

The History of AEDC

Amid the ashes of World War II, American scientists surveying German technology were disturbed to find a sophisticated network of flight simulation test facilities. It was a wake-up call for the future – a realization that the United States was years behind the Germans in the process of developing aerospace technology.

Fortunately, the Germans had developed these technologies too late to turn the tide of the war.

However, the discovery of these facilities confirmed the suspicions of General of the Air Force Henry H. “Hap” Arnold, commanding general of the Army Air Forces during World War II. Arnold had been preoccupied with the role of technology, research and development of air power even before the war.

General Arnold’s Vision

When Hap Arnold visited England in the spring of 1941, he saw a British plane flying without a propeller. “Regardless of what anybody says, I want this for the U.S.,” he said.

But American production lines were geared up trying to maintain the flow of military hardware to the Allies, and they



General Henry “Hap” Arnold

had no quick way of restructuring their assembly lines for something as drastic as a new type of engine. Besides, Arnold didn’t want to interrupt assembly of material he would need in the future. However, this wasn’t enough to stop him when he had a hot project on his mind; he simply brought new people into the business.

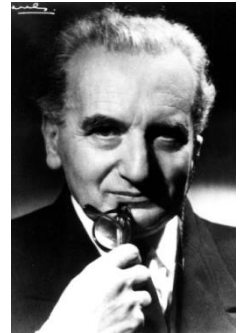
He talked General Electric into manufacturing the British Whittle engine and began looking for someone to build the airframe. Since Bell Aircraft had no major contracts in the works, he convinced Larry Bell to take on the job.

Around Oct. 1, 1942, the Bell XP-59A Airacomet made its first flight at Muroc Dry Lake (the current site of Edwards Air Force Base [AFB], California). The Army Air Corps had entered the jet age through Arnold’s initiative.

Arnold was quick to grasp any new development, but he also realized that the production of new hardware required the establishment of research and development organizations, as well as new and better testing facilities. The most revealing account of Arnold’s foresight is related by Dr. Theodore von Kármán in his autobiography, *“The Wind and Beyond.”* Arnold had appointed von Kármán to be his special adviser at Wright Field, Ohio, in 1940.

According to von Kármán, Arnold met him in a staff car at New York’s LaGuardia Airport in 1944 to discuss the future. Even at that time, the general knew the war was won, and his mind was already racing ahead in an attempt to determine future defense needs.

“General Arnold wasted no time in coming to the point,” von Kármán wrote. ‘We have won this war and I am no longer interested in it,’ he said. ‘I do not think we should spend time debating whether we obtained the victory by sheer power or by some qualitative superiority. Only one thing should concern us. What is the future of air power and aerial warfare? What is the bearing of the new inventions such as jet propulsion, rockets, radar and the other electronic devices?’



Dr. Theodore von Kármán

“I listened with fascination. I had always admired Arnold’s great vision, but I think then that I was more impressed than ever. This was September 1944. The war was not over; in fact, the Germans were to launch the Battle of the Bulge in December. Yet, Arnold was already casting his sights far beyond the war and realizing, as he always had, that the technical genius which could help find answers for him was not cooped up in military or civilian bureaucracy, but was to be found in universities and in the people at large.

“‘What do you want me to do, General?’ I said.

“‘I want you to come to the Pentagon and gather a group of scientists who will work out a blueprint for air research for the next 20, 30, perhaps 50 years.’”

The Scientific Advisory Group

Arnold asked von Kármán to form an advisory group, responsible only to the Air Corps Chief, to provide recommendations on the direction aviation research should take. Arnold formalized this request in a letter to the group dated Nov. 7, 1944. In the letter, he specified four major questions the group was to answer:

1. What assistance should we give or ask from our educational and commercial scientific organizations during peacetime?

2. Is the time approaching when all our scientists and their organizations must give a small portion of their time and resources to assist in avoiding future national peril and winning the next war?

3. What are the best methods of instituting the pilot production of required non-revenue equipment of no commercial value developed exclusively for the post-war period?

4. What proportion of available money should be allocated to research and development?

Von Kármán sent a task force from his newly formed Scientific Advisory Group (SAG) to take a closer look at German test facilities. In May 1945, they followed their analyses with a trip to Germany, again at Arnold's insistence, to find out what testing and research facilities had been in operation.

At Braunschweig, Munich, Goettingen, Kochel, Oetzal and other test centers in Germany they found facilities, rockets, aircraft and jet engines – all more advanced than what the Allies had even imagined. Dr. Frank Wattendorf was one of the American scientists who made the trek to Germany. He was responsible for surveying German wind tunnels and engine test facilities.



Dr. Frank Wattendorf

As one of von Kármán's associates during the survey of captured German test and research facilities, Wattendorf knew firsthand the sad state of aeronautical research in the U.S. The Germans had far outclassed all of the Allied nations in ground testing, but the capture of these testing facilities would give the U.S. a big boost. In fact, it was just the solution Wattendorf needed to a problem presented to him by Brig. Gen. Franklin O. Carroll, commander of Wright Field's engineering division.

A New Challenge

Carroll wasn't new to research and testing facilities. He graduated from the Massachusetts Institute of Technology (MIT) in 1921 – the first Air Service officer to be trained in aeronautical engineering. He had also commanded the engineering division at Wright Field for six years. In that capacity, he tried to persuade von Kármán to leave Washington, D.C., and work at Wright Field instead. Carroll was the kind of "doer" that Arnold liked to have around.

But he had one big headache at Wright Field – the limited space and available power in the Dayton area. New test facilities for testing jet engines would require more of both – more than he had available without

drastically reshaping existing facilities. When Wattendorf reported to Carroll as a research adviser, he inherited the General's headache – how to fit new facilities into the existing space and power limitations. The trip to Europe with von Kármán opened new possibilities.

The Trans-Atlantic Memo

With the survey of German facilities completed, Wattendorf went to Paris to write up his findings. While there, he received word that his father had died, and he left on emergency leave aboard a C-54. It would be a long flight, which gave him a perfect opportunity to summarize his findings.

Wattendorf's report of June 19, 1945, became known as the *Trans-Atlantic Memo* and was to become the baseline for establishing a "new Air Forces development center."

The memo, given to Carroll through Col. Paul H. Kemmer, became the basis of Carroll's presentation to Arnold's Air Staff.

In his presentation, Carroll advised the Air Staff of the advancements in ground testing that the Germans had made and outlined the deficiencies in America's wind tunnels.

He noted that "no facilities exist [in the U.S.] for the testing of turbojet compressors." Carroll also listed what he felt were the necessary facilities for U.S. research and development, suggesting that the Air Technical Service Command be charged with making a preliminary study "for the establishment of a new Army Air Force's (AAF) Applied Research and Development Center for Fluid Dynamics."

Maj. Gen. E. M. Powers, assistant chief of staff, materiel and services, gave Carroll the green light to proceed on July 31, 1945.

On Oct. 5, Kemmer, Carroll's deputy, formed a committee to do the study. The Kemmer Committee's initial report was completed on Dec. 18 for submittal to Arnold, five days before *Toward New Horizons* was published.

Both reports recommended using captured German test facilities in a new installation located near large sources of water and electric power. They anticipated power requirements at more than one million horsepower – too great to be handled at Wright Field. Using the German equipment would save almost eight years in facility design and construction. The Kemmer Committee Report also asked for \$300 million for purchase of the site and construction of housing, roads, utilities and the initial portion of the facility.

The report, "Proposed Air Engineering Development Center," was presented to the Air Staff Jan. 24, 1946. On March 21, Brig. Gen. H. I. Hodes, assistant chief of the War Department General Staff, authorized further planning on the proposed center, and Sverdrup & Parcel Inc. (S&P), a St. Louis engineering firm, was awarded a

\$1.5 million Army Air Forces contract to conduct the survey.

Site Selection Begins

S&P recommended, in order of preference: Moses Lake, Washington, Grand Wash Cliffs, Arizona, and the Tennessee Valley as possible sites for the new center. All three were considered acceptable because of power availability, low population density and room for growth.

Moses Lake was the first choice because the Air Force was closing a base there, and buildings and a runway were already in place. But the Air Force Chief of Staff didn't like the Moses Lake site because he felt it was too vulnerable to attack. Air Force Secretary Stuart Symington thereupon established a committee to look at the other choices.

A water dispute between Arizona and California knocked the Grand Wash Cliffs area out of contention, leaving only the Tennessee Valley to be considered. Huntsville, Alabama, emerged as the preferred site. The Tennessee River would provide ample water, and the Army was deactivating the Redstone Arsenal, which could be used to save time in constructing housing and offices. But when the Air Force started showing interest in Redstone, the Army quickly began to have second thoughts about closing it down.

It was then that Senator Kenneth McKellar of Tennessee made his big pitch: the state of Tennessee would donate Camp Forrest to the Air Force as the site for the Air Engineering Development Center. Not only that, but he could also help push legislation through Congress. The Air Force couldn't resist. On April 28, 1948, the former Army training camp was named as the site for the Air Force's new Air Engineering Development Center.

The Unitary Wind Tunnel and Air Engineering Development Act of 1949 set aside \$100 million for construction of the new facility. The Secretary of Defense approved construction of AEDC on March 3, 1950, and three weeks later the Air Force awarded its first construction contract: cranes for the Engine Test Facility (ETF). The Army Corps of Engineers, which established a district office in Tullahoma on Nov. 14, 1949, awarded their first construction contract for a perimeter fence and an access road. This work began on June 2, 1950. Three weeks later the Corps awarded a contract to dam the Elk River for a reservoir to provide cooling water for the facilities.

Symington directed on March 29, 1950, that AEDC would be operated by a corporation under contract to the Air Force. Several meetings in early April between Air Force personnel and S&P established the Arnold Research Organization (ARO), Inc., a Tennessee corporation, for managing and operating AEDC on a cost-plus-fixed-fee contract. On June 29, the contract was

signed in the amount of \$694,174.50 to cover the first 15 months of operation.

Part of the government's rationale was to maintain a stable work force that would accumulate a volume of experience with the test facilities that were to be built. That idea would make the center a model of outsourcing for the Department of Defense (DoD) by the 1990s.

AEDC's Dedication

On June 25, 1951, a year after General Arnold's death, President Harry S Truman dedicated the Air Engineering Development Center in Arnold's memory, naming it the Arnold Engineering Development Center.

"I am happy to dedicate this center to his memory and to name it the 'Arnold Engineering Development Center,'" the President said.

"The scientists who work here will explore what lies on the other side of the speed of sound. This is part of our effort to make our air power the best in the world and to keep it the best in the world."



President Harry S. Truman's
AEDC Dedication Speech

Compiled from Beyond the Speed of Sound
<https://www.arnold.af.mil/Portals/49/documents/AEDC-100322-069.pdf>