Air and Space this Week

Item of the Week

The Curtiss C-46 "Commando"

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The famous military adage, "Lieutenants discuss tactics, Generals discuss logistics," has an aviation analog because logistics, particularly by air, is a critical part of projecting power. Nowhere has this been truer than the WWII's far-flung theaters of action, especially in the Pacific and "Over the Hump" in India/Burma/China. The DC-3 was thrown into action; a little green paint, remove any passenger seats, and off to war it went, renamed the C-47. The features that made it a commercially-viable cargo aircraft in the 1930's and (long) after the War, made it a good transport. But there was a better one….

Air travel grew rapidly in the 1930's, but the infrastructure that supported it was in its infancy, and travel by air was very expensive. The DC-3 was a big step forward in moving people, and more importantly, cargo, by air. But it was a little too small to meet the projected needs, so Douglass created a four-engine version, the DC-4. Boeing rolled out its Stratoliner, the first passenger aircraft with a pressurized cabin, allowing it to fly over weather. And the Curtiss-Wright company wanted in on the action.

The Curtiss CW-20 design was finalized in 1937. It had a number of innovations, including a "figure-8" fuselage, for its cross-section appearance. The upper part of the "8" was for passengers, the lower part was intended for baggage/cargo. The mid-line "crease" (the "8" shape was more like an mild hour-glass than two separate cylinders atop one another) provided structural strength. The Curtiss people wanted to keep the engine/wing structures simple, so they planned for a two (large) engine design, rather than using four as in the DC-4. The designers did a lot of wind tunnel and other testing, resulting in a very aerodynamically-smooth fuselage. The engine cowling was innovative, too, using a special nacelle that ducted air around the engine cylinders and exhausted it below, reducing drag considerably. Curtiss-Wright showcased their advanced aircraft design in the 1939 World's Fair in NYC.

The first flight of the CW-20 was on March 26, 1940, with famed test pilot Edmund Allen at the controls (he made the first flight of the B-17B, C, D, E, and F models, and the XB-29). [Allen would also make the first flight of the C-69 Constellation on January 9, 1943. The XB-29 was a problem. It was a major step forward, but it had a lot of early teething pains. After its first flight on September 21, 1942, Allen was placed in charge of the entire XB-29 flight test program. The second B-29 prototype flew on December 30, 1942, but the flight was aborted due to a serious engine fire. They tried again on February 18, 1943, and had another bad engine fire. The crew thought they had successfully put that fire out went it re-erupted. Two

crewmen bailed out as Allen struggled to get the stricken aircraft back to Boeing Field, but there was not enough time/height for their parachutes to open, and both died on impact. The B-29 crashed into a packing plant short of the runway, killing Allen, eight other crewmen, and another 19 in the plant.]

The CW-20 was powered by two Wright Twin Cyclones, each producing 1700 hp. These were a lot larger than the engines on the DC-3, and made for a very satisfactory carrying capacity in spite of not having four engines.

When the War came, we needed aerial transports and quickly. Many DC-3s were commandeered and pressed into service with little delay. The DC-3 design would also undergo a transformation during the War, including more powerful engines, and would be re-designated as the C-47 Skytrain. The four-engine version would, after modifications, eventually enter service as the C-53 (paratroop transport, just ask "Pee Wee" – see the Aviation News section of the website) or C-54 Skymaster (cargo).

The Army purchased one CW-20 for evaluation, and initially designated it the C-55. At first, they passed on the design, and the only C-55 completed was bought by BOAC. But General "Hap" Arnold had seen the test results, and realized that its powerful engines and better performance than the C-47 might prove useful in the coming war. A number of modifications would be necessary to meet military needs, such as a larger set of cargo doors, a stronger floor, and a more-efficient internal cabin layout. The new CW-20, now designated the C-46, was rolled out in May, 1942. After first aircraft started their way through the construction pipeline, the engines were upgraded to Pratt & Whitney R-2800 Double Wasps (2000 hp), giving the C-46 a high power/weight ratio.

Many more C-47s were built for the War than C-46s or the cargo planes that followed. The DC-3 production line was already well-established by late 1941, and the C-47 did a great job, in part because it had a longer range than the C-46.

The C-46's bigger engines were important. Not only could the C-46 carry twice the cargo a C-47 could, it could also carry more airborne troops and their equipment, and it could tow troop-laden gliders. In places where engine power was of paramount importance, the C-46 was the plane of choice. This was particularly true in the China-Burma-India theater, where we were supplying our Chinese allies by flying all sorts of material from India to Burma/China "over the Hump" (the Himalayas). Rapid climbs from mountain valley airstrips over the tallest range in the world placed a real premium on engine performance, especially at higher altitudes. The extra cargo capacity was also important in the Pacific Theater.

Many of the pilots didn't like the C-46, in spite of its power and carrying capacity. Early models of planes in that era often had a lot of mechanical malfunctions and fires, and the C-46 was no exception. There were at least 30 known instances of in-flight fires and/or explosions during the War.

Flying the Hump was an extremely-difficult proposition. The very high altitudes, poor weather, poor airfields, difficulty in providing proper maintenance, and the lack of major navigational

aids all contributed to high losses (the Hump pilots laconically said that they didn't need much in the way of navigational support because all they had to do was follow the "aluminum highway" of wrecked cargo planes!)

Late in the War, C-46s participated in the offensive to cross the Rhein River (Operation Varsity) as paratroop transports. They flew in daylight, slowly and at low altitude, ***without self-sealing fuel tanks***, over very heavy concentrations of efficient German anti-aircraft weapons manned by experienced gunners with their backs to the wall. What could go wrong? Nineteen of 72 participating C-46s were shot down, and the commander of Operation Varsity forbade their further use (even though he and his planning team were arguably somewhat responsible).

The C-46's reputation as a pilot killer was largely unwarranted. The conditions under which they operated were extremely hazardous, which would have exacerbated the safety issues of any relatively-new aircraft design. Pilots who flew both C-46s and C-47s, and those who've flown the C-46 in post-War conditions, found it much easier to handle than any of the other cargo planes used in WWII.

After the War, some C-46s found a home at a few air transport companies, including the Flying Tigers. But the high-performance qualities that made it the choice in CBI didn't translate well to civilian use; its powerful engines gulped a lot of fuel. In South America and other mountainous areas, that extra power was vital, and it insured that the C-46 was used for decades, but it couldn't compete with the civilian version of the Skytrain in normal passenger operations.

Civilian users weren't the only potential customers for the C-46 in the post-War years. Its power and carrying capacity made it the choice for a covert US effort to support Israel's 1948 war for independence, and then a few years later, in Korea, where they served alongside other WWII-era transports. C-46s were used in the March 23, 1951 aerial assault on Munsan-ni, near Seoul, called Operation Tomahawk.

In Korea, not all the C-46s were ours…. The C-46s in China at the end of WWII had been purchased by Chiang Kai-shek, but later many were captured during the Communist take-over and used to support North Korea during the Korean Conflict.

C-46s supported the failed invasion of Cuba at the Bay of Pigs in 1961 and they saw limited use in Vietnam in counter-insurgency operations ("Air America"). Many other countries used the C-46 as military cargo plane in the post-WWII period, and over 350 commercial operators used them for decades. They were particularly important in serving on a variety of humanitarian relief missions in Africa, and it serving isolated communities in the frozen northland of Manitoba, where their service continued up to less than a decade ago.

Quite a record of service! Go Commando! (Er, wait a minute…)

For more information, see:

Pictures of the Curtiss-Wright CW-20 (and check out the rest of the January, 1941 issue of *Popular Aviation* – it's a hoot!
https://books.google.com/books?id=Uf8vvplmxF0C&pg=PA56#v=onepage&q&f=false

Edmund T. Allen: http://www.boeing.com/news/frontiers/archive/2004/april/i_history.html

Operation Varsity: https://armyhistory.org/operation-varsity-the-last-airborne-deployment-of-world-war-ii

U.S. Air Force Museum: https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/196258/curtiss-c-46d-commando

Aviation History Online Museum: http://www.aviation-history.com/curtiss/c46.htm

Air Force Magazine article on Korean War Aircraft: https://www.airforcemag.com/article/0700korea

Air Force Magazine article on significant events in the Air War over Korea, 1950-1953: https://www.airforcemag.com/article/1000korea

C-46 Airworthy/Display/Stored roster: https://en.wikipedia.org/wiki/List_of_surviving_Curtiss_C-46_Commandos

Flying the C-46 – First Impression: https://www.cafsocal.com/our-aircrafts/our-aircraft-and-history/c-46-china-doll/flying-the-c-46

Flying Tiger Line: https://www.flyingtigerline.org/aircraft/aircraft-history

History of War: http://www.historyofwar.org/articles/weapons_curtiss_C-46_commando.html

Operation Tomahawk: https://history.army.mil/books/korea/ebb/ch18.htm ; https://military.wikia.org/wiki/Operation_Tomahawk

Post-Korea military use of C-46: https://en.wikipedia.org/wiki/Curtiss_C-46_Commando

Flying the C-46 in Vietnam: https://www.historynet.com/life-as-an-air-america-cia-pilot-in-vietnam.htm

C-47 Skytrain: https://en.wikipedia.org/wiki/Douglas_C-47_Skytrain

C-54 Skymaster: https://en.wikipedia.org/wiki/Douglas_C-54_Skymaster

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