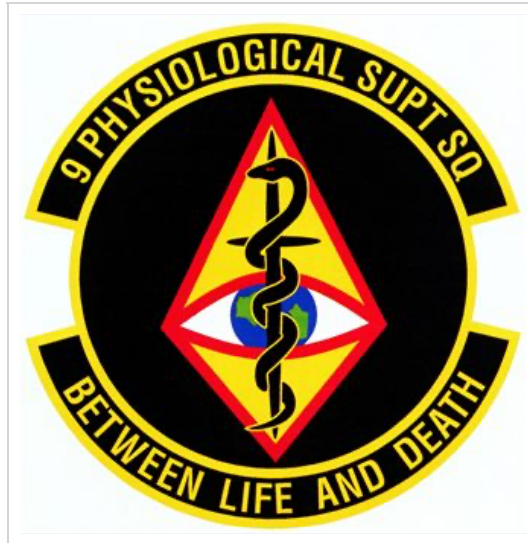


## 9 PHYSIOLOGICAL SUPPORT SQUADRON



### MISSION

The 9 Physiological Support Squadron (9 PSPTS) provides specialized support and training for U-2 aviators in support of worldwide intelligence, surveillance, and reconnaissance combat missions. The squadron supports more than 6,400 man-days per year in temporary duty at three Forward Operating Locations and en-route recovery bases. A \$90-million operation, the squadron houses the USAF Full Pressure Suit Depot, maintenance and supply center, supporting all USAF and NASA U-2, ER-2 and WB-57 high-altitude aircraft. The squadron serves as liaison with the Air Force Materiel Command U-2 Program Office for procurement of life-support equipment and the ACC Command Surgeon Office providing consultant activities for high-altitude physiology, human factors, radiation and nutrition. Additionally, the squadron serves as the USAF Western Region Physiological Training Center, providing life support and physiological training for DoD and NASA aircrew. The squadron consists of five staff functions: Commander's Support, Operations, Aircrew Training, Logistics, and Task Training/Certification.

### LINEAGE

9 Altitude Chamber Indoctrination Flight activated, 21 Jan 1953

Activated, 10 Mar 1953

Redesignated 9 Physiological Training Flight, 25 Apr 1957

Inactivated, 16 Jan 1959

9 Training Squadron constituted, 26 Aug 1994

Activated, 1 Sep 1994

9 Physiological Training Flight and 9 Training Squadron consolidated, 1 Dec 1995

Redesignated 9 Physiological Support Squadron, 15 Dec 1995

### STATIONS

Smoky Hill (later, Schilling) AFB, KS, 10 Mar 1953-16 Jan 1959  
Beale AFB, CA, 1 Sep 1994

### **ASSIGNMENTS**

802 Air Division, 10 Mar 1953-16 Jan 1959  
9 Medical Group, 1 Sep 1994  
9 Operations Group, 2 Dec 2019

### **COMMANDERS**

#### **HONORS**

##### **Service Streamers**

##### **Campaign Streamers**

##### **Armed Forces Expeditionary Streamers**

#### **Decorations**

Meritorious Unit Awards  
1 Jun 2009-31 May 2011  
1 Jun 2013-31 May 2014  
1 Jun 2016-31 May 2017

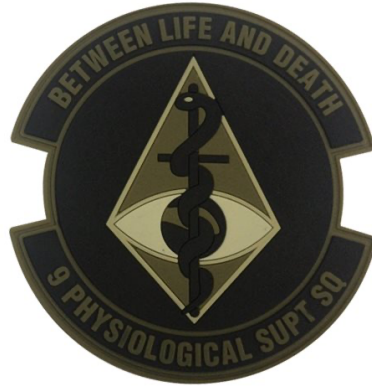
#### **Air Force Outstanding Unit Awards**

[1 Sep] 1994-30 Jun 1995  
1 Jun 2002-31 May 2004  
1 Jun 2005-31 May 2007  
1 Jun 2007-31 May 2009  
1 Jun 2011-31 May 2012  
1 Jun 2014-31 May 2015  
1 Jun 2015-31 May 2016

#### **Air Force Outstanding Unit Award**

[1 Sep] 1994-30 Jun 1995

### **EMBLEM**



The globe is framed by an eye-lid shape suggesting the global ISR mission, and both are centered in the diamond emblem, a carry-over shape from the original 'diamond patch' of PSD. The sword with the point to base is symbolic of sacrifice and mercy and alludes to the noncombatant role of the medical services, and it is entwined by a serpent, recalling the staff of Aesculapius and underscoring healing and the medical arts. The motto, 'Between Life and Death' captures the fragility of life in the upper reaches of the Stratosphere and the importance of providing systems that sustain the human at the edge of space. The circular black area represents the darkness of space. (Approved, 8 May 1997)

## **MOTTO**

## **OPERATIONS**

Tucked away in a corner of the flightline area sits Bldg. 1029, home of the 9 Physiological Support Squadron and one of the most unique operations in the Air Force. The building houses the Aerospace Physiological Training Flight, an 18 member flight entrusted with the lives of the pilots who fly the U-2. The APTF acquaints pilots and other aircrew with the physiological hazards of high flights by training more than 800 aircrew members each year on topics including oxygen equipment, cabin pressurization, fatigue, stress, rapid and slow decompression and hypoxia.

The human performance division of the flight focuses on teaching in a classroom environment. APTF members train aircrew about possible physical and mental affects during flight such as hypoxia, which is a condition pilots are susceptible to at high altitudes without oxygen, said Senior Airman Virgie Waite, APTF aerospace physiological technician. Other topics include fatigue, stress, situational awareness, and ergonomics.

"We give briefings on human performance to minimize the accidents that can occur as a result of these situations," Sergeant Armstrong said. After pilots receive the briefings they prepare for high altitude training in the flight chamber. To help combat the dangers of high flight, all pilots preparing to fly are fitted with custom suits, largely resembling what is commonly known as a space suit, which regulates the pressure on the body at high altitudes.

Three APTF physiological support staff help the pilot in suiting up, and then perform several inspections on the suit to check for air leaks. "Two people are suiting the pilot while one person supervises," explains Staff Sgt. Joe Mesa, a life support technician. "This way no mistakes are made." Once the pilot is suited up, they breathe 100 percent pure oxygen for up to one hour. The oxygen is used to cool the body down inside the suit, Sergeant Mesa said. Pilots then are then

hooked up to liquid oxygen coolers which they carry with them to the chamber or aircraft. The APTF also has a maintenance division to ensure proper function of the high-altitude chamber. This chamber simulates the different air compressions that a pilot may feel at different altitudes. According to Airman 1st Class Evan Schuelke, an APTF chamber maintenance technician, the six-person chamber at Beale has achieved an altitude of 130,000 feet.

In order to allow the chamber to achieve these altitudes, Airman Schuelke and other flight maintenance personnel perform numerous inspections weekly, as well as any time a flight is scheduled. Prepping and inspection includes starting the vacuum pumps used to simulate the altitudes; turning on the oxygen flow to the chamber; making sure instruments are working properly and checking for cracks and leaks in windows and seals. Maintenance must also inspect the safety equipment used in the chamber, such as oxygen masks and helmets.

Once the inspection is complete and emergency checklists are in place, the chamber is ready for flight. The actual chamber flight is where all divisions of the APTF come together as one. While a pilot is inside the chamber, administrative personnel are equipped with headsets and flight plans instructing the pilots on what is about to happen. Maintenance professionals are on hand to operate the chamber and keep it functioning properly, while support technicians are inside the chamber showing pilots how to properly use their equipment. "We usually take pilots up to 75,000 feet to give them confidence in their equipment," Sergeant Mesa said.

Pilots are taken up slowly and monitored at different altitudes. A highlight of the chamber flight is the rapid climb portion. Pilots are taken from an altitude of around 25,000 feet and shot up to an altitude of around 70,000 feet in a matter of one second. When this happens, the pilot's pressure suit expands rapidly to keep the pressure on the body at an altitude around 36,000 feet. If not for the specially designed suit, the pilot's blood would start to boil at around 60,000 feet, Airman Schuelke said. Once the chamber flight is over, all equipment is inspected again to make sure everything is working properly, and pilots are escorted to their aircraft. APTF life support Airmen strap the pilots in and perform one final inspection of safety equipment.

The Air Force has implemented modifications to its U-2 high-altitude surveillance aircraft to help eliminate the risk of decompression sickness among the pilots, according to officials at Beale AFB, Calif., home of the U-2 fleet. The Cockpit Altitude Reduction Effort, developed by Lockheed Martin, "reinforces the airframe structure, replaces valves, changes the bleed air system logic, and alters cockpit controls." "To eliminate the risk of DCS for U-2 pilots is phenomenal," said Lt. Col. Brian Musselman, commander of the 9 Physiological Support Squadron. Maintainers began installing the CARE gear on 27 U-2s last September and finished the work in June. "Since the CARE modifications have occurred, there have been no reported DCS incidents," said Lt. Col. Colby Kuhns, 1st Reconnaissance Squadron commander. Between 2002 and 2009, U-2 pilots reported a growing number and increased severity of DCS incidents. This motivated U-2 officials to pursue CARE. 2013

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DEPARTMENT OF THE AIR FORCE UNIT HISTORIES

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Sources

Air Force Historical Research Agency. U.S. Air Force. Maxwell AFB, AL.

Air Force News. Air Force Public Affairs Agency.