

Polish Military Institute of Aviation Medicine Spacesuit Integration and Human Centrifuge Testing Overview

2024

Trent Tresch



The Military Institute of Aviation Medicine (WIML), known in Polish as *Wojskowy Instytut Medycyny Lotniczej*, is a national military research and medical institute located in Warsaw, Poland at 01-755 Krasynskiego 54/56 Str. Founded in 1928, it is one of the oldest aviation medicine institutions in Europe and has played a central role in supporting Polish military and civilian aviation for nearly a century. The institute operates under the Polish Ministry of National Defense and serves as a key authority in aviation medical science and flight safety.

WIML's core mission is to study, protect, and enhance human health and performance in aviation and other extreme operational environments. The institute conducts interdisciplinary research and publication into aerospace physiology, human factors, and bioengineering, with a strong emphasis on issues such as hypoxia, decompression, high-G exposure, spatial disorientation, fatigue, and cognitive performance. These research efforts directly support the development of safer aircraft operations, improved life-support systems, and evidence-based medical standards for aircrew.

Certified by the United States Air Force, Brigadier General John A. Cherrey and Lt Col. David A. Welge, for recognition of its aerospace physiology and centrifuge training program.

The human centrifuge maintains an internal cabin which can be exchanged for both Russian and American flight systems (Mig 29 and F18).

In 2024 we were invited by WIML to integrate a full pressure suit into the centrifuge and its oxygen system while also testing pressure suits inside of their altitude chamber.

Over the course of two days, myself and the team consisted of institute personnel, including but not limited to Major Magdalena Kozak MD, as well as director Matt Harasymczuk and Agata Kolodziejczyk PhD and David Guajardo.

Human centrifuge flights and suit integration did not exceed 5g's as medical evaluations would have been required to do so. During our time in the centrifuge, we were used as research subjects in a study which was looking at pilot voice tonal changes under different G loads. Results will be published in the Institute's research journal by Dr. Kozak. It was also discovered that the flow rate and pressure of the centrifuge oxygen system was not sufficient for adequate flow of up to 25 liters per minute of aviators breathing oxygen. This was also a realization in the high-altitude flight chamber system. Chamber flights did not exceed 25,000ft.

We anticipate returning to assume flight profiles up to 9g's and altitude profiles up to 100,000ft while providing pressured tank oxygen systems capable of safe suit operation and appropriate physiological measures.

Contact:

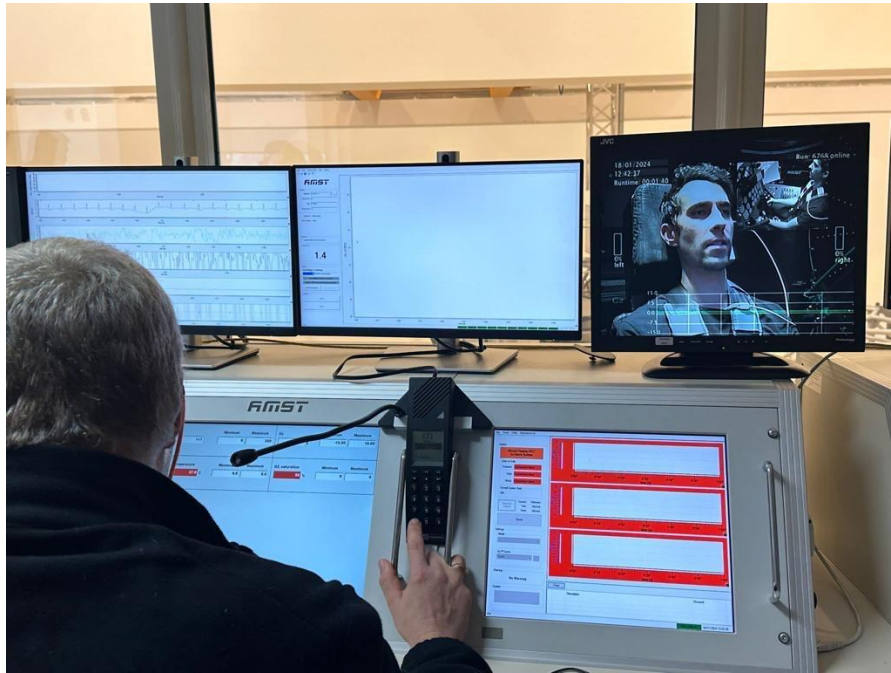
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Project Photos



Trent during flight in the centrifuge, viewed from the command center.



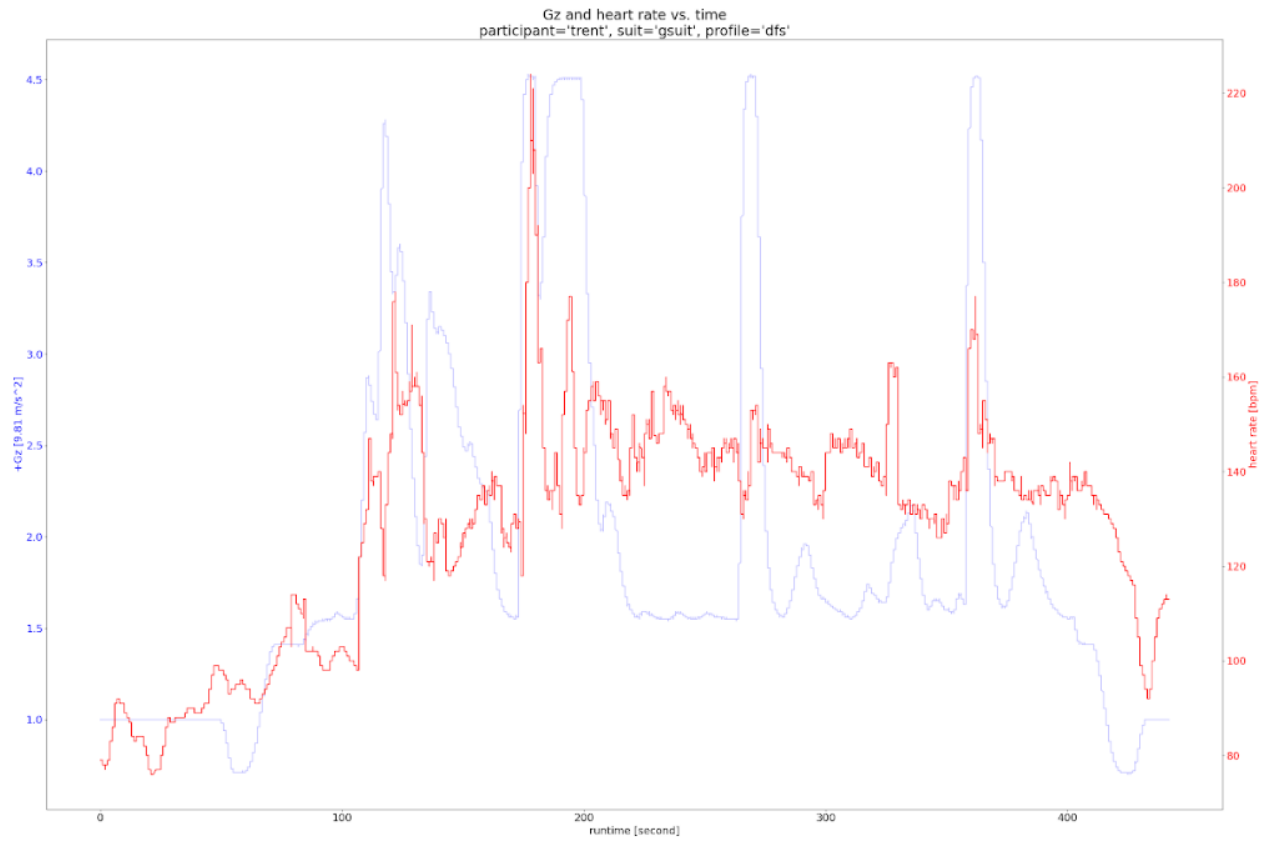
Trent, Agata, Matt and David in front of the centrifuge with two full pressure suits.



Trent inside the centrifuge prepping for an unsuited flight profile.



Matt and Trent in the altitude chamber prepping for suit testing.



Heart rate and Gz vs time

