

AFRL

RESEARCH ALTITUDE CHAMBERS

What is the RAC?

The Air Force Research Laboratory's Research Altitude Chambers (RAC), managed by the lab's 711th Human Performance Wing, are a family of four computer-controlled altitude chambers where researchers can perform a variety of studies to ensure the durability of flight equipment as well as to determine the effects altitude has on the human body. These chambers also provide a training capability that prepare air crews to perform their missions at various altitudes.

The RAC joins AFRL's centrifuge and Naval Medical Research Unit-Dayton's KRAKEN to create an epicenter of aerospace physiology research at Wright-Patterson Air Force Base. This partnership brings a wealth of knowledge and expertise to the Dayton area that works to enable, enhance and sustain military air crews and their missions.



RESEARCH ALTITUDE CHAMBER 1



CENTRIFUGE
Air Force Research Lab



KRAKEN
Naval Medical Research Unit-Dayton

What are the capabilities of each chamber in the RAC?

Chamber 1 is utilized to study hypoxia (lack of oxygen to the brain), decompression sickness, fatigue, and performance as they relate to altitude. This chamber holds up to 20 people and can reach a maximum altitude of 100,000 feet.

Chamber 2 is utilized to test aircraft life support systems as well as large equipment up to the size of a Humvee. This chamber is temperature-controlled with a vast temperature window that ranges from 150 degrees Fahrenheit to negative 67 degrees

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Fahrenheit. The humidity can also be adjusted between 2 - 98 percent. Chamber two's maximum altitude is 100,000 feet.

Chamber 3 is utilized to perform rapid decompressions as quickly as .04 seconds with qualified research participants up to 60,000 feet. This chamber is also temperature-controlled, and can be used to perform other research studies.

Chamber 4, the smallest in the RAC at 45 cubic feet, is used for rapid decompressions on small equipment such as small electronics like cell phones, to medical supplies and or equipment, computers, or any other small equipment needed to be taken up to altitude to ensure durability. This chamber, also temperature-controlled, has a controlled decompression rate of 8,000 to 23,000 feet in as quickly as .04 seconds, and can reach a maximum altitude of 100,000 feet.

How does research data from the RAC help our military?

The data accrued from research in AFRL's RAC ensures our air crews have durable equipment they need during flight operations. Further, the chambers provide the crews essential altitude training so they can complete their missions efficiently and effectively, and return home safely to their families. Aerospace Physiology research and training is essential to the readiness of our air crews and their missions.

About AFRL

The Air Force Research Laboratory leads the discovery, development and integration of cutting-edge and affordable warfighting and consumer technologies.

For more information, visit:
www.AFResearchLab.com.



CHAMBER 2



CHAMBER 3



CHAMBER 4