Air and Space this Week

Item of the Week

PAN AM CLIPPER FLYING BOATS

Originally appeared October 16, 2022

KEY WORDS: Pan Am Clipper Flying Boats Sikorsky S-40 S-42 M-130 B-314 Juan Trippe *Pacific Clipper*

*Airplane technology advanced rapidly in the post-WWI years, and by the mid-late 1920s, it was possible for new companies to provide short-range air transport for both passengers and (mail)freight. One of them was Pan American Airways, whose first flight was a mail run from Key West to Havana, on October 28, 1927. Pan Am began passenger service on January 16, 1928, and trans-Pacific service on **October 21, 1936**. Air travel was primitive then, weather stations were few, and there was no aerial radio established radio communications network. Many of the early companies failed quickly, but Pan Am made two important hires: Hugo Leuteritz, a radio expert, and the famous Charles Lindbergh, as Technical Director.*

PAN AM: THE EARLY DAYS

Juan Trippe had been born to "old money." He received a rigorous prep education and then attended Yale, graduating in 1921 after a stint in the Navy during WWI. He became qualified as a Naval Aviator, but the War ended before he could see combat. He made a number of contacts at Yale, and was very involved with the National Intercollegiate Flying Association in 1920.

Making lots of money on Wall Street quickly became boring for young Juan, so he quit his job, secured some financial backing from his old school ties, and started a small airline, the Colonial Air Transport Company, which began operations on October 27, 1925. Trippe's interest shifted to the Caribbean, and he established the Aviation Corporation of the Americas two years later, based in Florida. Trippe then went on a series of expansions and acquisitions, and his company evolved into Pan American Airlines. Serious difficulties, in terms of airfields, aircraft, radios, and other infrastructure, had to be overcome for Pan Am to continue to grow, and with Leuteritz and Lindbergh on board, growth continued apace.

Pan Am grew rapidly the next two years, with routes linking the southern U.S. with a number of places in Central and South America and building a network of subsidiary companies across South America.

The geography of Pan Am's operational area posed a serious problem. A number places desiring commercial air transport lacked the facilities to handle the heavy cargo aircraft Pan Am

was looking to use as they expanded. However, many of those places were on large rivers or sheltered ocean coastlines. Providing service to those places via the use of large seaplanes could be a lucrative market. Pan Am thought so, and turned to the Sikorsky Company for help.

Sikorsky designed a four-engined flying boat, starting in late 1928, and by April, 1931, the Sikorsky S-40 made its maiden test flight.

Trippe understand marketing and promotion as well as anyone. Oceangoing transport in the 1920s and 30s was in vogue (albeit expensive), the *Titanic* experience non-withstanding. He began christening the three S-40s Pan Am purchased with champagne, and referring to them as "Clippers," evoking the romanticized era of fast sailing ships. He dressed his flight crews in Navy-esque uniforms, and wanted his customers to think of his S-40s as ocean liners in the sky.

Pan Am's three S-40s: American Clipper, Caribbean Clipper, and the Southern Clipper, collectively flew over ten million miles in commercial service.

The S-40 design quickly became obsolete. It had a number of exposed struts, wires, and other non-aerodynamic obstacles that produced a lot of drag. Engine technology was advancing quickly, too. Pan Am asked Sikorsky for an improved model, which would become the S-42. It entered service in 1934, after extensive testing by Pan Am chief pilot Edwin Musick and Lindbergh himself. Simultaneously, Pan Am began working with the Glenn L. Martin Company for an even-more capable design, the M-130.

The S-42 was, indeed, an improvement, and it greatly helped with Pan Am's short- and mid-range business. On **October 21, 1936, eighty-six years ago**, Pan Am inaugurated its first trans-Pacific service, from San Francisco (Alameda) to Manila. Pan Am expanded their support infrastructure throughout the Americas.

PAN AM: PRE-WW2

Juan Trippe had his eyes on a building a bigger company. The North Atlantic ocean liner passenger and freight business was large and profitable, but the S-42 wasn't really up to the task of the longer distances and flight times that would be involved. It could make it across the Atlantic, but could carry less payload than the shorter hauls because it had to carry so much fuel. Trippe was focused primarily on the transatlantic market, but the large Pacific market would definitely require a longer-ranged, more-capable aircraft.

Pan Am was already working with the Glenn L. Martin Company to produce a larger aircraft, the M-130. It could carry 41 passengers on a short trip, but only 8 on the longer California to Hawaii run. Pan Am only bought three of them, causing Martin to take a loss they hoped they could make up with future business. The most famous was the first one delivered, the *China Clipper* (see the story in the Didja Know section below or on the website); her sisters were the *Hawaiian Clipper* and the *Philippine Clipper*. It was an expensive aircraft, twice the cost per plane than the S-42, but its increased capabilities made it a profitable purchase for Pan Am.

Charles Lindbergh's involvement with the development of the M-130 was limited because of the famous kidnapping and murder of his son. Pan Am hired Andre Priester from KLM as their Chief Engineer, and he played a big role in the production of the M-130.

[Alas, all three Pan Am M-130s would meet a sad end. The *Hawaiian Clipper* disappeared east of Manila in July, 1938; the *Philippine Clipper* crashed in a storm north of San Francisco on January 21, 1943; and the *China Clipper* crashed and sank at Trinidad, with some survivors, on January 8, 1945. The Philippine Clipper passenger list included Admiral Robert English, Commander of the U.S. Submarines in the Pacific Theater. To be blunt, Admiral English was a dud, but his replacement, Charles Lockwood, was an energetic and effective leader, beloved by all who served with him. For more about "Uncle Charley" and WWII submarine service, see here, here, and here.]

The M-130 was an important step forward for Pan Am, but they were having a difficult time securing the infrastructure necessary for a full-scale transatlantic service. The necessary permissions and construction would come, but more slowly and expensively than Trippe could tolerate. He began turning to the Pacific for new business, and the ranges involved there required yet another big step forward in transport aircraft performance.

In 1936, Pan Am released a proposal for the new aircraft performance they needed. A few airplane manufacturers replied, including Glenn Martin, who felt like his company should have the inside track because of the cost of the M-130. He was incensed when Pan Am selected a plane from the competition, the Boeing B-314. The Boeings would enter service in 1939. Their B-314 flying boats and B-307 Stratoliner land aircraft were paragons of luxury, the pinnacles of mid-1930s aviation technology, including pressurized cabins. The B-314 was a much larger aircraft that the M-130; its wings were so thick that an aviation mechanic could crawl along a passageway in them to service the engines in flight, a capability that would prove very valuable at times in the years to come.

Pan Am's growth continued to the start of the American involvement in WWII. By then, Pan Am had established air routes aggregating almost 89,000 miles, serving 52 countries, with 162 aircraft, 192 radio/weather stations, 300 airports, and 8,750 employees.

PAN AM GOES TO WAR

War clouds loomed in the late 1930s. In early 1941, Pan Am's Africa and Air Ferry Divisions began offering assistance to British forces in the Middle East. The flight training school Pan Am had established in Miami began training navigators for U.S. and British air forces in 1941, too; by 1944, the school would train over 5000 officers. Some of the men trained as navigators by Pan Am ended up flying in Doolittle's raid on Japan in 1942.

Pan Am greatly expanded their fight training program during the War years, and they and their subsidiaries operated many military services for the Allies. One such was the contractors flying supplies "over the Hump" in the CBI Theater, very hazardous duty; they would end up flying the Hump route over 20,000 times!

The Pearl Harbor attack found the *Philippine Clipper en route* from Wake Island to Guam. It was immediately ordered to return to Wake, where its commander was ordered to conduct reconnaissance, but before that could happen, Japanese planes attacked Wake and shot up the *Philippine Clipper* (97 bullet holes). Invasion forces were coming, so Captain Hamilton stripped the *Philippine Clipper*'s extra gear, stuffed 70 civilians aboard, and staggered off the water bound for Midway, Pearl Harbor, then San Francisco. It took three attempts to get airborne at Wake, but they made it, with news of the state of war in the mid-Pacific.

The Odyssey of the *Pacific Clipper*

The *Pacific Clipper* was caught *en route* to New Zealand when Pearl Harbor happened. Captain Robert Ford and his gallant crew were blocked by the Japanese from moving eastward to safety, so they had to go the long way around, becoming the first aircraft to make a round-the-world journey. What Ford and his crew were able to accomplish was the stuff of legend.

The entire region was in chaos in the days following Pearl Harbor. When Ford finally was able to contact Pan Am's home office, he was told that he and his crew would have to fly to the Pan Am station at Noumea, New Caledonia, pick up Pan Am personnel, and deliver them to relative safety in Australia. Their destination was Gladstone Harbor, first visited by Captain Cook in 1770. They made it OK and discharged their passengers from Noumea.

Now the task would be to pioneer a new 30,000-mile route back to the U.S. They would have to do all the aircraft servicing along the way, over terrain none of them had seen, all in the uncertainty of the time, with Japanese forces hot on the trail for the first part of the journey.

The first leg of the *Pacific Clipper*'s amazing flight was from Gladston to Darwin, a primitive port in northern Australia. The flight was a long one, with no place along the way the flying boat could land if there were mechanical or other problems. They made Darwin after a long flight, and then had to refuel the aircraft using hand labor and 5-gallon buckets, a task that took hours. The got a few hours of fitful sleep, then took off the next morning, for a 1400-mile leg to the Dutch East Indies, hoping they were still under Allied control.

Ford's concerns about Japanese interference were well-founded; Darwin was bombed heavily two months after the *Pacific Clipper* departed (see here). Surabaya and the rest of Java, and much of the surrounding area, would fall, too, in February, 1942, after the defeat of the Allies at the Battle of the Java Sea. But Ford and his intrepid crew stayed ahead of trouble, at least from the Japanese.

The *Pacific Clipper* made the trip from Darwin without major incident, but on approach to Surabaya, on Java, they were intercepted by several Bristol Beaufighters from the British garrison there. The Brits were perplexed by the size and configuration of the *Pacific Clipper*, and Ford did not have the current recognition signals. He could hear the plane-to-plane radio from the defenders but they could not hear him. The ground controller told the defending planes to let Ford land, but shoot him up if he made any threatening moves.

Ford made a very smooth landing, and a small boat came out to meet them, but did not approach. Ford slowly taxied toward shore and the boat met him half-way in. It turned out the Ford had landed in the middle of a defensive mine field!

Bad news awaited them at Surabaya. There was no high-octane avgas available. There was plenty of lower-octane automobile gas, however. This was a problem, since the next leg involved a very long over-water flight, with no prospect of refueling anywhere until they reached Trincomalee on Ceylon. The choice for Ford and his crew was simple, abandon the *Pacific Clipper* and take their chances on Java when the Japanese invaded, or take a chance on the car gas and try to reach Ceylon. Two bad options, but a simple decision. On to Ceylon!

The crew had taken some precautions with the fuel. They transferred the remaining avgas to two separate tanks, to be used only during takeoff and landing when the need for maximum engine power was greatest. The remaining tanks held the car gas.

All the navigator had was the latitude and longitude for Trincomalee. They had no aviation charts or maps; having enough fuel for the trip required a direct flight with no deviations. Away they flew. During climb out, Ford switched over to car gas. The engines rumbled, but kept running. The flight to Trincomalee was relatively uneventful, except when they inadvertently flew over a surfaced Japanese submarine! Upon landing, Ford and his crew met with the British officers, who were eager for news from Java and points east.

The *Pacific Clipper* took off on Christmas Eve, 1941, bound for Karachi. Shortly into the flight, the #3 engine suffered a cylinder failure and explosion, so Ford quickly turned back to Trincomalee. The crew had the tools and spare parts necessary for them to be able to affect repairs. They worked straight through the holiday, and departed for good on December 26.

The next two legs were uneventful. They flew across India to Karachi without further difficulty, spent the night, then made a routine flight to Bahrain, where the British had a garrison. The British warned Ford against his next planned leg, traversing Saudi Arabia, where the locals had been quite inhospitable to strangers delivered by air. Ford chose to ignore their advice, and flew over Mecca and the Red Sea and into Africa. After a long flight, the crew sighted the Nile River and followed it to Khartoum, which had a small RAF base.

The next leg would be dangerous. Ford wanted to avoid a long flight over the Sahara, where there was absolutely no place for a flying boat to land. A forced landing there would certainly be fatal, a la the case of the *Lady B. Good* a few years later (see here). Instead, Ford would fly southwest to Leopoldville in the Belgian Congo. He landed on the Congo River safely, fought with its current, and docked.

Pam Am HQ had been working hard to set up at least some logistical support for the Clipper struggling to come home. It was hellishly hot at Leopoldville, but the crew was heartened to find a Pan Am airport manager and radio officer awaiting their arrival. Ford was particularly pleased to see the two when they handed him a cold beer! Tomorrow the journey would continue, with a crossing of the Atlantic.

The Pacific Clipper had to take on a full load of fuel – at least it was avgas. But the aircraft weight, high heat, and the necessity of a downstream takeoff in a river with a six-knot current would put the biggest strain on the engines during the entire trip. Ford firewalled the throttle, and the plane struggled to clear the water. The need to get aloft was becoming imperative, because there were rapids in the river that would wreck the aircraft. Ford barely made it, then had to struggle for altitude. The engines had to run for 25 minutes at full power, which made everyone nervous.

The flight covered 3,000 miles in 20 hours, and the engines never wavered. They landed at Natal, Brazil, without incident. At least until they departed the next day, and then found that their money and most of their personal papers, including an important chart, were missing, stolen by the Brazilian crew "helping" the flight.

The next stop was Port of Spain, Trinidad, where Pan Am had an active presence. They were among friends now, but they still weren't home. They landed in the wee hours, had the aircraft fueled and serviced, and caught a little sleep. That night, they took off for New York. They arrived over LaGuardia before sunrise, and had to circle until sunup, since no water landings were allowed at night. They were finally home!

The flight of the *Pacific Clipper* set a lot of records. They had flown a total of 31,500 miles in 209 hours, making 18 stops in total in 12 different countries. Their flight from Leopoldville to Natal was the longest non-stop flight in Pan Am history – 3,583 miles.

Bob Ford and his crew spent most of WWII flying contract missions for the U.S. Armed Forces. Ford continued flying for Pan Am until 1952.

Rest of the War

Pan Am planes and personnel not only served in combat, they also performed vital strategic missions, such as the transport of rubber from the Amazon basin to make up for the loss of rubber resources in Malaysia. Pan Am built a lot of airports and other infrastructure around the world, including an important airfield that would support Montgomery against Rommel at El Alamein.

All told, over 200 members of the Pan Am team were killed in service, and another 45 were captured and interned in prison camps.

POST-WAR PAN AM

Pan Am re-opened both its Atlantic and Pacific pre-War routes, using the updated B-377 Stratocruiser, Lockheed Constellations, the DC-6 and DC-6B, and finally, the DC-7 aircraft (which was built to United specifications). Trippe was able to offer Round-the-World schedules, a major objective of the company, starting on June 17, 1947. Great effort was expended in expanding and modernizing international destinations. The heyday of commercial transport by flying boat was coming to an end.

The era of air route expansion ended in the mid-50s. Piston-engined aircraft were on the way out, at least for the longer routes; Pan Am started to make the transition in October, 1958. The company continued to expand its routes and fleets through the B-747 era in the early 1970s. However, that same time rising fuel costs, declining travel, increased competition, and deregulation caused financial difficulties for all carriers, and Pan Am was no exception.

Juan Trippe, the sparkplug of Pan Am's growth and industry dominance, died in 1981. Subsequent management teams were unable to regain profitability. When Pan Am 103 fell to a terrorist bomb over Lockerbie, Scotland, on December 21, 1988, the handwriting was bold on the wall, and the company never recovered. Pan Am went out of business on December 4, 1991.

REFERENCES

A Brief History of Pan Am: https://www.panam.org/about-pahf/paa-a-brief-history

Pan Am Across the Pacific: https://www.clipperflyingboats.com/transpacific-airline-service

Clippers at War: https://www.panam.org/war-years/609-clippers-at-war

Sikorsky Flying Boats: https://www.usni.org/magazines/naval-history-magazine/2018/june/historic-aircraft-sikorsky-flying-boats

Martin M-130: http://www.aviation-history.com/martin/m130.html

Boeing B-314: https://www.boeing.com/history/products/model-314-clipper.page

Flying Boat Museum (Ireland): https://www.flyingboatmuseum.com/aviation-museum

The Saga of the *Pacific Clipper*: https://www.panam.org/pan-am-inspirations/634-saga-of-the-pacific-clipper

Last Edited on 16 October 2022