

## Air and Space this Week

### Item of the Week

## ***Birth of the Federal Aviation Administration***

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*Commercial aviation required Federal regulation and oversight from the earliest days, and a variety of offices handled aviation-related issues until commercial air traffic grew rapidly after WWII. On June 30, 1956, a horrendous mid-air collision between TWA Flight 2 (a Super Constellation with 70 aboard) and United Airlines Flight 718 (a DC-7 with 58 aboard), occurred over the Grand Canyon. All aboard both aircraft perished; debris can still be seen at their crash sites. This was the worst air disaster to date, and led directly to the creation of the Federal Aviation Administration.*

### **DAWN OF COMMERCIAL AVIATION**

Airplane technology exploded in the first 14 years after Kittyhawk. By the start of WWI, airplanes had improved to the point that both their military and commercial potential were widely recognized. However, no serious steps had been taken to provide the infrastructure to support anything more than a few *ad hoc* startups in either cargo or passenger flight.

WWI proved the value of aircraft for bombing, reconnaissance, ground attack, and fighting other aircraft. The War also produced a number of heroic figures and a number of capable flyers. But commercial operations were another matter.

Airplanes could travel far and fast, and their travel paths weren't confined to road or rails. If air transport were to be commercially viable, an infrastructure would be needed that would allow for servicing stations at appropriate places, navigational aids along routes that were to be established, and eventually, protect against accidents, especially at service stations and terminals. This would require coordination at the national level. It would also require a lot of public support.

Two events were conducted after WWI that captured the attention of the American public and showed the potential of air transport to increase the quality of life for the taxpaying public. The "Transcontinental Reliability and Endurance Test of 1919," actually an air race, and the "1921 Transcontinental Air Mail Flight" were successful in both objectives, as was related in the February 15, 2021 Item of the Week in the website's Archive.

In spite of the public interest in, and demonstrated value of, commercial aviation, there was not enough revenue being generated to fully realize the potential national value of commercial aviation. That changed in 1925 with the passage of the Air Mail Act of 1925, which provided enough business carrying the mail to allow new airline companies to have the steady income they needed to grow. Over the next decade, four companies became well established, and they and/or their successors would dominate much of the twentieth-century USA commercial airline market: United, Eastern, Transcontinental, and Western Air.

The increased number of flights taking place nationally by the mid-1920s strained the growth of the larger terminals to the point where some sort of traffic control had to be added for safety. Pilots had no way of communicating with the ground, particularly dangerous at increasingly-busy airfields. The first air traffic controllers (they weren't called that yet), were guys standing on the field, waving colored flags at approaching airplanes.

Waving flags at landing aircraft was not particularly safe. Crashes during air races and demonstration flights like those cited above did not give the potential air passenger a sense of comfort, retarding airline growth. Aviation companies realized that Federal action was needed to improve travel safety, especially in air traffic control and long-distance navigation, and they began lobbying Congress aggressively for such support.

The Air Commerce Act of 1926 was a landmark law. It tasked the Commerce Department to issue and enforce air traffic rules, license pilots, certify aircraft for safety, establish air routes, and build out a navigational system. The Aeronautics Branch of the Commerce Department was established to do these things. William P. MacCracken was its first director; he had served in WWI as a flight instructor and was a member of the board of governors of the National Aeronautic Association and a member of the National Advisory Committee for Aeronautics (NASA's pre-cursor). His Aeronautics Branch won the 1928 Collier Trophy for its contributions to the development of commercial aviation infrastructure.

Commercial aviation boomed, in large part by the steps taken at the Federal level. The responsibilities of the Aeronautics Branch expanded with the industry, becoming the Commerce Department's Bureau of Air Commerce in 1934. Airline traffic control was becoming a real problem, and the new Bureau's first important action was to get the major players in commercial air to establish air traffic control centers at major hubs (Newark, Cleveland, and Chicago). The Bureau would take over those centers two years later. There was still no radio communication between pilots and controllers on the ground in those days, but the control centers were linked by telephone with airline dispatchers, airway radio operators, and airport air traffic controllers (operated locally), and could keep track of flights from those data.

The "silver lining" related to air crashes is that they expose weaknesses in the system and foster both the public and political will to make the changes necessary to improve safety.

Beloved Notre Dame football coach Knute Rockne was killed in a 1931 crash due in part to degradation of airplane materials, energizing public awareness of aviation dangers and creating demands for more safety to be built into the system. Any governmental reluctance vanished four years later with the death of a U.S. Senator, Bronson Cutting of New Mexico, and a crash of

a DC-2. The country was distracted, of course, by the raging Great Depression, but FDR and Congress came through anyway with the Civil Aeronautics Act of 1938. The Act established the Civil Aeronautics Authority (independent of the Department of Commerce), and provided for an Air Safety Board that would investigate accidents and provide recommendations for safety improvements. The CAA could also regulate fares and determine carrier routes, to help ensure adequate revenue for aircraft maintenance and management of longer distance flights to improve safety.

The CAA changed in 1940, when FDR split it into two separate agencies with two different mandates. The Civil Aeronautics Administration would return to the Department of Commerce, and would be responsible for air traffic control, pilot and aircraft certification, and safety enforcement. The new Civil Aeronautics Board would remain independent, and take on safety rule-making, economic regulation, and accident investigation.

WWII greatly increased the need for domestic flights, requiring the CAA to take over control of airport towers and traffic control functions. Like WWI, WWII produced very rapid advances in airplane and communications technologies, and a very large number of pilots. The need for better systems for managing flights and controlling congested airspace was exacerbated with the development of commercial jet airliners, with their much-higher speeds.

### **A BAD DAY OVER THE CANYON**

Airline travel in the 1950s was significantly looser than it is today. Passengers smoked at will, and security was lax (the spate of hijackings that tightened things up came 10-20 years later). Airplanes flying routes in the eastern half of the U.S. pretty much stuck rigorously to their assigned corridor, but in the west, air traffic mid-route was sparser, and many pilots enjoyed showing off some of the spectacles of the West as a bonus to their customers. The Grand Canyon was particularly popular in that respect. Airliners flew under the guidance of ground control much of the way the two planes would fly, but there was a zone of “uncontrolled airspace” over the Colorado Plateau. There the pilots would be on their own, under “visual flight rules,” where the pilots were fully responsible for looking out for hazards.

On **June 30, 1956**, United Flight 718 left Chicago, bound for L.A. At almost the same time, TWA Flight 2 departed from L.A., heading for Kansas City. The TWA flight was a Super Constellation; the United flight was a DC-7. Both pilots were thinking about doing a little sight-seeing, in spite of there being a lot of scattered clouds along the way.

TWA’s pilot was assigned a cruising altitude of 19000 feet. He requested a higher route, 21000 feet, to help avoid the worst of the cloudiness ahead. The controller assigned to the flight declined permission, but agreed to a “1000 feet above the cloud cover” follow-up request, thinking the TWA would be much higher than 21000. The United flight was assigned to 21000 feet. Visual flight rules prevailed; neither plane was being observed by radar or otherwise guided from the ground. Both pilots were dodging clouds, trying to get the best Canyon views for their passenger’s viewing pleasure.

At 10:32 AM PST, the two planes collided.

The United plane's left wing and propeller took the tail off the TWA plane. The United plane's left wing outboard of #1 engine was removed, engine #1 was destroyed, and #2 was likely stopped. As a consequence, it went into an uncontrollable spin. Its pilot did manage a garbled radio call before slamming into the Chuar Butte (east of the National Park's eastern entrance, near the confluence of the Colorado and Little Colorado Rivers). The nature of the collision, and the way it hit the ground, left most of its fuselage intact, but hanging atop a large cliff. No doubt most of its passengers were relatively uninjured prior to impact. The tail and fuselage sections of the TWA flight landed separately amid a cloud of debris, closer to the Colorado River than the United wreckage. They were completely demolished.

All 126 passengers and crew aboard both aircraft were killed, the largest air disaster to date. Access was so difficult that a team of Swiss high-altitude rescue experts had to be brought in to recover evidence and human remains.

Post-crash analysis indicates that the United plane was in a descending right bank when the collision occurred, perhaps due to a last-minute attempt at evasive action. Its left engine chopped a series of gashes in the bottom of the TWA plane's fuselage. Both planes were pressurized, and the distribution of debris from the TWA plane is suggestive of explosive decompression.

The collision's number of deaths and the fact that both aircraft ended up in a major National Park generated intense public interest. The few airplane tour operators in business at that time were kept busy ferrying news photographers to the site, even though landing was not possible. Access to the crash sites was extremely difficult, even today it involves a 36-mile round-trip hike over very tough terrain, after getting special permission from the NPS.

Air travel had grown very quickly prior to the accident, tripling in volume in the decade following WWII. But the infrastructure and safety procedures had not kept pace with the growth and were totally inadequate, as illustrated so completely by the tragic collision over the Canyon.

The post-crash report noted that the pilots did not see each other until it was too late. Investigators listed several factors contributing the disaster, including: Intervening clouds, obstructing cockpit supports, distraction of tour guide behavior, and inadequate facilities and personnel for full air traffic control. This would be the last major airplane crash prior to the inclusion of cockpit recorders.

Today, much of the larger debris is still there, or somewhat downhill, but much of the smaller pieces have succumbed to the elements. The site is officially closed to the public, and was designated a National Historic Landmark in 2014.

## **THE BIRTH OF THE FEDERAL AVIATION AGENCY TO TODAY**

Pressure for better airline flight safety grew from both the public and the airline industry had been brewing for some time prior to the Grand Canyon accident, but that crash catalyzed

action, especially when the investigation showed how primitive air traffic control was in some key spots around the country. People were shocked to learn that both aircraft were “off airways,” independent from all assistance from the ground, in spite of having so many passengers under their responsibility. Congress responded by holding a series of hearings, upping the 1957 budget for the ATC, and passing the Federal Aviation Agency Act of 1958, which President Eisenhower signed into law. The Act created the **Federal Aviation Agency**, and transferred the functions of the CAA to it. USAF General Elwood “Pete” Quesada was the first FAA Administrator. You might remember him as one of the five aviators who flew the “Question Mark” on a series of aerial refueling missions in the late 1920’s, along with future Air Force leaders, Ira Eaker and Carl Spaatz.

General Quesada was highly decorated during the War, holding a number of important command and staff positions. He retired from the Air Force in 1951, and briefly held a number of positions in the aviation industry. He returned to aviation in 1951 as a special assistant to Eisenhower, and later was appointed as Chair of the Airways Modernization Board. The new FAA’s responsibilities were phased in, and by the end of 1958, it was fully operational.

NASA was also established in 1958, and it assumed the aeronautical research function of NACA.

Aviation was not the only form of transport under Federal safety purview, so in 1967, the accident investigation part of the Civil Aeronautics Board was transferred to the new National Transportation Safety Board, where it resides today. At the same time, the U.S. Department of Transportation was established, and the FAA became the Federal Aviation Administration, not Agency.

The only function left for the CAB was authority of airline routes and fares. The Airline Deregulation Act of 1978 phased that out, and the CAB was eliminated by the end of 1984.

Aerial hijackings started in 1961 and became increasingly-common as the decade wore on. The FAA responded by beefing up security, safety inspections, and hiring sky marshals. Additional responsibility over noise standards and pollution came in 1968. The terrorist attack of 9/11 prompted the creation of the Transportation Safety Agency (which as we know manages airfield and passenger security) and the Department of Homeland Security.

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### **A Bad Day Over the Canyon**

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### **The Birth of the Federal Aviation Agency to Today**

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