

## **THE UNTOLD STORY OF LANGLEY AND A FAMOUS JAPANESE ZERO**

Langley retiree Joe Chambers is currently preparing a new NASA book on the history of the legendary Langley Full-Scale Tunnel (FST) which will include a synopsis of important projects that were conducted in the facility during its 78-year lifetime. Not surprisingly, while interviewing long-retired engineers, technicians, and administrative personnel who worked in the tunnel Joe has uncovered several previously unknown activities of significant historical interest and is seeking additional comments and material related to the subjects.

Recently, a previously undocumented test in the FST of the first Japanese Mitsubishi Zero fighter aircraft captured by the U.S. during World War II has been revealed and Joe is interested in inputs from active and retired viewers regarding more details of the top-secret test which will be discussed in the new book tentatively titled "Cave of the Winds: The Remarkable Story of the Langley Full-Scale Tunnel." Joe has found no previous documentation or knowledge of the Zero test in the FST prior to his current effort and would be extremely interested in comments and inputs.

The details of the capture of the Zero begin in the summer of 1942 as described by Alaskan writer Jim Rearden (reference 1):

On June 3 and 4, 1942, Japanese warplanes attacked the American military base at Dutch Harbor in Alaska's Aleutian archipelago. The attack on Alaska was intended to draw part of the U.S. fleet north from Pearl Harbor, away from Midway Island, where the Japanese were setting a trap.

During the attack on June 4, Japanese bombers blasted the Dutch Harbor facility while eleven Zeros strafed ground targets. Flight Petty Officer Tadayoshi Koga piloted one of the Zeros having a serial number of 4593. During the attack Koga's Zero was hit by ground fire and one of the bullets severed the return oil line between the oil cooler and the engine. As the engine continued to run, it pumped oil from the broken line.

Other Zeros accompanied Koga as he flew his oil-spewing airplane to a designated emergency landing site on Akutan Island, 25 miles away. A Japanese submarine was positioned nearby to pick up downed pilots. Unknown to the Japanese, the landing site was a bog with knee-high grass concealing water and mud. After Koga lowered his wheels and flaps and landed, his main wheels dug in, the Zero flipped onto its back and Koga was killed.

The wrecked Zero lay in the bog for more than a month, unseen by U.S. patrol planes and offshore ships. However, on July 10 the crew of a U.S. Navy PBY Catalina amphibian returning from overnight patrol spotted the Zero. Inspections of the wreck by ground troops indicated that the aircraft was salvageable, resulting in intense activity to bring the priceless war prize back to the U.S. for analysis. Prior to this event, the Zero was regarded as a formidable foe that was

virtually unbeatable in air combat and the delivery of a flyable Zero would provide valuable information on the characteristics of the aircraft and proper tactics for fighting it.

Koga's rebuilt Zero was the first flyable Zero fighter acquired and tested in the United States. Only two months after it was found, the aircraft had been shipped 2,800 miles to North Island Naval Air Station in San Diego, repaired, and was flying in simulated dogfights against frontline U.S. fighters to determine tactics to be used against the Zero in the Pacific theater. There is no evidence that the Japanese ever knew that the U.S. had salvaged Koga's plane.

During September and October American pilots flew in and against the Zero and learned that:

“The Zero had superior maneuverability only at the lower speeds used in dogfighting, with short turning radius and excellent aileron control at very low speeds. However, immediately apparent was the fact that the ailerons froze up at speeds above two hundred knots, so that rolling maneuvers at those speeds were slow and required much force on the control stick. It rolled to the left much easier than to the right. Also, its engine would cut out under negative acceleration (as when nosing into a dive) due to its float-type carburetor.

“We now had an answer for our pilots who were unable to escape a pursuing Zero. We told them to go into a vertical power dive, using negative acceleration, if possible, to open the range quickly and gain advantageous speed while the Zero's engine was stopped. At about two hundred knots, we instructed them to roll hard right before the Zero pilot could get his sights lined up.”

Koga's Zero was added to the U.S. Navy inventory and assigned its Mitsubishi serial number of 4593. The Japanese grey camouflage color and “meatball” insignia were replaced with the U.S. Navy blue/grey upper and lower colors and U.S. star insignia. During the end of 1942 it was flown against the best American fighters of the time—the P-38 Lockheed Lightning, the P-39 Bell Airacobra, the P-51 North American Mustang, the F4F-4 Grumman Wildcat, and the F4U Chance Vought Corsair. For each U.S. aircraft type, specific tactics were developed and quickly transmitted to the Pacific squadrons where they were quickly used to advantage.



Japanese Mitsubishi Zero on the NACA Langley Memorial Aeronautical flight line on March 8, 1943. The aircraft had been repainted in U.S. Navy colors and insignia but retained its Japanese serial number “4593” barely visible on the vertical tail. Koga’s Zero was unique in having a short stubby wooden radio mast. Aircraft is shown after installation of NACA wing-tip boom for flight tests at Anacostia NAS.

In early 1943 the Zero was flown to the Navy’s Anacostia Naval Air Station in Washington DC for more detailed Navy evaluation flights. The Navy recognized the expertise of the NACA Langley Memorial Aeronautical Laboratory in the field of flight instrumentation and requested support from Langley in outfitting the aircraft for flight tests. In response, the Zero was flown from Anacostia to Langley for installation of the instrumentation. Langley aircraft flight records indicate that the aircraft arrived at the NACA flight hangar in the East Area of Langley Field about noon on Friday March 5, 1943. The Zero’s presence at Langley is well documented in several books (e.g., reference 2) and photos of the aircraft are posted on the NASA LISAR multimedia site (reference 3). However, the secret activities of the next few days were only recently revealed after 67 years during interviews with retirees Joe Block, Phil Walker, and Ken Pierpont—who actually participated in the project (reference 4).

According to Pierpont, “While inspecting the aircraft along with 30 high-level Army, Navy, and NACA officials, Abe Silverstein (Head of the Full-Scale Tunnel) and Elton Miller (Chief of Aerodynamics) approached the Navy with a request to “borrow the aircraft” for aerodynamic

tests in the Full-Scale Tunnel over the weekend under tight security and to return it to the flight line as quickly as possible.” The NACA request was approved, and after sundown the airplane was covered and towed a few blocks to the FST where Friday night was spent mounting the aircraft to the struts—including top-priority fabrication of special hardware in the East Shop.

Pierpont, who was a member of the test team continues: “Wind-on tests commenced in the FST about noon on Saturday (March 6). The intense scope of testing (all power off) included wake surveys to determine the drag of aircraft components, tunnel scale measurements of lift, drag, control effectiveness, as well as sideslip tests. In addition, comparative drag tests were made for the aircraft in the “as received” condition and in a faired and puttied “clean” configuration. Testing continued all Saturday night and Sunday (March 7) until darkness fell, when the aircraft was removed from the test section, covered and moved back to the flight line to the same position it had occupied upon arrival.”

The security measures taken during the tests were remarkable. Spies were very active in the Peninsula area at that time, and the tests were conducted under strict need-to-know guidelines. Even the FST wind-tunnel test log was modified to ensure that the test was not acknowledged, and no known photographs were taken during the program. No NACA reports were written regarding the test or the results. The data measured in the tests were retained by Abe Silverstein and it is unknown whether he shared copies with other organizations. It is also unknown as to whether military personnel witnessed the tunnel tests. Research is underway to address these issues.

The Zero tests in the Full-Scale Tunnel were sandwiched between tunnel investigations of two famous U.S. Navy WWII aircraft—the Curtiss SB2C-1 “Helldiver” and the Grumman F6F-3 “Hellcat.” After the Zero was tested the Hellcat was mounted for tests, and dates of NACA identification numbers of the photos taken during that test were modified to cover the Zero activity.

On Monday (March 8) NACA photographers took pictures of the aircraft on the flight line as instrumentation was underway for the upcoming flight test at Anacostia. These photos are available in the Langley photo archives and the instrumentation task has been mentioned by several authors. The aircraft departed for Anacostia on Thursday (March 11) where a Navy pilot conducted flights to evaluate handling qualities including in-flight measurements of flight parameters. W. Hewitt Phillips of Langley analyzed the data and authored a NACA memo on May 5, 1943 (reference 5).

A few months after the Anacostia tests Koga’s Zero was displayed at an aviation anniversary celebration on May 15, 1943, at the Washington National Airport where it was displayed along with U.S. aircraft. The aircraft was used for further pilot training in 1944 including extensive flights by the Army Air Forces. This famous aircraft’s life ended in February 1945 when a Navy



Koga's Zero on public display at the Washington National Airport on May 15, 1943 during a celebration of the 25<sup>th</sup> anniversary of air mail service. Note the blue/grey color scheme applied by the U.S. Navy. (Photo by National Geographic Magazine September, 1943 issue).

pilot was taxiing Zero 4593 at the San Diego Naval Air Station, where it was being used to train pilots bound for the Pacific war zone. Another pilot in a Navy SB2C Helldiver overran it and chopped it up from tail to cockpit. The pilot survived, but the Zero was relegated to the trash heap.

The capture and analysis of the performance of Koga's Zero is regarded today by many Japanese historians as a major turning point in the war. They point out that many U.S. pilots vividly remembered briefings and recommended tactics for fighting the Zero learned from the captured Zero and several owed their lives to the information. Some of the historians believe that the capture of the Zero was as devastating to the Japanese war effort as the U.S. victory during the battle for Midway Island.

## REFERENCES

1. Jim Rearden, *Koga's Zero: The Fighter That Changed World War II* (Pictorial Histories Publishing Company, 1996)
2. James Hansen, *Engineer in Charge* NASA SP-4305, 1986
3. LISAR images EL-1997-00167 and EL-2000-00223
4. Interview of A. Kenneth Pierpont by Joseph Chambers, Grafton, VA, October 15, 2010.

5. W. Hewitt Phillips, *Journey in Aeronautical Research: A Career at NASA Langley Research Center* NASA Monographs in Aerospace History Number 12 (November 1998) pp. 63-64.

