OG Human Factors and Habitability

- Overview
- Required Crew Volumes
- Human Physiological Adaptation to OG
- Workstation Design
- Restraint Design
- Ideal Cabin Layout
- Stowage
Mercury Spacecraft Interior Layout
Gemini 4 Crew Cabin
Apollo Spacecraft (Rescue Configuration)
Required Habitable Volume

From Nicogossian et. al., *Space Biology and Medicine, Vol. II: Life Support and Habitability*, AIAA, 1994
OG Neutral Body Posture

From Nicogossian et al., *Space Biology and Medicine, Vol. II: Life Support and Habitability*, AIAA, 1994
OG Restrained Reach Envelope

From Nicogossian et. al., *Space Biology and Medicine, Vol. II: Life Support and Habitability*, AIAA, 1994
OG Workstation Layout

95 PERCENTILE MALE, 20 INCH EYEPOINT

5 PERCENTILE FEMALE, 15 INCH EYEPOINT

From Nicogossian et. al., *Space Biology and Medicine, Vol. II: Life Support and Habitability*, AIAA, 1994
Skylab Chair Restraint

Skylab Table Restraints

Isogrid Flooring Design

Cleat Restraint System

EVA Foot Restraints

Skylab Exterior Configuration

General characteristics
- Conditioned work volume: 12,700 ft³
- Overall length: 117 ft
- Weight (including CSM): 199,750 lb
- Width (of orbital workshop including solar array): 90 ft
Skylab Orbital Work Shop Interior
Skylab Multiple Docking Adapter Layout

Skylab Living Quarters Layout
Skylab Wardroom Layout

Skylab Waste Management Compartment
Stowage

- Number of items stowed proportional to volume, crew size, duration, complexity of mission
  - Mercury: 48 items
  - Gemini: 196
  - Apollo: 1727
  - Shuttle: 2600
  - Skylab: 10,160
  - ISS: >20,000

- After you stow it, how do you find it?
Psychosocial Issues

• Scheduling and planning
• Recreation
• Command structure
• Issues affecting crew morale
  - Environment
  - Food and drink
  - Exercise
  - Hygiene
  - Noise
  - Lighting
International Space Station
A Tour of ISS