

Gemini: EVA

INST 154

Apollo at 50

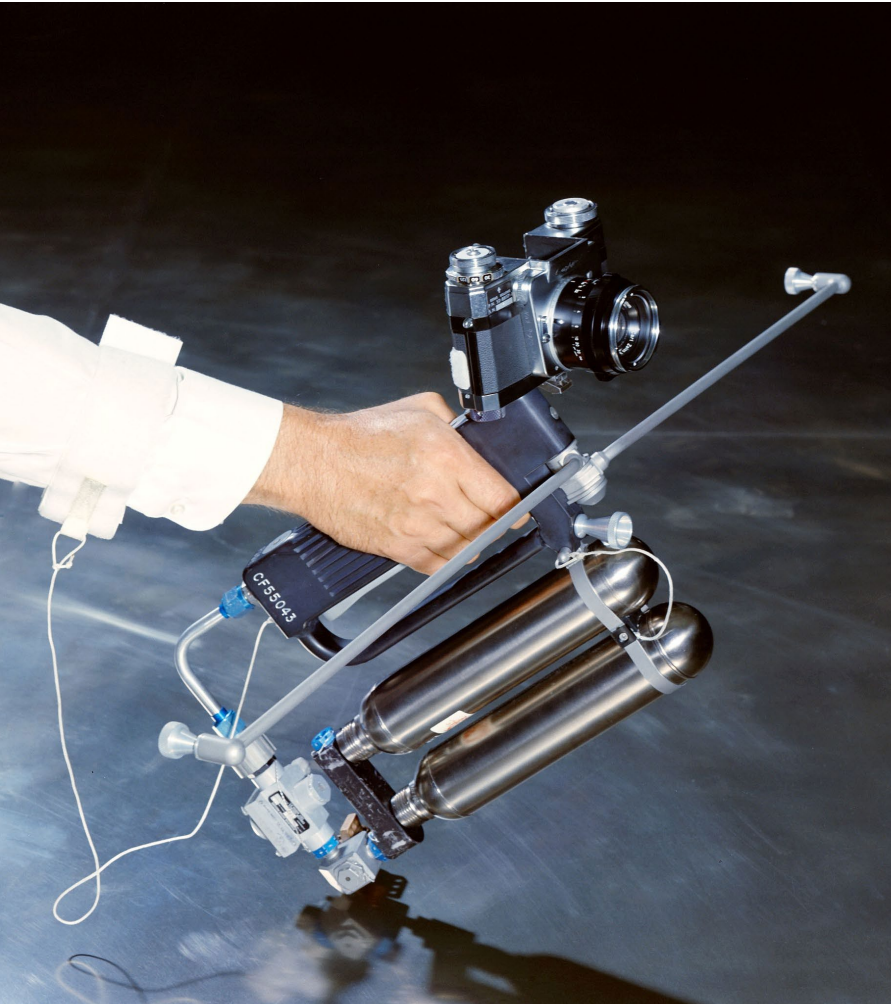
[Gemini XII](#)

Gemini and Apollo EVA Before Apollo 11

- Gemini 4 (36 minutes): Handheld maneuvering unit
- Gemini 9 (129 minutes): Backpack maneuvering unit **[EVA aborted]**
- Gemini 10 (39 minutes): Proximity operations **[EVA aborted]**
- Gemini 11 (38 minutes): Tethering two spacecraft **[EVA aborted]**
- Gemini 12 (129 minutes): Body restraint tests
- Apollo 9 (46 minutes): No umbilical



Maneuvering Units



Gemini 4
6 ft/sec

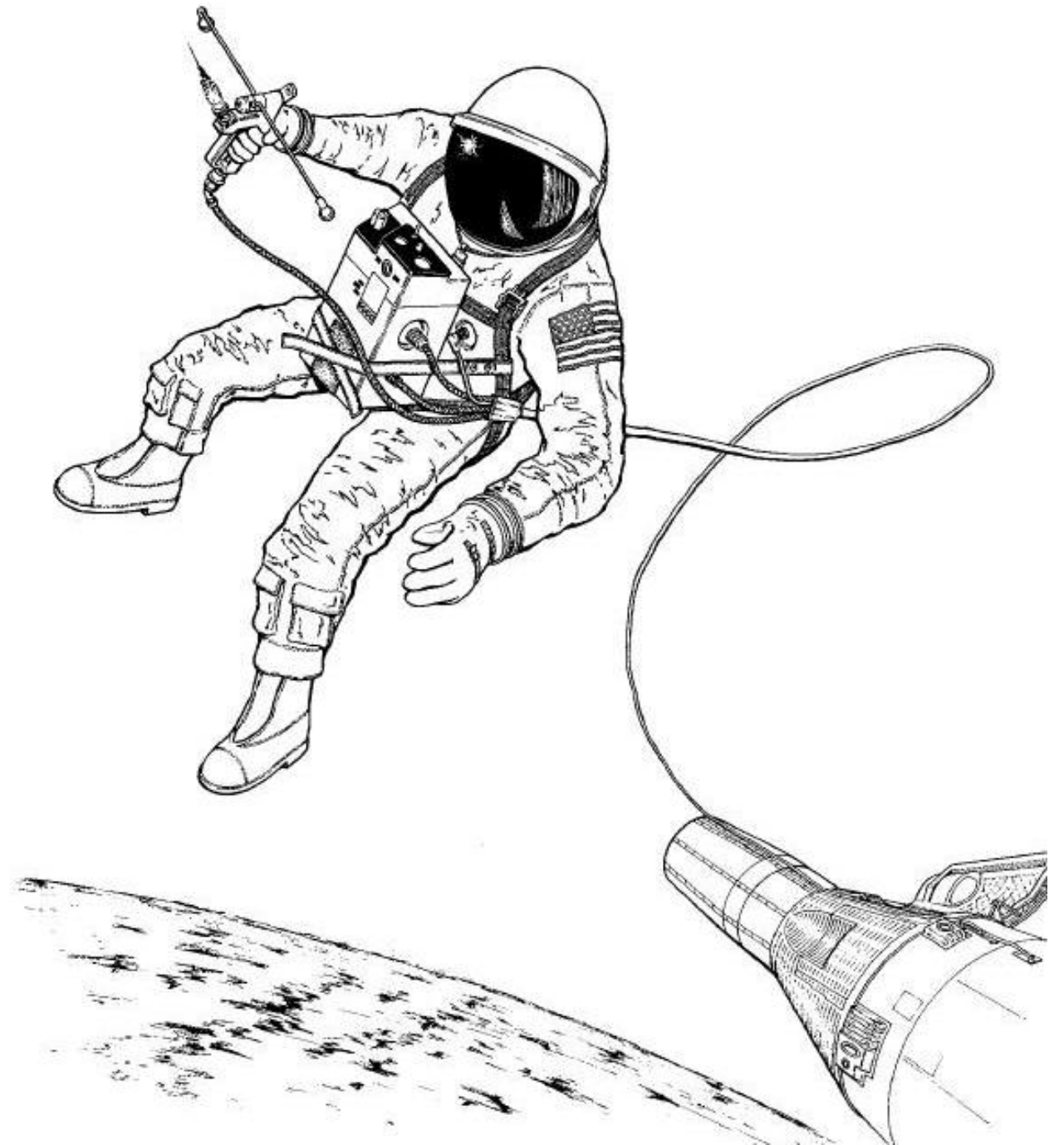


Gemini 9
250 ft/sec



Gemini 10 and 11
84 ft/sec

Gemini 10/11 Handheld Maneuvering Unit

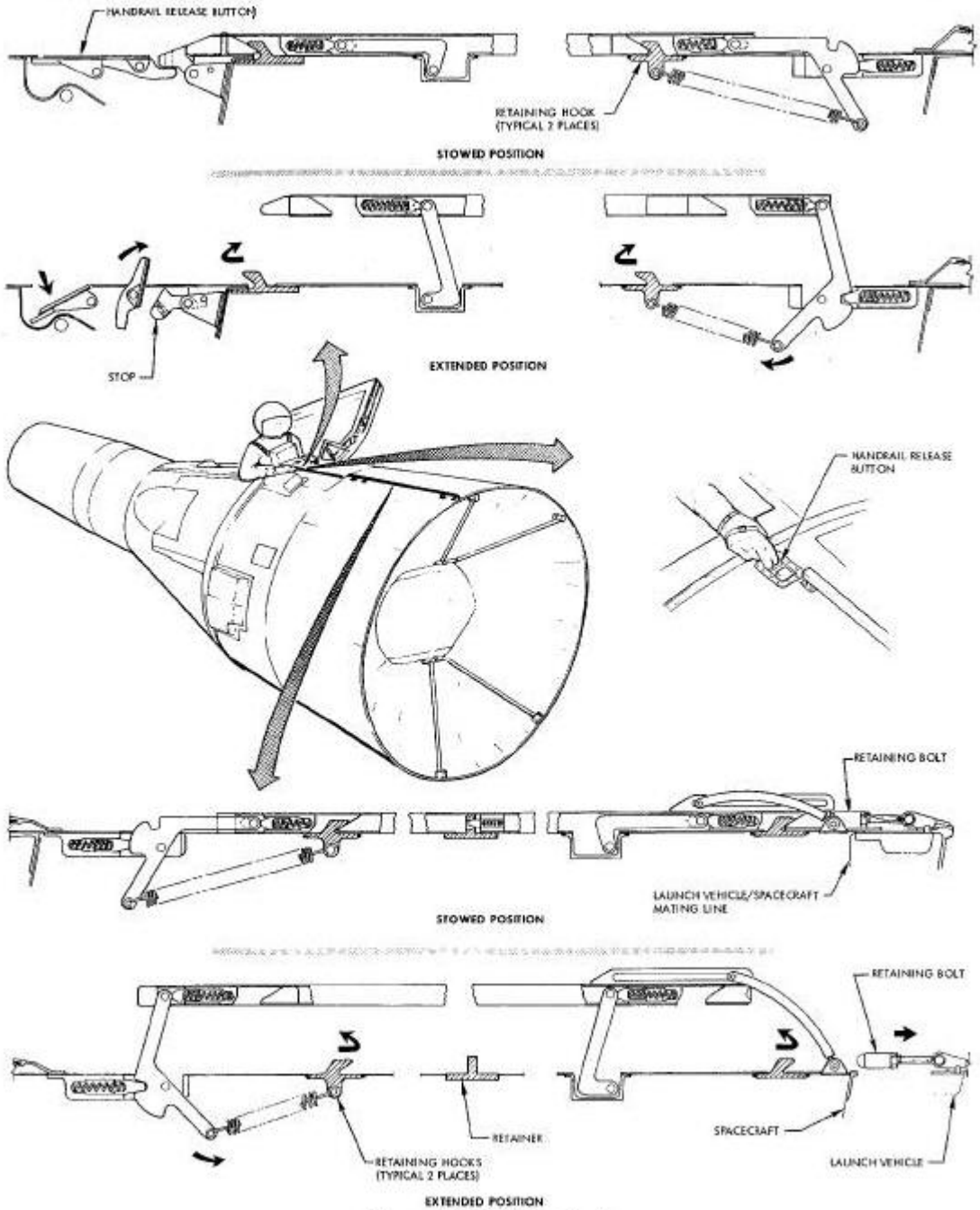


Air-Bearing
Floor
EVA Trainer
(Gemini 8)

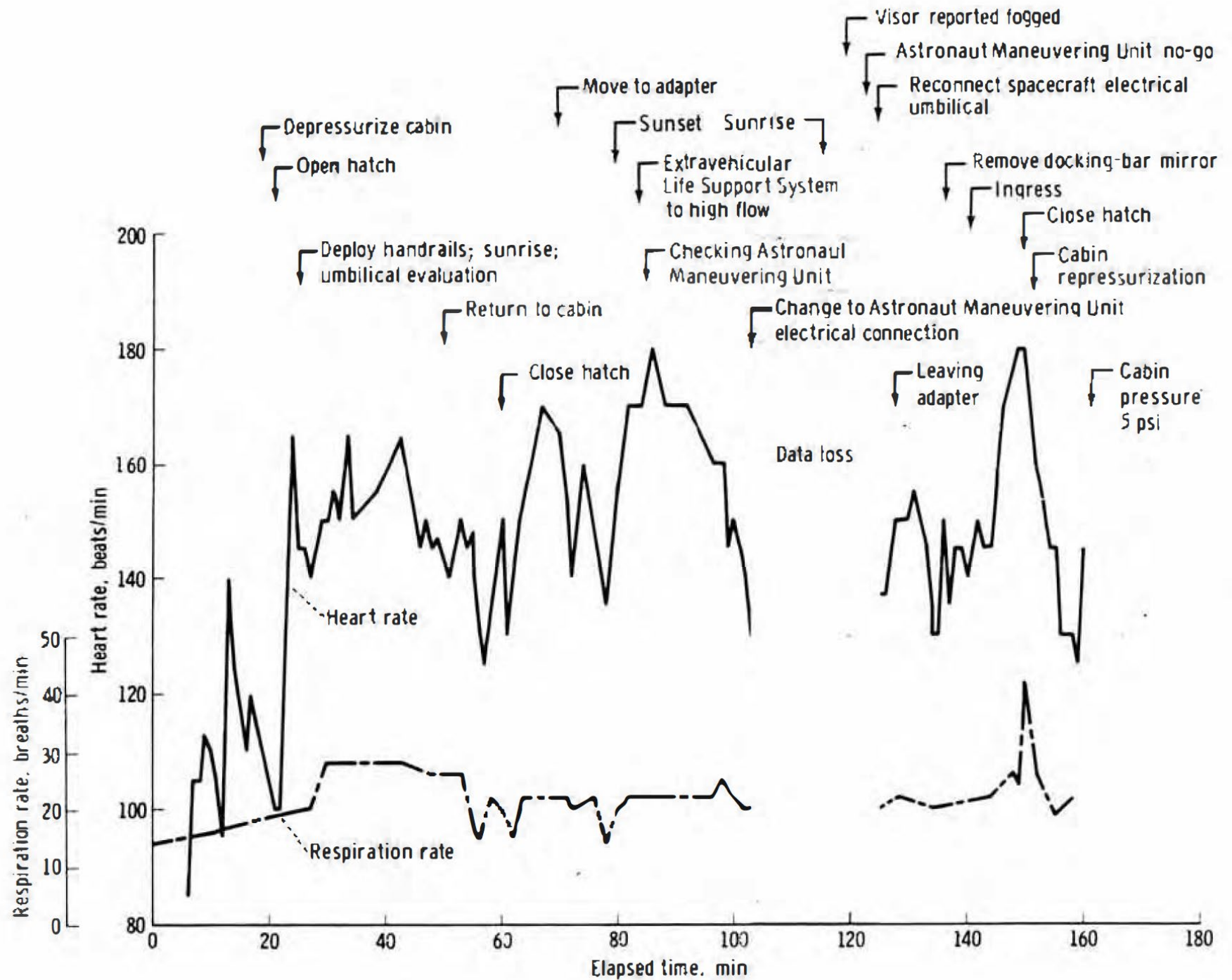




Adapter Section Handrails



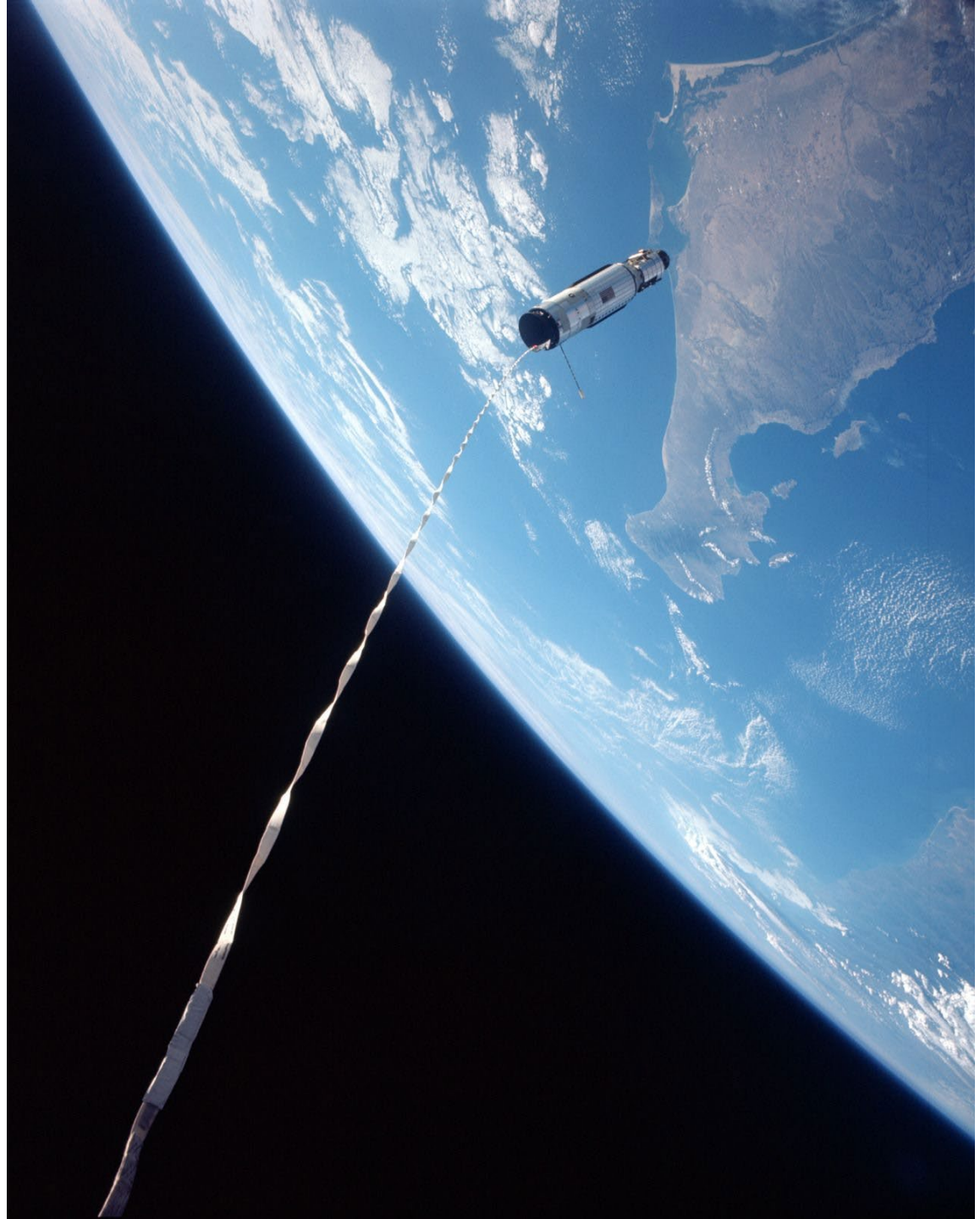
Gemini 9

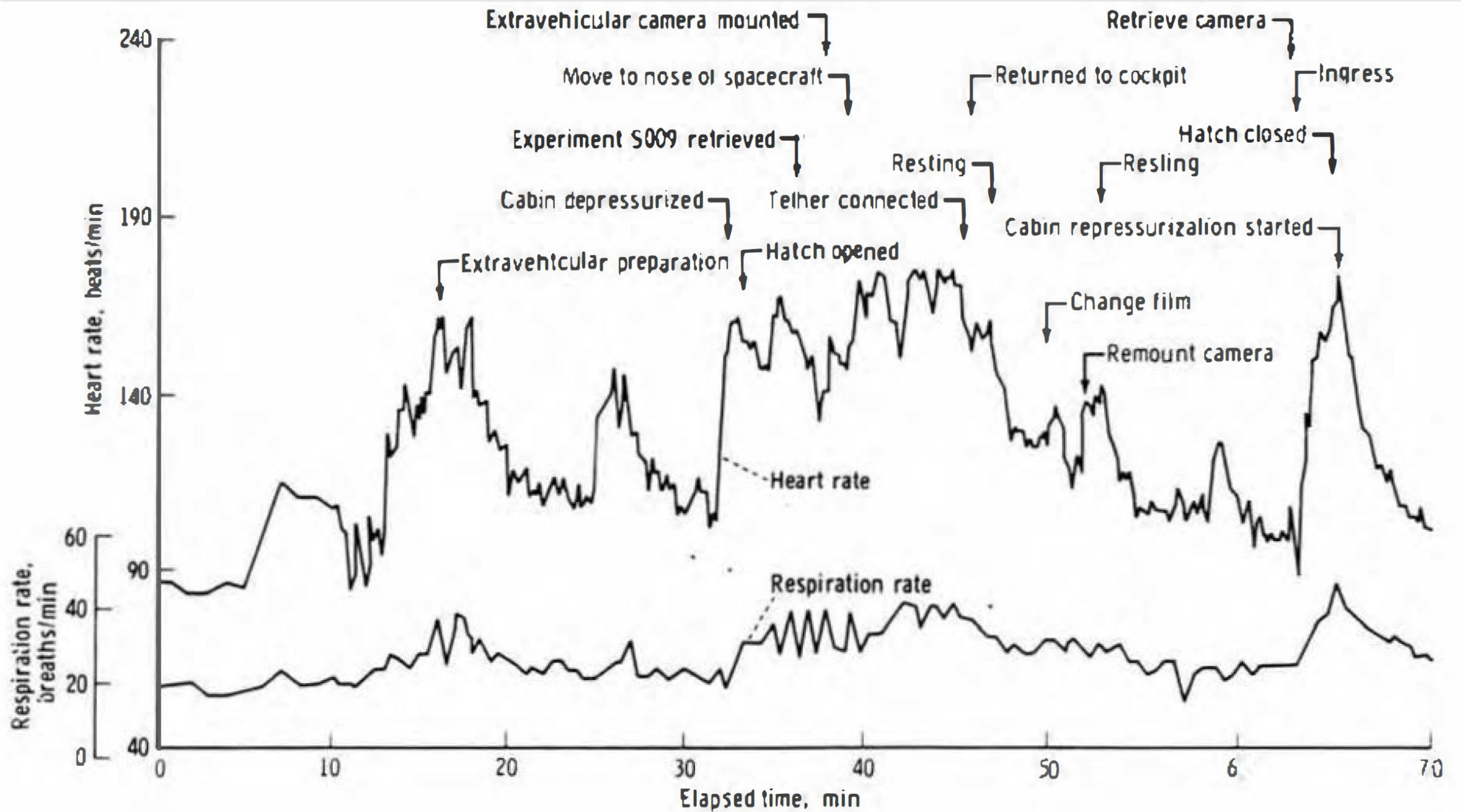




Beyond My Grasp
series of two
by James Dean

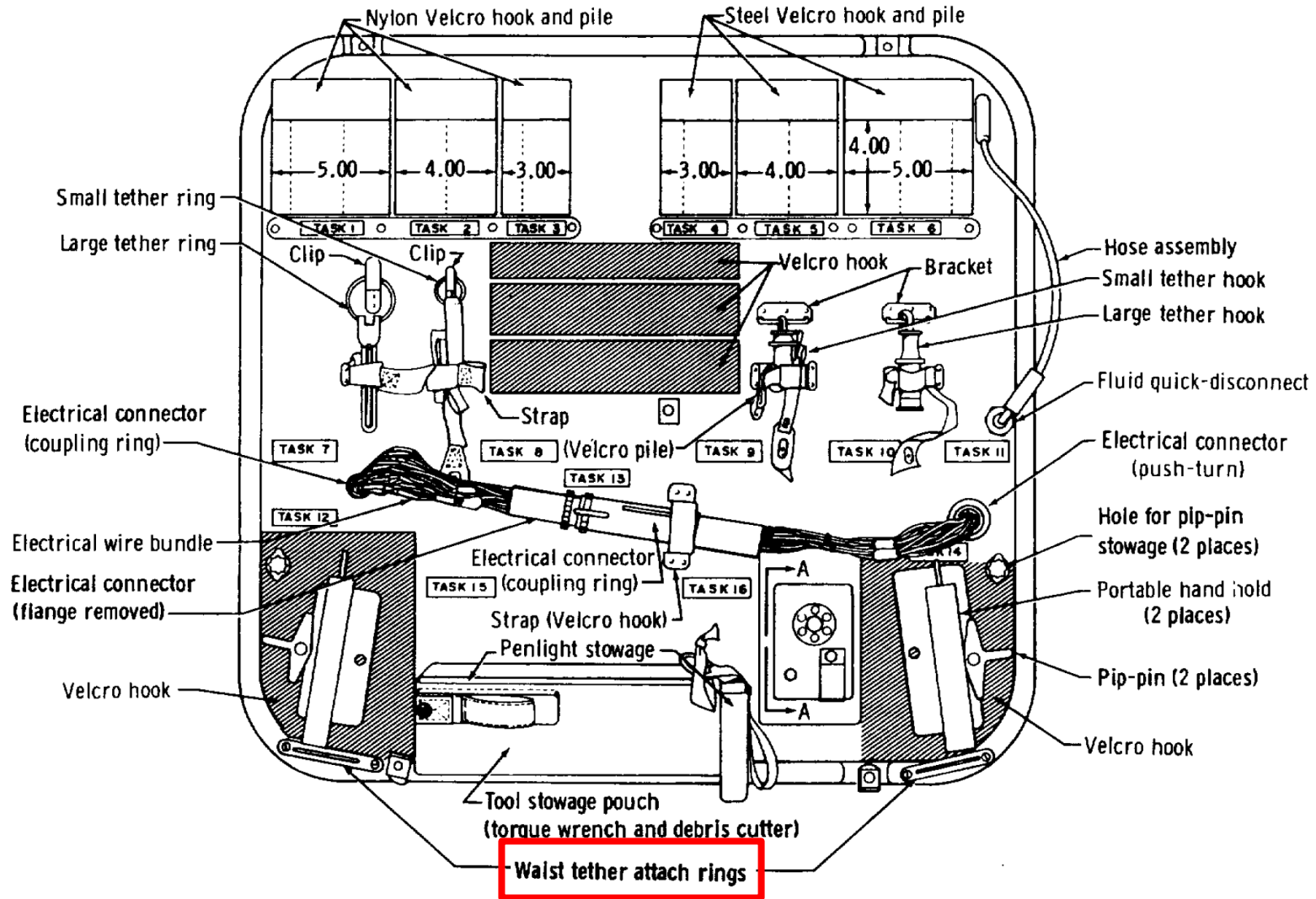
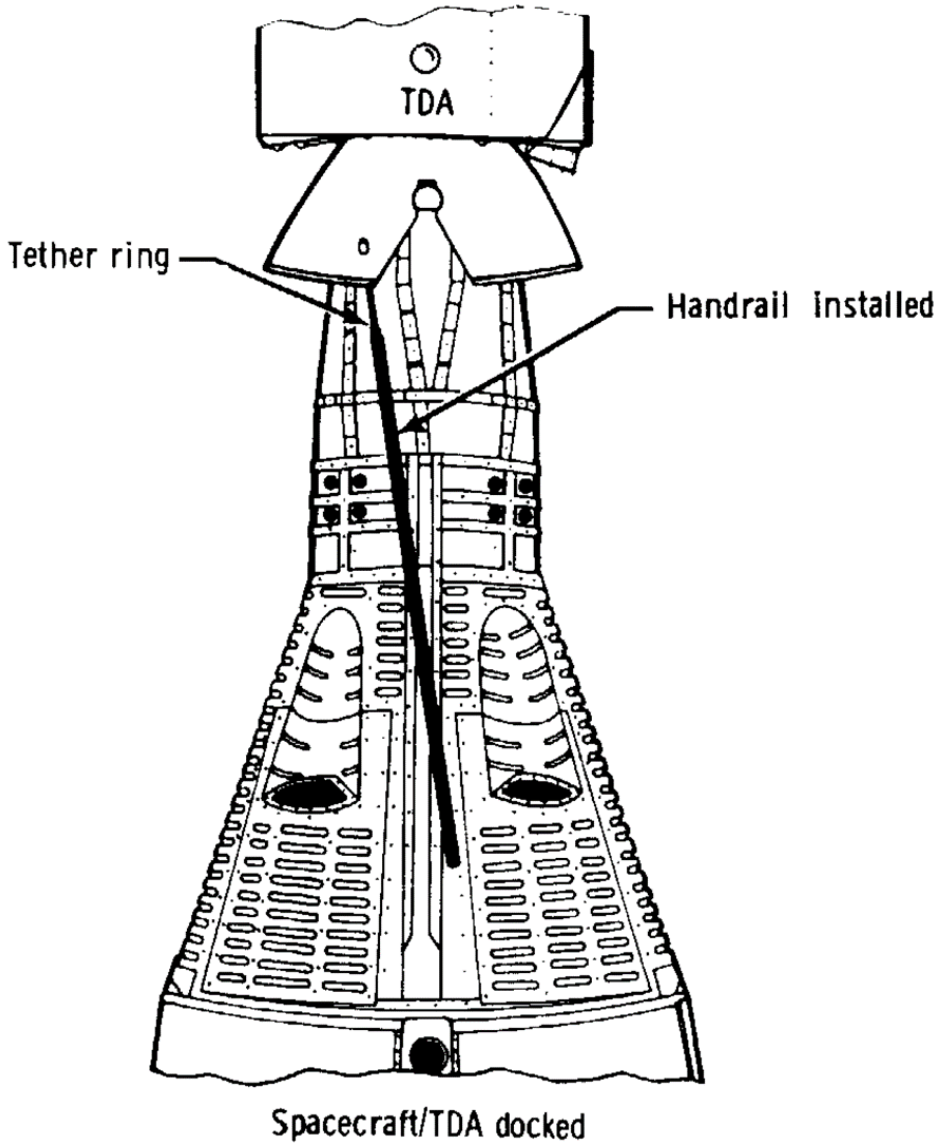
Gemini 11 Tethered Stationkeeping





(c) Gemini XI pilot.

Gemini 12 Body Position Aids



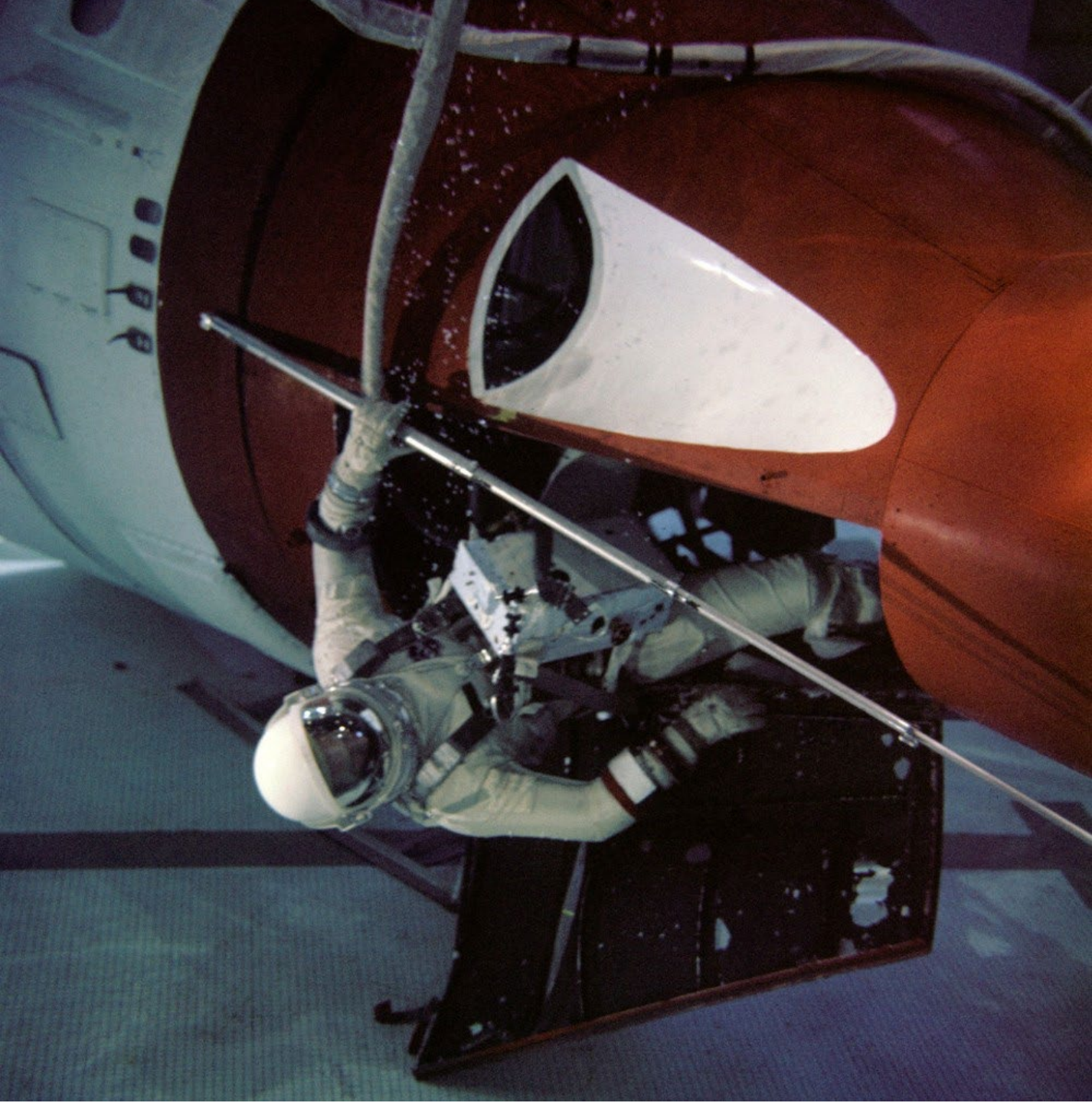
Neutral Buoyancy Experimentation

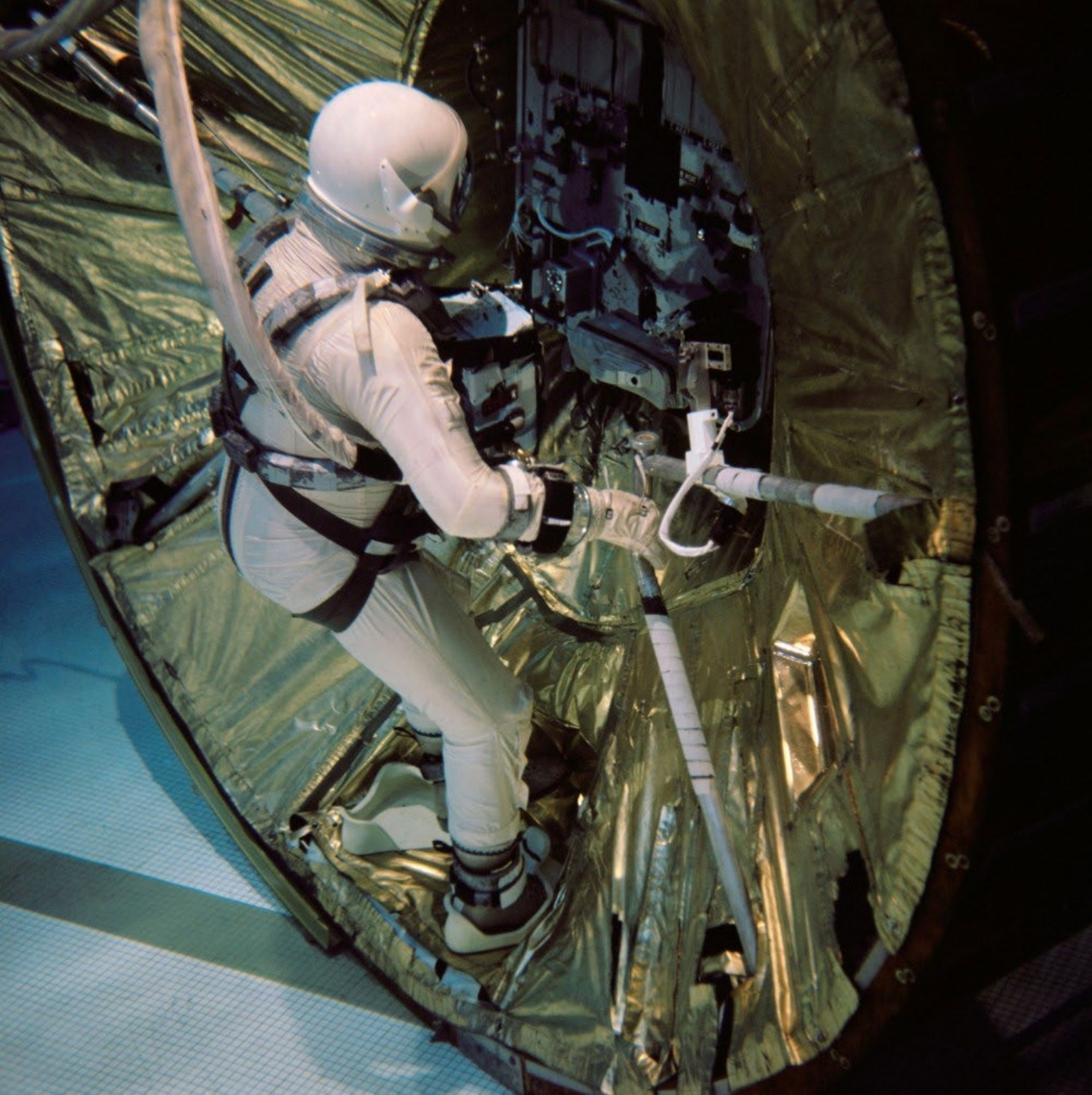
- Boeing Bioastronautics Division: 1963 [water pressurized]
 - Air Force X-20 DynaSoar (cancelled December 1963)
- Mattingly and Loats (“Environmental Research Associates”): 1964 [air pressurized]
 - Langley Manned Orbiting Research Laboratory (study ended 1966)
 - Gemini
- Marshall Space Flight Center: 1964 [air]
 - Wet Workshop (alternative to Skylab)
- General Electric Space Technology Lab: 1964 [water]
 - Air Force Manned Orbiting Laboratory
 - MSFC Wet Workshop
- Convair: 1964 [water]
 - Air Force (Manned Orbiting Laboratory?)



Gemini Neutral Buoyancy Simulations (1966)

- June 3-6: Gemini 9A
- June 15: Wet Workshop demo to Marshall (MSFC) and Houston (MSC)
- June 30/July 1 Gemini 10 procedures development
- July 18-21: Gemini 10
- July 25: Gilruth letter directing neutral buoyancy training: July 25
- July 28/29 Gemini 9 postflight evaluation (Cernan)
- August 10 Gemini 11 procedures development
- August 22 Gemini 12 procedures development
- September 11-12 Gemini 12 training (Aldrin)
 - September 12-15: Gemini 11
- September 14 Gemini 12 procedures development
- October 16-17, 29 Gemini 12 training (Aldrin)
 - November 11-15: Gemini 12: November 11-15
- December 1 Gemini 12 postflight evaluation (Aldrin)





Gemini Accomplishments

Specific Objectives

- Long duration flight
- Rendezvous
- Docking
- EVA
- Precision landing
- Tethered stationkeeping

Other Benefits

- Flight experience
- Mission operations experience
- Training experience
- Launch operations experience
- Responsive planning experience
- Hardware maturation

Discussion Groups

- **Portree (“Spacewalks that Never Were: The Gemini EVA Planning Group”)**
 - **The original plans for Gemini EVA – no plan survives first contact with reality!**
- Gemini Summary chapter 9 (“Body Positioning and Restraints during EVA”)
 - A description of what was learned during the Gemini “EVA crisis”
- Neufeld (“Practicing for Space Underwater: Inventing Neutral Buoyancy Training”)
 - A nicely nuanced treatment of the development of the invention of underwater training
- Gemini 12 Mission video
 - An excellent documentary on the Gemini XII underwater training and the mission



CCP
C P

B.A. ШАТААОВ

A.C. ENICEEB

«СОЮЗ-8»

1969

Discussion Groups

- Sonnet Report (“Report of the Ad Hoc Working Group on Apollo Experiments and Training on the Scientific Aspects of the Apollo Program”)
 - The first try to nail down what Apollo should do on the Moon
- **Compton chapter 3 (“Apollo’s Lunar Exploration Program”)**
 - **An explanation of what happened after the Sonnet Report**
- FETM episode 10 (“Galileo was Right”)
 - A dramatization of scientific training for an Apollo mission
- NRO Draft (“Project Upward: The NRO and NASA”)
 - Reuse of spy satellite technology in the Apollo program