# 418 FLIGHT TEST SQUADRON


**MISSION**

418 Flight Test Squadron mission is to conduct developmental flight test and support tanker, transport, trainer and special operations aircraft. Consisting of over 600 members, the 418 maintains a permanent presence in five states. The unit operates C-5, KC-10, C-12, C-17, EC-18, C-130, KC-135, HH-60, JPATS, T-39 and CV-22 test and support aircraft, as well as the Air Force's test parachute program. Affectionately known as Global Chaos Combined Test Force, the past year witnessed multiple unit mergers, standup of a Reserve Associate squadron, activation/deactivation of several detachments, and the drawdown of the Advanced Range Instrumentation Aircraft mission after successful years. In addition to flight test, tl conduct aerial refueling certification and opera testbed aircraft supporting research, engineering ris reduction, and electronic combat support.

The 418 has three detachments: Detachment 1, Marietta, Georgia, provides support for the C-5 program. Detachment 2, Kirtland AFB, NM operates Big Crow aircraft as electronic warfare laboratories. Detachment 3, Nellis AFB, Nevada provides developmental flight test support to HH-60G Pave Low program.

**LINEAGE**

28 Reconnaissance Squadron (Heavy) constituted, 28 Jan 1942
Redesignated 418 Bombardment Squadron (Heavy), 22 Apr 1942
Activated, 1 Jun 1942
Redesignated 418 Bombardment Squadron, Heavy, 20 Aug 1943
Inactivated, 19 Dec 1945
Redesignated 418 Bombardment Squadron, Very Heavy, 13 May 1947

Activated in the Reserve, 29 May 1947
Inactivated, 27 Jun 1949
Redesignated 418 Bombardment Squadron, Medium, 1 Dec 1958
Activated, 1 Mar 1959
Discontinued and inactivated, 1 Jan 1962

6518 Test Squadron designated and activated, 10 Mar 1989

418 Bombardment Squadron, Medium consolidated with 6518 Test Squadron, 1 Oct 1992

Redesignated 418 Test Squadron, 2 Oct 1992
Redesignated 418 Flight Test Squadron, 1 Mar 1994

**STATIONS**
Orlando AB, FL, 1 Jun 1942
Barksdale Field, LA, 18 Jun 1942
Pendleton Field, OR, 26 Jun 1942
Gowen Field, ID, 28 Aug 1942
Walla Walla, WA, 31 Oct 1942
Wendover Field, UT, 30 Nov 1942
Sioux City AAB, IA, 6 Jan 1943
Kearney AAFld, NE, 4 Feb–1 May 1943
Thorpe Abbots, England, 2 Jun 1943–11 Dec 1945
Camp Kilmer, NJ, 17–19 Dec 1945
Miami AAFld, FL, 29 May 1947–27 Jun 1949
Pease AFB, NH, 1 Mar 1959–1 Jan 1962
Edwards AFB, CA, 10 Mar 1989

**ASSIGNMENTS**
100 Bombardment Group, 1 Jun 1942–19 Dec 1945
100 Bombardment Group, 29 May 1947–27 Jun 1949
100 Bombardment Wing, 1 Mar 1959–1 Jan 1962
6510 (later, 412) Test Wing, 10 Mar 1989
412 Operations Group, 1 Oct 1993

**WEAPON SYSTEMS**
B–17, 1942–1945
Unkn, 1947–1949
B–47, 1959–1961
MC–130, 1989
AC–130, 1989

**COMMANDERS**
Lt Col Jeffrey S. Smith, 2001

**HONORS**
**Service Streamers**

**Campaign Streamers**
World War II
Air Offensive, Europe
Normandy
Northern France
Rhineland
Ardennes-Alsace
Central Europe
Air Combat, EAME Theater

**Armed Forces Expeditionary Streamers**

**Decorations**
Distinguished Unit Citations
Germany, 17 Aug 1943
Berlin, Germany, 4, 6, 8 Mar 1944

Air Force Outstanding Unit Award
1 Jan 2013-31 Dec 2013

French Croix de Guerre with Palm
25 Jun–31 Dec 1944

**EMBLEM**

418 Bombardment Squadron emblem approved, 4 Oct 1943


418 Bombardment Squadron, Heavy emblem approved, 9 Jun 1961


418 Flight Test Squadron emblem: Azure, an orle Or overall and throughout the cipher "X" of the like surmounted by a triangle Gules upper point bendwise and bebruised by a Bengal tiger head erased close proper, all within a diminished bordure Yellow. (Approved, 19 May 1994)

**MOTTO**
Tigers

**OPERATIONS**
Combat in ETO, 25 Jun 1943–20 Apr 1945. Strategic bombardment operations, Mar 1959–Oct 1961.

Tested the MC–130H and AC–130U, 1989–present.

Lightweight Parachute Tested for AC-130 Crews The Air Force tested a Low Profile Parachute that could serve as a lightweight replacement to the bulkier BA-22 parachute that AC-130 aircrew members currently use, according to a release from Edwards AFB, Calif. In April, Air Force testers finished evaluations of the low-cost, commercially available LPP, which weighs about 20 pounds-roughly half of the BA-22, states Edwards' May 2 release. Prior to actual jumps, the Air Force conducted wind tunnel tests and then fitted dummies with the LPP and dropped them from a World War II B-25 bomber and a SC.7 Skyvan, according to the release.

Then came some 55 test sorties with the jumpers. "Some minor malfunctions, such as line twists, were experienced, not to mention some hard openings at high speeds and some hard landings," said TSgt. Joe Monreal, 418 Flight Test Squadron noncommissioned officer in charge of the test program and one of the test jumpers. "But, in the end, we all feel that this new system will help AC-130 aircrew members . . . accomplish the mission more effectively and safely." 2013

The 412th Flight Test Squadron at Edwards AFB, Calif., officially inactivated in a ceremony there earlier this month, bringing an end to the unit's combined senior leader airlift and test mission. The squadron's single modified KC-135 "Speckled Trout" aircraft will shift solely to the test support role with Edwards' 418 FLTS. "It's the only KC-135 on base that's receiver capable, so we're planning on using it as part of the testing with the KC-46," said former 412th FLTS Commander Lt. Col. Michael Davis. Gen. Curtis LeMay directed the modification of a KC-135 to transport senior Air Force leaders in 1957 and "the Trout in its various forms and squadrons has transported 15 Chiefs of Staff over the years," Col. Rodney Todaro, 412th Operations Group commander said. The 412th FLTS stood up Jan. 1, 1994. 2015

Two C-17s drop-launched a pair of ballistic target missiles near Wake Island in the Pacific Ocean, supporting a recent Missile Defense Agency test. "High-altitude, heavy weight airdrop is something we're doing a lot of here at Edwards, supporting not only MDA, but NASA with the Orion capsule drops that we've been doing," 418 Flight Test Squadron pilot Capt. Stephen Koether from Edwards AFB, Calif. Edwards pilots initially deployed a Short-Range Air-Launch Target (SRALT) from the C-17's cargo bay, which was detected, tracked, and intercepted by a ground-launched Terminal High Altitude Area Defense (THAAD) missile. The second Globemaster launched a larger Extended Medium-Range Ballistic Missile (EMRBM) minutes later, testing defensive systems' ability to discriminate targets through debris from the first shot. The THAAD system on Wake successfully intercepted the first shot, and although the AEGIS destroyer USS John Paul Jones was able to track the EMRBM, its SM-3 missile failed to engage. The Oct. 31 test evaluated both land- and sea-based US missile defense. MDA is investigating the missile interceptor failure. 2015

Testers at Edwards AFB, Calif., have nearly completed certifying the first foreign tanker-Italy's KC-767-to refuel the F-35 in flight. "This is No. 1 in a long line of foreign tankers that will be tested" for compatibility with several Air Force aircraft, 418 Flight Test Squadron Program Manager Sawn Sandland. "We have a whole other coalition tanker effort that's going to certify additional receivers with the Italian, Australian, and United Arab Emirates tanker, which we plan to start within the next year," he added. The 418 FLTS and its Italian counterparts launched testing at Edwards in early July and "require only three more test sorties to complete the program," added F-35 experimental test pilot Vince Caterina, with the 461st Flight Test Squadron. Testing of the Royal Australian Air Force's KC-30 will immediately follow Italian certification, and efforts on the UAE's A330 multi-role tanker transport will kick off within the next year. The first Italian-assembled F-35 flew for the first time from Cameri AB, Italy, on Sept. 7. 2015

When it comes to aviation fuel, the C-17 Globemaster III utilization rate makes it stand out as the largest consumer in the Air Force. This is why a team at the 418 Flight Test Squadron has been working for the past year on the Air Force Research Laboratory's C-17 Drag Reduction Program

The 418 FLTS is currently wrapping up testing with the final three phases – out of five total – using 3-D printed parts by Lockheed Martin. The Lockheed Martin installations use a combination of laser positioning for locating and sealant to bond the parts to the aircraft. The laser positioning allowed the team to skip the design and build of installation tooling that would only be used during flight testing according to test managers. The bonding simplifies the installation and more importantly leaves the aircraft in its pretest condition after removal at the end of the flight test program.

The squadron is testing parts in various configurations to see if the external structure modifications can improve airflow around the airplane. During computational fluid dynamics simulations and wind tunnel tests, areas on the C-17 were identified that showed excessive drag and were targeted for optimization. In the spring, the first two phases of testing were completed. Those tests were conducted with two different configurations of parts made by Vortex Control Technologies. The placement of the parts and the different configurations hope to reduce drag and improve fuel efficiency. "A 1 percent improvement in drag reduction will result in 7.1 million gallons of fuel reduction per year," said Bogdan Wozniak, the 418 FLTS, project engineer. "One to 2 percent drag reduction could translate to $24-48 million dollars in fuel savings per year."

Currently, the team is preparing to test the fifth and final configuration using the Lockheed Martin parts. They have recently tested the third and fourth phases, which consisted of placing 12 microvanes toward the aft of the C-17 for phase three and then adding three fairings to each wing for phase four. The fifth phase will keep the 12 microvanes and six total fairings with the addition of two fairings on each winglet. At least three flight tests are conducted with each phase – a flying qualities regression flight and cruise performance flights at .74 and .77 Mach. The team will also conduct airdrop tests in December to ensure the microvanes do not interfere with the C-17's airdrop mission. The flights are always the same to make certain the data collected in each phase can be accurately compared to each other. The 418 FLTS is also using the same C-17 for all the flights. The plane is on loan from Joint Base Lewis-McChord, Washington, along with four maintenance Airmen.

"Aircraft and atmospheric data are collected with the aircraft flying straight and level at a constant airspeed and constant altitude with low winds and low air turbulence at 90 degrees to the wind to mitigate head- and tailwind effects. Each flight at a constant airspeed and altitude requires eight hours to acquire sufficient data for the analysis," Wozniak said. Flight data is collected and put into a computer program developed by Boeing that puts out parameters for lift and drag and then compares everything to see how much drag is reduced. The flight tests here are the final stage of AFRL's program following computational fluid dynamics simulations and wind tunnel tests with a scale model. The data collected will be sent to AFRL at Wright-Patterson Air Force Base, Ohio, to see if any of the modifications increase streamlining and reduce drag. Then, Air Force leaders will ultimately decide whether or not any of the modifications should be implemented throughout the C-17 fleet. The test team at Edwards AFB

consists of 412th Test Wing personnel, Lockheed Martin and Boeing contractors along with representatives from Canada, the U.K. and Australia, who have a stake in the program. The final flight for the C-17 Drag Reduction Program is expected to happen in December.

The 418 Flight Test Squadron and Global Reach Combined Test Force had a busy and successful 2018. The squadron oversaw “revolutionary” flight control upgrades for C-17 Globemaster IIIs in landing and air refueling modes; the final parachute certification air drops of NASA's new Orion space capsule; air launch of ballistic missiles to bolster the Missile Defense Agency's defensive shield and worldwide testing of a new avionics suite for the C-5 Galaxy.

The 418 FLTS’s continued testing on the KC-46A Pegasus program informed the decision for the Air Force officially accepting the new generation tanker Jan. 10, marking a major milestone for the next generation tanker and allowing Airmen to begin operational testing and flight training. “2018 was a banner year for the 418 (FLTS) and our busiest yet,” said Lt. Col. Paul Calhoun, 418 FLTS commander. “We are looking forward to transitioning to more local Phase III KC-46 testing this year as we continue to support worldwide test efforts for C-5 and MDA.”

As it turned out, 2018 ended on a rather serendipitous note for the Global Reach CTF. “In a moment of perfect harmony, we discovered that, quite by accident, the 418 (FLTS) flew exactly 418 sorties in 2018 - a year that will go down in 418 history as one of our most prolific ever,” said Calhoun. It was noted that KC-46 sorties are tracked separately and not part of the 418. Now, the squadron will begin Phase III testing for the KC-46, which is a transition from Boeing-led testing out of Seattle to Air Force-led testing at Edwards Air Force Base.

“Phase III is a 15-month period where the Air Force will certify fleet aircraft to refuel or be refueled by the KC-46,” Calhoun said. “There is also a data collection effort for (simulation) certification during this time frame. This will support initial operational testing by providing the (operational testing) community with needed certified aerial refueling pairs.” In the past couple of years, when the KC-46 came to Edwards AFB for a few months at a time, Phase II testing was led by Boeing. Calhoun said Phase III is the final phase of KC-46 developmental testing and the tanker will be a regular fixture here.

“Depending on the scope of the follow-on flight test program for continuing KC-46 upgrades after initial developmental testing, we may have a KC-46 at Edwards (AFB) from now on for years to come. There will be a second KC-46 arriving the week of Jan. 21 to further augment the Phase III testing effort,” Calhoun said. Calhoun added that the KC-46 test team has overcome incredible schedule and technical challenges enabling the Air Force to accept delivery of the first KC-46 this month. “Though the level of effort alone was laudable, I am most proud of that team for their rigorous analysis which enabled them to clearly articulate significant technical issues to our warfighter customer,” said Calhoun. “Due to their strenuous efforts, the Air Force and Boeing are on a path to correct all significant deficiencies and ensure the warfighter has the tools necessary to project American power for decades to come.”

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Sources
Air Force Historical Research Agency, U.S. Air Force, Maxwell AFB, Alabama.
The Institute of Heraldry. U.S. Army. Fort Belvoir, Virginia.
Air Force News. Air Force Public Affairs Agency.
*Air Force Flight Test Center, Edwards Air Force Base, CA, 50th Anniversary. 1951-2001.*