American Military Aviation in the 20th Century
Sample Pages

CHAPTER 3

Armageddon

World War II began in earnest for the United States with a devastating attack by Japanese naval aviators and ended with the Americans launching one of the most deadly air campaigns in history. From start to finish, aviation played a critical role in America's only truly global war. In the process, it achieved unprecedented levels of coordination between armies, navies, and air forces. Richard Overy observed that, along with Great Britain, the United States "embraced air power as one of the most important instruments for achieving victory. . . . [T]he Allies opted for the general use of air power in bombing, blockade, land support, and the naval war" while their enemies followed more limited air strategies.[1]

Although America's military aviation program had fallen well behind those of the other major belligerents in the late 1930s, it rapidly surpassed them in most areas after the United States entered the war in December, 1941. That broad application of air power depended on the wartime mobilization of the world's largest economy, the nation's strategic circumstances, and an unprecedented degree of collaboration between America's military, industrial, scientific, and political elites. It rested upon the strong technological and industrial foundation the armed forces had developed with the aviation industry during the interwar years. Yet, although critical to victory, air power proved not to be the military panacea that some had predicted before the nation went to war. The aerial Armageddon unleashed by Anglo-American air power caused so much

death and destruction that it called warfare's utility as a rational tool of statecraft into question while threatening the very existence of civilization.[2]

GLOBAL AIRLIFT

President Roosevelt's massive aircraft production program, technological progress, and military circumstances encouraged the U.S. armed forces to develop applications of air power to which they had devoted little or no resources in the past. Airlift was a prime example. As early as World War I, aircraft had been used to transport key personnel, vital supplies, and wounded troops. During the interwar years, army aviators had recognized that the geographic mobility of their operational flying units was a key dimension of air power. The extremely short range of military aircraft and the army's reliance on relatively slow surface transportation to deploy critical support units and their equipment, severely limited its mobility.

In the 1930s, the Army Air Corps had begun transporting supplies to its maintenance and repair depots around the United States in a handful of aircraft dedicated to that purpose. It experimented with using transports and bombers to support air units deployed on exercises. The Air Corps also conducted a few tests with parachutists during the interwar period while monitoring airborne warfare developments in Germany and the Soviet Union. However, it devoted few resources to either airlift or airborne operations before World War II. Because the British were extremely short of pilots, Air Corps aviators were pressed into service in November, 1940, to ferry American-built aircraft to overseas pickup points. The following May, the Air Corps established a ferrying command to run the operation and created an international airlift network for carrying key personnel, high-priority cargo, and diplomatic correspondence abroad. It functioned for about a year before General Arnold reorganized the army's airlift operations. He established the Troop Carrier Command in June, 1942, to conduct airborne operations and ad hoc airlift within operational theaters. Arnold formed a separate support organization, the Air Transport Command (ATC) that same month. It flew combat aircraft and key U.S. and Allied personnel all over the world. In the process, the ATC developed an international system of airfields, communications facilities, and weather stations that spanned six continents. The navy established the Naval Air Transport Service (NATS) in December, 1941, because it was convinced it could not rely upon the army to meet all of its global airlift needs.[3]

While the vast bulk of personnel, equipment, and supplies were moved from the United States to the combat theaters overseas by ship, airlift made enormously significant contributions to military operations. At its wartime height,

"an ATC cargo or combat plane crossed the Atlantic at an average rate of one every 13 minutes and traversed the wider Pacific Ocean once every 90 minutes. The personnel and equipment of civil airlines in the United States contributed significantly to ATC's success."[4] By the war's end, ATC's approximately 209,200 military and 104,600 civilian personnel operated more than thirty-seven hundred aircraft. Its naval counterpart consisted of 431 aircraft and approximately 26,100 military personnel. The ATC carried some 339,000 sick and wounded personnel. During the war, "the command's ferrying operations delivered 282,537 aircraft. Its air transport operations, both military and contract carriers, flew over 8.5 billion passenger- and 2.7 billion ton-miles."[5]

The nation's commercial airline industry supplied executives, pilots, navigators, and operations specialists who played critical roles in the wartime military airlift program. Arnold appointed American Airlines president C. R. Smith to serve as a general officer and as ATC's second in command. His role epitomized "the unlimited knowledge of airports, cargo handling, and meteorology, which only the airlines could contribute, [and which] made the difference between success and failure."[6] After the war, Smith and other airlift veterans drew heavily on their military experience and the global airlift network they had developed to establish American commercial carriers as the dominant force in international airline competition.[7]

MOBILIZING THE NATION

The Japanese attack on Pearl Harbor and Hitler's subsequent declaration of war on the United States removed the remaining political restraints on the mobilization of American resources for a long global war. The world's most powerful economy was fully tied to the Allied cause, and America quickly became the "Arsenal of Democracy." It would rather spend treasure than blood to field forces employing weapons that were qualitatively and quantitatively superior to those of its enemies. That approach worked. The United States spent $350 billion on its war effort—more than any of the other major powers expended—while suffering 405,399 war-related military deaths, the fewest of the major belligerents.

America placed the smallest proportion of its population in uniform of any of the major combatants. Some 16 million Americans served in the armed forces during the war. Separated geographically from the fighting fronts, it experienced trivial civilian casualties and virtually no damage to its economy due to enemy action. American industry lavishly supported the nation's own armed forces. It also played a major role in sustaining the Allies while building a huge merchant marine fleet. Unlike other major belligerents, the war actually strengthened the nation's economy.

By the end of 1941, America's aircraft industry was already outproducing every other major power except Great Britain. It manufactured 19,433 military planes that year. Germany, which had yet to fully mobilize its economy for a long war, produced 11,776 aircraft in 1941, while Japan turned out only 5,088. Great Britain produced 20,094.

Unlike Germany and Japan, where the military controlled industrial production decisions, the United States relied on cooperation between industrialists, military officers, and civilian government officials to shape economic mobilization.[8] Industry and the armed forces had experimented with various methods to expand aircraft production. To achieve Roosevelt's ambitious goals, aircraft makers converted from handcrafting to mass production. Factories began operating around the clock, seven days a week. Building on the momentum of European military orders beginning in the late 1930s, industry sold stock and borrowed money from government agencies for expansion. However, most of the wartime increase was achieved by direct government funding of new plants operated by the aircraft manufacturers, greater reliance on subcontractors outside the aircraft industry, and the eventual conversion of segments of the automobile industry to aviation production.

Both the aircraft and automobile industries were reluctant to embrace such a conversion. Aircraft manufacturers feared that Detroit, with its far larger financial resources, would steal their technology and swallow them up after the war. The automakers, who had experienced a boom in private car sales and government contracts in 1940–41 primarily due to increased defense spending, were reluctant to plunge into military aircraft production. The Roosevelt administration eventually forced a significant segment of the auto industry to convert to aircraft production through its control of critical raw materials.

America's enormous wartime aircraft production program required a huge expansion of the industry's labor force that, for the first time, tapped large numbers of women, minorities, and other unskilled workers. Aviation industry employment grew from sixty-three thousand in 1939 to a wartime peak of more than 2 million in 1944. The new workers had to be trained quickly and integrated into constantly changing production programs. To accommodate the huge influx of unskilled workers and mass production requirements, aircraft firms divided production responsibilities into simple repetitive tasks and adopted an unprecedented degree of mechanization.

World War II dramatically illustrated the importance of feedback from the combat theaters as well as intensified research and development that responded to rapidly changing combat needs and exploited technical opportunities for improved weapons performance. Beginning in 1940, the army and the navy sent observers to the United Kingdom to gather critical operational and techni-

cal data on air combat in Europe. Borrowing from the British example, modification centers were established to incorporate those and other changes in American aircraft. According to one estimate, 25 to 50 percent of the labor devoted to manufacturing military aircraft was performed at modification centers. It was 1944 before the services mastered block modifications that incorporated the latest design changes in aircraft as they were produced in the primary assembly plants.

American aircraft production accelerated in 1942, reaching a wartime peak of 96,318 in 1944. Germany, the most formidable member of the Axis, increased its aircraft production from 11,776 to just 39,807 during the same period. While it was producing astounding numbers of planes, the United States was also building progressively larger, more technically complex, and increasingly capable aircraft.

Aviation experts generally agreed that the overall weight of national airframe production offered a rough measure of qualitative progress except for jet aircraft. The nation's airframe production soared from 81.5 million pounds in 1941 to 951.6 million in 1944. The latter figure was larger than the combined 518 million pounds produced by Britain, Germany, and Japan. The Soviet Union claimed that it produced forty thousand aircraft in 1944 with a weight of 200 million pounds. Japan, Germany, the Soviet Union, and Great Britain together produced less than 700 million pounds, or less than two-thirds of U.S. output that year. From 1939, when it began its first major production expansion, until 1945, the United States built more than 324,000 military aircraft. The U.S. Army Air Forces received 231,000 of them; the navy, Marine Corps, and America's Allies got the rest.

In addition to outstripping the other major belligerents in volume of aircraft production, the United States rapidly eliminated the prewar aircraft quality gap. All the combat planes flown by the U.S. armed forces in World War II were either in production or under development before December 7, 1941. Many of them were being produced in quantity and had already entered operational service when the Japanese struck Pearl Harbor. Before the war ended, the army, navy, and Marine Corps fielded aircraft that were at least the equal of and often superior to every class of foreign military planes except jet fighters and bombers.[9]

The main aeronautical innovations undertaken by American industry during the war were gliders, helicopters, and jet engines. Nearly sixteen thousand gliders were produced for the U.S. military use during the conflict. Igor Sikorsky, a Russian émigré, produced the first practical helicopter, which was test-flown in April, 1939. The helicopter's wartime production run was limited to four hundred aircraft because of its poor performance. Although the Germans used them widely during the war, the helicopter did not come into its own in the

U.S. armed forces until after the conflict ended. The same was true of American jet engines, which were based on a British design transferred to America after General Arnold observed them during a trip to the United Kingdom in the spring of 1941. The first U.S. jet aircraft, the Bell XP-59A, flew in October, 1942, but its performance fell far short of expectations. The USAAF then asked Lockheed to build an airframe for another jet. It designed and produced the XP-80 in 143 days. After its first successful test flight in January, 1944, the aircraft was redesigned to accommodate a more powerful engine. Altogether, 243 P-80s were produced during World War II, but none flew combat missions during that conflict. However, it did see extensive combat during the Korean War.

Ryan Aeronautical Corporation built the navy's first jet-powered aircraft, the XFR-1, which made its maiden flight on June 25, 1944. Because of the requirement for short takeoffs from aircraft carriers, it was a composite aircraft with both a piston engine and a jet power plant. Its operational version, the FR-1, was fielded in March, 1945, but only sixty-six were produced before the contract was terminated. The FR-1 never saw combat and was withdrawn from service in 1947. The navy had several pure jet fighters under development during the war and one of them, the FD-1 Phantom, made its first flight before the war ended.[10]

The unprecedented wartime mobilization of Anglo-American science and engineering played a key role in achieving a balance between quantity and quality in aircraft and other weapons. The United States stressed applied research and development rather than basic research to improve existing equipment and help solve operational problems. The USAAF and the navy relied on industry, the National Advisory Committee on Aeronautics, and military laboratories to improve their aircraft, engines, and related support equipment during the war. They emphasized practical improvements that increased the range, firepower, and reliability of aircraft. Relatively little attention had been devoted to revolutionary new technologies like radar, jet propulsion, and atomic fusion by the American armed forces before the war.

To apply science and technology beyond the immediate needs of aircraft and their related equipment, the government turned to the National Academy of Sciences. When that body proved to be unresponsive to pressing military requirements, FDR established the National Defense Research Committee in June, 1940. Chaired by MIT's Vannevar Bush, it operated mainly through contracts with colleges, universities, and private laboratories. In January, 1941, Roosevelt incorporated it in the new Office of Scientific Research and Development (OSRD), which reported directly to him. Bush also won a critical early bureaucratic battle, getting some ten thousand scientists and engineers exempted from the draft. Under his leadership, OSRD played a key role in fostering the

successful development of such high-technology armaments as proximity fuses, computers, radar, and rockets during the war. The OSRD ensured that there was close collaboration between the military and civilian scientists and engineers in the development of wartime equipment.

The war stimulated especially important gains in electronics and rocketry. While the Germans and Americans had achieved significant progress in the development of radar since the mid-1930s, the British advanced even more rapidly while building an air defense network to blunt the growing threat posed by the Luftwaffe. As mentioned earlier, ground-based radar played a critical role for the RAF during the Battle of Britain in 1940. That same year, Henry Tizard led a British mission to the United States that persuaded the Americans to devote more of their resources to the development and production of improved radar systems. At about the same time, the British achieved a technical breakthrough that led to smaller and more effective airborne radar sets that improved navigational and targeting techniques and were used by RAF and USAAF aircraft in all of the combat theaters. In the Atlantic, radar played an important role in the defeat of German U-boats. On the other side of the world, radar-directed U.S. naval gunfire helped defeat the Japanese in several surface engagements.

The USAAF and the navy also successfully employed radio-guided bombs launched from aircraft as far as twenty miles away against key targets such as bridges and warships. Work on these weapons provided a useful foundation for the development of guided missiles after the war. The Allies also fielded solid-propellant rocket devices, including jet-assisted boosters to help aircraft on take-off. The Luftwaffe made even more successful use of such devices, employing guided bombs to sink a battleship and several smaller vessels.[11]

While industry and science were gearing up for war, the U.S. armed forces struggled to acquire and train personnel for the massive wartime expansion needed to conduct a global war against the Axis powers. The USAAF and naval aviation were much smaller and more selective than the established surface components of their parent services. Because aerial combat made much greater demands on individuals than surface combat, aircrew members required more extensive training. Since their duties were more technical, they were also taught aeronautics. Generally, only men who met high physical, intellectual, and educational standards were selected for flying duties.

The huge expansion of wartime aviation forced the USAAF and the navy to reorganize their training programs. Preflight training was initiated at civilian schools. In the USAAF, flight training had taken one year to complete before the war. That was compressed to twenty-seven weeks plus nine weeks of preflight training. Army Air Forces pilots continued to receive some three hundred

hours in the air before going into combat, three times what novice German aviators received after the United States entered the war. The training of naval aviators went through a similar compression, because the sea service was more interested in preparing them for combat than careers. The prewar requirement that each naval aviator qualify on every major type of aircraft in the navy's inventory was dropped in favor of specializing in one. When volunteering was eliminated in December, 1942, the military air arms had to compete with the other branches for personnel from the selective service system. Draftees and other enlisted men were allowed to apply for aviation training including flight school. Unlike the Germans and the Japanese, who kept veteran pilots flying until they were captured or killed, the Americans rotated experienced aviators stateside for training and other key support assignments once they had completed their prescribed combat tours.

Women also played an important supporting role in wartime U.S. military aviation. Female civilian volunteers began ferrying aircraft overseas for the USAAF in 1942. Later, they served as flight instructors. Altogether, 1,074 Women Airforce Service Pilots (WASP) flew during the war. While women did not serve as naval or marine aviators during the war, they were recruited for volunteer service in administrative and other support positions beginning in 1942 in order to release more men for combat duty. Unlike the WASPs, the navy's Women Accepted for Voluntary Emergency Service (WAVES), and their army counterparts in the Women's Army Auxiliary Corps (WAAC) eventually held military rank. The WAAC was redesignated the Women's Army Corps (WAC) in 1943. At their peak in May, 1945, 99,388 WACs were in uniform. They included twenty aircrew members and over seventeen hundred aircraft mechanics. Some twelve thousand WAVE officers and seventy-five thousand enlisted women served in the navy during the war. They were concentrated in support and training activities at shore installations in the continental United States. Women also served in the Coast Guard and Marine Corps during the war.[12]

Pressure on the Roosevelt administration from civil rights groups compelled the armed forces to increase the number of blacks on active duty and expand the enlisted occupational specialties open to them. However, they remained barred from flying duty in the navy and Marine Corps. In the USAAF, Negroes were limited to 6.1 percent of all personnel despite agreements by the armed forces to recruit 10.6 percent of their personnel from the black population. Although accepted for flight training in the army's air arm, they were restricted to segregated flying units in line with War Department policy. The mechanics and other support personnel in those organizations were also black. They were trained at a segregated installation: Tuskegee Field, Alabama. During the war, more than two thousand Negro pilots earned their pilot's wings. The USAAF

established eight segregated flying squadrons—four fighter and four medium bomber—during World War II. Although the bomber units did not see combat, the fighter squadrons compiled an outstanding record against the Germans in North Africa and Italy. The exploits of the Tuskegee airmen did not, however, obscure the fact that the vast majority of black servicemen in World War II were relegated to menial tasks by a highly segregated military establishment.[13]

STRATEGY AND SUBMARINES

While the United States was mobilizing its industrial, scientific, and human resources, American and British military leaders were planning how to defeat the Axis. They agreed before the United States declared war on Japan that Germany was the most dangerous enemy and had to be defeated while the Japanese were held at bay. The Americans were convinced that the best way to defeat Germany was to launch a cross-Channel invasion of Europe from Britain as soon as possible. However, before they could amass the forces and supplies to do that, they had to overcome several enormous challenges—not the least of which was that the attack on Pearl Harbor had convinced many Americans that the United States should first seek revenge on the Japanese.

To stem the rapid advance of Japanese forces across the Pacific, President Roosevelt had to devote enormous military resources to that theater early in the war, despite his agreement with British prime minister Winston Churchill on the Germany first strategy. More U.S. forces were dispatched to the Pacific than to Europe in 1942, delaying efforts to amass sufficient strength in Britain to invade the continent in 1943, as originally proposed by General Marshall. Churchill's fascination with a Mediterranean strategy and FDR's determination to have U.S. ground troops in action against the Germans before the congressional elections in 1942 led to campaigns in North Africa, Sicily, and Italy that devoured critical resources and delayed the day when the Allies faced the Germans head-on in western Europe.

General Arnold and other senior USAAF leaders hoped that a cross-Channel invasion would prove unnecessary. Inspired by prewar Air Corps doctrine and determined to make the strongest possible case for a separate postwar air force, they prepared to mount a strategic bombing campaign against German economic and military targets from Britain, which they hoped would drive Hitler out of the war before Allied soldiers were ready to invade France. Williamson Murray and Allan Millett concluded that, despite the fact the army airmen watched the first two years of the European war from the sidelines, "the Americans learned little from the experience of their Allies. There is no evidence that the additional time had any impact on the American airmen's conceptions of the