The Building of an Industry

Freighters and Air Cargo Help Shape the World

The world took a healthy leap forward on Dec. 17, 1903. One hundred years hence, the Wright brothers' tremendous achievement has made the world much smaller and more interdependent than Wilbur and Orville might have imagined. Overlooked by many people in the coming months will be the contributions of "the other side" of air transport -- the movement of high-value goods that today find their way to the far corners of the world.

It would be difficult to imagine our lives today without the products available to us as a result of the air cargo industry. From the electronics and mail that keep us connected, to the fresh fruits that keep us nourished, our society is evermore dependent on the materials that travel by air.

"From its humble beginnings, air cargo is today a $46 billion business, and 40 percent of world trade value travels on-board commercial aircraft," notes Dora Kay, president of The International Air Cargo Association. "The speed and reliability of air cargo are giving global customers greater choice than ever before, helping to create successful businesses, economic growth and employment."

The business possibilities and culture we now enjoy were facilitated by the talents and innovations of the developers of the airplanes that built today's Boeing company. From the Boeing B&W and the Douglas DT/C-1 airplanes to today's 747-400 Freighter, Boeing and its heritage companies have been at the forefront of air cargo from day one -- to the point that Boeing airplanes today provide 90 percent of revenue-generating capacity to freighter operators.

Mail -- The Beginning

On March 3, 1919, William Boeing (right) and pilot Eddie Hubbard performed the first U.S. international airmail flight in this Boeing Model C, a modified World War I trainer they flew from Vancouver, Canada, to Seattle.

While today, most of us think of airplanes in terms of passengers, in the very beginning, there were no passengers, only cargo.

In 1916, the B&W was the first airplane developed by Bill Boeing and his then-partner, George Westervelt, an airplane that later pioneered express and airmail deliveries in New Zealand. And in 1919, Boeing and pilot Eddie Hubbard used a Boeing Model C to carry 60 letters from Vancouver, British Columbia, Canada, to Seattle, delivering the first international airmail.

During the same period, Douglas Aircraft developed its second airplane, the DT-1 and -2, in California, under contract with the U.S. Navy. In addition, 59 mail planes derived from the DT, including the Douglas M-2, which was one of the first aircraft to fly U.S. commercial airmail.

Boeing also produced the Model 40 mail plane in 1923 and, two years later, refurbished it as the Model 40A. In 1927, powered by a much lighter air-cooled engine, the Model 40A won the U.S. Post Office contract to deliver mail between San Francisco and Chicago.

Transition in the 1940s

"The Douglas DC-3, which made air travel popular and airline profits possible, is universally recognized as the greatest airplane of its time," notes Jim Edgar, cargo marketing director for Boeing. "As a rugged airframe, it really took air transportation and air cargo to a new level."

American Airlines was the first U.S. carrier, in 1942, to provide transcontinental air cargo service with its DC-3 Freighters.

The Douglas DC-3 was the most popular airplane in the sky. By 1939, an estimated 90 percent of worldwide passenger traffic was handled by DC-3s. It also saw extensive action as the C-47 Skytrain military transport during WWII.

The attributes of the DC-3 did not go unnoticed by one of Douglas's oldest customers -- the U.S. Army, which ordered a hybrid DC-2/DC-3, the C-39, the first serious effort by the Army to establish an airlift capability. The cargo variants of the DC-3 (including its C-47 military transport derivative) were highly capable airplanes, suitable for up to 6,000 pounds of cargo and large enough to hold a fully assembled ground vehicle. By the end of World War II, more than 10,000 had been built, and airlines kept the DC-3 operating in significant service numbers for quite a few years.

"The DC-3 made, in 1957, Lufthansa's first all-cargo flight from Germany to New York," said Jean-Peter Jansen, chairman of the Lufthansa Cargo Executive Board. "This opened a long and successful North Atlantic freight operation for us."

One of the first airplanes to fly a regularly scheduled around-the-world route was the Douglas DC-6, with its high performance, increased accommodation, greater payload and pressurized cabin. The all-cargo DC-6A entered service in 1949 and also found

success as personnel carriers, transports and medical evacuation airplanes. As we entered the new millennium, the DC-6 was still flying with smaller airlines around the world.

The Jet Age

The Douglas DC-6 was one of the first airplanes to fly a regularly scheduled around-the-world route. The larger, all-cargo DC-6A first flew Sept. 29, 1949.

"Both Boeing and Douglas found success in adapting the jet engine to air transport," said Edgar. "Boeing led the way, but Douglas acted quickly and readily courted carriers who were becoming more focused on freight to generate revenue."

The first jet application in cargo airplanes was the Boeing Dash-80, which featured few windows and no seats, but with two large cargo doors. As a result, in addition to the obvious success of its offspring -- the Boeing 707 -- in bringing jet-propelled travel to the world, the airplane also found fortune as a freighter and, eventually, as the leading tanker-transport, the KC-135.

"Productivity took a giant leap forward in the early sixties," according to Pete Diefenbach, manager, U.S. Sales & Marketing for Nippon Cargo Airlines. "My first flight in a jet aircraft was in the jump seat of a newly acquired Boeing 707F enroute from Idlewild (now Kennedy) Airport in New York, to Shannon in Ireland, and London. At the time, Pan Am was replacing older DC-6A Freighters with the Boeing 707 Freighters on the North Atlantic. The 707F was 75 percent faster and carried a payload more than twice that of the DC-6A, achieving a four-fold increase in productivity. Great flight, great airplane!"

Meanwhile, its major competition was the Douglas DC-8, which was designed with future power, payload and range increases in mind. This attribute ultimately resulted in the "stretch" DC-8 Freighter that still operates nearly 40 years after its commercial introduction.

Passenger to Freighter Conversions

As demand increased for jet-powered freighter aircraft, new cargo versions of several models were developed, including the DC-9, DC-10, 767, 757, 737 and MD-11. However, due in part to the acquisition cost of new airplanes, a number of operators instead chose to purchase passenger airplanes for modification to a freighter configuration.

The Douglas DC-8 helped inaugurate reliable jet travel to the world in the late 1950s. Although it was outsold by the Boeing 707, the Douglas team showed a particular interest in the cargo market. DC-8 cargo variants have proven to be very sturdy, with more than 150 DC-8 Freighters still in operation.

Although reliability, maintenance costs and other attributes of new airplanes attract a number of well-known operators, the cost of the pre-owned airplane, coupled with the conversion cost, provides an attractive, lower-cost alternative for many of the world's air freight carriers.

"Cargo brings additional life to airplane programs," notes Pierre Vellay, vice president, New Aircraft and Corporate Fleet Planning for Air France. "Many models, after starting life as a passenger airplane, then serving more dense tourist routes, have the capacity to be transformed into cargo aircraft for essentially a third life, bringing more value to the overall development program. Today's successful passenger airplanes will be tomorrow's successful freighters."

The Boeing 747

The 1970s brought new direction to the air cargo business. During the initial development of the Boeing 747, the prospect of a supersonic transport loomed large on the horizon. So large, in fact, that the company was not sure how long the 747 would be viable as a passenger airplane.

"To optimize its expected eventual primary role, it was decided that the design should incorporate capabilities to perform more efficiently as a freighter -- with such features as the high interior profile and nearly straight vertical walls," said Joe Sutter, senior sales counselor for Boeing Commercial Airplanes. "Since the first 747 Freighter entered revenue service with Lufthansa in 1972, the 747F has been a key element in an amazing 30-year expansion of air cargo capacity, introducing unprecedented efficiencies to the industry."

The Boeing 747-400ER (Extended Range) Freighter is the latest version of the 747 freighter family, providing the lowest operating cost and improving on what is already the most capable cargo transport in the industry. More than 250 747 Freighters are in operation throughout the world.

The portion of total freighter airplane capacity provided by the 747 alone (versus all other freighter airplane types) is staggering. Even today, nearly half of the world's freighter capacity is comprised of 747F models. It could be said that the 747 built the air cargo industry that we, as consumers, take for granted today.

"With the introduction of the Boeing 747, which we launched in 1972, the intercontinental air freight business got the tool that became the backbone of international trade," notes Lufthansa Cargo's Jansen. "This made the amazing globalization of the

world economy possible -- for high tech industries, it is a requirement of the worldwide supply chain."

M. S. Cho, managing vice president, Planning & Coordination of Korean Air agrees. "In 1974, Korean Air became the first transpacific operator of the Boeing 747-200 dedicated freighter, helping us gain world recognition," said Cho. "This aircraft, which opened a new era of aircraft economics, was a timely fit for customer needs for mass air transportation and contributed greatly to our cargo business expansion."

The key to this success is the versatility of the 747. With the ability to carry 113 metric tons up to 9200 kilometers nonstop, the 747-400F is the only Western-built freighter that has both side and nose doors, providing its operators with additional revenue earning potential.

"The development of the 747-400 production freighter during the last decade was a very significant milestone in the freight industry," says Ram Menen, director, cargo, for Emirates, serving the Middle East. "This is a situation where speed and reliability in a time-definite market were becoming increasingly critical in moving to just-in-time or zero inventory environments."

The nose door of the 747 production freighter can accommodate long, outsize loads, which generally command a premium rate for shipment. The side door can accommodate tall, outsize items and high-cube pallets. Sutter points out that the nose and side cargo door combination provides operators with a valuable tool -- the ability to earn $4 to 6 million per year in incremental revenue per airplane.

More than 250 747 Freighters are in service with nearly 40 operators carrying everything from cut flowers and fresh produce to boats, helicopters and road vehicles. This fleet includes all variants of the 747 Freighter (747-100SF, 747-200F, 747-200SF, 747-300SF and today's 747-400F and 747-400ER Freighter).

In addition, the passenger version of the 747 has had its own impact on the industry. Passenger airplane lower cargo holds, or bellies, carry a majority of the cargo that moves by air.

Geoff Bridges, chairman of Bridges Worldwide PLC, a global express consolidator, and a past president of The International Air Cargo Association, notes that the 747 passenger airplane had a "profound effect on the cargo distribution system. The 747 altered the capacity differential between what could be carried in belly holds and freighters. With a capacity exceeding 15 metric tons, the 747 passenger version could carry, by size, up to 90 percent of all cargo offered."

Last year, Boeing delivered the first 747-400ER Freighter, the latest enhancement to the product line, which features the top range, payload and speed of any freighter currently in service.

"The Boeing 747-400 Freighter greatly improved our operational efficiency, guaranteeing better profitability," notes Korean Air's Cho. "Thanks to the 747-400F, we have grown to be a world-leading cargo carrier. We now operate a fleet of 11 747-400Fs, including one 747-400ER Freighter, and hope to continue our business success with Boeing."

With the 747-400 Freighter as the flagship, world airlines in 2002 earned more than 90 percent of their air cargo revenues with Boeing freighters. The Boeing Freighter Fleet Forecast, contained in its World Air Cargo Forecast and Current Market Outlook documents, indicates that world air cargo traffic levels will triple over the next 20 years and that the jet freighter fleet will double in number. In addition, the average size freighter is expected to increase.

"Air cargo is just going to increase in importance as companies work to become more efficient," predicts Boeing's Sutter. "And I think we'll continue to see the 747 as the key transport in the air cargo industry for a long time. In addition to having revolutionized the industry, its influence and presence will be with us far into the future."

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