

What is *Aerospace Medicine*?



Introduction to Aerospace Medicine

- When the human body is exposed to environments outside of our evolved tolerances, it does not always behave as expected





Humans evolved in a specific environment

- Constant Gravity of 9.8 m/s^2
- Atmospheric Pressure near 760 mmHg
- With 21% oxygen, 79% nitrogen and some trace gases
- Temperature near 24°C

These are the conditions at sea level on Earth

But we did not stay there...



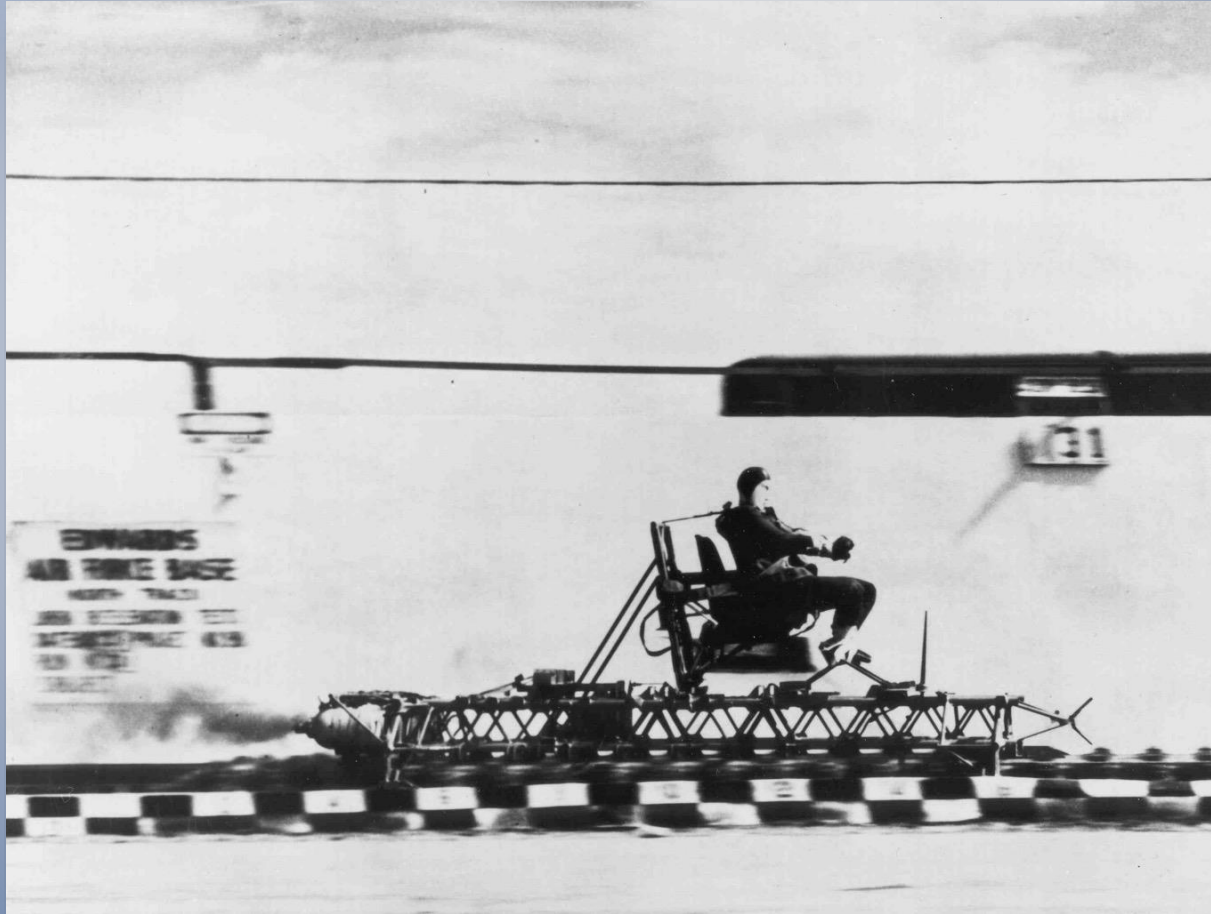
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We have traveled to where the force of gravity cannot be perceived...



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... and have experienced when that force is equivalent to over 40 times Earth's gravity.





To where ambient pressure is zero...



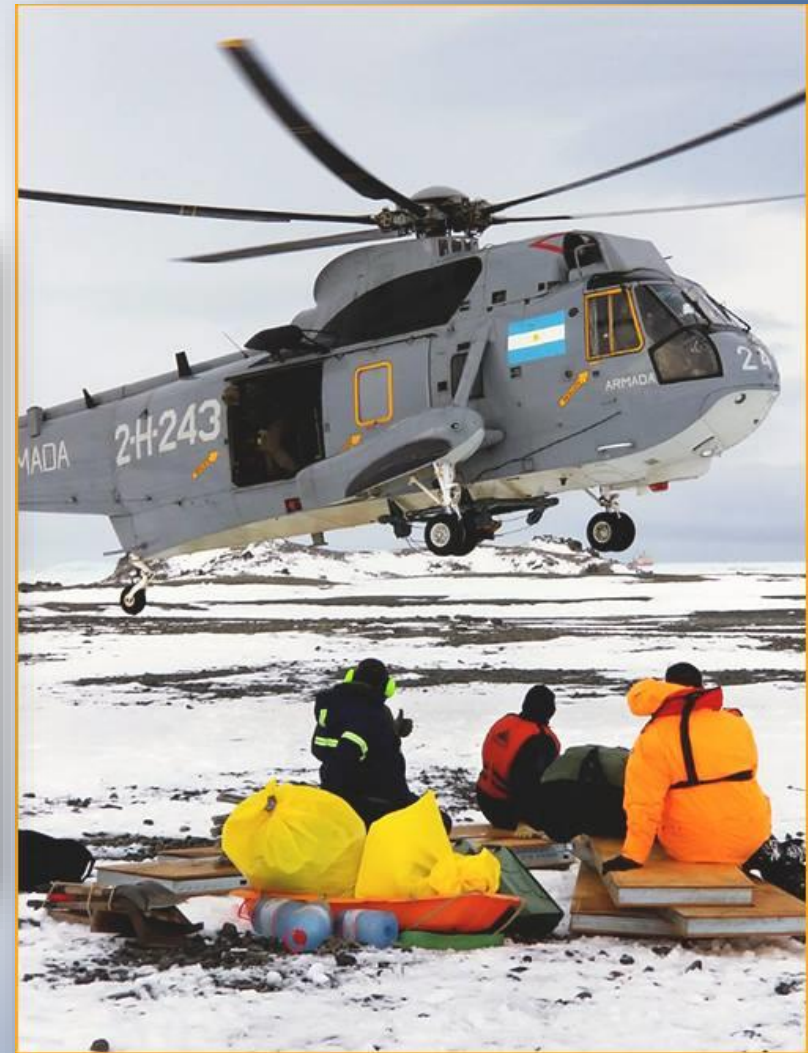
... and where it is 1,000 times that at sea level.



To extreme altitudes where supplemental oxygen & pressure are necessary.



To where temperatures are way below zero...





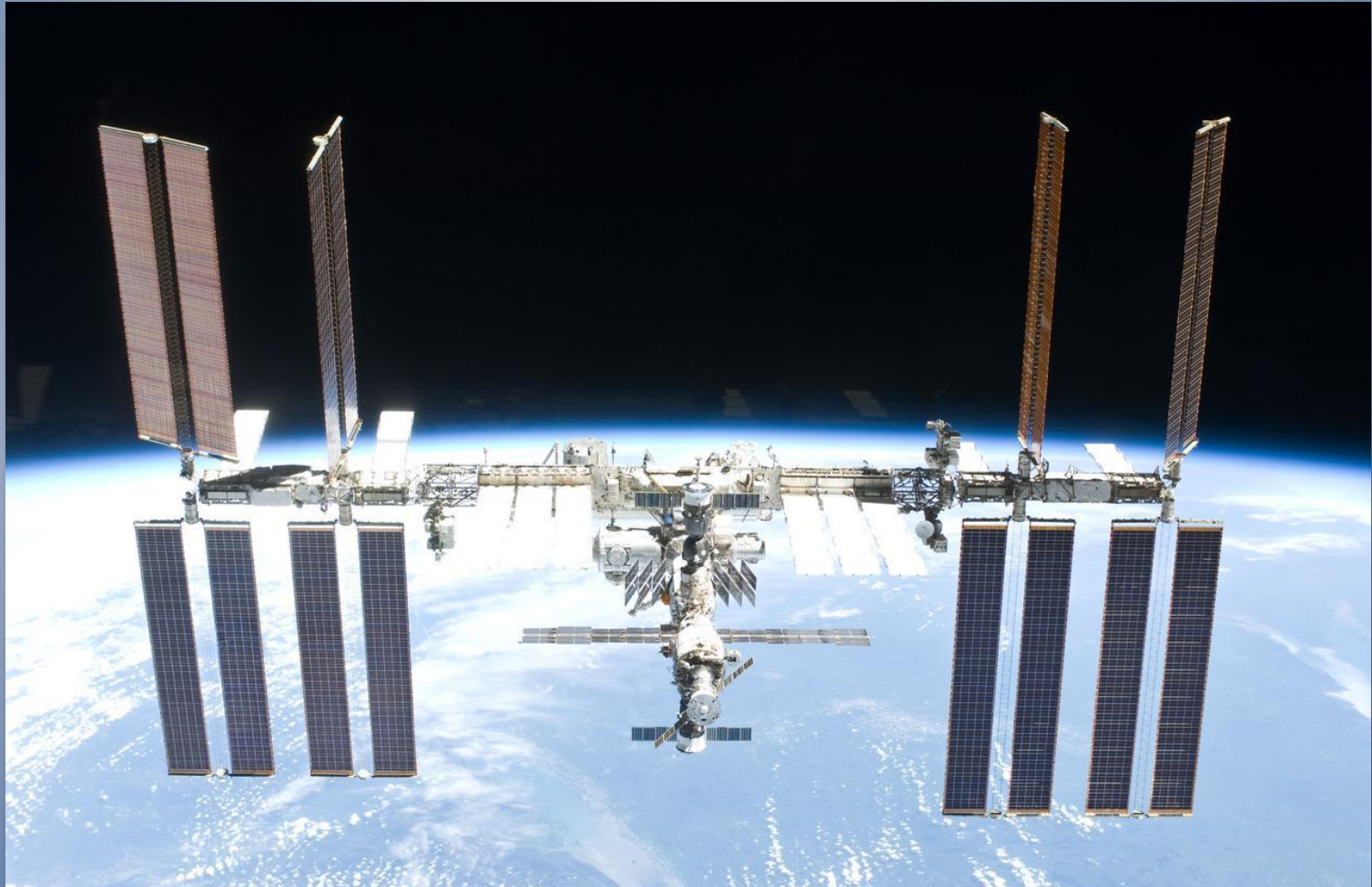
... and where the temperature is hot enough to melt a spacecraft.



Our practitioners care for people in every corner of the globe...



... and beyond it.



The Practice of Aerospace Medicine

- Humans often explore in environments that are dangerous and inhospitable
- We have been able to explore every conceivable environment due to our ability to learn, prepare, train, and adapt to that environment
- In essence, aerospace medicine is the medicine of extreme environments





Aerospace Medicine Specialists

- Aerospace Medicine specialists draw from the full range of medical specialties
- Working with professionals from dozens of other disciplines, Aerospace Medicine Specialists keep people healthy in Earth's atmosphere and beyond
- Aerospace Medicine primarily encompasses four key areas:
 - Clinical
 - Research
 - Education
 - Policy

Aerospace Medicine Specialists work with:

- Engineers
- Nurses
- Pharmacists
- Medics
- Doctors
- Astronauts
- Pilots
- Civilians
- Military

Clinical Aerospace Medicine

- Contingency/Emergency Response
 - Remote Medical Care in the Field
 - In-Flight Telemedicine
 - Orbital and Interplanetary Telemedicine
 - Search and Rescue
 - Disaster Preparedness
 - Accident Investigation
- Screening and Prevention
 - Pilots and Air Crew
 - Astronauts
 - Air Traffic Controllers
 - Flight Controllers
 - Health maintenance
 - Occupational Health and Wellness



Aerospace Medicine Research

- Human Factors:
 - Habitability
 - Survivability
 - User Interfaces
 - Control Surfaces
- Environmental Effects and Mitigation:
 - High Altitude
 - Hyperbarics and Hypobarics
 - Non-standard Gravity
 - Radiation Countermeasures
- Human Physiology:
 - Sensory Effects of Unusual Environments
 - Spatial Disorientation
 - System Specific responses
- Behavioral Health and Performance:
 - Crew Selection
 - Crew Resource Management
 - Fatigue Management
 - Social Isolation
 - Operations and Contingency Planning
 - Autonomous Health Systems
 - Search and Rescue techniques
 - Life Support Systems
 - Fitness for Duty Criteria





Aerospace Medicine Education

- **Pilots**
 - Military
 - Civilian
 - Students
- **Doctors**
 - General Practitioners
 - Specialists
 - Aviation Medical Examiners
 - Continuing Medical Education
 - Researchers
- **Nurses**
 - Clinical practice
 - Administrators
 - Researchers
- **Paramedics**
 - Flight Medics
 - Critical Care Medics
 - Public Health Practitioners
- **Professionals**
 - Engineers
 - Students
 - Civilian
 - Military
- **Graduate Students**
 - Multiple Disciplines
- **Other Training:**
 - Aerospace physiology courses
 - Online courses
 - University Affiliated Courses
 - Aerospace Medicine Residencies





Aerospace Medicine Policy

- Civil and Military Aviation Health
- Defense Health

- Transportation Health
- Accident Investigation & Prevention
- Training Requirements

- Government Space Activities
- Commercial Space Activities

- Behavioral Health Issues:
 - Addiction
 - Fatigue
 - Mental illness



So you want to be an Aerospace Medicine Specialist...





Training Path and Opportunities

- What it Takes to Become an Aerospace Medicine Specialist
 - Undergraduate degree
 - Medical School
 - Residency training
 - Subspecialty training
 - Additional masters or doctorate level training
- Aerospace Medicine Residency Programs and Other Education Opportunities



Where Aerospace Medicine Specialists Work

- Civilian government
 - Civil aviation authorities
 - Civil space flight agencies
 - Accident investigation boards
- Military
 - Every military and branch that has pilots needs aerospace medicine specialists
- Private sector
 - Commercial aviation
 - Commercial spaceflight
 - Travel medicine
- Academic medicine
 - Academic medical centers
 - Universities
 - Research organizations





Aerospace Medical Association (AsMA)

- International leader in aerospace medicine and human performance
- Apply and advance scientific knowledge to promote and enhance the health, safety and performance of those involved in aerospace and related activities
- AsMA members are in every country that flies and every country that has a human spaceflight program



<https://www.asma.org/>



This is Aerospace Medicine

*Our **Calling** is to Push the Limits of Human Physiology*

*Our **Task** is to Reduce the Risk to Human Wellbeing in Earth's Atmosphere
and Beyond*

*Our **Expertise** is in Integrating the Human System into the Technology That
Supports Us*

*Wherever You Imagine We Can Go, Aerospace Medicine Specialists Can
Help You Get There*

Questions?

