide was an all-metal biplane in an era of monoplanes; only its power and good handling characteristics led to its being placed into production. World airlines quickly realized that it was a good design, despite having only about half the cargo and passenger capability of its contemporaries, the DC-3 and Ford Trimotor. The wings were strong despite a minimum of cross supports, and the fuselage, despite looking a bit lumpish, was actually a good, aerodynamic design. The Rapide had large control surfaces, which made to a great extent its excellent low-speed handling and good takeoff and landing performance. Unusually, the engines were carried in pods on the lower wings near the fuselage, with the main wheels below the engines in fairings that were built as a part of the engine pods. The Rapide was a “taildragger” design, with a tail wheel in addition to the main landing gear. The cockpit windows were large and afforded excellent visibility to the crew, and the side windows were also large for an aircraft of its type and praised by passengers. Passengers and crew both entered through a door on the left side over the lower wing.

Though it was easy to fly, the Rapide did require some familiarization with the pilots. The Rapide was much lighter than it looked and could be thrown around by high winds, was subject to bouncing at the wrong time on takeoff and landing, and had higher acceleration than most pilot were used to from such an aircraft. In addition, passenger flight was a bit spartan; civilian passenger Rapides had little more than a cramped kitchenette and shelves for in-flight refreshment, and passenger seating was limited and a little cramped at a time when passengers were beginning to expect a little more luxury. One of the radios carried was usually tuned to civilian broadcasts. On the other hand, mail and cargo runners often had an internal layout similar to a Dominie, though sometimes the kitchenette was retained. And again, takeoffs and landings could be a bit bouncy, and flying in bad weather could be harrowing.

The first production versions were designated DH-89 Rapide. The same aircraft, equipped with a landing light in the nose, modified wingtips that slightly improved low-altitude and low-speed performance, and a cabin heater, were designated DH-89A Rapide. All DH-89s were quickly converted to the DH-89A standard within a few months after the DH-89A standard was defined. The DH-89 Mk 4 referred to at first experimental modifications, equipped with Gipsy Queen II engines; some civilian Rapides were produced with these engines, which were designated Gipsy Six II engines in civilian use, but on the other hand, this upgrade was common in military service. Even less civilian models were equipped with Gipsy Six III engines, though somewhat more were produced with the equivalent military engine (the Gipsy Queen III). Civilian modifications to the Gipsy Six III did not begin in earnest until after World War 2, and eventually 1350 Gipsy Six IIIs were built solely for civilian use. Dominies with Gipsy Queen engines were built for specific roles and therefore quite rare; the fact that they were originally built for military use only and few were retrofitted after the war makes them even rarer.

Military Dominies had their civilian accommodations stripped out, and the interior converted to a large cargo space. The passenger door was retained, but converted to a sliding door. This was still where personnel were loaded, and often, parachutists exited the aircraft through this door. (The procedure for parachuting

from a Dominie was for the parachutist to go out the door, get into a seated position, and let the slipstream slide the parachutist off of the lower wing. The tailplanes were low enough that the parachutist did not hit them. Afterwards, the parachutist deployed his parachute manually.) On the right side, a larger sliding door was added, allowing bundles on parachutes to be thrown out of the door or larger cargoes to be loaded and unloaded on the ground. The Dominies had a new suspension for the main landing gear, making them even more capable of landing and taking off from unimproved surfaces. The engine cowlings and air intakes were also modified to do a better job of keeping FOD out of the engines, and the wooden propeller blades in most cases were replaced with metal blades. Dominies sometimes had folding metal seats along the exterior walls; these were installed in sections for one, two, or three passengers and could be removed or installed as needed.

Though some Dominies were used for special operations insertions and paradrops, a large number were actually used as trainers for future bomber and larger cargo aircraft. In this role, pilots and navigators both received instruction, though not usually at the same time. Radio operators also received some training in this aircraft, but most of their training took place on the ground. Most of these trainers were then modified again, into mobile communications aircraft. In this role, the Dominies normally operated as aerial retransmission aircraft, allowing the troops on the ground to dramatically increase their communications range. They were important aircraft to airborne forces and scouts operating sometimes far ahead of the main body of troops. Generally, a fourth seat was added just behind the cockpit (in case a pilot and navigator *was* being trained at the time), as well as two other seats with desks at the front of the cargo bay for two other students. Another use for the Dominies was as aerial command posts, though normally they didn't carry the actual field commanders, relaying orders instead. In this role, they carried extra radios, including at least one very-long-range VHF set, and seats for radio operators and the "aerial commander," plus spaces, drawers, and suchlike for maps, codebooks, and office-type supplies.

Dominies were more widely used in the early part of World War 2, and leads to perhaps their most heroic role. Dominies were used as part of the evacuation of troops from France, often flying deep into enemy territory to retrieve troops cut off from the main body. An unknown number of civilian Rapides were also used in the evacuation, sent into France without being modified in any way for a military role. During this time, their losses were severe; ten Dominies and an unknown amount of Rapides were shot down; some sources state that possibly as many as 32 Rapides were shot down in the evacuation. The Dominies and Rapides used in the evacuation generally left France overloaded with troops and with the severe decrease in performance one would expect.

Another role for Dominies were to fly dignitaries around Britain and to Ireland; despite being officially called Dominies, these aircraft were essentially Rapides, retaining their civilian internal fit, though with one or two extra radios. A surprisingly small amount were actually used as straight cargo aircraft, since the bulk of Dominies (about 150) were used as trainers and communications aircraft. 14 were used to fly needed military supplies around Britain to some of the more far-flung sites, including ammunition, food and water, spare parts, and some small creature comforts such as newspapers, mail, books, and occasional pure luxury items such as chocolate, candy, and suchlike. Two were used as medical evacuation aircraft, primarily for British or (later) American pilots who had been shot down or crashed over British soil, or British civilians or troops injured in Nazi attacks on Britain. The primary modifications for these two aircraft were the conversion of most of the interior space to carry stretchers as well as storage for medical equipment. Two medical personnel were usually assigned to such flights, normally specially-trained nurses.

In addition to the Dominies used in Britain, two were used in Africa and the Middle East, and nine were used in India. These were generally used as communications aircraft in Africa and the Middle East as shown above, and as special operations and straight cargo aircraft in India and some of the surrounding countries; some were even known to fly even farther, supplying special ops units such as Merrill's Marauders and even other far-flung and largely unsung special operations units. Extra fuel tanks were often carried internally in this role, as well as extra long-range radios and odd bits of equipment needed by the troops, as well as the occasional reinforcements. Their excellent low-speed performance and unimproved landing and takeoff qualities served them well in these roles. Military Dominies outfitted for training roles were designated DH-89 Dominie Mk 1 and were most often based on DH-89 Mk 4s, though with special governors and derated engines to aid in the training process. Dominies outfitted as Commo/air command posts were designated DH-89B Dominie Mk IIs, regardless of what other Mark they may have carried (usually Mk 4s or Mk 5s). Special ops Dominies were generally given fictitious designations and names that changed on a regular basis, though they were generally based on stripped cargo aircraft. Special ops Dominies outfitted with internal extra fuel tanks were generally designated the same way as other Special ops aircraft. Dominies designed for cargo carrying of whatever type were usually given the simple designation of DH-89B and usually based on DH-89As or DH-89 Mk 4s. (After World War 2, military Dominies that were refitted back to civilian specifications were usually designated DH-89B, with the appropriate Mark number appended to the end. Dignitary transportation and medical transport aircraft were usually designated DH-89B, though unofficially given the designation of DH-89D Dominie.

Statistics-wise, the most of the prototype Rapides and very early production Rapides were powered by a pair of De Havilland Gipsy Six I 200-horsepower 6-cylinder engines, improved versions of the engines that powered the DH-86. The Gipsy Six I had bronze cylinder heads and could be coupled only to fixed-pitch propellers. The Gipsy Queen I was the military version of the Gipsy Six I, essentially identical except that it could burn either leaded or unleaded aviation gasoline, could be coupled to variable-pitch propellers, and was slightly more powerful at 205 horsepower; this engine powered early military models. Most military versions and some civilian Rapides were powered by the Gipsy Queen II/Gipsy Six II, which were basically identical; improvements included strengthened crankcase and a slight increase in power to 210 horsepower. These were referred to as the DH-89 Mk 4s. Some Dominies were powered by the Gipsy Queen III, which provided a further-strengthened crankcase, a tapered crankcase (which allowed only fixed-pitch propellers), and slightly-derated power to 200 horsepower; however, the Gipsy Queen III was far more maintenance-friendly, and reduced the required time for maintenance greatly. These aircraft were designated DH-89 Mk 5. A few rare Rapides and Dominies had Gipsy Queen IV engines, which were supercharged versions of the Gipsy Queen III. The supercharger allowed the Rapides and Dominies equipped with them a higher service ceiling, though at higher fuel consumption. These aircraft were often referred to as DH-89Cs in both civilian and military service, though officially they were also designated DH-89 Mk 5s. One Rapide was produced, stripped of all unnecessary weight and designated the DH-88 Comet; this used 223-horspower versions of the standard engines called Gipsy Six "R" engines, and I have not been able to discover its fate after flying in the races it was built for. The Rapide had a length of 10.51 meters, a height of 3.096 meters (to the top of the tail), and a wingspan of 14.63 meters. The controls, though not boosted in any way (control boosting was an experimental design at the time of the Rapide's development), they did have special linkages that made the controls easier to move.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
DH-89 Rapide	$611,520	AvG	555 kg	1.62 tons	3+10	12	None	Enclosed
DH-89A Rapide	$622,850	AvG	562 kg	1.62 tons	3+10	12	None	Enclosed
DH-89 Mk 4 Rapide	$623,820	AvG	569 kg	1.62 tons	3+10	12	None	Enclosed
DH-89 Mk 5 Rapide	$617,540	AvG	555 kg	1.64 tons	3+10	10	None	Enclosed
DH-89C Rapide	$674,510	AvG	555 kg	1.66 tons	3+10	12	None	Enclosed
DH-89B Dominie	$422,060	AvG	1.19 tons	1.5 tons	3+10 or 8 Paratroopers	11	None	Enclosed
DH-89B Dominie (Special Ops Fit)	$1,923,770	AvG	893 kg	1.65 tons	3+4 or 3 Paratroopers	15	None	Enclosed
DH-89A Dominie (Special Ops Fit, Extra Fuel)	$1,925,900	AvG	706 kg	1.9 tons	3+4 or 3 Paratroopers	16	None	Enclosed

DH-89 Mk I Dominie	$439,430	AvG	1.17 tons	1.6 tons	4+4	13	None	Enclosed
DH-89 Mk II Dominie	$1,072,930	AvG	595 kg	1.89 tons	3+4	15	None	Enclosed
DH-89D Dominie (Medical)	$458,420	AvG	595 kg	1.53 tons	4+4 Stretchers*	10	None	Enclosed
DH-89C Dominie	$468,060	AvG	1.16 tons	1.52 tons	3+10 or 8 Paratroopers	10	None	Enclosed
DH-88 Comet	$419,480	AvG	1.19 tons	1.35 tons	2	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
DH-89 Rapide	872	219 (73)	NA 52 4/2 40/20	249	56	5090	FF3 CF3 RF2 T2 W3
DH-89A Rapide	892	224 (66)	NA 53 4/2 40/20	249	57	5090	FF3 CF3 RF2 T2 W3
DH-89 Mk 4 Rapide	913	229 (60)	NA 54 4/2 40/20	249	57	5090	FF3 CF3 RF2 T2 W3
DH-89 Mk 5 Rapide	872	219 (60)	NA 52 4/2 40/20	249	57	5090	FF3 CF3 RF2 T2 W3
DH-89C Rapide	862	215 (60)	NA 51 4/2 40/20	249	65	6108	FF3 CF3 RF2 T2 W3
DH-89B Dominie	915	230 (66)	NA 55 4/2 40/20	249	55	5090	FF3 CF3 RF2 T2 W3
DH-89B Dominie (Special Ops Fit)	853	209 (66)	NA 50 4/2 40/20	249	61	5090	FF3 CF3 RF2 T2 W3
DH-89A (Dominie Special Ops Fit, Extra Fuel)	806	202 (66)	NA 48 4/2 40/20	381	63	5090	FF3 CF3 RF2 T2 W3
DH-89 Mk I Dominie	858	216 (60)	NA 52 4/2 40/20	249	58	5090	FF3 CF3 RF2 T2 W3
DH-89 Mk II Dominie	732	184 (70)	NA 44 4/2 40/20	249	69	5090	FF3 CF3 RF2 T2 W3
DH-89D Dominie (Medical)	897	225 (60)	NA 54 4/2 40/20	249	56	5090	FF3 CF3 RF2 T2 W3
DH-89C Dominie	903	227 (60)	NA 54 4/2 40/20	249	64	6108	FF3 CF3 RF2 T2 W3
DH-88 Comet	1074	266 (60)	NA 64 4/2 40/20	249	64	5090	FF3 CF3 RF2 T2 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
DH-89/DH-89A/DH-89A Mk 4 & Mk 5/DH-89C Rapide	2xLong-Range Radios, Magnetic Compass, Kitchenette	200/350 Unimproved Runway	None	None	None
DH-89B/C Dominie	2xLong-Range Radios, 1 Short-Range Radio, Magnetic Compass	200/350 Unimproved Runway	None	None	None
DH-89B Domnie (Special Ops Fit)	2xLong-Range Radios (One Aircraft-Ship), Very-Long-Range Radio, Radar Altimeter, Transponder, 550-Candlepower Spotlight, RDF, Magnetic Compass	200/350 Unimproved Runway	None	None	None
DH-89A Mk I Dominie	2xLong-Range Radios, 1 Short-Range Radio, Magnetic Compass	200/350 Unimproved Runway	None	None	None
DH-89 Mk II Dominie	1 Very-Long-Range Radio, 2xLong-Range Radios, 2xMedium-Range Radios, Gyrocompass, Barometric Altimeter	200/350 Unimproved Runway	None	None	None
DH-89D Dominie (Medical)	2xLong Range Radios, Magnetic Compass, Standard Medical Supplies.	200/350 Unimproved Runway	None	None	None

*Two stretchers may be removed, making room for up to two seated casualties per stretcher.

De Havilland Canada DHC-4A Caribou

Notes: This Canadian cargo aircraft comes in civilian and military versions. The civil version seats 30 passengers, while the military version carries 32 troops. This aircraft is used by Canada (where it is known as the CC-108), the US (where it is known as the C-7A), Australia, Cameroon, Costa Rica, Malaysia, Vietnam, and Thailand. The Caribou is used by many bush pilots in Canada and Alaska. It is noted for its use by the CIA's Air America during the Vietnam War, and for being "the only RAAF plane ever hijacked" (an interesting story in of itself). It is mostly retired from military service, but remains in use by civilian companies and relief organizations. It is a basic transport first built in 1958. US Army Caribous were at first designated CV-2.

The Caribou is a light transport with STOL takeoff and landing characteristics, and able to remain in the air at slow speeds. The wingspan is long, but the wings are narrow, and have wide flaps for its STOL mission. The tail is tall and well off the ground, beyond the rear cargo ramp. The Caribou is powered by a pair of piston engines set into the inner wing; these are Pratt & Whitney R-2000-7M2 Twin Wasps with 1450 horsepower each. The DHC-4A has strengthened fuselage ribs and has a higher weight than the stock DHC-4. The DHC-4T is a DHC-4A that is powered by a pair of Pratt & Whitney PT-6A-67T turboprop engines that produce 1294 horsepower each and are more fuel efficient, though lower in power than the DHC-4 and 4A, and the engines are lighter in weight than the Twin Wasp. The DHC-4T was test flown and certified, but has not yet been produced in scale.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
DHC-4	$7,053,046	AvG	3.64 tons	14.23 tons	3+32, or 26 paratroops, or 22 stretchers	15	None	Enclosed
DHC-4A	$7,227,235	AvG	3.64 tons	14.56 tons	3+32, or 26 paratroops, or 22 stretchers	15	None	Enclosed
DHC-4T	$9,476,625	JP5	3.64 tons	13.73 tons	3+32, or 26 paratroops, or 22 stretchers	15	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
DHC-4	588	163 (80)	NA 44 4/2 40/20	3100	1292	7559	FF4 CF4 RF3 T3 W4
DHC-4A	575	160 (80)	NA 43 4/2 40/20	3100	1292	7559	FF5 CF4 RF4 T3 W4
DHC-4T	545	152 (80)	NA 41 4/2 40/20	3100	1154	7559	FF5 CF4 RF4 T3 W4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	None	565/365m Primitive Runway	None	None	None

De Havilland Canada DHC-5 Buffalo

Notes: This is a turboprop, STOL, stretched version of the Caribou. Except for the distinctive T-tail, the Buffalo retains the lines of the Caribou (and at first was designated the Caribou II). It is known as the CC-115 in Canadian service, and the C-8A in US service. It was also sold to about 20 world air forces. The US Air Force saw them as an expensive duplication of the role already filled by the C-123 Provider, and did not take many of the Buffalos other than the four already bought by the Army for evaluation. In addition to the basic cargo aircraft, specially equipped Buffaloes are used for maritime patrol (not detailed here). Several are in use by bush pilots and civilian agencies. Some 126 had been built and sold to a variety of nations by 1986.

The DHC-5 series is powered by turboprop engines; the DHC-5 is powered by a pair of GE T64-10s developing 2650 horsepower, the DHC-5A by CT64-820-1s developing 2825 horsepower each, and the DHC-5D by CT-820-4s developing 3133 horsepower each. Each increase in engine power allowed the DHC-5 to haul more cargo, while retaining the STOL and rough field capabilities. In 2006, Viking Air of British Columbia purchased the rights to manufacture the DHC-5, and proposed the DHC-5NG (New Generation), powered by a pair of Pratt & Whitney PW150s developing 4920 horsepower each. No such manufacturing has yet taken place, though a test airframe with the PW150 engines has been produced and flown.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
DHC-5	$18,138,986	JP5	4.82 tons	17.27 tons	3+41, or 35 paratroops, or 24 stretchers	15	Weather Radar (40 km)	Enclosed
DHC-5A	$18,615,956	JP5	5.68 tons	18.6 tons	3+41, or 35 paratroops, or 24 stretchers	17	Weather Radar (40 km)	Enclosed
DHC-5D	$19,459,826	JP5	8.18 tons	22.36 tons	3+41, or 35 paratroops, or 24 stretchers	17	Weather Radar (40 km)	Enclosed
DHC-5NG	$24,357,941	JP5	12.22 tons	27.32 tons	3+41, or 35 paratroops, or 24 stretchers	17	Weather Radar (40 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
DHC-5	879	244 (80)	NA 66 4/2 40/20	7980	2366	7620	FF5 CF4 RF4 T3 W4
DHC-5A	870	242 (80)	NA 65 4/2 40/20	7980	2522	7620	FF5 CF4 RF4 T3 W4
DHC-5D	804	223 (80)	NA 60 4/2 40/20	7980	2798	7620	FF5 CF4 RF4 T3 W4
DHC-5NG	1030	286 (80)	NA 77 4/2 40/20	7980	4400	7620	FF5 CF4 RF4 T3 W4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	All-Weather Flight	320/375m Primitive Runway	None	None	None

Ultralight

Notes: This is a generic category of very light, man-portable (in the sense that one man can lift it), one-passenger aircraft based on a light engine and a paraglider. They usually are collapsible and fit into a wooden box or metal or fiberglass carrying case. There are no hardpoints, and no ejection seats. The ultralight is not capable of in-flight refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$2,369 (S/R)	G, AvG	200 kg (including pilot)	48 kg	1	2	None	Open

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
352	88 (40)	NA 22 7/4 50/30	24	5	3000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	175/55m Primitive Runway	None	None	None

C-160 Transall

Notes: This is a French-German built, medium-range transport aircraft. South Africa and Turkey also use this aircraft. Transall is the German abbreviation for Transporter Allianz, a consortium of MBB, Aerospatiale, and VFW-Fokker. The Transall first flew in 1963, and entered service in 1967. The Transalls are getting a bit long in the tooth, but remain in service, more than 60 years after the first flight, with the air force of Turkey. The C-160 has seen combat service in Cyprus, Zaire, South Africa, and Sudan, mostly with peacekeeping detachments. Several civilian variants of the C-160 are also in use by civilian agencies, such as the International Red Cross and several civilian freight operators.

Newer C-160NGs have upgraded electronics, and increased fuel tankage by removing the center port side cargo door and replacing it with an additional fuel tank in the center wing section, through the fuselage. The C-160NG also has Kevlar antispalling liners for the cockpit. The Transall has paratrooper doors near the rear of the fuselage, and a rear cargo ramp. A flexible fuel bladder may be carried internally at the expense of cargo to add an additional 9000 liters to fuel capacity. The C-160 has no ejection seats, but is capable of in-flight refueling. The Transall can "kneel," partially lowing onto its landing gear, when loading cargo into its hold. The cargo hold can be pressurized for high-altitude flight, especially if passengers are carried. The Transall is powered by a pair of Rolls-Royce Tyne 20 turboprop engines developing 5670 horsepower each on the base C-160, but these are uprated to 6035 horsepower each for the C-160NG. (It was actually well known that the Tyne 20 engine could be safely operated at higher power levels.)

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-160	$100,226,788	JP4	16 tons	46 tons	3+93 or 88 paratroopers or 62 stretchers	23	Radar (74 km)	Enclosed
C-160NG	$140,650,318	JP4	17 tons	48 tons	3+93 or 88 paratroopers or 62 stretchers	24	Radar (74 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-160	710	197 (100)	NA 53 2/1 30/15	19000	5072	8230	FF7 CF6 RF6 T5 W7
C-160NG	724	201 (100)	NA 54 2/1 30/15	28000	5396	8230	FF7 CF6 RF6 T5 W7*

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-160	None	550/720m Primitive Runway	None	None	None
C-160NG	Flare/Chaff Dispensers (30/30), RWR, GPS	550/720m Primitive Runway	None	None	None

*The cockpit has Kevlar liners and has an AV of 9.

CASA/IPTN CN-235

Notes: This is a joint project of Indonesia and Spain. It is a cargo aircraft that can also be used as an anti-ship aircraft or gunship. It is also produced in a commercial passenger version, with 44 seats. The CN-235 was designed for easy maintenance from a variety of independent contractors, and to be easy to fly. This aircraft has been widely exported. First flight was in 1986 and service entry was in 1988. In addition to Indonesia and Spain, the CN-235 is used by the Turkish Air Force, the French Air Force, Venezuela, Columbia, Thailand, Mexico, South Korea, Jordan, Senegal, and the Royal Malaysian Air Force. A wide variety of civilian versions have been built, ranging from regional transport to cropdusters. The CN-235 was later further developed into the Spanish C-295 and the Indonesian N245. The CN-235 saw combat service in 2021 in Afghanistan, when Ireland sent their only CN-235 to assist in evacuations from Kabul, and in 2022 in Ukraine, when they helped with the evacuation of wounded civilians.

The CN-235 is a twin-turboprop light cargo aircraft with a relatively wide fuselage, an upswept tail, and wings that angle slightly upwards from their mounting point on the fuselage. The wings are also fairly wide for this type of aircraft. The CN-235 is powered by a pair of GE CT7-9C3 turboprops with a power of 1750 horsepower each, connected to four-blade propellers. The CN-235-10 is the base aircraft design; the CN-235-100/110 uses a significant amount of composites in its construction (the 100 is built in Spain, and the 110 is built in Indonesia). The CN-235-200/220 incorporates high-lift devices and leading-edge slats on its wings to produce more lift and more cargo-carrying capability (again, the 200 is built in Spain and the 220 in Indonesia). The CN-235-330 is built in Indonesia and has further design elements to allow an even higher cargo capacity.

The CN-235 MP and MPA are two maritime surveillance and attack platforms that are similar in concept, though different in equipment carried. Both are capable of carrying the same weapons, such as a pair of Mk 46 torpedoes, a pair of Exocet antishipping missiles, or six Harpoon antishipping missiles. The CN-235 MP is equipped with a Litton APS-504(V)5 radar and a FLIR-2000HP Forward-Looking IR system, along with an ALR-86(V) EW system. The MPA uses the Thales AMASCOS system, which includes an Ocean Master 100 radar, the Chilo thermal imager system, and an ASQ-508 MAD system.

The HC-144 Ocean Sentry is employed by the US Coast Guard as a SARbird and maritime patrol aircraft. The HC-144 has been involved in many search and rescue operations as well as drug interdiction missions. The HC-144 can drop supplies such as rubber rafts, medical equipment, water, and food off the ramp in the rear.

The AC-235 is a light gunship produced by KADDB in Jordan, armed with a 30mm autocannon firing out of the left side and Hellfire missiles and Hydra 70 or APKWS rocket pods on sponson wing stubs on the fuselage; the actual wings do not have hardpoints. The autocannon is on a trainable mount, and can elevate, depress, and traverse to an extent. The fire control is excellent, and the weapons detect their targets by laser designator and synthetic aperture radar (SAR). USSOCOM is currently evaluating the AC-235.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CN-235-10	$23,384,058	JP4	6 tons	16.5 tons	3+51, or 35 paratroopers, or 18 stretchers	23	None	Enclosed
CN-235-100/110	$23,929,054	JP4	6 tons	16.2 tons	3+51, or 35 paratroopers, or 18 stretchers	23	None	Enclosed
CN-235-200/220	$24,228,168	JP4	6.3 tons	16.8 tons	3+51, or 35 paratroopers, or 18 stretchers	23	None	Enclosed
CN-235-330	$24,420,456	JP4	6.5 tons	16.8 tons	3+51, or 35 paratroopers, or 18 stretchers	23	None	Enclosed
CN-235 MP	$58,171,967	JP4	4.5 tons	16.6 tons	4	26	Radar (370 km), FLIR (55 km)	Enclosed
CN-235 MPA	$63,142,476	JP4	4.5 tons	16.6 tons	4	26	Radar (300 km), Thermal Imaging (30 km), MAD (1.2 km)	Enclosed
HC-144 Ocean Sentry	$38,099,742	JP4	5.5 tons	16.5 tons	2	25	Radar (300 km), FLIR (56 km)	Enclosed
AC-235	$37,827,850	JP4	1.6 tons	16 tons	8	26	SAR (45 km), FLIR (30 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
CN-235-10	610	170 (95)	NA 46 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7
CN-235-100/110	621	173 (95)	NA 47 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7
CN-235-200/220/330	599	167 (95)	NA 45 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7
CN-235 MP/MPA	608	169 (95)	NA 46 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7
HC-144 Ocean Sentry	612	170 (95)	NA 46 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7
AC-235	631	175 (95)	NA 47 4/2 40/20	2820	1556	9100	FF7 CF7 RF7 T6 W7

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
CN-235-10/100/110/200/220/330	RWR, Flare/Chaff Dispensers (30/30)	500/420m Primitive Runway	None	None	None
CN-235 MP	RWR, Flare/Chaff Dispensers (30/30), Look-Down Radar, ECM 1, IRCM 1, Sonobuoys (40)	500/420m Primitive Runway	+3	6 Hardpoints*	None
CN-235 MPA	RWR, Flare/Chaff Dispensers (40/40), Look-Down Radar, ECM 2, IRCM 1, EW Suite, Sonobuoys (40)	500/420m Primitive Runway	+3	6 Hardpoints*	None
HC-144 Ocean Sentry	RWR, Flare/Chaff Dispensers (30/30), Look-Down Radar, Secure Radios, SAR Gear, Video Camera (56 km), Still Camera (56 km)	500/420m Primitive Runway	None	None	None
AC-235	RWR, Flare/Chaff Dispensers (30/30), Secure Radios, Laser Designator (30 km)	500/420m Primitive Runway	+4	30mm M230LF Autocannon (Left Side), 8 Hardpoints	450x30mm

*If the aircraft is carrying Mk 46 torpedoes or Exocet missiles or weapons of a similar size and weight, only the center hardpoint on each wing may be used.

IAI Arava

Notes: This is an Israeli cargo aircraft that has also found use as a special missions aircraft in the Israeli Air Force. However, the IAF was mostly unimpressed with Arava and only employed a relatively few Aravas. Many versions exist, such as EW, ELINT, ESM, reconnaissance, and others. It is also used to deliver special teams behind enemy lines due to its ability to fly low and maneuverable. The Arava is also in service with Thailand and several Latin American and African countries. The Arava's primary success was in the export market, and several civilian sales were made to commuter airlines. Regardless, only a total of 103 Aravas were built, with most customers employing only a handful of Aravas.

The rear end of the fuselage hinges to the right for bulk cargo loading, and there are also doors on each side. The Arava consists of a barrel-like center fuselage and twin tail booms which extend from the engine nacelles. The aircraft does not have ejection seats and is not capable of in-flight refueling. The two hardpoints are on the fuselage and normally carry machinegun pods or rockets. The 201 is the base military model, with a pair of PT6A-34 turboprops developing 750 horsepower each. The 202 is the upgraded military model, with strengthened wing struts (in the 201, excessive flutter could develop and tear the wings off the fuselage), and wet wings (containing fuel tanks). The 202 is also powered by PT6A-36 turboprops which are a little more powerful at 783 horsepower; however, the entire aircraft is also much heavier. The 101 is the civilian counterpart of the 201, with 20 airline-type seats, a baggage hold at the rear, and pressurization; the 102 is the civilian version of the 202. Neither have hardpoints. (They are otherwise not detailed here.) One variant is the SIGINT model, which will not be detailed here due to lack of information, but presumably carries ELINT gear and has several bulges in the fuselage for antennas.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Arava 201	$4,129,040	JP5	2.5 tons	6.8 tons	2+24, or 16 paratroops, or 12 stretchers	11	None	Enclosed
Arava 202	$4,194,208	JP5	2.6 tons	7.71 tons	2+24, or 16 paratroops, or 12 stretchers	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
Arava 201	635	176 (80)	NA 48 6/4 60/40	1450	668	7620	FF3 CF3 RF3 W3 T2
Arava 202	586	163 (80)	NA 44 6/4 60/40	2365	698	7620	FF4 CF4 RF3 W3 T2

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	None	350/400m Primitive Runway	None	2 Hardpoints	None

Aeritalia G.222

Notes: The G.222 (G for the chief designer, Giuseppe Gabrielli, 2 for the twin engine arrangement, and 22 for the NATO Basic Military Requirement 22 for which it had been originally designed) was conceived in response to a NATO requirement for a medium V/STOL transport. The vertical takeoff requirement eventually evaporated as impractical, but Aeritalia continued the development of the G.222 as a STOL aircraft able to operate from austere and rough fields. The Italian Air Force accepted them for service in 1978, and various export customers emerged over the next 20 years. In many cases, G.222 airframes were retired from some countries' air forces, refurbished, and then sold on to other countries' air forces. The US Air Force operated ten G.222s, upgraded by Chrysler Aerospace; these were designated C-27A Spartan (see below). The G.222 has seen heavy use in humanitarian missions in Africa as well as military airlift roles, and has seen combat service in Africa as well as Iraq and Afghanistan. It has also been used as aerial firefighting, maritime patrol, radio and radar calibration, and VIP transport. The equipment for such missions is modular, and can be changed out as the mission changes.

The G.222 is of conventional design, with high-mounted wings and an upswept rear, including a ramp for loading the aircraft. The engine nacelles are inboard of the center of the wings. The G.222 have adjustable-height landing gear, enabling it to "kneel" for easier loading. Most G.222s are powered by General Electric T64-GE-P4D turboprops of 3400 horsepower each, but as the US had an embargo on military equipment to Libya, G.222Ts exported to Libya are powered by Rolls Royce Tyne turboprops with 4860 horsepower each instead, with other US-based avionics being replaced by European equivalents. The Tyne engines gave the Libyan variant superior performance at the cost of increased fuel consumption. (This variant, the G.222T, was also available from Aeritalia.) Early variants had basic avionics and equipment, but upgrades started by some operators in the mid-1990s brought better communications, better defensive gear, and cockpit lighting changes that allow the crew to fly the aircraft and read all the instruments while wearing night vision goggles, along with state of the art navigation systems, and the changing out of some other avionics and equipment with their modern counterparts. There is excellent visibility from the cockpit, and most instruments are centrally placed to be accessible to both pilots. Some G.222s are fitted with aerial refueling probes, though the G.222 is not fitted with aerial refueling equipment as standard. There is an EW platform version; it is not included here due to lack of information. The US C-27A Spartan is essentially the G-222-710 aircraft in US military paint, and with improved communications and navigation equipment.

The C-27J Spartan is a vastly upgraded C-27A, with improvements in the engines, avionics, part of the empennage, and various subsystems taken from the C-130J Super Hercules. First flight was in 1999, with military certification taking place in 2001. The first customer for the C-27J was the Italian Air Force in 2006; the US then ordered 38 of them in 2007. (The Italians call their C-27J the Praetorian.) They were first used by the US Air Force, but were retired due to budget cuts five years later, and the C-27Js were then assigned to the Coast Guard, Forestry Service (as aerial firefighters) and SOCOM. The C-27 has also been acquired by several Eastern European nations, several African nations, Australia, Mexico, and Peru. The C-27J is powered by Rolls-Royce AE 2100D3 engines developing 4590 horsepower each, with six-bladed propellers instead of the three-bladed propellers of the G.222/C-27A, and the crew has the glass cockpit of the C-130J. The cargo compartment is updated in view of the greater cargo capacity. An aerial refueling probe is not fitted as standard, but is an option.

Variants of the C-27J include the AC-27J Stinger II (after the AC-119K Stinger), a medium gunship armed with a left-side-firing Bofors autocannon and equipped with six hardpoints normally taken up with precision guided weapons such as Hellfire ATGMs or Viper Strike smart bombs. The cockpit has a liner of Kevlar, increasing protection slightly. In the end, SOCOM elected to standardize on C-130-based gunships instead of using the AC-27J, though Leonardo still offers the conversion to customers worldwide. Most potential AC-27J customers opted for the MC-27J Praetorian Gunship instead (below).

The MC-27J is a multimission variant of the C-27J, taking lessons learned from the AC-27J modification and adding equipment for C3-ISR, Signals Intelligence (SIGINT), and a plethora of sensors, including AESA radar, Electro-Optical/IR vision, EW, and even enhanced communications including SATCOM radio and datalink capabilities. There are fewer hardpoints, but these normally carry Multiple Ejector Racks (MERs) to increase weapons load. It can support ground troops with anything from direct fire to electronic jamming or listening in on radio transmissions, as well as providing commanders with a highly effective mobile command post.

The HC-27J is a US Coast Guard maritime surveillance platform, festooned with sensors, radar, cameras, and recorders. It can also double as a standard transport, and does perform many humanitarian response missions. The HC-27J fleet consists of reassigned USAF C-27Js, refitted and outfitted for their surveillance mission. The HC-27J replaces HC-130Hs in Coast Guard service; there is currently no money in the budget for new HC-130Js, though the Coast Guard expects to be able to replace the HC-27Js starting in 2028.

The EC-27J "Jedi" (for Jamming and Electronic Data Instrumentation, but this is not an official name for the aircraft) is an initiative of Leonardo in Italy for a battlefield EW platform. As such, it is loaded with jamming and MIJI-capable equipment, as well as some battlefield surveillance gear. An important feature of the Jedi is the use of jammers specifically designed to jam cell phones and hand radio transmissions, as well as other remote detonators for IEDs.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
G.222A	$35,227,513	JP5	9.4 tons	28 tons	3+53 or 40 paratroops or 36 stretcher cases	21	Weather Radar (150 km)	Shielded
G.222A (Upgraded)	$60,444,229	JP5	9.4 tons	28.7 tons	3+53 or 40 paratroops or 36 stretcher cases	23	Radar (150 km)	Shielded
G.222T	$39,373,873	JP5	9.4 tons	29.1 tons	3+53 or 40 paratroops or 36 stretcher cases	22	Weather Radar (150 km)	Shielded
C-27A	$46,658,533	JP5	9.4 tons	28 tons	3+53 or 40 paratroops or 36 stretcher cases	22	Radar (150 km)	Shielded
C-27J	$47,718,887	JP5	10.3 tons	30 tons	3+53 or 40 paratroops or 36 stretcher cases	24	Radar (200 km)	Shielded
AC-27J	$60,837,451	JP5	2.75 tons	29.5 tons	5	27	Radar (100 km), FLIR (30 km)	Shielded
MC-27J	$76,324,256	JP5	3 tons	29.75 tons	6+4	28	AESA Radar (140 km), FLIR (45 km), SAR (45 km)	Shielded
HC-27J	$68,028,776	JP5	5 tons	30 tons	3	28	Radar (300 km), FLIR (60 km), SAR (45 km)	Shielded
EC-27J	$77,339,190	JP5	2 tons	29 tons	4	29	Radar (150 km), FLIR (30 km), SAR (30 km)	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
G.222A	699	194 (120)	NA 52 4/2 40/20	12000	3038	7620	FF6 CF6 RF6 T5 W5
G.222A (Upgraded)	682	190 (120)	NA 51 4/2 40/20	12000	3038	7620	FF6 CF6 RF6 T5 W5
G.222T	920	256 (120)	NA 69 4/2 40/20	12000	4178	7620	FF6 CF6 RF6 T5 W5
C-27A	699	194 (120)	NA 52 4/2 40/20	12000	3038	7620	FF6 CF6 RF6 T5 W5

C-27J	878	244 (100)	NA 66 4/2 40/20	12000	4106	9144	FF6 CF6 RF6 T5 W5
AC-27J	892	248 (100)	NA 67 4/2 40/20	12000	4106	9144	FF6 CF6 RF6 T5 W5*
MC-27J	885	246 (100)	NA 66 4/2 40/20	12000	4106	9144	FF6 CF6 RF6 T5 W5*
HC-27J	878	244 (100)	NA 66 4/2 40/20	12000	4106	9144	FF6 CF6 RF6 T5 W5
EC-27J	907	252 (100)	NA 68 4/2 40/20	12000	4106	9144	FF6 CF6 RF6 T5 W5

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
G.222A	None	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
G.222A (Upgraded)	RWR, Flare/Chaff Dispensers (30/30), GPS, Secure Radios	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
G.222T	None	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
C-27A	Secure Radios, INS	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
C-27J	RWR, Flare/Chaff Dispensers (30/30), GPS, Secure Radios, TFR (40 km)	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
AC-27J	RWR, Flare/Chaff Dispensers (30/30), GPS, Secure Radios, TFR (40 km), Day/Night CCTV (30 km), Laser Designator (30 km)	550/500m Primitive Runway	+4	40mm Bofors L/60 Autocannon (Left Side), 6 Hardpoints	450x40mm
MC-27J	RWR, Flare/Chaff Dispensers (30/30), GPS, Secure Radios, TFR (40 km), Day/Night CCTV (30 km), Radio Jamming 3, ELINT 3, ECM 1, Laser Designator (30 km)	550/500m Primitive Runway	+4	30mm M230LF Autocannon (Left Side), 2 Hardpoints	450x30mm
HC-27J	RWR, Flare/Chaff Dispensers (30/30), GPS, Secure Radios, Day/Night CCTV (30 km), Look-Down Radar, 2xVideo Camera (30 km), 2xStill Camera (30 km)	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None
EC-27J	RWR, Flare/Chaff Dispensers (40/40), GPS, Secure Radios, ECM 3, IRCM 2, Radio Jamming 3, ELINT 3	550/500m Primitive Runway	None	2 Hardpoints (Fuel Tank Only)	None

*The cockpit has a Kevlar liner, and has an AV of 8.

Kawasaki C-1A

Notes: This Japanese transport was first accepted into service in 1970 to replace the C-46 in its Air Defense Force's service. Looking similar to a smaller, shorter C-17, these aircraft have been steadily upgraded with more advanced electronics allowing it to be used under almost any conditions and to drop large items or do LAPES insertions. The primary use for the C-1 is to supply outlying islands, support Japanese industry, and to support military assistance and humanitarian operations. The C-1 is flown only by the Japanese JASDF.

The C-1 does not have ejection seats and is not capable of aerial refueling. It is equipped with several lift devices, including Fowler Flaps and leading-edge slats, which contribute to its STOL takeoff and landing profile. Several electronic devices, including inertial navigation and radar, allow it all weather performance. The C-1 is powered by a pair of Pratt & Whitney JT8D-M-9 turbofan engines in pods under the inner wings, and these develop 14,500 pounds thrust each. The C-1 can settle onto its landing gear, "kneeling" to aid in loading cargo, and there is a large ramp at the rear to load the aircraft. If there is a shortcoming in the C-1A, it is in its short range; the C-1A can barely make it to Okinawa and back with internal fuel. To this end, the last five C-1As were delivered with some of the rear cargo area taken up with a large internal fuel tank, at the expense of a chunk of cargo capacity.

The EC-1, an electronic warfare and intelligence variant, carries mostly its sensors and EW gear, though it can carry a small amount of cargo, as well as the personnel to operate its equipment. Only one was built.

Twilight 2000 Notes: During the Twilight War, they were standouts in the defense of islands like Okinawa, and were also used for limited paratrooper drops as far away as Korea. In addition, the electronic warfare variant, the EC-1, was used to jam Russian and North Korean radio and radar transmissions to good effect, as well as to conduct electronic reconnaissance.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-1A	$78,158,546	JP5	11.9 tons	45 tons	5+60 or 45 paratroopers or 36 stretchers	25	Radar (150 km)	Shielded
C-1A (Last 5)	$78,236,506	JP5	5.8 tons	45 tons	5+48 or 35 paratroopers or 28 stretchers	25	Radar (150 km)	Shielded
EC-1	$138,876,457	JP5	2 tons	46 tons	5	30	Radar (150 km)	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-1A	1681	467 (100)	NA 126 6/3 60/30	15200	5894	11580	FF6 CF6 RF6 T5 W5
C-1A (Last 5)	1681	467 (100)	NA 126 6/3 60/30	22996	5894	11580	FF6 CF6 RF6 T5 W5
EC-1	1645	457 (100)	NA 123 6/3 60/30	15200	5894	11580	FF6 CF6 RF6 T5 W5

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-1A	All-Weather Flight, Secure Radios, INS, Flare/Chaff Dispensers (30/30)	1180/2190 Hardened Runway	None	None	None
EC-1	All-Weather Flight, Secure Radios, RWR, INS, Flare/Chaff Dispensers (50/40), ECM 3, IRCM 2, Radio Jamming 3, ELINT 3	1180/2190 Hardened Runway	None	None	None

Shin Meiwa US-1

Notes: This is a Japanese built STOL amphibian that may be used for cargo transportation, search and rescue, and ASW duties. The aircraft began as the PS-1 patrol seaplane and was later developed into the more versatile US-1 utility seaplane. Both are based on the American HU-16 Albatross amphibious aircraft, but has a T-tail and numerous design differences that differentiate them from their parent design.

The PS-1 was developed as an amphibious maritime patrol/ASW aircraft. The PS-1 is not a true amphibian; it can be moved on land and carries its own beaching equipment, but cannot use conventional runways, being limited to takeoffs and landings on water. The PS-1 is powered as its prototype, with two 1425-horsepower Wright radials, along with a pair of Pratt & Whitney R-1340 radials outboard. In addition, the PS-1 has a GE T58 turboshaft compressed air generator used to assist in takeoffs and landings on water by controlling boundary layer effects; this has 1250 horsepower and is generally not designed to sustain power in flight. The second fuel type is for the T58 turboshaft. The PS-1 also has a system to redirect sea spray and propwash over the wings, further decreasing takeoff distance. The PS-1's dipping sonar cannot be used in flight; the PS-1 must land on water to deploy its sonar, taxiing along the water to tow its dipping sonar. The PS-1 can land on and taxi on water in seas of up to three meters. The PS-1 is not pressurized and carries only emergency oxygen equipment, though it does have air conditioning and heating. The PS-1 is generally armed with a mix of torpedoes, depth charges, and 5-Inch Zuni rockets, carrying them on underwing hardpoints, often equipped with MERs. On the outboard of its wings are a pair of floats to support the wings during water operations. No ejection seats are provided, and the aircraft is not capable of in-flight refueling.

In 1976, a single PS-1 was experimentally modified into a water bomber for firefighting duties, but this experiment ended with no production examples and other aircraft were used for the envisioned firefighting mission. This version carried 7350 liters of water internally. This aircraft will not be detailed further here.

Japan planned for the PS-1 to be operationally succeeded by the then-new P-3 Orions imported from the US in 1980, and this would make the PS-1 obsolete. However, the Japanese Maritime Self-Defence Force (that is what Japan calls their Navy) was looking for an amphibious SARbird (an aircraft designed for search and rescue functions), and felt that the PS-1's design was a good place to start. The new aircraft, the US-1 (Utility Seaplane), first flew in 1974 and entered service in 1975. There were some changes; the US-1 has one door on each side and a cargo door at the rear. The US-1 is a true amphibian, having the ability to land on water, and also having retractable landing gear for operation from land-based runways. There are large bulges on the sides of the aircraft for the retraction of this landing gear, with the nose wheel being retracted under the aircraft's nose internally. Much of the military equipment of the PS-1 is deleted (particularly the crew workstations and the dipping sonar in the tail), freeing up room for more fuel. The US-1 is powered by four 3400-horsepower Ishikawjima-Harima/GE T64-IHI-10 turboprops, lesser-rated versions of the US-1A's engines. The US-1A is powered by four Ishikawjima-Harima/GE T64-IHI-10J turboprops with 3493 horsepower. In addition, both have a T58-IHI-10-M2 turboshaft compressed air generator used to assist in takeoffs and landings on water by controlling boundary layer effects; this has 1400 horsepower and is generally not mounted to sustain power in flight.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
PS-1	$51,029,562	AVG + JP4	6 tons	43 tons	10	26	Dipping Sonar (3 km), Radar (50 km)	Enclosed
US-1	$76,606,312	JP4	10 tons	43 tons	7+20 or 12 stretchers	25	Radar (50 km)	Enclosed
US-1A	$67,861,562	JP4	10 tons	45 tons	7+20 or 12 stretchers	50	Radar (50 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
PS-1	560	156 (90)	NA 42 5/2 35/20	18249	2252	8200	FF6 CF6 RF4 T4 W5
US-1	871	242 (90)	NA 65 5/2 35/20	22489	5840	8200	FF6 CF6 RF4 T4 W5
US-1A	890	247 (90)	NA 67 5/2 35/20	22489	6242	8200	FF6 CF6 RF4 T4 W5

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
PS-1	Sonobuoys (20)	500/220m Water	+2	6 Hardpoints	None
US-1/1A	SAR Gear, Flare Launcher (10), INS	500/220m Water/Primitive Runway	None	2 Hardpoints	None

Antonov An-2

Notes: The An-2 is a seemingly antiquated design that was so useful to Soviet and Russian civilians, and to the Air Force, that it was produced in large numbers from 1947-2001. The An-2 is known for being a very rugged and robust design that gives a long period of useability to its owners. The An-2 was mass produced in astounding numbers, and used by civilians and military concerns all over the world. The An-2 was originally designed as a forestry and agricultural aircraft as well as a bush plane, but the basic airframe is very adaptable and numerous variants have been developed, from basic transport to scientific research to water bombers. Initial production of the first 5000 An-2s was at State Factory 473 in Kyiv, and later Soviet production was as State Factory 464 in Dolgoprudniy. After 1960, most An-2s were actually built by PZL in Poland, where over 13,000 were built. China also built the An-2 under license as the Shijiazhuang Y-5. By 1992, the An-2 had the longest production run of any aircraft, though this record has since been exceeded. The An-2 is essentially a large, slow, rugged biplane. The An-2's first military use was by North Korea during the Korean War.

The An-2 is a biplane in a world of monoplanes, but the paired wings give high lift and maneuverability. Despite the biplane design, the aircraft is of all-metal construction. The most common version is the 12-seater An-2T utility cargo aircraft. The initial engine designated for the An-2 was quickly replaced by the 9-cylinder radial Shvetsov ASh-62 engine developing 1010 horsepower. The An-2 is not known for its speed, but it has excellent slow speed handling characteristics and STOL performance. The An-2 was deliberately built with complexity kept to a minimum. The wings have automatic (though non-mechanical) leading edge slats that contribute to the An-2's slow speed handling. The compressor is connected to an air pump so that tire pressure in the landing gear and shock absorbers can be adjusted. The landing gear brakes are the same as those on heavy trucks of the period. The engine is self-starting and does not need an external power source. The cabin is heated and ventilated.

Variants include the An-2A, developed from the An-2T as an interceptor for reconnaissance balloons from the US. It has a combined searchlight/autocannon turret on the rear fuselage on top mounting a pair of GSh-23 autocannons or a single A-12.7 heavy machinegun. The An-2A has a turbocharged ASz-62IR engine for high-altitude use, delivering 1178 horsepower. The An-2P is the An-2T with permanently mounted passenger seats; Soviet An-2Ps had ten seats plus two for the pilots, but PZL-built An-2Ps had 12 seats plus two for the pilots. The An-2TP is a version specifically for the transport of small teams of paratroopers, and has tip-up bench seats and static line attachment cables. The An-2V is a floatplane variant, with floats instead of conventional landing gear. It will not be further detailed here.

The An-3 is essentially a turboprop-powered An-2T, powered by Glushenkov TVD-20-03 1375-horsepower turboprop engine. This comes in variants similar to the An-2; the An-2TK is a convertible cargo/passenger version with six foldable twin seats, and the An-3D is the paratrooper version.

In 2013, there were further developments on the turboprop-powered An-2 front; Antonov developed a new version of the An-2, called the An-2-100, powered by a Motor Sich MS-14 turboprop developing 1500 horsepower. The primary aim was owners in former CIS countries, where aviation gasoline is no longer being produced in large amounts.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-2T	$489,013	AvG	1.14 tons	5.44 tons	2+8	14	None	Enclosed
An-2A	$3,716,055	AvG	308 kg	6.08 tons	4	16	None	Enclosed
An-2P	$500,033	AvG	1.14 tons	5.52 tons	2+10 or 12	14	None	Enclosed
An-2TP	$494,523	AvG	1.14 tons	5.5 tons	2+10 paratroops	14	None	Enclosed
An-3T	$819,834	T7, RT	1.37 tons	5.8 tons	2+8	14	None	Enclosed
An-3TK	$832,674	T7, RT	1.37 tons	5.89 tons	2+12	14	None	Enclosed
An-3D	$826,254	T7, RT	1.37 tons	5.87 tons	2+10 paratroops	14	None	Enclosed
An-2-100	$861,564	JP5	1.5 tons	5.89 tons	2+12, or 10 paratroops, or 4 stretchers	14	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-2T	519	144 (50)	NA 39 8/4 80/40	1200	435	4500	FF4 CF4 RF4 W4 T4
An-2A	544	151 (50)	NA 41 8/4 80/40	1200	510	10000	FF4 CF4 RF4 W4 T4
An-2P	512	142 (50)	NA 38 8/4 80/40	1200	435	4500	FF4 CF4 RF4 W4 T4
An-2TP	514	143 (50)	NA 38 8/4 80/40	1200	435	4500	FF4 CF4 RF4 W4 T4
An-3T	668	186 (50)	NA 50 8/4 80/40	1200	601	4400	FF4 CF4 RF4 W4 T4
An-3TK	658	183 (50)	NA 49 8/4 80/40	1200	601	4400	FF4 CF4 RF4 W4 T4
An-3D	661	184 (50)	NA 50 8/4 80/40	1200	601	4400	FF4 CF4 RF4 W4 T4
An-2-100	716	199 (50)	NA 54 8/4 80/40	1200	655	4500	FF4 CF4 RF4 W4 T4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-2A	None	215/170m Primitive Runway	+2	2x23mm GSh-23 Autocannons or 1x12.7mm A-12.7 Machinegun	400x23mm or 700x12.7mm
(Others)	None	215/170m Primitive Runway	None	None	None

Antonov An-12

Notes: Also known by the NATO reporting name of Cub, this aircraft was produced in very large numbers and sold worldwide to former Soviet client states and trading partners. It is also used by civilian agencies. It is roughly in a class with the American C-130 Hercules, and also looks similar to that aircraft, except for the An-12's T-tail. It is a military variant of a civilian passenger aircraft, the An-10, which itself developed from the An-8 prototype aircraft. First flight occurred in 1957, and initial service entry was with the Soviet Air Force in 1959. A similar version is built in China and known as the Y-8. Military users of this aircraft include Afghanistan, Angola, Czechoslovakia, Ethiopia, Iraq, Russia, Yemen, China, Myanmar, Sri Lanka, and Sudan. Variants include ELINT and ECM versions, as well as a SAR version.

The aircraft has a rear ramp for cargo and paratroopers. The wing is mounted high on the fuselage, like most modern military cargo aircraft, and the tail is mounted in a semi-T fashion, with a long fin in front of the vertical stabilizer. Above the rear tailcone is a position for a tail gunner, manning a pair of autocannons. The An-12 is powered by four Ivchenko AI-20A turboprops, each delivering 4000 horsepower. The An-12 can be used for airdrops, and can, for example, tote a pair of BMD fighting vehicles.

The An-12 has a number of variants. The An-12A has fuel tanks in the inner part of the wing as well as the outer wings, and is powered by AI-20K engines developing 4250 horsepower each. The An-12AP is a further improved An-12A, with more fuel tanks under the floor of the cargo compartment.

The An-12B has the extra wing fuel tanks of the 12A, and the wings are also stressed to handle the extra fuel load. It also has a separate Flight Engineer station at the rear of an enlarged cockpit. A TG-16 APU is mounted in the port landing gear fairing, which allows for operations with the engines turned off or to allow the An-12B to self-start. The engines are the same power as the An-12A, but are more reliable AI-20Ms. Some An-12Bs were built at the factory as civilian transports; these have military and sensitive equipment removed or replaced, but carry the same designation of An-12B. The An-12B-I is an An-12B equipped for electronic

warfare with a Fasol active jamming system. Only seven such modifications were made. The An-12BK is an An-12B with improved avionics, a TG-16M APU, and a widened cargo door; it is also rated for a larger cargo capacity. The An-12BK-IS is another EW variant, equipped with the Sirena active jamming system as well as the Fasol active jammer; from 1974, the Fasol and Sirena systems were supplemented with the Bar'yer ECM system and a new IRCM jammer (don't know the name of it). The An-12BK-PPS is developed from both the An-12BK and An-12PP; it is similar to the An-12BK-IS, but has the addition of chaff dispensers in the tailcone. Most An-12BK-PPSs served until 2006, when they were stripped of EW equipment and returned to transport duties as An-12BKs. The An-12BP is the same as the BK, but also has the underfloor fuel tanks of the An-12AP.

The An-12BKTs is a meteorological reconnaissance laboratory. The An-12BPTs is similar to the An-12BKT, but also has a data recording suite and cloud seeding equipment. The An-12BKK is a VIP transport variant, with a single such aircraft being so modified. The An-12BKT is sort of a flying gas station; it is not an aerial tanker, but designed for refueling of aircraft on the ground where no refueling facilities are available. It's cargo bay has a sealed tank for 19,500 liters of fuel. The An-12T is similar, but can also be equipped to carry rocket fuels and oxidizers. The An-12PL is an An-12BP fitted with skis instead of conventional landing gear. These in this paragraph will not be further detailed here.

The An-12M is a standard initial-production An-12, but fitted with four AI-20DM 5180-horsepower turboprops; this variant, despite its higher performance, was stopped due the AI-20DM engines being discontinued. The An-12P is a standard initial production An-12 with additional fuel tanks under the floor of the cargo bay. The An-12PP is an EW platform based on the An-12B, equipped with Booket active jammers to provide wide radius jamming support; the An-12PP was designed to operate as part of a larger formation of An-12s and provide wide-radius EW support. The An-12PP also has ECM jammers and automatic chaff dispensers in the tailcone. The An-12R is the probable designation for a small number of An-12BKs modified for the electronic reconnaissance role. The An-12R is studded with antennas and antenna fairings, and is equipped with ELINT gear and radar and radio detection and ranging gear. The An-12VKP is an An-12A airborne command post, with several secure radios of various ranges and a navigation suite. The cargo bay is pressurized and fitted out as a "war room." The An-12VKP has several self-defense flare and chaff dispensers. Only one was built.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-12	$138,337,737	T7, RT	20 tons	61 tons	5+91 or 60 paratroopers	46	Radar (100 km)	Enclosed
An-12A	$141,296,487	T7, RT	20 tons	62.51 tons	5+91 or 60 paratroopers	51	Radar (100 km)	Enclosed
An-12AP	$141,311,687	T7, RT	20 tons	63.27 tons	5+91 or 60 paratroopers	51	Radar (100 km)	Enclosed
An-12B	$142,716,687	T7, RT	20 tons	63.14 tons	5+91 or 60 paratroopers	51	Radar (100 km)	Enclosed
An-12B-I	$201,339,387	T7, RT	4 tons	63.22 tons	8+10	52	Radar (100 km)	Enclosed
An-12BK	$170,185,328	T7, RT	30 tons	64 tons	5+130 or 100 paratroopers	57	Radar (100 km)	Enclosed
An-12BK-IS	$203,865,765	T7, RT	5 tons	64.04 tons	8+10	58	Radar (100 km)	Enclosed
An-12BK-IS (1974+)	$241,096,703	T7, RT	5 tons	64.12 tons	8+10	59	Radar (100 km)	Enclosed
An-12BK-PPS	$230,836,744	T7, RT	5 tons	64.07 tons	7+10	59	Radar (100 km)	Enclosed
An-12BP	$155,999,502	T7, RT	30 tons	63.9 tons	5+130 or 100 paratroopers	57	Radar (100 km)	Enclosed
An-12M	$153,979,662	T7, RT	20 tons	62.39 tons	5+91 or 60 paratroopers	51	Radar (100 km)	Enclosed
An-12P	$144,038,262	T7, RT	20 tons	61.76 tons	5+91 or 60 paratroopers	47	Radar (100 km)	Enclosed
An-12PP	$203,260,602	T7, RT	4 tons	63.6 tons	8+10	58	Radar (100 km)	Enclosed
An-12R	$211,906,169	T7, RT	2 tons	64.3 tons	7+10	59	Radar (100 km)	Enclosed
An-12VKP	$227,656,088	T7, RT	2 tons	63.4 tons	10	59	Radar (100 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-12	1508	419 (130)	NA 113 4/2 40/20	29350	7154	10200	FF4 CF4 RF3 W3 T3
An-12A	1563	434 (130)	NA 117 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12AP	1545	429 (130)	NA 116 4/2 40/20	32130	7604	10200	FF4 CF4 RF3 W3 T3
An-12B	1548	430 (130)	NA 116 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12B-I	1546	429 (130)	NA 116 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12BK	1527	424 (130)	NA 114 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12BK-IS	1526	424 (130)	NA 114 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12BK-IS (1974+)	1525	423 (130)	NA 114 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12BK-PPS	1526	424 (130)	NA 114 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12BP	1530	425 (130)	NA 115 4/2 40/20	32130	7604	10200	FF4 CF4 RF3 W3 T3
An-12M	1902	528 (130)	NA 143 4/2 40/20	29350	9030	10200	FF4 CF4 RF3 W3 T3
An-12P	1490	414 (130)	NA 112 4/2 40/20	30740	7154	10200	FF4 CF4 RF3 W3 T3
An-12PP	1537	427 (130)	NA 115 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12R	1520	422 (130)	NA 114 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3
An-12VKP	1542	428 (130)	NA 116 4/2 40/20	30740	7604	10200	FF4 CF4 RF3 W3 T3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-12/12A/12AP/12B	None	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12B-I	ECM 1, Active Jamming	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12BK	RWR	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12BK-IS	RWR, ECM 1, Active Jamming	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12BK-IS (1974+)	RWR, ECM 2, IRCM 1, Active Jamming	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm

An-12BK-PPS	RWR, Chaff Dispensers (40), ECM 2, IRCM 1, Active Jamming	1200/1100 Primitive Runway	Nil	None	None
An-12BP	RWR	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12M	None	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12P	None	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12PP	RWR, Chaff Dispensers (40), ECM 2, Active Jamming	1200/1100 Primitive Runway	Nil	None	None
An-12R	Radio Detectors, Radar Detectors, ELINT 3, RWR, ECM 1	1200/1100 Primitive Runway	+1	Twin NR-23 23mm autocannons (Rear)	500x23mm
An-12VKP	Communications Suite, RWR, Flare/Chaff Dispensers (20/20), INS	1200/1100 Primitive Runway	Nil	None	None

Antonov An-14 Pchelka/An-28 Bryza

Notes: Known to the Russians as the Pchelka (Little Bee) and to NATO as the Clod, the An-14 is a light short-range STOL transport originally produced for civil aviation, but pressed into military service, particularly for insertion of small Spetsnaz teams. The Clod has excellent low-speed characteristics, and it is capable of short and rough-field takeoffs and landings; it generally praised for being easy to fly and having natural stability. The An-14 is used by Russia, Bulgaria, Guinea, Mongolia, and Yugoslavia. Despite its good flying statistics, the An-14 proved unable to replace the An-2 and was not built in as large numbers.

The An-14 is a high-wing monoplane with struts under the wings. The wings have automatic leading edge slats and split flaps. The tail has a slightly V-shaped set of tailplanes and twin vertical stabilizers. The tricycle landing gear is not retractable, but the wheels can be fitted with skis for winter operation. The main wheels are mounted on short sponsons. The An-14 has a clamshell rear end that can open for cargo loading, but this rear end cannot be opened in flight. The An-14 is powered by a pair of Ivchenko AI-14RF radial piston engines developing 300 horsepower each.

The An-14B variant tested the viability of giving the An-14A retractable landing gear, but this gear added so much weight and complexity that manufacture was not authorized. The An-714 tested the use of an air cushion device to allow landings on very rough terrain, but again this added so much weight and complexity that it was not manufactured beyond the initial prototype. These versions will not be detailed here. The An-14M eventually diverged enough from the initial An-14 design that it was given its own designation, the An-28.

Also known by its NATO reporting name of Cash, the An-28 is an expanded-fuselage version powered by Glushenkov TVD-10B turboprop engines with 960 horsepower each, a vast increase in engine power over the An-14, enabling it to haul more weight. The wings have a bit more surface area than the An-14, as do the tailplanes and vertical stabilizers. It is almost two meters longer than the An-14, with a wider fuselage.

The An-28RM Bryza 1RM is modified as a SARbird and air ambulance; I don't have enough details to stat this one with justice. The An-28PT is made by PZL of Poland, and is powered by Pratt & Whitney PT6A-45 turboprops developing 1020 horsepower each.

Twilight 2000 Notes: Germany had 4 An-14s at the start of the Twilight War that once belonged to the former East Germany. The An-28PT does not exist in the Twilight 2000 timeline.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-14	$888,569	AvG	850 kg	3.63 tons	2+9 or 7 paratroopers or 6 stretchers	9	None	Enclosed
An-28	$1,662,807	T7, RT	1.75 tons	6.5 tons	2+17 or 15 paratroopers or 12 stretchers	13	None	Enclosed
An-28PT	$1,700,787	JP5	1.75 tons	6.7 tons	2+17 or 15 paratroopers or 12 stretchers	13	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-14	949	264 (70)	NA 71 5/3 50/30	1540	265	5000	FF3 CF3 RF3 W3 T3
An-28	1686	468 (70)	NA 126 5/3 50/30	1960	854	5000	FF3 CF3 RF3 W3 T3
An-28PT	1739	483 (70)	NA 130 5/3 50/30	1960	908	5000	FF3 CF3 RF3 W3 T3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	None	110/110m Primitive Runway	None	None	None

Antonov An-22 Antei

Notes: This is a Russian transport designed for the shipment of bulk cargo, and has little accommodations for troops. The aircraft is fitted with two radars, one being terrain-following radar that lends itself to low approaches and low-altitude flying.

The An-22, known as the Cock to NATO, is a conventional design high-wing monoplane with a pair of vertical stabilizers at the tail. The tails are fitted with anti-flutter masses atop the vertical stabilizers. The An-22 is powered by four Kuznetsov NK-12MA turboprop engines with 15,000 horsepower each, driving contra-rotating propellers with eight blades each. The landing gear is designed for takeoff from rough surfaces; initially, the tire pressure could be adjusted in flight for the surface on which they were about to land, but this feature was later deleted as unnecessary. The cargo space was pressurized to only 3.55 PSI, allowing the construction of the fuselage to be lighter. (Oxygen bottles were carried by loadmasters and cargo crews.) The forward part of the cargo section, separated by a bulkhead from the rest of the cargo space, is pressurized to a 3000-meter level. Prototypes had glazed noses, but production versions were fitted with radar and the glazing deleted; the standard radar was fitted in the right wheel well and the TFR in the nose. The flight controls were augmented to ease the flying task on the pilots. The rear of the aircraft has a large ramp for loading and unloading of cargo, and the An-22 can "kneel," settling onto its landing gear to facilitate loading and unloading.

Initial production An-22s required an external engine start system, but the An-22A (a designation not used by the Soviet military) had an internal APU for engine starts, and had updated radios and navigation equipment. The An-22PZ was designed to transport wing center sections and outer wings externally above the fuselage. These aircraft are fitted with pylons above the fuselage to carry the outsize cargo. These aircraft have a third vertical stabilizer in the center. The An-22PZ will not be detailed here.

The An-22 was originally slated to operate until 2033, when they would be fully replaced by the An-124. However, they were retired early; an An-22 was destroyed in a crash in 2025, when it was testing equipment to extend the life of the fleet, and the upgrade program ended and the fleet was grounded. The An-22 still holds the record as the largest turboprop ever produced.

Twilight 2000 Notes: Only about 45 remained in service by the time of the Twilight War, most being used by Russian Airborne forces and Spetsnaz for the delivery of vehicles and other large cargoes.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-22	$553,273,544	T7, RT	60 tons	250 tons	6+29	104	Radar (150 km)	Enclosed
An-22A	$557,617,052	T7, RT	60 tons	251 tons	6+29	106	Radar (150 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-22	1383	384 (120)	NA 104 4/2 40/20	165000	26840	9100	FF6 CF7 RF6 W6 T6
An-22A	1378	383 (120)	NA 103 4/2 40/20	165000	26840	9100	FF6 CF7 RF6 W6 T6

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-22	All-Weather Flight, TFR (30 km), Flare/Chaff Dispensers (40/30)	800/1300m Primitive Runway	None	None	None
An-22A	All-Weather Flight, Secure Radios, TFR (30 km), Flare/Chaff Dispensers (40/30), INS	800/1300m Primitive Runway	None	None	None

An-26 Nastia

Notes: The An-26 is a military version of the An-24 Coke passenger aircraft, first flown in 1960. It is a short-range transport with a rear ramp for loading cargo, and has an enlarged cargo compartment. The aircraft is very popular in the Third World. The An-26 also has paratrooper exit doors on the sides near the rear. The An-26 is also manufactured by China, without a license, as the Xian Y-7. The An-26 is known by NATO as the Curl.

The An-26 was built to replace the An-24, which was based on a commercial passenger transport and did not have good accommodation for military service, not having a rear ramp or paratrooper doors. The An-24 uses a lot of the airframe of the An-24, and in some ways may be thought of as an An-24 with a rear ramp. The An-26 may be reconfigured in 20-30 minutes for paratrooper or personnel delivery to a pure cargo configuration, or to a medical evacuation configuration. No ejection seats are provided, and the aircraft is not capable of in-flight refueling. The An-26 is a standard military cargo configuration aircraft, with high wings and long landing gear struts. The An-26 is powered by a pair of Ivchenko AI-24 turboprop engines developing 2820 horsepower each. The An-26 has a small Tumansky Ru19A-300 turbojet engine in the tail, functioning as an APU and providing a little more oomph for takeoff runs, developing 1760 pounds thrust. Unusually, the An-26 has a secondary role as a bomber, with hardpoints under the wings next to the fuselage, which are able to take MERs; it was employed as such in several African conflicts.

The An-26D is an extended range version with extra fuel in the wings and extra fuel tanks mounted on the sides of the fuselage. One such An-26 was retrofitted and delivered. The An-26LL-PLO is designed specifically for the hunting and killing of stealthy nuclear submarines; it has several special sensors for the role and carries weapons such as torpedoes, depth charges, and antishipping missiles on its hardpoints, along with sonobuoys, MAD gear, and even sniffers for detecting any nuclear particles the submarines may shed. Only one was built, and it is not known whether it is still in service. The An-26REP is an EW version which was built and tested but did not enter service, it had cylindrical active jamming pods on the lower sides of the fuselage and chaff and flare dispensers. The An-26RT is an ELINT and electronic reconnaissance variant. The An-26RTR is a battlefield communications relay aircraft, capable of retransmission from battlefields in Europe to the national command authority in Moscow.

There are several specialist versions of the An-26 which will not be covered here. These include the An-26 Nel'mo arctic reconnaissance and surveillance aircraft, the An-26 Pogoda weather control aircraft, the An-26 Polyot air traffic control research aircraft, the An-26 Sfera atmospheric research aircraft, the An-26 Vita mobile operating room, the An-16ASLK automated flight control and monitoring system research aircraft, the An-26B Tsiklon weather control research aircraft and the An-26P and An-26LP firefighting aircraft.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-26	$16,853,622	T7, RT	5.5 tons	24 tons	5+40 or 30 paratroopers or 24 stretchers	19	None	Enclosed
An-26D	$16,873,622	T7, RT	5.5 tons	26 tons	5+40 or 30 paratroopers or 24 stretchers	19	None	Enclosed
An-26LL-PLO	$28,042,800	T7, RT	5.5 tons	25.87 tons	8	22	Radar (50 km), MAD (1.5 km)	Enclosed
An-26REP	$57,957,234	T7, RT	1 ton	24.87 tons	6	22	None	Enclosed
An-26RT	$30,648,084	T7, RT	1 ton	25.11 tons	5	22	None	Enclosed
An-26RTR	$17,852,433	T7, RT	1 ton	25 tons	5	23	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-26	1540	428 (110)	NA 116 2/1 40/20	6800	2876	7500	FF5 CF5 RF5 W6 T4
An-26D	1424	396 (110)	NA 107 2/1 40/20	8800	2876	7500	FF5 CF5 RF5 W6 T4
An-26LL-PLO	1434	398 (110)	NA 107 2/1 40/20	6800	2876	7500	FF5 CF5 RF5 W6 T4
An-26REP	1491	414 (110)	NA 112 2/1 40/20	6800	2876	7500	FF5 CF5 RF5 W6 T4
An-26RT	1477	410 (110)	NA 111 2/1 40/20	6800	2876	7500	FF5 CF5 RF5 W6 T4
An-26RTR	1483	412 (110)	NA 111 2/1 40/20	6800	2876	7500	FF5 CF5 RF5 W6 T4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-26/An-26D	All-Weather Flight	500/700m Primitive Runway	+1	2 Hardpoints	None
An-26LL-PLO	All Weather Flight, Sonobuoys (30), Nuclear Particle Detector (5 km)	500/700m Primitive Runway	+2	2 Hardpoints	None
An-26REP	All Weather Flight, Flare/Chaff Dispensers (40/30), ECM 3, Active Jamming, RWR	500/700m Primitive Runway	+1	2 Hardpoints	None
An-26RT	All Weather Flight, ELINT 3, Radio Detectors, Radar Detectors, RWR	500/700m Primitive Runway	+1	2 Hardpoints	None
An-26RTR	SATCOM, 8 radios (30-600 km), Retrans Gear	500/700m Primitive Runway	+1	2 Hardpoints	None

An-32 Cline

Notes: This is a development of the An-26, with a high-lift wing and engines mounted 1.5 meters above the wing to improve unimproved airstrip performance and allow for larger propellers. The An-32 may be thought of in some ways as an enhanced An-26 with more powerful, remounted engines. The engines are more powerful, the aircraft is larger, and the tail is higher and has a larger vertical tailplane. The aircraft is optimized for high-altitude takeoff and landings as high as 4500 meters. It is used by Russia and nine other countries, including Ukraine and India; India is in fact the one of the largest users of the An-32; another notable user of the An-32 is Mexico, who employs some of theirs as water bombers. The An-32's NATO reporting name is Cline.

There are doors in the rear fuselage for paratroopers, and a rear ramp. The aircraft has a removable upper deck that can hold up to 3 tons of the cargo. The aircraft has no ejection seats and is not capable of in-flight refueling. The planform of the An-32 is generally the same as the An-26, but the wings have additional high-lift devices, including triple-slotted flaps, automatic leading-edge slats, and an enlarged tailplane for improved stability in thin air. The engines of the An-32 are Ivchenko AI-20DM turboprops developing 5112 horsepower each, nearly double that of the An-26. They retain the hardpoints and bombing option of the An-26, and Iraq employed them as such against ISIS targets in 2014.

Variants include the modernized An-32B-100 with maximum takeoff weight and cargo capacity increased. The An-32B-110 has modernized avionics allowing the deletion of the flight engineer on the crew, and giving enhancements such as a radar altimeter. The 110 uses metric instrument readouts; the An-32B-120 is the same aircraft with redouts in Imperial measurements. The An-32B-300 is fitted with Rolls-Royce AE 2100 turboprops, which are less fuel hungry but also less powerful at 4600 horsepower each. The An-32V-200 is based on the An-32B-100, and is further modernized like the An-32B-110 or 120. Despite persistent interest from various countries, few have been sold. The An-32 RE is like the An-32V-200, but with further enhanced avionics including weather radar and computerized navigation.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-32	$22,403,637	T7, RT	6.7 tons	27 tons	5+50, or 42 paratroops, or 24 stretchers	19	None	Enclosed
An-32B-100	$23,747,856	T7, RT	7.5 tons	28.5 tons	5+50, or 42 paratroops, or 24 stretchers	19	None	Enclosed
An-32B-110/120	$38,747,937	T7, RT	7.5 tons	28.5 tons	4+50, or 42 paratroops, or 24 stretchers	20	None	Enclosed
An-32B-300	$37,372,337	JP5	6.7 tons	27 tons	4+50, or 42 paratroops, or 24 stretchers	20	None	Enclosed
An-32V-200	$38,747,937	T7, RT	7.5 tons	28.5 tons	4+50, or 42 paratroops, or 24 stretchers	20	None	Enclosed
An-32 RE	$47,797,937	T7, RT	7.5 tons	28.5 tons	4+50, or 42 paratroops, or 24 stretchers	21	Weather Radar (100 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-32	2162	601 (100)	NA 162 3/2 40/20	6800	4568	9500	FF5 CF5 RF5 W6 T4
An-32B-100	2050	569 (100)	NA 154 3/2 40/20	6800	4568	9500	FF5 CF5 RF5 W6 T4
An-32B-110/120	2050	569 (100)	NA 154 3/2 40/20	6800	4568	9500	FF5 CF5 RF5 W6 T4
An-32B-300	1848	513 (100)	NA 139 3/2 40/20	6800	4112	9500	FF5 CF5 RF5 W6 T4
An-32V-200	2050	569 (100)	NA 154 3/2 40/20	6800	4568	9500	FF5 CF5 RF5 W6 T4
An-32 RE	2050	569 (100)	NA 154 3/2 40/20	6800	4568	9500	FF5 CF5 RF5 W6 T4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-32/32B-100	All-Weather Flight	450/600m Primitive Runway	+1	2 Hardpoints	None
An-32B-110/120	All-Weather Flight, Flare/Chaff Dispensers (30/20)	450/600m Primitive Runway	+1	2 Hardpoints	None
An-32B-300	All-Weather Flight, Flare/Chaff Dispensers (30/20)	450/600m Primitive Runway	+1	2 Hardpoints	None
An-32V-200	All-Weather Flight, RWR, Flare/Chaff Dispensers (30/20)	450/600m Primitive Runway	+1	2 Hardpoints	None
An-32 RE	All-Weather Flight, RWR, Flare/Chaff Dispensers (30/20)	450/600m Primitive Runway	+1	2 Hardpoints	None

Antonov An-72 Cheburashka

Notes: This is a Russian transport aircraft designed for STOL operations from unpaved runways. It was designed to be a jet-powered replacement for the An-26. There are other versions than the basic cargo carrier, but it is the most numerous; there is also a civilian transport, a maritime patrol and attack version, a luxury transport version, and an all-weather version (the An-74). Besides Russia, this aircraft is used by Iran and Peru. The maiden flight was in 1977, but development was slow, and it did not see service in the Soviet Air Force until the late 1980s. There is some indication that the An-72 was a response to the American Advanced Medium STOL Transport program; though the AMST program did not result in a production aircraft, one of the prototypes of that program, the YC-14, has a marked resemblance to the An-72. The An-72's name is based on its resemblance to a Soviet-era cartoon character; its NATO reporting name is Coaler.

The engines are located above the wing to keep them clear of debris and to utilize the Coanda effect to increase lift by blowing the jet exhaust over the wing and flaps. The high T-tail and the automatic augmented flight control system also cater to the An-72's STOL profile. The wings have a double sweep angle – inboard, they are almost straight, while they have a marked sweep angle outboard beyond the engines. The wings have flaps which are double-slotted, and the leading edges have automatic slats. In addition to being able to operate from austere runways and fields, the An-72 can take off and land in icy conditions. The aircraft has a rear ramp which may be opened in flight, though only 7.5 tons of cargo can be configured for airdrops. The An-72 is powered by a pair of Lotarev D-36 Series 1A Turbofans developing 14,330 pounds of thrust each.

The An-72A is the primary production version; it is longer than the prototype and has several other improvements to fix problems found in prototype testing. The An-72S is a VIP transport version, with luxury seats. Normally, the cabin is fitted with 24 luxury recliners, but these can be replaced with 38 less luxurious seats, or to fly cargo, or as an air ambulance/operating room supporting eight patients. The An-72P is a patrol version, armed with a 23mm autocannon and hardpoints for bombs and rocket pods; I have not been able to ascertain how the autocannon is mounted, so I have just gone with a forward-firing mount. The An-72R was a prototype ELINT/electronic reconnaissance aircraft; it was known as "Aircraft 88" during development and therefore erroneously called An-88 in the West at first. I do not know whether the An-72R is still in service.

The An-74 is a variant of the An-72 modified for use in the high Arctic and Antarctic. It has upgraded avionics and radar, and can be equipped with skis for ground operations. It has the same nickname, Cheburashka, as the An-72, and carries the same NATO reporting name, Coaler, it was manufactured at the same time as the An-72, but can carry heavier cargo and with a larger avionics bay. It also has advanced navigation gear, including a trip computer. The An-74 uses the same engines as the An-72. The An-74 has an internal winch to assist in loading cargo.

The An-74D is the VIP transport version, similar to the An-72S above. The An-74T is a freighter version of the standard military An-74; it is not configured for passengers, though they could be carried as cargo, and that is the figure given below. The An-74TK-100 is convertible, able to be quickly configured for passengers, paratroops, stretcher cases, or cargo. It will not be covered further in this entry. There are various civilian passenger and freighter versions in service around the world; they will not be detailed here due to lack of information.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

An-72A	$81,981,545	T7, RT	10 tons	34.5 tons	4+52 or 44 paratroopers or 24 stretchers +12 seated casualties	29	Radar (150 km)	Enclosed
An-72S	$89,821,961	T7, RT	2 tons	34.76 tons	4+24 or 38 or 8 stretchers	31	Radar (150 km)	Enclosed
An-72P	$95,626,568	T7, RT	2.7 tons	34 tons	7	31	Radar (150 km), FLIR (30 km)	Enclosed
An-72R	$82,281,390	T7, RT	2 tons	35.6 tons	7	32	Radar (150 km)	Enclosed
An-74	$103,789,502	T7, RT	11 tons	35.5 tons	4+52 or 44 paratroopers or 24 stretchers +12 seated casualties	29	Radar (200 km)	Enclosed
An-74D	$113,813,251	T7, RT	2.2 tons	35.76 tons	4+24 or 38 or 8 stretchers	31	Radar (200 km)	Enclosed
An-74T	$103,789,502	T7, RT	11 tons	35.25 tons	4+39 or 12 stretchers	29	Radar (200 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-72A	2157	599 (90)	NA 162 5/3 50/30	16250	5822	10100	FF5 CF5 RF4 W5 T4
An-72S	2141	595 (90)	NA 161 5/3 50/30	16250	5822	10100	FF5 CF5 RF4 W5 T4
An-72P	2188	608 (90)	NA 164 5/3 50/30	16250	5822	10100	FF5 CF5 RF4 W5 T4
An-72R	2091	581 (90)	NA 157 5/3 50/30	16250	5822	10100	FF5 CF5 RF4 W5 T4
An-74	2097	582 (90)	NA 157 5/3 50/30	22750	5822	10100	FF5 CF5 RF4 W5 T4
An-74D	2082	578 (90)	NA 156 5/3 50/30	22750	5822	10100	FF5 CF5 RF4 W5 T4
An-74T	2111	587 (90)	NA 158 5/3 50/30	22750	5822	10100	FF5 CF5 RF4 W5 T4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
An-72A/S	Flare/Chaff Dispensers (40/30), RWR	420/620m Primitive Runway	None	None	None
An-72P	Flare/Chaff Dispensers (40/30), RWR	420/620m Primitive Runway	+3	23mm GSh-23 Autocannon, 4 Hardpoints	500x23mm
An-72R	Flare/Chaff Dispensers (40/30), RWR, ELINT 3, Radio Detectors, Radar Detectors	420/620m Primitive Runway	None	None	None
An-74 (All)	All-Weather Flight, Flare/Chaff Dispensers (40/30), RWR, INS	420/620m Primitive Runway	None	None	None

An-124 Ruslan

Notes: The second-largest aircraft in the world, it is the largest that was in regular production (the An-225 Mriya derivative having had only two models made, both especially for transport of the Buran, the Russian space shuttle). In the early 1970s, design work began on the Ruslan, to alleviate the shortfall the Soviets had in heavy airlift capacity. First flight was in December 1982, but civilian certification didn't take place until 1992; the ex-Soviet Air Force sought to sell some of the An-124s it could no longer afford to civilian airlines and air freight companies. The An-124 resembles the American C-5 Galaxy, but is even larger. About 5% of the An-124 is of carbon fiber, with the remainder being largely of aluminum, titanium, and stainless steel. The floor of the entire lower cargo deck is composed of titanium. The An-124 is operates by both the Russian military and by civilian air freight operators; 13 are in the Russian Air Force with a further 13 in reserve, while 15 are used by civilian agencies. The An-124's NATO reporting name is Condor.

The An-124 may be loaded from the front and rear, but only the rear ramp or the side doors may be opened in flight. The An-124's cargo hold has a fully pressurized upper deck holding 88 passengers, but the main cargo hold is only partially pressurized (3.57 PSI) to save weight and money. The An-124 may "kneel," settling onto its landing gear, to help facilitate loading and unloading operations. The Ruslan's lower cargo deck has an overhead crane able to winch in 20 tons. The An-124 is not normally used to deploy paratroops, as the partial pressure of the lower cargo hold would mean that the troops would require oxygen masks and cold weather gear during flights. The An-124 is powered by four Lotarev D-18 turbofan engines, each developing 51,000 pounds thrust each; the An-124 is also equipped with a pair of TA18-200-124 18 Kw APUs to power the aircraft on the ground and to provide power to start the engines. These APUs are fed by fuel from the An-124's fuel tanks. The APUs' exhausts are near the bottom of the aircraft; the exhausts are so hot that many airports require runway and tarmac protection to allow them to operate. The engines have thrust reversers to shorten the landing run. The An-124 has two radar units, one for navigation and one for weather.

The An-124-102 Sion is a stretched version which is also re-engined for more power, with four Progress PD-35 engines, developing 77,000 pounds thrust each. The An-124-102 is almost 13 meters longer and has an almost 15-meter greater wingspan, with a nearly two-meter wider fuselage. The An-124-102 has upgraded avionics and navigation computers. The wing has a higher aspect ratio and is largely of composite construction. This version is still in development and is not yet in service.

Twilight 2000 Notes: By 2000, the survivors of the fleet were rarely flown due to the large amount of fuel required to fly them even short distances. However, earlier in the war they were used for massive spot insertions of troops and heavy equipment, as they can move even multiple heavy tanks, and are fairly fast aircraft. The An-124-102 does not exist in the Twilight 2000 timeline.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
An-124 Ruslan	$691,543,060	T7, RT	120 tons	392 tons	7+300 or 200 paratroopers or 84 stretchers	165	Radar (200 km)	Enclosed
An-124-102 Sion	$1,496,732,453	T7, RT	150 tons	490 tons	4+300 or 200 paratroopers or 84 stretchers	150	Radar (200 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
An-124	2728	758 (120)	NA 205 3/2 30/20	289600	41486	12000	FF9 CF9 RF8 W8 T7
An-124-102	3282	912 (120)	NA 246 3/2 30/30	371590	62636	12000	FF9 CF9 RF8 W8 T7

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo

(Both)	All-Weather Flight, Flare/Chaff Dispensers (40/30), RWR, INS	915/2125m Hardened Runway	None	None	None

Ilyushin Il-76

Notes: This was one of the primary transports of Russia during the late Cold War, and was also produced as a tanker (Il-78 Midas) and an AWACS aircraft (A-50 Mainstay). It remains in service, though it has been partially supplanted by the An-124 in the Russian Air Force. It was designed to replace the An-12 in the heavy lift role, and capable of delivering cargo to austere airstrips in Arctic and Subarctic conditions. It is similar in appearance to the US C-17; the Il-76MF is a rare, stretched version, 6.6 meters longer and slightly wider and with more powerful engines. The Il-76 was also produced as a civilian airliner. Military versions are unusual in that some of them have tail guns. Another unusual fact is that the Il-76 was first designed as a commercial airlifter, then developed into a military variant. The Il-76 is noted for its rugged airframe and ability to shrug off damage. The Il-76's NATO reporting name is Candid.

There are side doors for crew entry near the front, at the rear for paratrooper exit, and clamshell doors and a ramp at the rear. The Il-76 has some resemblance to the C-17, though it preceded the C-17 by more than two decades; however, it has a T-tail, a noticeable hump above the wing roots, a glazed nose for the navigator, and a fairing under the nose for radar. And, of course, those tail guns. (The Il-76 perhaps looks more like a smaller C-5 Galaxy.) The Il-76 is powered by four Soloviev D-30KP-2 turbofan engines developing 26,460 pounds thrust each. Landing run is shortened by using thrust reversers in the engines.

The IL-76D was the original military version (Desantnyi, or paratrooper); its interior is optimized for paradrop operations, though it may also be configured for regular troop and cargo carrying. It is armed with a pair of 23mm autocannons in the tail, along with a position for a tail gunner. The Il-76MD is similar but has more fuel in the wings and the fuselage. The Il-76M is the standard military version; it is not normally equipped with hookups for static lines and is optimized for cargo, though it can easily be configured for troops or paratroops. For game purposes, the Il-76M is identical to the Il-76D. The Il-76MD-90 is also similar but is powered by four Aviadvigatel PS-90 turbofans with more power at 35,300 pounds thrust each. The Il-76MF is based on the MD-90, but is stretched and widened and has more cargo capacity and a higher maximum takeoff weight; the Il-76MF was designed for the Royal Jordanian Air Force, but the Jordanians later sold the two they had to the Egyptian Air Force. The Il-76MD-M is a version of the MD with modernized avionics, including weather radar, and a glass cockpit; one crewmember, the flight engineer, is deleted as unnecessary due to the modernization. The Il-76MD-90A is the same as the Il-76MD-90, but with upgraded avionics and cockpit, a stretched and expanded fuselage, and a one-piece carbon fiber wing; the carbon fiber wing is much lighter than the standard aluminum wing. There are also numerous scientific specialist versions and civilian versions which will not be detailed here.

Twilight 2000 Notes: The Il-76MD-M and MD-90A do not exist in the Twilight 2000 timeline.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Il-76D	$363,581,223	T7, RT	42 tons	170 tons	5+140 or 124 paratroopers or 52 stretchers	66	Radar (150 km)	Enclosed
Il-76MD	$363,751,223	T7, RT	48 tons	176 tons	5+140 or 124 paratroopers or 52 stretchers	68	Radar (150 km)	Enclosed
Il-76MD-90	$424,178,683	T7, RT	50 tons	178 tons	5+140 or 124 paratroopers or 52 stretchers	69	Radar (150 km)	Enclosed
Il-76MF	$515,407,729	T7, RT	60 tons	210 tons	5+176 or 154 paratroopers or 64 stretchers	74	Radar (150 km)	Enclosed
Il-76MD-M	$389,078,653	T7, RT	48 tons	176 tons	4+140 or 124 paratroopers or 52 stretchers	69	Radar (150 km)	Enclosed
Il-76MD-90A	$484,568,415	T7, RT	60 tons	200 tons	5+176 or 154 paratroopers or 64 stretchers	74	Radar (150 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
Il-76	2438	677 (130)	NA 183 4/2 40/20	113400	21518	12200	FF9 CF9 RF8 W8 T8
Il-76MD	2357	654 (130)	NA 177 4/2 40/20	130400	21518	12200	FF9 CF9 RF8 W8 T8
Il-76MD-90	3095	860 (130)	NA 232 4/2 40/20	130400	28712	12200	FF9 CF9 RF8 W8 T8
Il-76MF	2630	731 (130)	NA 197 4/2 40/20	130400	28712	12200	FF9 CF9 RF8 W8 T8
Il-76MD-M	2357	654 (130)	NA 177 4/2 40/20	130400	21518	12200	FF9 CF9 RF8 W8 T8
Il-76MD-90A	2758	767 (130)	NA 207 4/2 40/20	130400	28712	12200	FF9 CF9 RF8 W8 T8

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	RWR, Flare/Chaff Dispensers (40/30), INS	450/1500m Primitive Runway	+1	2x23mm GSh-23 Autocannons (Rear), 8 Hardpoints	2000x23mm

CASA C-212 Aviocar

Notes: This is a Spanish transport for both military and civilian uses, in use by a large amount of countries all over the world. The basic version is the C-212, and they get progressively bigger and more capable. First flight was in March 1971, and the Aviocar was designed initially to replace the outmoded Junkers Ju-52s and Douglas C-47s the Spanish Air Force was using in the late 1960s. The Aviocar entered Spanish Air Force service in 1974, and first civilian examples were delivered in 1975. Construction began in Spain by CASA, but in 1975 IPTN in Indonesia negotiated a license to produce the Aviocar, and by 2006, IPTN became the only source of parts and new Aviocars. (Indonesian C-212s are designated NC-212.) The C-212-200 is in use by US SOCOM as the C-41A; the C-41A was also in use in Iraq and Afghanistan by PMC Blackwater. The C-212 is popular with skydivers and smoke jumpers due to its rear ramp which can be opened in flight. The C-212 is currently used by some 35 military operators.

The C-212 is a turboprop-powered STOL cargo aircraft which also has civilian airline versions. It is characterized by its boxy fuselage with a high-mounted wing and tall tail. The rear fuselage has side doors for paratroopers and a rear ramp, a rarity in such a small cargo aircraft; there is also a door for crew entry on the front left side. The fuselage is not pressurized, limiting its service ceiling. The Aviocar has been designed for austere environments without a lot of ground support or hardened runways. The engines are self-starting with a small onboard APU. The wings are narrow but wide, and are fitted with high-lift devices such as double slotted flaps and leading-edge slats.

The base model is the C-212A (also known as the C-212-100); this model has a pair of Honeywell TPE331-5-251C turboprop engines developing 840 horsepower each. The C-212-200 is stretched and is powered by a pair of TPE331-10R-511C turboprop engines developing 900 horsepower each. The C-212-300 has further upgraded TPE331-10R-513C engines, also with an output of 900 horsepower each. The vertical stabilizer was also slightly enlarged, and winglets were added to the tips of the wings. The nose is stretched and more aerodynamic, and houses a cargo compartment. Avionics have been upgraded, including the addition of an autopilot. The C-212-400 is powered by TPE331-12JR-701C engines developing 925 horsepower each. The nose houses upgraded avionics instead of cargo. The NC212i is an improved Indonesian C-212-400, with uprated engines developing 970 horsepower each. The SH-89 is an antisubmarine version of the C-212-200, with an extended nose for search radar, sonar, ECM, and SIGINT gear. It is used primarily by the Swedish Air Force (the base C-212-200 is designated the Tp 89 by the Swedish), but also built by the Indonesians as the NC-212-200 MPA (Maritime Patrol Aircraft).

The C-212 may carry a 1000-liter auxiliary fuel tank in the fuselage or a pair of 750-liter auxiliary fuel tanks. The wings have a pair of hardpoints, but these may only be occupied by 500-liter fuel tanks.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-212-100	$2,333,789	JP5	2.82 tons	8 tons	3+18 or 16 paratroopers or 8 stretchers	15	None	Enclosed
C-212-200	$3,002,054	JP5	3.16 tons	9 tons	3+28 or 24 paratroopers or 14 stretchers	15	None	Enclosed
C-212-300	$12,409,474	JP5	3.26 tons	9.19 tons	3+28 or 24 paratroopers or 14 stretchers	17	Radar (74 km), FLIR (30 km)	Enclosed
C-212-400	$12,409,474	JP5	3.95 tons	11.14 tons	3+28 or 24 paratroopers or 14 stretchers	17	Radar (74 km)	Enclosed
NC212i	$12,456,444	JP5	3.95 tons	11.14 tons	3+28 or 24 paratroopers or 14 stretchers	17	Radar (74 km)	Enclosed
SH-89	$18,057,013	JP5	3 tons	8.7 tons	5	20	Radar (74 km), SLAR (50 km), FLIR (30 km), Sonar (2 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-212-100	1216	338 (110)	NA 92 4/2 40/20	2040	752	7500	FF4 CF4 RF3 W4 T3
C-212-200	1152	320 (110)	NA 86 4/2 40/20	2040	800	7500	FF4 CF4 RF3 W4 T3
C-212-300	1128	313 (110)	NA 85 4/2 40/20	2040	800	7500	FF4 CF4 RF3 W4 T3
C-212-400	963	267 (110)	NA 72 4/2 40/20	2040	824	7500	FF4 CF4 RF3 W4 T3
NC212i	1010	281 (110)	NA 76 4/2 40/20	2040	866	7500	FF4 CF4 RF3 W4 T3
SH-89	1189	330 (110)	NA 89 4/2 40/20	2040	800	7500	FF4 CF4 RF3 W4 T3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-212-100/200	None	600/500m Primitive Runway	None	2 Hardpoints (Fuel Tanks Only)	None
C-212-300/400/NC212i	Flare/Chaff Dispensers (30/20)	600/500m Primitive Runway	None	2 Hardpoints (Fuel Tanks Only)	None
SH-89	ECM 2, ELINT 3, Secure Radios, Sonobuoys (60)	600/500m Primitive Runway	None	2 Hardpoints	None

CASA C-295

Notes: The CASA C-295 (now Airbus C295) is an improved version of the CN-235 listed in International Cargo Aircraft. It was developed by CASA in the 1990s, and the launch customer was the Spanish Air Force in 1999. Currently, Egypt is currently the largest user of the C-295, with 21 in their air force, though India currently has eight and plans to add 12 per year for a few years. License production is undertaken in Indonesia by IPTN and India by Tata. The C-295 has seen combat service in Kosovo, Iraq, and Afghanistan. The C-295 has a modular cargo bay and can be rapidly reconfigured for passengers, paratroops, medevac, or cargo. Ground crew and equipment requirements are minimal and the C-295 is at home in austere environments. The C-295 is in use by military forces, civilian airlines and cargo companies, and by relief organizations.

The C-295 is a stretched version of the CN-235 with more powerful engines. The fuselage is long and slender and the wingspan likewise long. The wings also have several STOL and low speed refinements such as double slotted flaps and leading-edge slats. It can move 50% more cargo with the same range as the CN-235, and can go a little faster and higher as well. The landing gear has an autoreverse capability, and is able to turn 180 degrees on the ground on a runway as narrow as 12 meters. The landing gear can take the stress of operating from soft, grassy fields as well as hardened runways. The avionics are advanced, including an autopilot, weather radar, and the HIAS (Highly Integrated Avionics System). The avionics allow the aircraft to function within civil aviation rules as well as military rules. The C-295 is powered by a pair of Pratt & Whitney Canada PW127G turboprop engines, delivering 2645 horsepower each. These engines are coupled to six-bladed propellers with composite scimitar-shaped blades. The engines have a modular design easing maintenance and upkeep. The wings have hardpoints, and have been integrated with a wide variety of air-to-ground ordnance.

There are a number of variants and projected variants of the C-295. The AEW&C variant is a relatively inexpensive AWACS-type aircraft incorporating a 360-degree radar in an external saucer dome on the roof of the fuselage, and allows functions similar to that of the E-2 Hawkeye carrier-borne early warning aircraft. The SIGINT (Signals Intelligence) variant conducts radio and radar surveillance and electronic reconnaissance. The MPA variant (Maritime Patrol/Antisubmarine) is a reconnaissance patrol and antishipping/antisubmarine aircraft with devices to hunt and kill enemy shipping and submarines. It has been tested with several antishipping missiles, including the Harpoon, Exocet, and Marte, as well as bombs, rockets, torpedoes, and depth charges. For a short time in the early 2000s, the C-295 was studied for possible conversion to a gunship, similar to the AC-235. Indian C-295s have extra EW equipment. The C-295 ISR variant is equipped with machineguns, antitank missiles, and bombs and rockets on its hardpoints. The KC-295 is an aerial refueling tanker variant; it will not be further detailed here.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-295	$54,106,036	JP5	9 tons	23.2 tons	4+71 or 48 paratroopers or 24 stretchers	25	Radar (200 km)	Enclosed
C-295 (Indian)	$61,080,036	JP5	9 tons	23.24 tons	4+71 or 48 paratroopers or 24 stretchers	26	Radar (200 km)	Enclosed
C-295 AEW&C	$107,051,249	JP5	1 ton	24.5 tons	7	50	Radar (400 km)	Enclosed
C-295 SIGINT	$58,281,893	JP5	2 tons	23.42 tons	7	27	Radar (200 km)	Enclosed
C-295 MPA	$84,826,506	JP5	6 tons	23.4 tons	5	28	Radar (300 km), Thermal Imaging (30 km), MAD (1.2 km)	Enclosed
C-295 ISR	$56,555,653	JP5	3.5 tons	23.5 tons	4	27	Radar (200 km), FLIR (30 km)	Enclosed
AC-295	$75,426,600	JP5	3 tons	23.9 tons	8	28	Radar (200 km), SAR (45 km), FLIR (30 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-295	1315	365 (95)	NA 99 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
C-295 (Indian)	1313	365 (95)	NA 99 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
C-295 AEW&C	1247	346 (95)	NA 93 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
C-295 SIGINT	1303	362 (95)	NA 98 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
C-295 MPA	1304	362 (95)	NA 98 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
C-295 ISR	1299	361 (95)	NA 97 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7
AC-295	1278	355 (95)	NA 96 4/2 40/20	7500	2366	9145	FF7 CF7 RF7 T6 W7

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-295	RWR, Flare/Chaff Dispensers (30/30), All-Weather Flight, Secure Radios	320/670m Primitive Runway	+1	6 Hardpoints	None
C-295 (Indian)	RWR, Flare/Chaff Dispensers (30/30), All-Weather Flight, Secure Radios, ECM 1, IRCM 1	320/670m Primitive Runway	+1	6 Hardpoints	None
C-295 AEW&C	Advanced IFF, RWR, ECM 2, Short-Range Radio Jamming (10 km), Track While Scan, Target ID, ELINT 3, Look-Down Radar, Secure Radios, Auto Track, GPS, Satcom Gear, Flare/Chaff Dispensers (30/30)	320/670m Primitive Runway	Nil	None	None
C-295 SIGINT	RWR, Flare/Chaff Dispensers (30/30), All-Weather Flight, Secure Radios, ELINT 3, Radio/Radar Detectors, ECM 1	320/670m Primitive Runway	+1	6 Hardpoints	None
C-295 MPA	RWR, Flare/Chaff Dispensers (40/40), Look-Down Radar, ECM 2, IRCM 1, EW Suite, Sonobuoys (40)	320/670m Primitive Runway	+3	6 Hardpoints	None
C-295 ISR	RWR, Flare/Chaff Dispensers (30/30), All-Weather Flight, Secure Radios, Laser Designator (30 km)	320/670m Primitive Runway	+2	6 Hardpoints	None
AC-295	RWR, Flare/Chaff Dispensers (30/30), All-Weather Flight, Secure Radios, Laser Designator (30 km)	320/670m Primitive Runway	+4	30mm M230LF Autocannon (LS), M134D Minigun (LS), 6 Hardpoints	750x30mm, 2000x7.62mm

Grumman C-2 Greyhound

Notes: This cargo aircraft was derived from the E-2 Hawkeye naval AWACS aircraft. In this role, the aircraft is a cargo aircraft, the primary cargo aircraft of the US Navy and also operated by Israel, France, and Taiwan. The C-2 is generally known as the "Cod" to US Navy personnel, for COD (Carrier Onboard Delivery). The C-2 provides critical logistics support to the Navy, ferrying personnel, mail, and important spare parts to carriers at sea. The US Navy will have replaced the C-2 with CMV-22BB Ospreys by 2028; they started in 2020. First flight was in 1964, with deliveries the next year. These were overhauled in 1973. In 1984, the fleet was expanded by authorizing more construction of C-2s; these are designated C-2A(R)s. In 2010, all C-2A(R)s received navigation, avionics, and propeller upgrades; in particular, the C-2A(R)s received a glass cockpit, GPS navigation, and 8-bladed propellers.

Only Israeli versions of the C-2A are capable of aerial refueling, and none have ejection seats. There is a cargo ramp in the rear and two doors on each side behind the cockpit; the ramp may be opened in flight and is sometimes used for the deployment of SEAL and Marine Recon teams. They are capable of navigation across trackless spaces. Their endurance is very long, with low fuel consumption. They were also known for their easy maintenance and the large amount of time that they were available for duty. The "Land" figures refer to operations totally from land bases, while the "Ship" figures are for if the Greyhound must take off, land, or both from a carrier. Some parts of the C-2 are interchangeable with those of the A-6 Intruder strike aircraft. The Greyhound has four vertical stabilizers, each with a rudder; this was done because a single stabilizer would have required the surface to be too tall to fit into the hanger deck of a carrier. The C-2 is powered by a pair of Allison T56-A-425 turboprop engines developing 4600 horsepower each.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-2A	$14,671,542	AvG, JP4, JP5	(Land) 6.8 tons, (Ship) 4.54 tons	27.22 tons	4+26 or 12 stretchers	32	Radar (100km)	Shielded
C-2A(R)	$17,736,542	AvG, JP4, JP5	(Land) 6.8 tons, (Ship) 4.54 tons	27.22 tons	4+26 or 12 stretchers	32	Radar (100km)	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-2A	1934	537 (90)	NA 145 6/4 60/40	10184	3701	10200	FF4 CF4 RF4 W5 T3
C-2A(R)	1954	543 (90)	NA 147 6/4 60/40	10184	3664	10200	FF4 CF4 RF4 W5 T3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-2A	Secure Radios, Flare/Chaff Dispensers (30/20), All-Weather Flight, INS	500/400m Hardened Runway	None	2 Hardpoints (Drop Tanks Only)	None
C-2A(R)	Secure Radios, Flare/Chaff Dispensers (30/20), All-Weather Flight, INS/GPS	500/400m Hardened Runway	None	2 Hardpoints (Drop Tanks Only)	None

Lockheed C-5 Galaxy

Notes: One of the largest aircraft in the world, the C-5 is designed to haul large bulk cargoes and large amounts of passengers, sometimes both at the same time. The C-5 has taken part in all major US operations since 1970 and several humanitarian operations, as well as the US space program. Development was fraught with difficulties both in the design and the costs of development, and nearly bankrupted Lockheed, and by 1971 production was nearly halted for a short time, until the US government gave Lockheed some low-interest loans. By 1980, the C-5A fleet had to have their wings replaced due to cracking. The C-5 was subject to some weird testing, such as in 1974 the testing of air-launched Minuteman ICBMs. (It turned out to be feasible, but not practical, though it gained the US some leverage during the SALT talks.)

The Galaxy has a conventional design for a military cargo aircraft, with a long fuselage, swept wings, and a high T-tail. The fuselage, especially, is large, while not being a high-drag shape, though it is essentially a cylinder. The fuselage can be opened at the front and rear with large ramps at either end, allowing for rapid loading and unloading or unloading and loading at the same time. The wings are swept at 25 degrees and have four engines – the C-5A was powered by the General Electric TF39 turbofan, a high bypass engine producing 43,000 pounds thrust each, while the C-5B is powered by GE CF6-80C2 turbofans with a power of 51,000 pounds thrust each. The C-5M is powered by the F138-GE-100 turbofans, a development of the CF6 which is designed to produce less noise pollution, but has a power of 51,600 pounds thrust. The C-5 can "kneel," settling onto its landing gear to lower the fuselage and making it easier to load and unload the cargo bay. The cargo bay may be split into an upper and lower cargo hold configuration; in this role, the C-5 can transport 81 troops up top and 36 master pallets of cargo down on the bottom. If only troops are carried, 270 may be carried above and below on the cargo hold. Parachuting is not normally done from the C-5, as numerous parachutist accidents occurred early in the C-5's career; in addition, using the C-5 for parachutist delivery is considered quite wasteful of the Galaxy's capabilities and operating costs.

The C-5A is the original variant; development was long, difficult, and expensive. The last C-5A was retired in 2017. The C-5B is an improved C-5A, with new engines, upgrades in the wing using stronger aluminum alloys not yet discovered when the C-5A was being built, and updated avionics. The C-5Bs were built from 1986 to 1989. The C-5C was the designation given to two C-5As modified to carry large, outsized loads such as satellites. The rear passenger compartment floor was removed, the rear cargo door was split in the middle, and a new movable rear bulkhead was installed. The C-5C is officially designated the C-5A(SCM) for Space Cargo Modified. The C-5D was a proposed variant of the C-5B designed to be an alternative to producing more of the C-17 Globemaster III; this variant was not proceeded with, but the improvements were folded into the C-5M program. The C-5M is re-engined, has been equipped with the AMP (Avionics Modernization Program), and upgrades to the APUs, aircraft skin and frame, landing gear, and cockpit and pressurization systems. The AMP began in 1998, and was at first applied to C-5As and C-5Bs; C-5As received only the AMP and did not get modified into C-5Ms. The rest of the upgrades began in 2006; all C-5Ms are upgraded from C-5Bs and the two C-5Cs.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-5A Galaxy	$514,885,960	JP5	123.73 tons	349 tons	7+270 or 125 stretchers	148	Radar (150 km)	Shielded
C-5A Galaxy (AMP)	$538,997,530	JP5	123.73 tons	349 tons	7+270 or 125 stretchers	148	Radar (150 km)	Shielded
C-5B Galaxy	$583,383,365	JP5	127.46 tons	381 tons	7+270 or 125 stretchers	161	Radar (150 km)	Shielded
C-5M Super Galaxy	$603,385,695	JP5	127.46 tons	381 tons	7+270 or 125 stretchers	162	Radar (200 km)	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-5A Galaxy	2587	716 (115)	NA 193 4/2 40/20	193600	34976	13716	FF8 CF8 RF7 W7 T6
C-5B Galaxy	2804	780 (115)	NA 211 4/2 40/20	193600	41492	13716	FF8 CF8 RF7 W8 T6
C-5M Super Galaxy	2836	788 (115)	NA 213 4/2 40/20	193600	41972	13716	FF8 CF8 RF7 W8 T6

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-5A Galaxy	None	1100/1600m Hardened Runway	None	None	None

C-5B Galaxy	RWR, Flare/Chaff Dispensers (30/20), Secure Radios, All Weather Flight, INS	1100/1600m Hardened Runway	None	None	None
C-5M Super Galaxy	RWR, Flare/Chaff Dispensers (30/20), Secure Radios, All Weather Flight, GPS/INS	1100/1600m Hardened Runway	None	None	None

McDonnell Douglas C-17 Globemaster III

Notes: The C-17 was designed to carry large, bulk items such as the M-1 Abrams main battle tank and AH-64 Apache helicopter. It is the only aircraft in the US inventory able to air drop large items such as the M-2 Bradley IFV or the M-8 Devers AGS. It was designed to replace the C-141 in the tactical transport role. The C-17 is based on the YC-15, s smaller tactical airlifter designed in the 1970s as a part of the AMST project. Though the AMST program did not produce a production aircraft, the Air Force was sufficiently impressed by the YC-15 for it to request a prototype of a larger version. The C-17, compared to the YC-15, is larger, as more powerful engines, and has swept wings, as well as more advanced avionics. The C-17, in addition to US Air Force use, is used by Qatar, India, Canada (who designates the C-17 the CC-177), Britain (who call it the C-17 UK), Australia, Kuwait, UAE, and the NATO Strategic Airlift Capability program.

C-17 aircrews have nicknamed the C-17 the “Moose,” because during ground refueling, the pressure relief vents sound like a female moose in heat.

The C-17 has a rear ramp and side doors for paratroopers. It is capable of aerial refueling, but does not have ejection seats. The C-17 is powered by four high-bypass Pratt & Whitney F117-PW-100 turbofan engines developing 40,440 pounds thrust each. The thrust reversers of the engines direct thrust forward and up, cutting down on FOD caused by possible ingestion of runway debris. The thrust reversers can be used to move the aircraft backwards, and autoreversing landing gear allows the aircraft to operate on narrow taxiways and runways. The fuselage of the C-17 is sort of bulbous in configuration (the better to load outsize cargoes into), with large swept high wings and a high T-tail. The cargo floors have rollers for loading cargo, and these rollers are reversible into a flat surface for loading things like vehicles. There are also numerous lock-down, tie-down, and chain-down points in the cargo bay. Like many such cargo aircraft, the C-17 can “kneel,” settling onto its landing gear to lower the fuselage and making it easier to load and unload the cargo bay.

The C-17 was one of the prime aircraft for the Rapid Dragon program, which turns the C-17 into a missile truck able to launch 45 JASSM-ER or XR, or JDAM-ERs, mines, or drones.

Instead of different designations for improvements and modifications being made, the C-17A designation is used, along with a number of “Blocks” for modifications. Block 13, also known unofficially as the ER (Extended Range) variant, has an additional fuel tank in the center wing section, which was previously empty. This carries an additional 20,000 liters of fuel, and this modification is applied to all C-17As of Block 13 and later. Block 16 brought an improved OBIGGS II (Onboard Inert Gas-Generating System), a new weather radar, an improved stabilizer strut, and improved avionics. Block 21 added ADS-B (Automatic Dependent Surveillance-Broadcast) capability for interoperability with civilian air traffic control systems, advanced IFF, communication and navigation upgrades, and improved flight management.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-17A	$231,540,020	JP5	77.5 tons	265.35 tons	3+134 or 102 paratroopers or 36 stretchers and 54 seated patients	110	Radar (150 km)	Enclosed
C-17A Block 13	$231,740,020	JP5	77.5 tons	272.35 tons	3+134 or 102 paratroopers or 36 stretchers and 54 seated patients	113	Radar (150 km)	Enclosed
C-17A Block 16	$230,368,170	JP5	77.5 tons	272.35 tons	3+134 or 102 paratroopers or 36 stretchers and 54 seated patients	113	Radar (200 km)	Enclosed
C-17A Block 21	$242,316,161	JP5	77.5 tons	272.35 tons	3+134 or 102 paratroopers or 36 stretchers and 54 seated patients		Radar (200 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-17A	3184	884 (105)	NA 239 5/3 40/20	134560	32894	13716	FF8 CF8 RF7 W7 T6
C-17A Block 13/16/21	3104	862 (105)	NA 233 5/3 40/20	154560	32894	13716	FF8 CF8 RF7 W7 T6

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-17A/Block 13	All Weather Flight, RWR, Flare/Chaff Dispensers (40/30), TFR (40 km)	985/1067m Primitive Runway	None	None	None
C-17A Block 16	All Weather Flight, RWR, Flare/Chaff Dispensers (40/30), TFR (40 km), INS	985/1067m Primitive Runway	None	None	None
C-17A Block 21	All Weather Flight, RWR, Flare/Chaff Dispensers (40/30), TFR (40 km), GPS/INS, Advanced IFF	985/1067m Primitive Runway	None	None	None

Lear C-21/C-21A

Notes: The C-21 and C-21A are the military version of the Learjet 35A. The US military uses these as VIP transports. The C-21 is essentially a business jet in military paint, and has a comfortable interior with near-luxury accommodations. It is not really a tactical aircraft, but is used by senior level officers due to its speed and agility, and because it can be made ready to fly quickly and use nearly any hard runway.

The C-21 and C-21A do not have ejection seats and cannot be refueled in the air. The fuselage is cylindrical with pods near the rear of the fuselage for the engines. The leading edge of the wings is swept while the trailing edge is straight, and the tail is a T-tail. The wings have hardpoints on the tips for fuel tanks; these can carry an additional 718 liters between the two of them. The C-21 is powered by a pair of Garrett TFE731-2-2B turbofan engines developing 3500 pounds thrust each.

The C-21A has increased range, at the expense of passenger capacity. The C-21 and C-21A recently received their first major update, with a glass cockpit, updated avionics, and new communications gear being installed.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-21	$3,272,273	JP-A, JP4, JP5	1.43 tons	8.24 tons	2+8 or 1 stretcher or 5 seated patients, +2 attendants	13	Weather Radar (100 km)	Shielded
C-21A	$3,277,973	JP-A, JP4, JP5	1.41 tons	8.24 tons	2+7 or 1 stretcher or 4 seated patients, +2 attendants	13	Weather Radar (100 km)	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-21	3299	917 (165)	NA 248 4/2 40/20	3538	1418	12497	FF3 CF3 RF2 W3 T2
C-21A	3299	917 (165)	NA 248 4/2 40/20	4118	1418	12497	FF3 CF3 RF2 W3 T2

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	INS	900/750m Hardened Runway	None	None	None

Douglas C-47 Skytrain

Notes: The origins of the C-47 go back almost a decade before World War 2, starting in 1932 with the design of the DC-1, then the DC-2, and then the DC-3 in 1935. These were designed for the then-new civilian airlines, designed for long-range travel with a relatively small passenger and cargo load. When US involvement in World War 2 began in earnest, the US military suddenly found themselves with a dearth of cargo aircraft, and basically asked any company who could supply cargo aircraft to dramatically increase their production. Douglas was the most capable of filling this role, having already a large production line for their DC-3. The US military pretty much sucked up all unsold DC-2s and DC-3s, making some modifications on most of them to increase their utility as military cargo aircraft. C-47s were built by several countries, with and without a license, and the last new aircraft of the basic C-47 line is believed to have been built in 1962. The C-47 has also been the subject of numerous modifications and experiments, including the famous AC-47 gunship modifications first done during the Vietnam War, and several variants with more powerful engines, turboprop engines, or somewhat different dimensions, cargo capacities, and fuel capacities. The US Navy also used C-47s, designated as the R4D. Generals Eisenhower, Patton, and MacArthur all acknowledged the C-47 as one of the most important weapons of World War 2.

Note that this entry does not deal with the civilian version, the DC-3, though the C-47 was developed from the DC-3.

Some 2000 C-47s and DC-3s are still in service today; most are still being used as cargo aircraft, some by Third-World air forces, but mostly by private individuals in various places; another common use for the C-47/DC-3 today is as a drop aircraft for civilian skydivers. These original C-47s (and DC-3s) still fly on, in various states of repair.

The Initial C-47s: C-47, C-47A, C-47B

The C-47 began limited use in 1941, which turned into full, if not massive, production in 1942. The US, whether in Army service as the C-47 or the R4D in its Navy guise, called it the Skytrain. The British, Canadians, Australians, and New Zealanders called it the Dakota. Many aircrews and other troops, particularly US troops, called it the Goony Bird. However, it was the Dakota name that had the longest lifespan; examples still being used in Africa and other out-of-the-way places generally refer to the DC-3/C-47 as the Dakota. The C-47 is legendary for its capability to absorb damage and keep flying; this is in part due to the over half a million rivets used in the construction of its airframe. A C-47 crashed during World War 2 on a glacier in Iceland and was abandoned; months later, it reappeared further down the glacier, was brought to Reykjavik, and found to still be in flyable condition. Also in World War 2, a C-47 was rammed by a Japanese fighter; the Japanese fighter crashed several thousand feet below, while the C-47, minus part of its wing, was able to fly home. (The crew received credit for a Japanese kill and was allowed to display a kill marking on their aircraft.)

The first C-47s were delivered in late 1941. For the most part, the airframe remained unchanged. The most visible change from the exterior was a large double cargo door on the left rear side of rear fuselage; this double door has a smaller passenger door was set into right cargo door, with folding steps on the passenger door. The span of each wing was increased by 15 centimeters, which gave the C-47 better handling, but the primary reason the wingspan increase was to allow the fitting of larger wing fuel tanks. The floor of the interior was reinforced to allow the carriage of heavier cargoes. The floor was also fitted with pulleys, lock-down points, and tie-down points. Behind the cockpit, a navigator's position was added, complete with a low navigation astrodome. The interior could carry bulk cargo, 28 fully-equipped troops or paratroopers, or up to 18 stretchers and six medics, nurses, or doctors. In addition, three hardpoints under each wing could be loaded with airdrop supply containers. The last change was the replacement of the DC-3's engines with supercharged Pratt & Whitney R-1830-92 Twin Wasps developing 1200 horsepower each. Some 935 of these initial C-47s were built.

Demand for the C-47 was so high that Douglas put up another, larger production line for the C-47 in Tulsa, and another in Long Beach. However, at the same time, the electrical system was uprated, and the designation was changed to "C-47A." For game purposes, however, the C-47 and C-47A are identical. Some 4931 C-47As were built between Tulsa and Long Beach.

With operations in Asia becoming more important, with that the necessity of flying over the Himalayas to supply China from India and Burma, the C-47B was designed. These had uprated versions of the C-47A's engines, either Pratt & Whitney R-1830-90 or R-1830-90Bs; engine power was identical, but the C-47B's engines had two-stage superchargers to give them more power at high altitude. They also generally carried extra fuel in their cargo bay (at the expense of cargo capacity), though this could be removed. The C-47B carried powerful cabin heaters to protect the crew despite the altitude at which they flew. About 3108 C-47Bs were built. Note that the C-47B was essentially a special model, designed specifically for flying "The Hump" from India and Burma to China.

Some special versions of the C-47 were built. 217 examples, known as the C-53A Skytrooper, were built; these had no double cargo doors, instead having a single wide passenger door which was also the jump door. The seats were simple metal seats, and the aircraft had an attachment point for a glider tow rope. The C-53B was a winterized version of the C-53B; eight were built, and they had full heating for the cockpit and cabin, as well as extra fuel capacity in the form of a fuel tank in the cargo cabin, which took up some of the aircraft's cargo capacity and room for troops. The C-53B also had a separate navigator's station, and for that reason had a larger cockpit. Seventeen versions, designated the C-53C, were built; this version was simply a C-53A which had a door about 150% the size of a standard door. The C-53D is simply a C-53C with an improved electrical system; 159 were built. In 1962, these aircraft were redesignated C-117A, B, or C. One C-117C was converted to a SARBird configuration and was designated the SC-117A. Several C-53Bs had their high-altitude superchargers removed; these were designated C-117B. Some retained their high-altitude superchargers, and were designated C-117D. Three were converted for use in the Antarctic; these were similar to other such C-47s. They were until 1962 designated R4D-8L, when they were redesignated LC-117D. The Naval training version, used for navigational and ASW training, was at first designated R4D-8T, then redesignated TC-117D.

A single prototype of a winterized version designed to land on show and ice was built, the XC-47A. This was followed by eight winterized C-53Bs (no special designation); these had the same features as the XC-47A except for increased fuel capability (at the expense of cargo space and carrying capacity).

In addition, several VIP transport versions of the C-47A and C-47B were built. These aircraft, designated VC-47A and VC-47B, had many of their conventional passenger aircraft features restored, and had equipment to cook meals, heat tea and coffee, special cargo storage, and in some cases, small sleeper compartments. Though 131 were ordered, only one VC-47A and sixteen VC-47Bs were actually built and delivered. Later, more were built, but they have always been few in number; these later versions were based on the C-53A and C-53B Skytrooper. The ones owned by the Navy were at first designated R4D-8; later, both the Air Force and Navy redesignated theirs to C-117A. Though the standard C-117As were fitted out as VIP transports, three of them had even more lavish appointments and were designated VC-117A. A few C-117Bs were converted to the VC-117A standard, and designated VC-117B. Another version, based on the C-53C and called by the Navy the R4D-8Z, was later redesignated the VC-117D; for game purposes, it is identical to the VC-117B except for its service ceiling.

The SC-47 (designated HC-47 after 1962) was a SAR variant of the C-47A, which served well into the Vietnam War in US service. The SC-47 was fitted with two heavy and four light hardpoints under each wing; the heavy hardpoints were also wet hardpoints and could mount fuel tanks or heavy droppable rescue assistance gear, such as large inflatable life rafts or bulk survival gear. The SC-47 was fitted with a searchlight under the fuselage, and had dispensers for flares.

Though the AC-47 we all know and love is the Spooky gunship, the first version of the C-47 (actually, C-47A) to be designated the AC-47 was an electronic warfare version that entered service in 1953. It was so designated until 1962, when it was redesignated the RC-47, then a few months later, the EC-47N. This version was used to monitor radio and radar frequencies, primarily those known to be in use by Soviet and Chinese equipment of the time, (i.e., depending on the time period, frequencies used at a given time between about 1950 and 1975) and in addition could offer limited tactical support through the use of flare dispensers and a searchlight under the fuselage. EC-47Ns also carried cameras in the belly for photographic reconnaissance of targets which were being jammed, as well as targets that resisted jamming partially or completely. These cameras were slaved to special ELINT gear which identified and measured the radar and radio emanations from targets, both those being jammed and those which resisted jamming. Other electronic gear included a short radome in the nose which carries a weather radar system, Up to six wire antennas for detection of Y-Band and Q-Band radios and radar, eight whip antennas for X-Band equipment, a trailing antenna which was extended after takeoff for detection of Z-Band equipment, antennas below the nose for a marker beacon and the TACAN system, a VOR antenna above

the crew cabin, a radio and radar detection and direction-finding antenna below and behind the wing center, another antenna was mounted above the crew cabin for a UHF radio. Inside the crew cabin were large consoles for the electronic warfare specialists to ply their trade, while two radiomen were seated near the cockpit. Other parts of the cabin were crammed with anything from flare droppers to personal equipment. As the EC-47N, this version served through most of the Vietnam War. The AC/RC/EC-47N can be distinguished by its plethora of antennas, some of which deploy after takeoff due to their size. An extra internal fuel tank completed the fit. A common nickname for this aircraft is the “Electric Gooney.” EC-47Ns based on the C-47A were largely replaced by later versions by the early 1960s.

The US Navy essentially used the same aircraft, for the most part with the same design features. Navy C-47s were designated the R4D-1, C-47As were designated the R4D-5 (later redesignated the C-47H after 1962), C-47Bs were designated the R4D-6 (later redesignated the C-47J), and C-53s were designated the R4D-3. The Navy also used a small number of DC-3s that were impressed into military service and little-modified from their DC-3 form, designating those R4D-2s. These aircraft generally filled the same role in the Navy as the VC-47A/B.

Some specialist versions were also employed, most based on the C-47A (R4D-5). This includes the R4D-5L (later redesignated the LC-47H); this had removable skis, special wheel brakes, and slates which could be raised above and below the wing for additional braking power. The R4D-5Q (redesignated in 1962 the EC-47Q) served as a trainer for ECM crews; the “equipment” was mostly for training purposes and had little or no actual functionality. The R4D-5R (redesignated the TC-47H) was a trainer for cargo pilot crews, most notably for prospective C-2A Greyhound crews; it is essentially the same as a C-47A, but with extra seating behind the crew positions for six students. It can otherwise be used as a troop or cargo carrier.

133 TC-47Bs were produced; these were essentially standard C-47Bs with additional tables and other equipment and special layouts to fit them for their role as navigational trainers for cargo aircraft and bomber crews. For Twilight 2000 purposes, the TC-133 is a C-47B with an unusual cockpit layout.

Though “Dakota” is now used as a general designation in many places of the world, its origin began with the British designation of the C-47 as the Dakota; the British received large amounts of C-47s under the Lend-Lease Program. The Dakota I was the RAF designation for the C-47 and R4D-1; the Dakota III was the designation for the C-47A, and the Dakota IV was the RAF designation for the C-47B. The RAF did not use the later iterations of the C-47. The Canadians also used the C-47, C-47A, and C-47B; they also used the Dakota I/II/II designation, until 1970, when the designations were changed to CC-129, CC-129A, and CC-129B respectively.

Perhaps the strangest experiment for the C-47, undertaken using a C-47-DL (a minor variant of the C-47), was undertaken in 1944. The new, more powerful C-54 was becoming available in increasing numbers, and it was thought that a new glider should be designed to take advantage of the C-54’s power. The XCG-17 was therefore designed in 1944; this was a modified C-47, with the engines removed and replaced with aerodynamic nacelles (and the rest of the housing containing weights to compensate for the removal of the engines and help remain the aircraft’s stability in flight). Virtually all of the wiring and bulkheads were removed, as was the navigator and radio operator’s positions. Though the conversion proved to be mostly satisfactory, the XCG-17 was not capable of landing safely on surfaces like open fields and other places an assault glider might have to land. In addition, World War 2 was coming to a close, and by 1946 the Army was transitioning rapidly to the use of all-airborne forces and the deletion of gliderborne forces. The XCG-17 was capable of carrying 6.8 tons of bulk cargo, 40 fully-equipped troops, three jeeps in a single load, or two 105mm field howitzers plus a reduced load of ammunition. The single XCG-17 was converted back to a C-47 and later received several upgrades in its Army and Air Force career. The aircraft was sold to Mexico in 1959, where it served until 1980.

Various C-47s, C-47As, and C-47B were given a number of minor modifications, and were designated C-41A, C-48, C-49, C-50, C-51, C-52, and C-82. The C-41A could just as easily referred to as the VC-41A (though I stress it was NOT), as it was simply a DC-3A with its engines replaced by the Pratt & Whitney R-1830-21 1200-horsepower radials. Only one was built, and was used by the Chief of Staff or the Army Air Corps. The C-42 was also equipped for use by a VIP (in this case, the Commanding General of the Air Force GHQ after World War 2). Again, only one was built, and is essentially the same as C-41A, but it retained the civilian-standard 1000-horsepower Wright R-1820-21 radials. The C-48 refers to DC-3As rebuilt into military cargo standard. The C-49 was the designation given over to 138 DC-3 taken over from the airlines and rebuilt into military cargo standard; these also had the 1000-horswepower civilian-standard engines. The C-50s are the same as the C-49s, but never reached airline service before they were appropriated into military service. The C-52 is sort of a “pre-Skytrooper,” as noted above. As such, these six aircraft were taken over by the Army Air Corps straight off the DC-3 production line and fitted out as paratrooper aircraft. The C-52 did, however, have a large double door, did not have a reinforced floor, and have the navigator’s astrodome that was deleted on the C-53. The C-82 was a postwar development of the DC-3B, essentially turning it into a C-47B.

Later versions: the C-47D and its iterations – the chameleon of Skytrains

A large number of C-47Bs, starting during World War 2 but mostly after that war, has their two-stage high-altitude superchargers removed, essentially giving them performance equal to the C-47A, but with many of the non-engine improvements of the C-47B, including the capability to carry an extra internal fuel tank, the powerful cabin heaters, and various wiring and hydraulic improvements. Again, for game purposes, the C-47D is identical to the C-47A.

The C-47Ds claim to fame is the large number of variants into which it was modified. Some of the less drastic variants include the VIP transport, the VC-47D, which is essentially the same as the VC-47A and B in its internal arrangements and otherwise the same as the VC-47A in game terms. A SARBird version, first designated the SC-47D and later the HC-47D, was also put into service; this is the same as the SC/HC-47A above in game terms, and it too served well into the Vietnam War.

Unlike the RC-47 above, the RC-47D was more a straightforward photo reconnaissance platform, though it also had some ELINT capability in the form of detecting radios and radar. The RC-47D’s forte was the photographing of heavy jungle; it’s slow speed meant that it could catch details faster aircraft could not, and also allowed the RC-47D to photograph targets that could be seen by the aircrew. Photography was aided by the mounting of a spotlight in the belly, and a plethora of flare dispensers. Some were also used in operations above the Ho Chi Minh trail, where they would drop motion and sound detectors (ideally, just off the Trail).

The EC-47P was the electronic warfare version of the C-47D. As was the EC-47N, the EC-47P was often called the “Electric Gooney.” The ELINT equipment was basically the same as on the EC-47N, and it carried the same flare dispensers and searchlight under the fuselage, as well as the same camera setup. The EC-47Q is the same aircraft, but was re-engined with a pair of 1290-horsepower Pratt & Whitney R-2000-4 engines.

The C-47E has a rearranged interior which allows for more passengers or larger cargoes. (It does not actually increase the weight of cargo the C-47E can carry.) For game purposes, it is the same as a C-47A, but has a Crew rating of 3+32 or 24 paratroopers.

The C-47L and M were designed as VIP aircraft for the American Legate US Navy Attaché and the Military Assistance Advisory group; for game purposes, they are the same as the VC-117A. The C-47R was a singular version designed for high-altitude VIP transport at the request of Ecuador; the C-47R has the twin superchargers added back in to allow it to accomplish its role as a VIP aircraft who could fly over the Andes. For game purposes, the C-47R is the same as the VC-117B.

The AC-47D Spooky Gunship, arguably the most famous version of the C-47, will be handled in US Special Aircraft.

Modernized and Post-War Skytrains

Not long after the Skytrain and DC-3 went out of mainline service and many of their number became available on the civilian market, various companies and individuals began modifications and modernizations, big and small. These ranged from simple rewiring to more modern standards and improved hydraulic systems to more drastic updates such as lengthening, rendering the cargo deck much more conducive to loading and unloading, and re-engining, including with turboprops and trimotor versions.

One of these is Basler Turbo Conversions’ BT-67. BTC begins with an overhaul of the C-47 or DC-3, restoring the aircraft to nearly an “As New” condition. This version is stretched by over a meter forward of the wing, and the cockpit bulkhead is moved ahead 1.5 meters to further increase cargo space and also counteract the unbalancing caused by the stretching of the fuselage. The BT-67 therefore has 35% more interior space and 43% more useful load. The outer leading edge and wingtip are modified to improve low-speed handling, provide some anti-stall characteristics. The wings are furthermore greatly-strengthened to give the BT-67 improved lifting capacity as well as to support the weight of larger fuel tanks. The BT-67 is completely rewired, and de-icing equipment was added for the windshield as well as the leading edge of the wings and the leading edge of the propellers. Part of the instrument panel even uses glass-cockpit-type instruments. Both the cockpit and the cargo space are heated, partially by heat bled off the engines. The cockpit is also given an overhaul in the controls and instruments, making them more understandable, accounting for new equipment, and with the BT-67 providing a hydraulic boost for the controls. Modern navigation equipment and radios are fitted, including GPS. The engines are replaced by Pratt & Whitney Canada PT6A-67R turboprops with a rating of 1424 horsepower each and offering more acceleration and lifting power. The propeller is replaced by a 5-bladed propeller with aluminum blades made by Hartzell. The BT-67 can be outfitted for cargo operations, military operations, or conventional passenger operations. The BT-67 uses a large double door with a smaller door within the right door for loading. The

BT-67 is designed to function optimally even in Arctic conditions, and can even be fitted with skis for landing on ice or snow. The US military was once seriously considering taking the BT-67 into service, going as far as assigning the designation “C-47T” to the aircraft. Basler is willing to outfit an individual BT-67 to many different specifications; a few are noted below.

After World War 2, Douglas Aircraft hoped to produce and sell more C-47s to the military, as well as more civilian DC-3s to the airlines. To this end, they produced two prototypes of the “Super DC-3,” also known as the “DC-3S.” These prototypes were modifications of C-47Ds, with fully retractable landing gear, flush rivets, aerodynamic antennas, a longer fuselage, a taller tail, and squared-off wingtips. The radio operator’s position had become unnecessary due to better technology and was eliminated. The wings were redesigned; they became a bit longer and had some sweep in them to accommodate a change in the center of gravity caused by the lengthening of the fuselage and rearrangement of the interior. In addition, the Super DC-3 had larger flaps, allowing for a lower stall speed and better takeoff and landing performance. The first prototype used Wright R-1820-C9HE Cyclone radials with an output of 1475 horsepower each, while the second prototype used Pratt & Whitney R-2000-D7 engines with an output of 1380 horsepower each; for the rest of production, the Cyclones were used. So much of the Super DC-3 was new that Douglas claimed the Super DC-3 was 75% new. The big problem with the Super DC-3 was its altitude restriction; the cabin was unpressurized, meaning that the carriage of certain cargoes or people kept the Super DC-3 from flying as high as the aircraft was capable of flying. The civilian airlines largely passed on the Super DC-3, and Douglas managed to sell only three of them to the airlines. The Air Force got the first prototype in 1949, but they passed on it and the Navy, who were more impressed with the aircraft, and bought 100 of them. These were designated at first “R4D-8,” but the designation was later changed to “C-117D.” Sometime later, these were again redesignated “C-47F.”

Conroy Aircraft attempted to get interested going in their versions of the C-47/DC-3, which were called the Turbo Three and the Tri-Turbo-Three. The first, the Turbo Three, was often called the Super Turbo Three since it was converted from a pair of Super DC-3s. They used surplus Vickers Viscount engines, which were 1800-horsepower turboprops. This led to an increase in speed and some increase in lifting power, but also to a large increase in fuel consumption, and it is probably because of the fuel consumption along with the generally outdated design of the C-47 that meant there were no takers for the design. In addition, the propeller radius was small due to the retention of the original Viscount propellers, air flow was restricted by the retention of the original C-47-type nacelles, and the landing gear fairings partially restricted the exhaust. This led to long takeoff and landing run, and the expected increases in performance were not what was hoped for. The first Turbo Three was dismantled and the parts sold, while the second Turbo Three ended up parked at the Groton-New London airport. In 1984, it’s cockpit was hit by the wing of a C-130 and largely torn off, and never replaced or repaired.

The Conroy Tri-Turbo-Three was an even more ambitious project: it turned the C-47/DC-3 into a trimotor aircraft, with three Pratt & Whitney Canada PT-6A engines each developing 1940 horsepower. Two of the engines were in the usual place, while the third engine was in a greatly-extended nose section. This increased the top speed, but the increased weight again did not deliver the hoped-for increase in performance, and increasing fuel consumption as well. However, the nose engine could be turned off in flight to increase cruising range. Despite the potential drawbacks, Polair and the Canadian/American Maritime Patrol and Rescue service each ordered one. Polair modified theirs with skis to allow takeoffs and landings on snow and ice, as well as improved brakes and slats on the bottoms of the wings and atop the wings to help slow the aircraft. Polair’s first Tri-Turbo-Three was accidentally destroyed by maintenance technicians on the ground at Santa Barbara Municipal airport in May 1986; Conroy built them a new Tri-Turbo-Three, which is still functioning today. The Tri-Turbo-Three operated by the Maritime Patrol and Rescue service was replaced by a model of the C-130. Both the Turbo Three and the Tri-Turbo-Three were capable of great speed and lifting power, but their engines gulped a lot of fuel.

Not Made Here: The Lisunov Li-2

Both the Japanese and Russians had licenses to produce C-47s/DC-3s. The Russians got their license during the War, while the Japanese got theirs in 1938, promising that the aircraft were not to be used by the military (honest, Mr Douglas, airlines only!).

The Soviets manufactured almost 3000 C-47/DC-3s under license. Though the Russians took considerable effort not to change the design of the aircraft, several tweaks did in fact creep in. The wings had a slightly smaller span, provisions were made for the attachment of skis (for some Siberian operations), the Li-2 received structural reinforcement in the wing roots, lower section of the fuselage, some window rearrangements, and the main passenger door was placed on the right of the fuselage, across from the cargo doors. Perhaps the greatest change was in the engines; the Russians chose an engine they were experienced with, the Shvetsov Ash-62 radial; this unfortunately developed only 1000 horsepower, and the Li-2’s performance lagged behind Western C-47s/DC-3s. To make matters worse, the Li-2 had a slightly smaller wingspan, which impacted maneuverability; they had attachments and hardpoints designed specifically to allow ski landing gear to be attached, slightly increasing weight; and they were structurally reinforced and had thicker skin on the belly and around the cockpit – this gave the Li-2 the ability to carry slightly heavier loads (though the space inside was unchanged) and increased the survivability of the Li-2, but also did a good job of increasing the Li-2’s weight. Some other changes included some rearrangement of the windows and the main passenger door being moved from the left to the right (the cargo door remained on the left).

Several versions of the Li-2 were built. The Li-2P is a basic passenger model, equivalent to the DC-3 (and will not be detailed here); the Li-2G is a basic cargo hauler, with a reinforced floor and tie-downs, and large double doors on the left for the loading of cargo. The Li-2P could be readily changed from its basic passenger version into a cargo hauler.

The Li-2T is a fully militarized version. In a dorsal turret was a ShKAS or UBT machinegun, and on either side of the aircraft a ShKAS machinegun could be mounted on either side of the aircraft firing out of windows. Any of these positions could be removed or use passengers to man them. Under the fuselage, racks could be fitted; a typical load was four 250-kg bombs centerline and six 82mm rockets under each outer wing. The Li-2T did not have the attachment for skis. The Li-2D was also a military version; it was optimized for delivering paratroopers, and was also equipped with a glider tow hook, but the dorsal turret opening has doors to cover the opening to allow more paratroopers (or regular troopers) to be carried. Late versions of the Li-2D had a glazed front left crew door with a bulged window to allow the deputy jumpmaster to observe the paratroopers as they left the Li-2 and started to fall. A long range version, the Li-2DB, was for use in special operations and had long-range fuel tanks which took up part of the cargo bay. The Li-2R, used by both the military and civilians, was a survey version; it was essentially a reconnaissance aircraft, with a battery of cameras in the belly, a flare dropper, and a spotlight. The Li-2V was a postwar version, equipped with superchargers for the engines and used at high altitudes and in the Arctic.

Perhaps the most extreme variant of the Li-2 was the Li-2VV – an Li-2D converted into a bomber. For the most part, the Li-2VV was used as a night bomber and few such conversions were built. Those that were built had a decent wartime record, but were not known for their bomb-carrying capacity. The Li-2VV retained the dorsal turret and waist guns, with the bombs being mounted on the wings and under the fuselage. Though up to 1500 kilograms of bombs could be carried under the wings and fuselage, in practice the Li-2VV carried only 1000 kilograms to increase range. A small amount of 50-kilogram bombs were also carried in the fuselage. The Li-2VV bombardier was equipped with a rather poor bomb sight and the Li-2VV was not known for its accuracy; accuracy with the bombs in the bomb bay was even worse than with the wing and fuselage bombs. The Li-2VV could be easily distinguished by its glazed nose, which also longer than on a standard Li-2. Accuracy improved on the Li-2NB, an Li-2VV with an improved bomb sight and with a window that allowed the bombardier to look straight down and also slightly to the rear. In both cases, the aircraft could carry a small amount of cargo; often, this cargo space was used for anything from mortar shells and grenades to chunks of scrap iron and things like old wheels or roadwheels from destroyed vehicles – the cargo door and passenger door remained, and the waist gunners and the radio operator would often throw them out of the doors when passing over a target, to cause more damage.

For the most part, information on the Soviet/Russian version of the C-47 is a bit sketchy, particularly what happed to the Li-2 after World War 2. Their career is believed to have stretched into the late 1950s, and it is possible that client states received some Li-2s and used them even later. NATO knew of Soviet use of the Li-2 after World War 2 and assigned the aircraft the reporting name of “Cab.”

Also Made Elsewhere, Perhaps Under Shady Circumstances: The Showa L2D

Just before World War 2 in 1938, Douglas sold several DC-3s to Japan for evaluation, and were built by Showa and Nakajima. Mitsui, the design and retroengineering company, went on to buy a license from Douglas, and obtained all the specifications from Douglas along with two unassembled DC-3s. Of course, aster the Japanese attack on Pearl Harbor, Douglas terminated their contract with the Japanese; by then, however, the Japanese had the full specifications for the DC-3, which they called the L2D series.

The first 71 of this series were simple DC-3 clones, with one exception – including the original 1000-horsepower Pratt & Whitney R-1830 Twin Wasp engines of the original DC-3A instead of the uprated engines of the US military versions. These were essentially identical to the original DC-3A, but used Mitsubishi Kinsei 43 radials. Nakajima built these 71 aircraft, then stopped building DC-3 clones. These were designated L2D2. Showa, however, continued building DC-3 clones,

building the first one in 1941; they built a few L2D2s, then moved on to different and improved models. (Being a commercial aircraft variant, the L2D2 will not be discussed here. Maybe if in the future I do commercial aircraft…)

The L2D2-1 was essentially the Japanese equivalent of the C-47; most of the passenger seats were removed except for four at the front and fold-down seats down the length of the cargo cabin. The cargo floor was reinforced, and on the left side of the fuselage were double cargo doors. The L2D3 was essentially the same aircraft, except for its improved Kinsei 51 1300-hosepower radials. The L2D3-1, L2D3a, and L2D3-1a were essentially the same, except for the electrical system, in some cases the cockpit instrument layout, and differences in the window layout. The L2D3-1a could also airdrop supplies.

The L2D4 was an armed VIP variant, essentially an armed DC-3A with less seats, and extra radios. Another version, the L2D4-1, was an armed cargo carrier. Atop the aircraft (not in a turret) was a 13mm Type 93 machinegun; through side windows on either side of aircraft, Type 98 8mm machineguns were mounted (copies of the MG-15). The L2D5 was the same aircraft, but by this stage of the war, as many “non-strategic” metals were used in production (wood and remilled scrap steel), and the engines were replaced by 1560-horsepower Kinsei 62 radials. (It is speculative, but these engines may have been too hot for the aircraft.) The L2D5s were produced only as prototypes, and production did not begin before the Surrender of Japan; if they had entered production, pilots and plane captains would have discovered that, due to the increased weight of the L2D5’s use of less-than-optimum materials and the engines themselves, the performance increase would not have been as great as one might think.

Showa built 416 or these aircraft, in addition to the 71 built by Nakijima. Allied pilots called them the “Tabby.”

Twilight 2000 Notes: At the beginning of the Twilight War, it is estimated that there were about 2000 flying examples of this aircraft. Most are DC-3s and C-47 variants, and most of the C-47 variants are cargo hauler types. Most specialist versions have long been out of service; though some may be found at the Boneyard in Arizona, the specialist Skytrains are as rare as hen’s teeth, and specialist versions with functioning special equipment are rarer still. These C-47 variants and DC-3s are most common in the US, Canada, and Africa. In the US and Canada, virtually all of them were in the hands of civilians, most commonly being restored and flown for exhibition at air shows. A few were flown by the Confederate Air Force in the US. Perhaps 50 of these aircraft were used by civilians for skydiving. Some 500 were actually “working” aircraft, hauling cargo to remote areas (especially in Africa and other out-of-the-way places).

Some 40 Basler BT-67s were available at the start of the Twilight War; most were outfitted for use by various research organizations.

The status of Li-2 variants, even during the Cold War and beyond, was always the subject of debate. It is believed, however, that few Li-2s are in flying condition; as more and more were simply parked in the grass at airfields of open fields, and the survivors increasingly stripped for parts to keep Li-2s in better condition flying. Nonetheless, the arrival of more advanced aircraft (especially Soviet-built aircraft) gradually consigned the Li-2s to air shows, and later trailing targets for ground gunners or equipped with remote controls and used as target drones. By 1960, the Soviets stated that there were no Li-2s in active service.

Almost all Showa L2Ds were destroyed by the US military occupation forces in Japan after World War 2, though some of them in better shape were upgraded and used by US forces and later (for a short time) Japanese forces. They were retired from service by 1955; I have not been able to find out if Japan has any L2D variants in flying condition.

The Twilight War saw the use of C-47 and DC-3 variants by guerilla forces, irregular forces, partisans, and even emergency use by regular military troops. Many have, in fact, been pressed into military use by US and Canadian forces, and even the Mexican forces use three of them. The BT-67s were based in various places in the world, basically in range of wherever the research project was. Most of them were impressed into service by the countries that they happened to be in between 1996 and late 1997. It turned out that one flyable Showa L2D4-1 was present in Japan. Twelve Lisunov Li-2s were operational at the start of the Twilight War; half of these were Li-2Gs, and another quarter were Li-2Ps. However there was also a flyable Li-2T, an Li-2DB, and an Li-2NB. Most of these were kept in the rear supplying cargo which would be taken to the front. The Li-2T, Li-2DB, and Li-2NB were used closer to the front, with the Li-2NB used in actual bombing missions. Most of these surviving Li-2s got shot down fairly quickly; by 2000, only four Li-2s were still flyable; for some reason, the sole Li-2NB survived all of its combat missions.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-47/C-47A/C-47D/C-53A/C-53C	$313,620	AvG	4.1 tons	7.7 tons	3+28 or 20 paratroopers	8	None	Enclosed
C-47B	$325,830	AvG	4 tons	8.1 tons	3+28 or 20 paratroopers	10	None	Enclosed
C-53B	$332,910	AvG	3.1 tons	8.2 tons	3+21 or 15 paratroopers	8	None	Enclosed
SC-47A/SC-117A/HC-47D	$1,301,480	AvG	3.6 tons	8.7 tons	5	11	Searchlight	Enclosed
XC-47A	$350,250	AvG	3.81 kg	8.86 tons	3+28 or 20 paratroopers	9	None	Enclosed
C-53B (Winterized)	$385,700	AvG	2.81 tons	8.7 tons	3+21 or 15 paratroopers	9	None	Enclosed
EC-47N/P	$24,279,860	AvG	1.48 tons	8.84 tons	11	13	Searchlight, Radar (30 km)	Enclosed
VC-47A	$435,700	AvG	1.75 tons	8.3 tons	3+14	10	None	Enclosed
VC-47B	$457,910	AvG	1.75 tons	8.3 tons	3+14	12	None	Enclosed
VC-117A/C/C-47L/C-47M	$477,340	AvG	1.73 tons	8.35 tons	3+14	11	None	Enclosed
VC-117B/C-47R	$499,550	AvG	1.73 tons	8.35 tons	3+14	13	None	Enclosed
XCG-17	$138,060	N/A	6.8 tons	5 tons	2+40	2	None	Enclosed
RC-47D	$5,699,570	AvG	1.55 tons	8.7 tons	6	10	Searchlight, Radar (20 km)	Enclosed
EC-47Q	$24,283,530	AvG	1.5 tons	8.84 tons	11	13	Searchlight, Radar (30 km)	Enclosed
BT-67 (Standard)	$4,759,770	JP4/5/6	4.63 tons	8.44 tons	3+32 or 23 paratroopers	11	Radar (30 km)	Enclosed
BT-67 (Cargo/Passenger)	$5,176,860	JP4/5/6	3.1 tons	8.57 tons	3+10	12	Radar (30 km)	Enclosed
BT-67 (Arctic Fit-Out, Standard)	$4,796,400	JP4/5/6	4.47 tons	8.77 tons	3+32 or 23 paratroopers	12	Radar (30 km)	Enclosed
BT-67 (Arctic Fit-Out, Cargo/Passenger)	$5,200,190	JP4/5/6	3 tons	8.97 tons	3+10	13	Radar (30 km)	Enclosed
Super DC-3	$556,420	AvG	4.7 tons	8.86 tons	2+30	8	None	Enclosed
Turbo Three	$436,280	JP4/5/6	5.13 tons	8.43 tons	3+28 or 20 paratroopers	9	None	Enclosed
Tri-Turbo-Three	$546,760	JP4/5/6	6.41 tons	8.8 tons	3+28 or 20 paratroopers	10	None	Enclosed
Li-2G	$376,490	AvG	4.3 tons	7.9 tons	3+28 or 20 paratroopers	8	None	Enclosed
Li-2T	$1,655,900	AvG	3.3 tons	8.9 tons	6+22 or 15 paratroopers	10	None	Enclosed
Li-2D	$1,665,740	AvG	3.3 tons	8.9 tons	6+28 or 20 paratroopers	10	None	Enclosed
Li-2DB	$1,774,730	AvG	2.1 tons	9.2 tons	6+14 or 10 paratroopers	10	None	Enclosed
Li-2R	$1,237,300	AvG	1.8 tons	8.58 tons	8	12	Searchlight	Enclosed
Li-2V	$388,700	AvG	4.2 tons	8.3 tons	3+28 or 20 paratroopers	10	None	Enclosed
Li-2VV	$2,417,770	AvG	1.26 tons	9.68 tons	6	11	None	Enclosed
Li-2NB	$2,508,570	AvG	1.26 tons	9.68 tons	6	11	None	Enclosed

L2D2-1	$289,020	AvG	4.1 tons	7.45 tons	3+28 or 20 paratroopers	8	None	Enclosed
L2D3	$313,620	AvG	4.34 tons	7.83 tons	3+28 or 20 paratroopers	8	None	Enclosed
L2D3-1a	$326,860	AvG	4.34 tons	7.83 tons	3+28 or 20 paratroopers	8	None	Enclosed
L2D4	$763,430	AvG	2 tons	8.1 tons	3+14	11	None	Enclosed
L2D4-1	$623,940	AvG	4.14 tons	8.03 tons	3+28 or 20 paratroopers	9	None	Enclosed
L2D5	$671,500	AvG	4.28 tons	8.82 tons	3+28 or 20 paratroopers	9	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
C-47/C-47A/C-47D/C-53A/C-53B/C-63C	573	146 (41)	NA 36 5/3 40/30	1500	696	7070
C-47B	551	138 (41)	NA 36 5/3 40/30	1500	792	8230
C-53B	544	136 (41)	NA 36 5/3 30/30	1600	719	7070
SC-47A/SC-117A/HC-47D	522	136 (41)	NA 34 5/3 40/30	1700	742	7070
XC-47A	538	135 (40)	NA 32 5/3 40/30	1500	721	7070
C-53B (Winterized)	544	136 (41)	NA 32 5/3 40/30	1600	742	7070
EC-47N/P	539	135 (41)	NA 34 5/3 40/30	1600	748	7070
VC-47A	555	207 (41)	NA 35 5/3 40/30	1500	723	7070
VC-47B	555	139 (41)	NA 35 5/3 40/30	1500	723	8230
VC-117A/C/C-47L/C-47M	554	139 (41)	NA 34 5/3 40/30	1500	725	7070
VC-117B/C-47R	554	139 (41)	NA 34 5/3 40/30	1500	725	8230
XCG-17	**	** (34)	NA None 5/3 40/30	None	None	7070
RC-47D	543	136 (41)	NA 34 5/3 40/30	1500	742	7070
EC-47Q	547	137 (41)	NA 34 5/3 40/30	1500	776	7070
BT-67 (Standard)	630	157 (37)	NA 39 5/3 40/30	3028	1564	5791
BT-67 (Cargo/Passenger)	625	156 (37)	NA 39 5/3 40/30	3028	1576	5791
BT-67 (Arctic Fit-Out, Standard)	617	155 (37)	NA 38 5/3 40/30	3028	1594	5791
BT-67 (Arctic Fit-Out, Cargo/Passenger)	611	153 (37)	NA 38 5/3 40/30	3028	1613	5791
Super DC-3	599	150 (34)	NA 37 5/3 40/25	1700	761	9144****
Turbo Three	669	168 (41)	NA 42 5/3 40/30	1700	1991	9000
Tri-Turbo-Three	782	196 (41)	NA 49 5/3 40/30	1700	3004	9000
Li-2G	459	115 (42)	NA 29 5/3 40/35	1500	590	7000
Li-2T	412	103 (44)	NA 26 5/3 40/35	1500	627	7000
Li-2D	412	103 (44)	NA 26 5/3 40/35	1500	627	7000
Li-2DB	400	100 (44)	NA 25 5/3 40/35	1700	636	7000
Li-2R	423	106 (42)	NA 27 5/3 40/35	1700	615	7000
Li-2V	440	110 (42)	NA 28 5/3 40/35	1700	605	8160
Li-2VV/Li-2NB	378	95 (44)	NA 24 5/3 40/35	1700	656	7000
L2D2-1	488	122 (41)	NA 30 5/3 40/30	1500	590	7000
L2D3/L2D3-1a	600	150 (41)	NA 37 5/3 40/30	1500	770	8000
L2D4	580	145 (41)	NA 36 5/3 40/30	1500	783	8000
L2D4-1	575	144 (41)	NA 36 5/3 40/30	1500	786	8000
L2D5	639	160 (41)	NA 39 5/3 40/30	1500	926	7500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Most C-47 Variants	None	600/500m Primitive Runway	None	3 Hardpoints (Non-Weapon Only; 3xWet)	None
SC-47A/SC-117A/HC-47D	32xFlares	600/500m Primitive Runway	None	4 Light Hardpoints (600 kg max), 2 Heavy Hardpoints (1200 kg max; Wet); None May Carry Weapons	None
EC-47N/P/Q	32xFlares	600/500m Primitive Runway	None	4 Light Hardpoints (247 kg max), 2 Heavy Hardpoints (494 kg max; Wet); None May Carry Weapons	None
XC-47A/C-53B (Winterized)	None	600/500m Primitive Runway*	None	3 Hardpoints (Non-Weapon Only; 3xWet)	None
XCG-17	None	600m Primitive Runway***	None	None	None
RC-47D	40xFlares	600/500m Primitive Runway	None	4 Light Hardpoints (260 kg max), 2 Heavy Hardpoints (516 kg max; Wet); None May Carry Weapons	None
BT-67	None	400/500m Primitive Runway	None	None	None
BT-67 (Arctic Fit-Out)	None	400/500m Primitive Runway*	None	None	None
Super DC-3	None	500/400m Primitive Runway	None	3 Hardpoints (Non-Weapon Only; 3xWet)	None
Turbo Three/Tri-Turbo-Three	None	400/500m Primitive Runway	None	3 Hardpoints (Non-Weapon Only; 3xWet)	None
Li-2G	None	600/500m Primitive Runway	None	3 Hardpoints (Non-Weapon Only; 3xWet); 8 Hardpoints on Wings and	None

Li-2T	None	600/500m Primitive Runway	None*****	Fuselage for Attachment of Skis 4 Hardpoints (113 kg max), 2 Hardpoints (6x82mm Rockets only), 1 Hardpoint (No Weapons; Wet); Dorsal Turret with ShKAS; 2xWaist Guns with ShKAS	3000x7.62mm
Li-2D/Li-2DB	None	600/500m Primitive Runway	None*****	4 Hardpoints (113 kg max each), 2 Hardpoints (6x82mm Rockets only); Dorsal Turret with ShKAS; 2xWaist Guns with ShKAS	3000x7.62mm
Li-2R	None	600/500m Primitive Runway	None	None	None
Li-2V	None	600/500m Primitive Runway	None	3 Hardpoints (Non-Weapon Only; 3xWet)	None
Li-2VV	6xFlares	600/500m Primitive Runway	-1******	6 Hardpoints (250 kg max), Bomb Bay (6x50 kg Bombs max); Dorsal Turret with ShKAS; 2xWaist Guns with ShKAS	3000x7.62mm
Li-2NB	12xFlares	600/500m Primitive Runway	+1******	6 Hardpoints (250 kg max), Bomb Bay (6x50 kg Bombs max); Dorsal Turret with ShKAS; 2xWaist Guns with ShKAS	3000x7.62mm
L2D	None	600/500m Primitive Runway	None	None	None
L2D3-1a	None	600/500m Primitive Runway	None	3 Hardpoints (360kg each; Wet)	None
L2D4/L2D4-1/L2D5	None	600/500m Primitive Runway	None	3 Hardpoints (360kg each; Wet); 13mm Type 93; 2x8mm Type 98	500x13mm, 2000x8mm

*Increase landing run by 50% and takeoff run by 10% when using ice as an airfield.
**The XCG-17's starting speed will be the same as that of the aircraft which is towing it (the XCG-17 was meant to be towed by a single C-54 at a speed of approximately 230 kmh). Once released, the XCG-17's speed will fall by 10% each turn, assuming a safe landing profile (safe in a utility glider being a matter of terms).
***Though the XCG-17 can land safely in 600 meters on a primitive runway, it was meant to land in a space as little as 50 meters on a decently-flat surface, with the wings shearing off, the tail surfaces shearing off, and possibly worse damage occurring to the XCG-17.
****This is the maximum ceiling, but the Super DC-3 normally operated at a maximum ceiling of half that when carrying passengers, due to the unpressurized cabin.
*****The dorsal turret gunner has a simple reticle gunsight, giving him RF +1.
******The dorsal turret gunner on both aircraft has a simple reticle gunsight, giving him RF +1. As stated above, the Li-2VV's bombardier has a rather poor gunsight; the RF rating above worsens to -2 when using the bombs from the bomb bay. On the Li-2NB, the RF when using the bombs in the bomb bay is +0 (i.e., no penalty or bonus).

Fairchild C-123 Provider

Notes: This tactical assault transport had its genesis as a design for a heavy cargo glider during World War 2. The glider version proved to be impractical, but in 1949 engines were added to the design and it became a viable transport. The Provider proved to be too slow in the coming era of jet aircraft, and two small jet engines (under the wings or on the wingtips) were added to enable them to keep up with escorting fighters and refuel those aircraft as well as carry more cargo. (This is the C-123K, below.) During the Vietnam War, these aircraft were common in the skies above Vietnam, Cambodia, and Laos during their participation in Operation Ranch Hand, the spraying of Agent Orange. More were used as transports to forward areas due to their ability to land on the most primitive strips and fields. After the Provider's retirement from US service in 1979, many of the former Ranch Hand aircraft were modified by civil aviation for dumping water on forest fires, and some were operated by the CIA and civil aviation as transports.

The C-123 has some resemblance to the later C-130. The wings are straight and the engines are inboard to the wings, and the fuselage is relatively bulbous and blunt-nosed, with a rear ramp. The ramp can be opened in flight for the dropping of bulk parachute cargo. Landing gear is basic with one heel main landing gear and a double front landing gear. The vertical stabilizer is relatively high, but is not a T-tail. Originally, the C-123 was ordered in two prototypes: the XC-123 with a pair of Pratt & Whitney R-2800-23 piston engines with 2200 horsepower each, and the XC-123A with four General Electric J47-GE-11 turbojets developing 5000 pounds thrust each. It was quickly discovered that the XC-123A could not be used from short and rough runways due to the poor acceleration and the danger of ingestion of FOD. The turbojets also had a markedly high fuel consumption, and for these reasons the XC-123A was not proceeded with. The C-123B was the refined version of the XC-123, and it was in this version that most were C-123s built; it had a pair of Pratt & Whitney R-2800-99W engines developing 2500 horsepower each. The C-123K has a pair of podded GE J85 turbojets under the outboard of the wings. This not only did not have the hoped-for increase in performance, but it also required that different fuel be carried onboard. The turbojets of the C-123K develop 2850 pounds thrust each.

The C-123 has two hardpoints, one under each wing, for external drop tanks, able to carry 850 liters each.

Twilight 2000 Notes: By 2000, the only active military users were in the Far East, Southeast Asia, and South America, except for about 10 or so that were used by the Alaska Air National Guard during the latter stages of the war.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
XC-123	$39,064,130	AvG	6.75 tons	25 tons	3+60 or 41 paratroops or 28 stretchers	18	Radar (75 km)	Enclosed
XC-123A	$49,899,723	JP5	10.5 tons	26 tons	3+60 or 41 paratroops or 28 stretchers	18	Radar (75 km)	Enclosed
C-123B	$48,701,931	AvG	6.81 tons	25.22 tons	3+60 or 41 paratroops or 28 stretchers	32	Radar (75 km)	Enclosed
C-123K	$50,253,490	AvG+JP5	10.89 tons	27.22 tons	3+60 or 41 paratroops or 28 stretchers	42	Radar (75 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
XC-123	1020	283 (75)	NA 76 5/3 50/30	5530	1965	8839	FF5 CF5 RF4 W5 T4
XC-123A	1500	417 (75)	NA 113 5/3 50/30	5530	6097	8839	FF5 CF5 RF4 W5 T4
C-123B	1147	318 (75)	NA 86 5/3 50/30	5530	2234	8839	FF5 CF5 RF4 W5 T4
C-123K	1201	334 (75)	NA 90 5/3 50/30	5530	5085	8839	FF5 CF5 RF4 W5 T4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
XC-123	None	390/635m Primitive Runway	None	2 hardpoints (drop tanks only)	None
XC-123A	None	490/795m Hardened Runway	None	2 hardpoints (drop tanks only)	None

C-123B	Flare/Chaff Dispensers (30/20)	365/595m Primitive Runway	None	2 hardpoints (drop tanks only)	None
C-123K	Flare/Chaff Dispensers (30/20)	549/356m Primitive Runway	None	2 hardpoints (drop tanks only)	None

Lockheed C-130 Hercules

Notes: The C-130 is produced in a huge amount of variants, including cargo transport, weather reconnaissance, Antarctic transport, search and rescue, tankers, surveillance, maritime patrol, electronic warfare, command post, and bombardment (the C-130 is able to carry the 10-ton Daisy-Cutter FAE bomb). It has a large rear ramp and paratrooper doors on both sides near the rear. It is used throughout the world, including by the US, Australia, Belgium, Canada, Denmark, Egypt, France, Greece, Honduras, Iran, Israel (these aircraft are often used to deliver commandos), Italy, Japan, South Korea, Mexico, Netherlands, New Zealand, Norway, Oman, Saudi Arabia, Spain, Taiwan, Thailand, Turkey, Britain, and several countries in Africa and South America. It is also in use by many civilian agencies. The C-130 continuously produced military aircraft during 72 years of production.

The Hercules is a conventional cargo airplane, with a high-mounted wing and a tall tail which is not a T-tail. It appears to be larger, four-engined version of the C-123 Provider. Hardpoints, except on the Combat Talons, are normally used for fuel tanks, as the range of the Hercules is a little disappointing.

The C-130A is the original "blunt nose" version, with four Allison T56-A-9 turboprop engines developing 3750 horsepower each. It was superseded by the C-130B, with more powerful T56-A-7B engines developing 4200 horsepower each. The C-130E was probably the most exported version, and is essentially a modernized C-130B with the same engines as the C-130B. The C-130H was probably the most produced, and has T56-A-15 engines developing 4590 horsepower each. The C-130J is the current US standard model, and is powered by four Rolls-Royce AE 2100D3 turboprops developing 4637 horsepower each. The C-130J-30 is a stretched version of the C-130J, about a meter longer than that aircraft. Most C-130s have a cargo bay measurement of 12.19x3.02x2.74 meters; the C-130J-30 has a 16.76x3.02x2.74-meter cargo bay.

The MC-130 Combat Talon is basically a C-130 brought up to special operations standards. The MC-130E Combat Talon 1 is based on the C-130E; the MC-130H Combat Talon 2 is based on the C-130J. Improvements include a comprehensive ECM/IRCM suite with flare and chaff dispensers, an ability to navigate by GPS or inertial navigation, terrain-following radar (and the ability to conduct paving), equipment to extract skyhook-equipped ground forces, and the ability to conduct parachute and LAPES drops with greater precision and at higher speeds. From an altitude of over 9000 meters, a Combat Talon can locate and accurately drop cargo or troops into a drop zone little larger than a football field; from lower altitudes, greater feats are possible. Deviation during parachuting is half normal if a navigational fix is made before the jump, and such jumps may be made at 50% higher speeds. The cockpit gauges and controls show up well when the crew is wearing night vision goggles. The Combat Talon has a full-time electronic warfare officer to counter enemy detection attempts, and it was rumored that some Israeli and American Combat Talons carry antiradiation missiles or even Maverick missiles. One weapon known to be used by the Combat Talons was the massive 15,000-pound "Daisy Cutter" fuel-air explosive bomb. The Combat Talons do not have ejection seats, but are capable of aerial refueling. They are painted in low radar reflective paint that gives radar and radar-guided weapons -2 against them.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-130A	$64,533,945	JP4, JP5	17.04 tons	56.33 tons	4+92 or 64 paratroopers or 57 stretchers	34	Radar (50 km)	Enclosed
C-130B	$73,042,280	JP4, JP5	18.41 tons	61.22 tons	4+92 or 64 paratroopers or 57 stretchers	36	Radar (75 km)	Enclosed
C-130E	$82,240,480	JP4, JP5	19.09 tons	69.75 tons	4+92 or 64 paratroopers or 57 stretchers	44	Radar (75 km)	Enclosed
C-130H	$88,010,260	JP4, JP5	19.09 tons	70.31 tons	4+92 or 64 paratroopers or 57 stretchers	44	Radar (100 km)	Enclosed
C-130J	$89,665,173	JP4, JP5	19.09 tons	70.31 tons	4+92 or 64 paratroopers or 57 stretchers	44	Radar (100 km)	Enclosed
C-130J-30	$96,251,000	JP4, JP5	19.96 tons	74.39 tons	3+128 or 92 paratroopers or 82 stretchers	39	Radar (100 km)	Enclosed
MC-130E	$137,291,707	JP4, JP5	7.24 tons	69.75 tons	9+53 or 26 paratroopers or 23 stretchers	50	Radar (74 km), FLIR (30 km)	Enclosed
MC-130H	$155,372,776	JP4, JP5	10.25 tons	69.75 tons	7+77 or 52 paratroopers or 46 stretchers	51	Radar (74 km), FLIR (30 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-130A	1610	447 (115)	NA 121 5/3 35/20	24000	7064	10000	FF6 CF6 RF5 W5 T5
C-130B	1577	438 (115)	NA 118 5/3 35/20	24000	7514	10000	FF6 CF6 RF5 W5 T5
C-130E	1388	385 (110)	NA 104 5/3 50/30	24000	7514	10000	FF6 CF6 RF5 W5 T5
C-130H	1502	417 (110)	NA 113 5/3 50/30	24000	8210	10000	FF6 CF6 RF5 W5 T5
C-130J	1517	421 (110)	NA 114 5/3 50/30	24000	8294	12310	FF6 CF6 RF5 W5 T5
C-130J-30	1435	399 (115)	NA 108 5/3 50/30	24360	8294	12310	FF6 CF6 RF5 W5 T5
MC-130E	1388	385 (110)	NA 104 5/3 50/30	24000	7514	12000	FF6 CF6 RF5 W5 T5*
MC-130H	1529	425 (100)	NA 115 5/3 50/30	24000	8294	12000	FF6 CF6 RF5 W5 T5*

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-130A/B	Flare/Chaff Dispensers (40/40), Secure Radios	1105/800m Primitive Runway	None	2 Hardpoints	None
C-130E/H/J/J-30	RWR, Flare/Chaff Dispensers (40/40), Secure Radios	1220/975m Primitive Runway	None	2 Hardpoints	None
MC-130E	Secure Radios, RWR, Flare/Chaff Dispensers (80/80), ECM 2, IRCM 1, Deception Jamming (40 km), TFR (37 km), EW Suite, INS, Laser Rangefinder (30 km)	800/1105m Primitive Runway	+1	4 Hardpoints	None
MC-130H	Secure Radios, RWR, Flare/Chaff Dispensers (80/80), ECM 2, IRCM 1, Deception Jamming (40 km), TFR (37 km), EW Suite, GPS/INS, Laser Rangefinder (30 km)	800/1105m Primitive Runway	+2	4 Hardpoints	None

*The cockpit has a Kevlar liner and has an AV of 8.

Lockheed C-141 Starlifter

Notes: This aircraft entered service in 1964 as the US Air Force's first all-jet transport. In the early 1960s, the US Air Force faced a problem: their existing airlifters, some of which could handle outsized cargo, were piston-powered and could not move cargo quickly. Most of the other Air Force aircraft were jets and had more power and speed than their cargo aircraft. The USAF issued Specific Operational Requitement (SOR) 182, calling for an all-jet tactical and strategic airlifter. Lockheed won the competition in 1961 with its Model 300, which became the C-141A; this had its first flight in 1963.

The C-141 takes the form of a long, slender fuselage with a ramp and clamshell doors in the rear and long, swept wings and podded engines under the wings. The aircraft also has side doors at the rear for dropping of paratroopers. The main problem with its design is that the fuselage is very narrow, causing the interior space to be packed to its limits before the maximum cargo weight is reached. Wide vehicles and cargo often cannot be accommodated within its fuselage (though an entire Minuteman missile can be accommodated). This led to the stretched C-141B. This stretched fuselage helped, though many wide vehicles and outsized cargoes could still not be carried. When first introduced, the C-141 could not fully replace the C-124 Globemaster II due to its difficulty with outsized cargoes, and was later supplemented and then replaced by the C-5 Galaxy and C-17 Globemaster III. The C-141 was fully retired in 2005. The C-141 is powered by four Pratt & Whitney TF33-P-7 turbofans developing 20,250 pounds thrust each. It has no ejection seats, but the C-141B and C are capable of in-flight refueling. (The C-141A is not.)

As stated above, the slender fuselage often leads to the C-141A maxing out on cargo space before the maximum cargo weight is realized. This was inefficient. This led to the stretched C-141B, which is 7.11 meters longer than the C-141A. In 2001, the C-141Bs were modified into the C-141C standard, which feature a glass cockpit, weather radar, GPS, and improved avionics, including an ability to operate within civilian air traffic control standards. In 1994, 13 C-141Bs were modified into the SOLL II (Special Operations Low Level) standard, with terrain following radar, GPS/INS, and improved defensive countermeasures. These were operated by AFSOC (Air Force Special Operations Command).

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
C-141A	$423,649,255	JP5	32.14 tons	143.6 tons	5+154 or 123 paratroopers, or 80 stretchers	57	Radar (100 km)	Enclosed
C-141B	$456,393,903	JP5	41.22 tons	147 tons	5+205 or 168 paratroopers or 103 stretchers	59	Radar (100 km)	Enclosed
C-141C	$496,125,243	JP5	41.22 tons	147 tons	5+205 or 168 paratroopers or 103 stretchers	59	Radar (100 km)	Enclosed
C-141B SOLL II	$544,887,409	JP5	41.22 tons	147.18 tons	5+205 or 168 paratroopers or 103 stretchers	62	Radar (100 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
C-141A	2408	669 (145)	NA 181 4/2 30/15	90850	36236	12680	FF7 CF6 RF6 W7 T5
C-141B/C	2352	653 (145)	NA 176 4/2 30/15	90850	36236	12680	FF7 CF6 RF6 W7 T5
C-141B SOLL II	2349	653 (145)	NA 176 4/2 30/15	90850	36236	12680	FF7 CF6 RF6 W7 T5

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
C-141A/B	All Weather Flight, Flare/Chaff Dispensers (40/40)	1770/1130m Hardened Runway	None	None	None
C-141C	All Weather Flight, RWR, Flare/Chaff Dispensers (40/40), GPS	1770/1130m Hardened Runway	None	None	None
C-141B SOLL II	All Weather Flight, RWR, Flare/Chaff Dispensers (60/60), Deception Jamming, GPS/INS, TFR (37 km)	1770/1130m Hardened Runway	None	None	None

Bell-Boeing V-22 Osprey

Notes: This aircraft is a radical hybrid of helicopter and fixed-wing aircraft. The propellers and engines of the Osprey tilt 90º from their forward position, giving V/STOL performance. The MV-22B version was added as an assault helicopter substitute by the US Marines in the late 1990s,and by 2012, it had completely replaced the Marines' CH-46 and CH-53D helicopters. The first flight was in 1989. The V-22 program has been plagued by repeated crashes, both by mechanical and pilot error; the learning curve has been steep in both cases. The V-22 program was repeatedly killed and resurrected, but it appears to have largely ironed out its flaws. In addition to the US, the CMV-22 (designated by the Japanese as the V-22) is used by the Japanese Maritime Self-Defense Force. France, India, Indonesia, Israel, and Britain are all considering or have considered one or more of the V-22 variants.

The Osprey is able to lift 2/3 it's listed load in VTOL mode, and its full load with a short (150 m) takeoff run. No ejection seats are provided, but the Osprey is equipped for aerial refueling. The Osprey has two forward doors and a rear ramp, and can carry a slung load of up to 4500 kg at half its listed safe speed (in VTOL mode). The Osprey is powered by a pair of Rolls-Royce T406-AD-400 turboprop/turboshaft engines developing 6150 horsepower each.

The CV-22B version's hardpoints normally carry drop tanks and Sidewinder missiles, and up to three auxiliary fuel tanks may be added in the cabin with capacities of 760 or 1630 liters may be carried at the expense of cargo. The CV-22 is essentially the Air Force's special operations variant. The CV-22B has an electronics suite similar to the MH-53H Pave Low, and shares its terrain-following capability, though Paving (flying nap-of-the-earth for an extended period) in an Osprey is only a Difficult: Pilot task.

The CMV-22B is essentially an MV-22B modified for the Carrier Onboard Delivery (COD) role, taking over from the C-2 Greyhound. In this role, the CMV-22B does not normally carry weapons, though they may be fitted if necessary. Hardpoints are normally fitted with drop tanks or baggage pods, though again weapons or other gear may be fitted. Internal auxiliary fuel tanks may be carried at the expense of cargo. The CMV-22 is equipped with an additional high-frequency radio and a public address system. It also carries a rescue hoist (300 kilograms capacity) over its left front door.

The MV-22B is the special operations version of the Osprey, flown by the US Marines. In this role, the Osprey is heavily modified with extra armament, fuel, and electronics. The MV-22B has an electronics suite similar to the MH-53H Pave Low, and shares its terrain-following capability, though Paving (flying nap-of-the-earth for an extended period) in an Osprey is only a Difficult: Pilot task. The MV-22B can carry almost anything on its hardpoints, and in addition may carry a large flexible fuel bladder in its cargo bay (1775 liters), at the expense of cargo. The MV-22B may conduct in-flight refueling and buddy refueling, but has no ejection seats. The MV-22C has upgraded EW equipment and radar.

Twilight 2000 Notes: The CMV-22B is available, but designated the HV-22B, and is used primarily as a SARbird. The MV-22C is not available in the Twilight 2000 timeline. The Japanese do not have V-22s in the Twilight 2000 timeline.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CV-22B	$14,990,522	JP4, JP5, JP8	7.78 tons (up to 4.5 tons of that slung)	25.52 tons	5+24 or 15 paratroops or 12 stretchers	30	Radar (74 km)	Enclosed
CMV-22B	$11,502,558	JP4, JP5, JP8	9.07 tons (up to 4.5 tons of that slung)	25.21 tons	3+24 or 12 stretchers	28	Radar (74 km)	Enclosed

MV-22B	$14,995,975	JP4, JP5, JP8	7.78 tons (up to 4.5 tons of that slung)	25.86 tons	5+24 or 15 paratroops or 12 stretchers	32	Radar (74 km), FLIR (30 km)	Enclosed
MV-22C	$16,391,815	JP4, JP5, JP8	7.78 tons (up to 4.5 tons of that slung)	25.86 tons	5+24 or 15 paratroops or 12 stretchers	33	Radar (100 km), FLIR (30 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
CV-22B	1373	381	45/103 6/4 35/25	15850	5498	7925	FF6 CF5 RF5 W5 T4*
CMV-22B	1389	386	45/104 6/4 35/25	17850	5498	7925	FF6 CF5 RF5 W5 T4*
MV-22B/C	1355	377	45/102 6/4 35/25	16850	5498	7925	FF6 CF5 RF5 W5 T4*

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
CV-22B	Laser Designator (20 km), Secure Radios, RWR, Flare/Chaff Dispensers (40/40), ECM 2, IRCM 1, GPS, Engine Noise Reduced by 50%, TFR (37 km)	(VTOL) 50m (STOL) 150m Primitive Runway	+2	M2HB (Rear), 2xDoorguns (M134 or M240 or M2HB), 4 Hardpoints	2000x.50; 3000x7.62mm or 2000x.50
CMV-22B	Secure Radios, Homing Equipment, RWR, Flare/Chaff Dispensers (40/40), GPS, PA System	(VTOL) 50m (STOL) 150m Primitive Runway	+2	M2HB (Rear), 4 Hardpoints	2000x.50
MV-22B	Laser Designator (20 km), Secure Radios, RWR, Flare/Chaff Dispensers (40/40), ECM 2, IRCM 1, GPS, Engine Noise Reduced by 50%, TFR (37 km)	(VTOL) 50m (STOL) 150m Primitive Runway	+3	M2HB (Rear), 2xDoorguns (M134 or M240 or M2HB), 4 Hardpoints	2000x.50; 3000x7.62mm or 2000x.50
MV-22C	Laser Designator (20 km), Secure Radios, RWR, Flare/Chaff Dispensers (40/40), ECM 2, IRCM 1, Deception Jamming (40 km), GPS, Engine Noise Reduced by 50%, TFR (37 km)	(VTOL) 50m (STOL) 150m Primitive Runway	+3	M2HB (Rear), 2xDoorguns (M134 or M240 or M2HB), 4 Hardpoints	2000x.50; 3000x7.62mm or 2000x.50

*The cockpit has a Kevlar liner and has an AV of 8.