

## HUMAN HEALTH AND PERFORMANCE

Exploring Space | Enhancing Life

# Decompression Sickness Mitigations

### World Renowned Collection of Expertise

With experts in the fields of research and operational aerospace medicine, dive medicine, dive physiology, decompression physiology, and exercise physiology, as well as a wide variety of engineering disciplines, including computer science and space suit engineering, Johnson Space Center is a hub for decompression sickness research and management. These expertise coupled with cutting edge technology development enable NASA to implement leading prevention and treatment modalities for decompression sickness, not only in the operational high altitude and space environments, but in the diving environment as well.



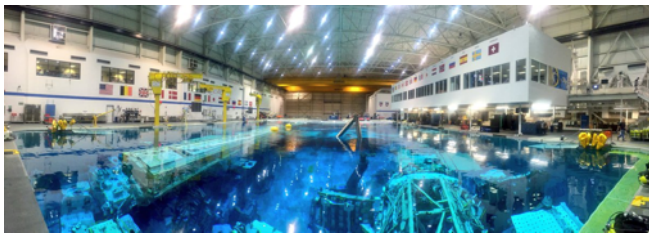
### Decompression Sickness Modeling and Risk Assessment

Johnson Space Center utilizes state of the art software systems to help experts better understand decompression physics and physiology by modeling tissue absorption of inert gases such as nitrogen, nitrogen bubble formation, and nitrogen off-gassing during decompression. These analyses enable NASA to better assess the risk of decompression sickness during Center Operations and to help minimize and mitigate such risks. This includes the development of pre-breathe protocols to reduce risk of decompression sickness during extravehicular activities or during suit testing and the development of operational procedures to minimize decompression sickness risk during extravehicular activity training at the Neutral Buoyancy Laboratory.

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## Pre-Diving Medical Risk Assessment and Mitigation

As part of its medical support operations, the Flight Medicine and Occupational Medicine Clinics at Johnson Space Center, as well as the Human Test Support Group at the Neutral Buoyancy Laboratory conduct pre-diving risk assessment and mitigation, including the management of risk for decompression sickness. This includes yearly physicals for support divers and space-suited subjects, as well as weekly dive physicals prior to participation in diving operations. Suited subjects have dive physicals on the day of their runs any day they are participating in suited operations.



## Operational Medical Support

The Space and Occupational Medicine Branch at Johnson Space Center provides on console medical support for extravehicular activity operations, both during training operations at the Neutral Buoyancy Laboratory, as well as during in-flight extravehicular activity operations. Medical personnel are able to speak with crew



members directly in the event of a medical contingency to minimize risk to any crew members during an extravehicular activity run and to effectively and efficiently treat issues, such as decompression sickness, should they arise, to ensure the continued health of the crew and success of the mission.

## Emergency Medical Response Procedures and Capabilities

Johnson Space Center has a robust treatment capability for the management of a medical contingency. This includes the treatment and management of decompression sickness and includes such capabilities as a multi-place hyperbaric chamber located at the Neutral Buoyancy Laboratory. It also includes medical supplies for the management of injuries and illness located with the Human Test Support Group at the Neutral Buoyancy Laboratory and with the clinic at Johnson Space Center, as well as a mobile medical supply capability for operations at Johnson Space Center's Mockup Facility or the Crew and Thermal Systems Division Test Facility. In addition, it includes medical supply capabilities on board the International Space Station, along with procedures for in-suit pressurization and treatment of decompression sickness, in the event of a medical contingency during extravehicular activity operations in-flight.



For the benefit of all