

PLSS: Portable Life Support System

The PLSS (Pronounced "Pliss") is a backpack mounted life support system developed by Hamilton Standard Division and International Latex Corporation

The PLSS is made up of 3 main subassemblies:

1. Portable Life Support System (PLSS)
2. Oxygen Purge System (OPS)
3. Remote Control Unit (RCU)

The PLSS you see is an Engineering Model used for R&D. All PLSS units that went to the Moon (Sans Apollo 13) were left on the surface as their purpose was not needed for the journey back to Earth.

A few versions of the PLSS were produced; most improvements were made to overall mass and performance (duration), O₂ capacity which allowed for crew members to venture further out from the Lunar Excursion Module (LEM).

PLSS (along with user) had to survive the harsh Lunar environment:

Direct Sun Temp = 250°F (121°C)

Shade Temp = -140°F (-96°C)

PLSS mass (Apollo 15) = 129lbs. (EARTH)

Last Rev of the PLSS:

O₂ capacity increased from 1020 psia to 1430 psia

Cooling water increased from 8.5lbs to 11.5lbs

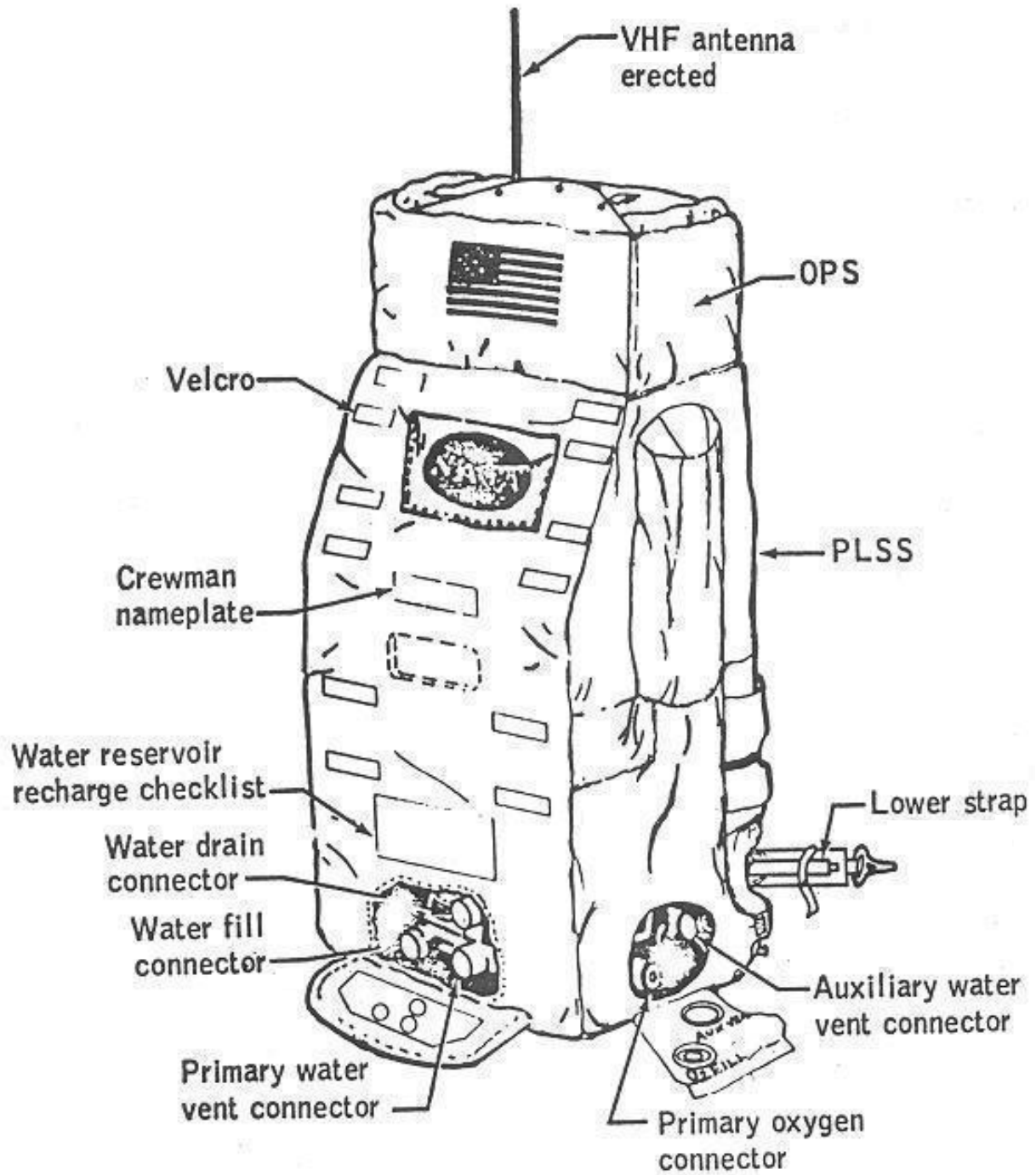
Battery capacity increased from 279 w/hr to 390 w/hr

Lithium Hydroxide canister capacity increased from 3 lbs. to 3.12 lbs.

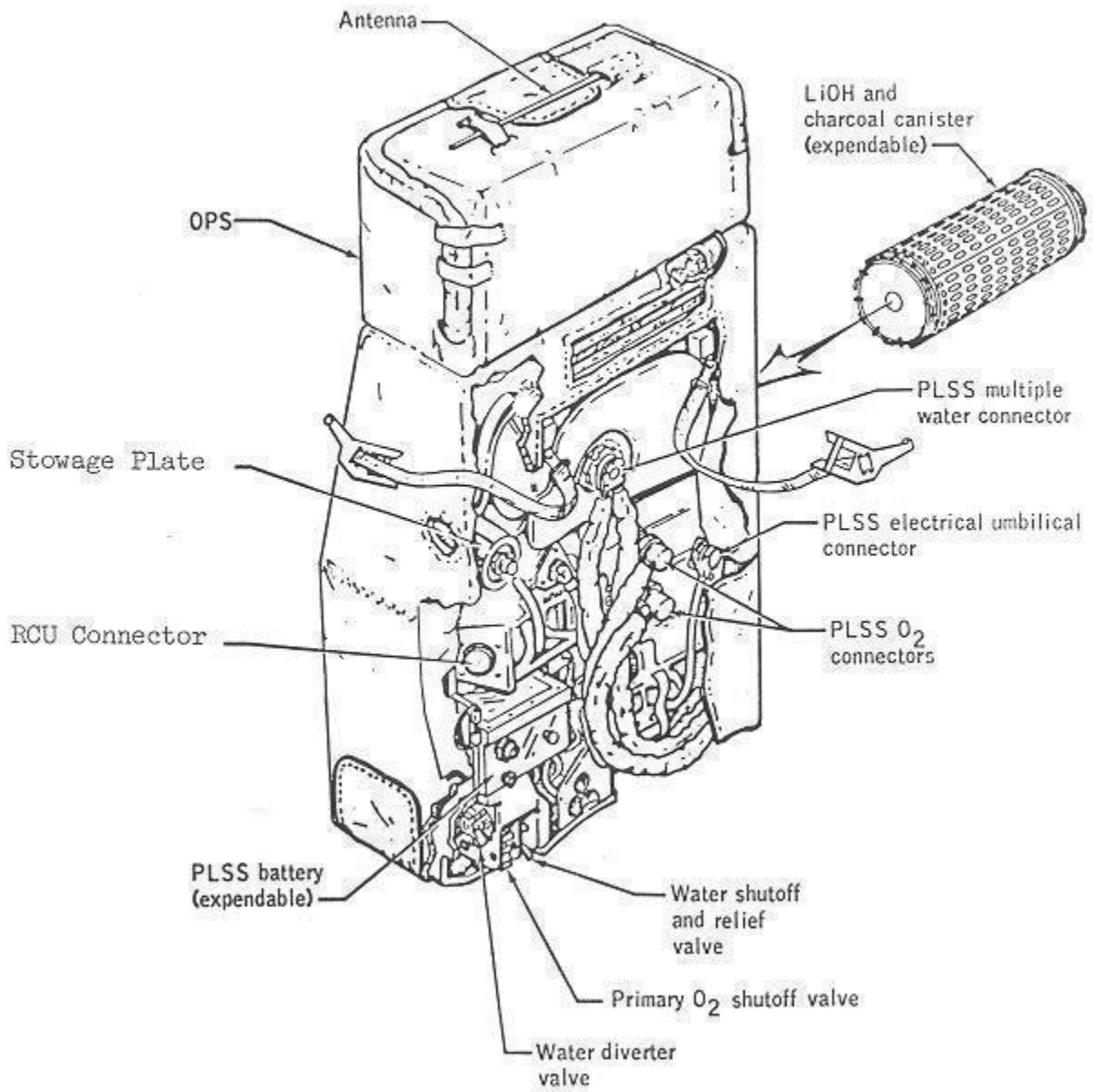
PLSS performed well on the Lunar surface with EVA duration over 7hrs with consumables to spare.

Table 2 - Parameters of the 1965 "Dash One" (-1) PLSS

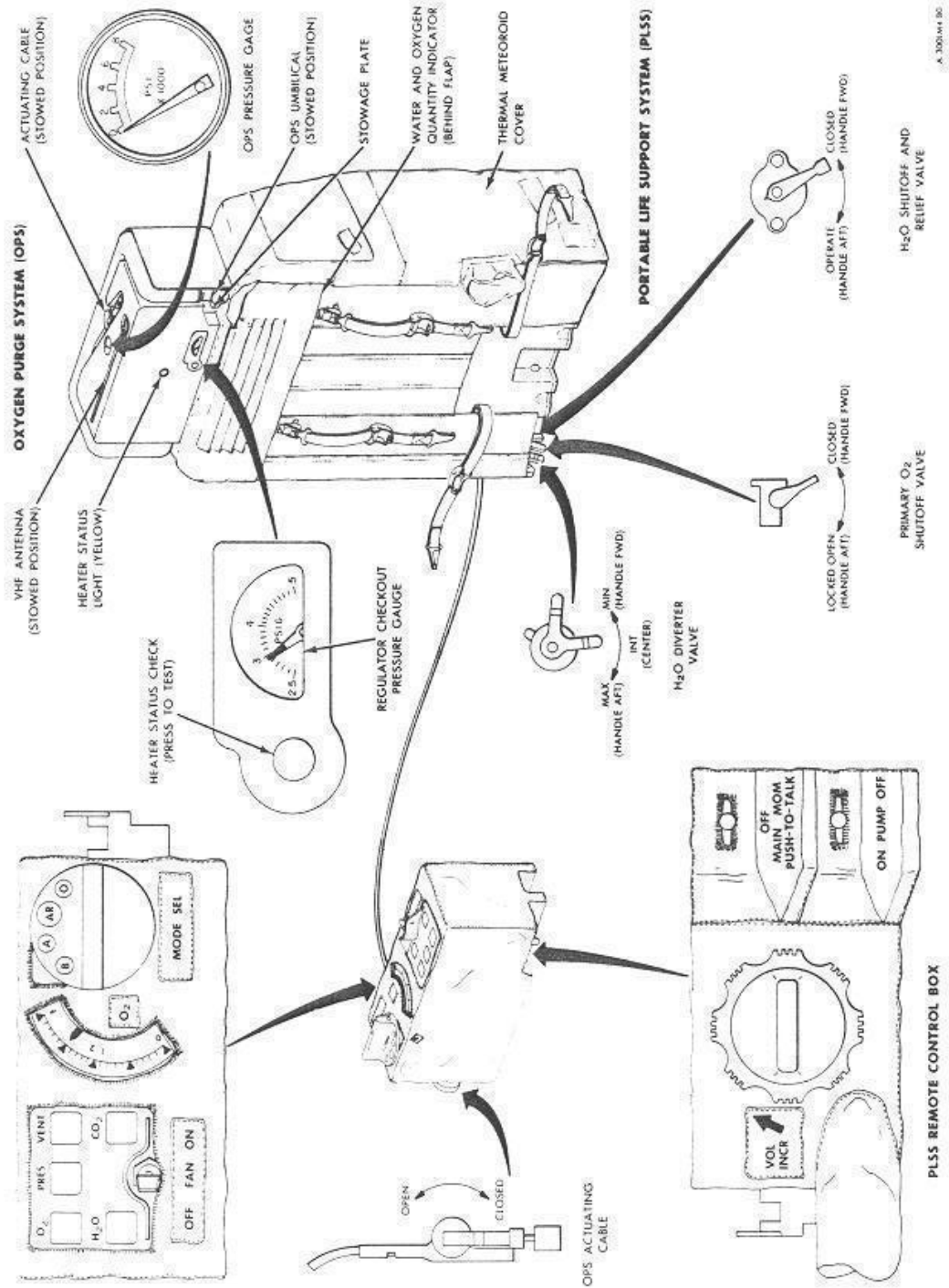
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|--|------------------------------------|
| Duration (Maximum) | 4 Hours |
| Metabolic Rate | |
| Average (3 Hours) | 1600 Btu/hr. |
| Average (4 Hours) | 1200 Btu/hr. |
| Average (6 Hours) | 930 Btu/hr.. |
| Peak | 2000 + Btu/hr. |
| Total Heat Leak | +250 to -350 Btu/hr. |
| Total Useful Heat Removal Capability | 5550 Btu |
| Gas Leakage Rate | 200 scc/min. |
| Gas Flow Rate | 6 CFM |
| Liquid Flow Rate | 4 lbs/min. |
| Suit Pressure Drop @ 3.7 psia | 1.6 in. H ₂ O |
| Weight (fully charged) | 80 lbs (nominal) |
| Overall Dimensions | 8.4 x 16.6 x 27.2 in. |
| Suit Inlet Gas Temp. | 75°F |
| Suit Inlet Liquid Temp. | Variable (45°F Minimum) |
| CO ₂ Partial Pressure into Helmet (Maximum) | |
| @ 3 Hours | 10 mm Hg. |
| @ 4 Hours | 15 mm Hg. |
| Power Source | Silver-Zinc Battery (Rechargeable) |
| Power Required | 33 W |
| O ₂ Storage Pressure | 1000 psi |
| O ₂ Storage Quantity | 1.0 lbs (Recharge) |
| Water Storage Quantity | 7.5 lbs (Recharge) |
| LiOH Quantity | 2.7 lbs |
| Contaminant Control Cartridge Wt. | 4.7 lbs |
| Reliability (12 Hours) | 0.9995 % |



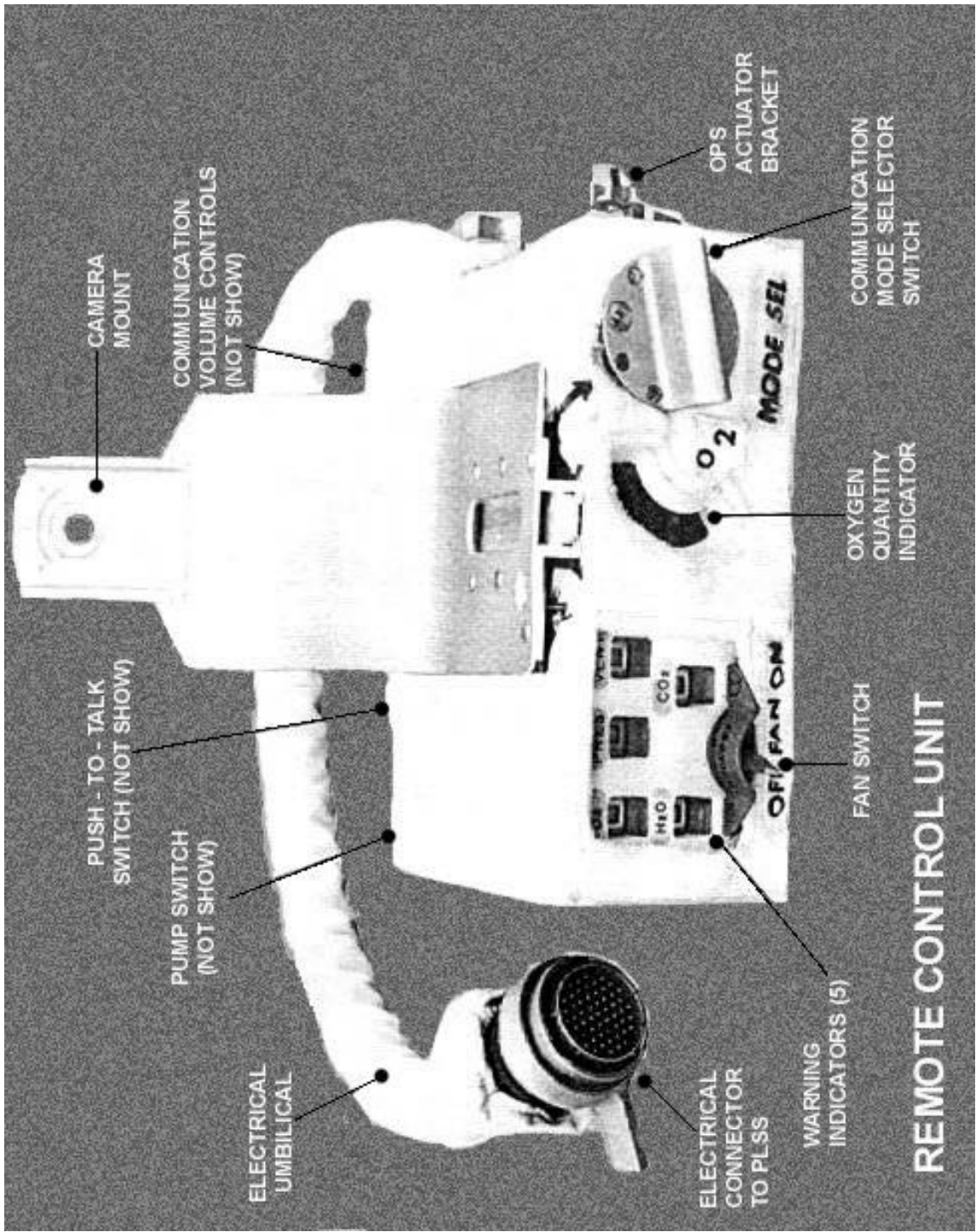
Overall PLSS backpack view



PLSS Backpack Overview



PLSS System Identifier Diagram



Remote Control Unit Diagram with Hasselblad Camera mount.



Figure 2 (Above) HSD Designer Earl Bahl
Demonstrating Potential Control and
Connection Locations
(Courtesy United Technologies Aerospace
Systems)

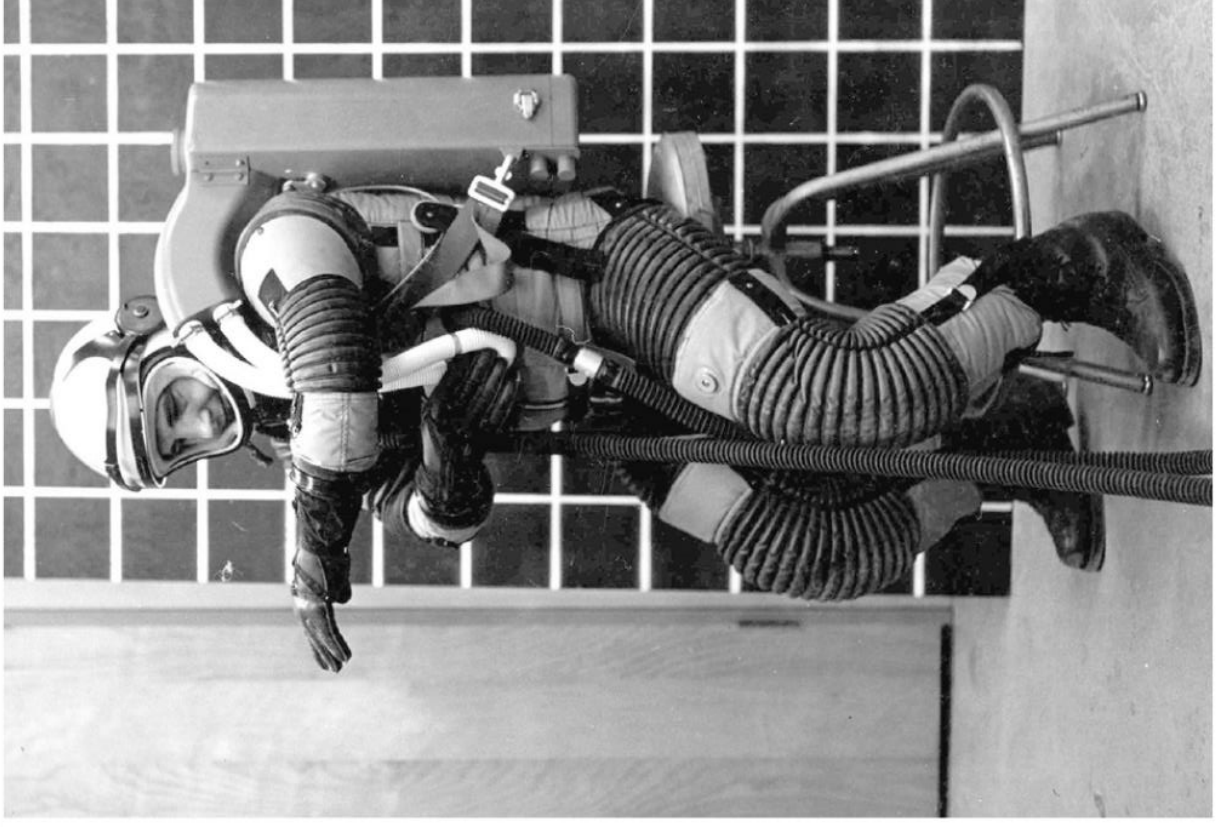


Figure 3 (right) ILC's George Durney In
Interface Evaluations
(Courtesy ILC Dover LP)

Further Reading:

<https://www.hq.nasa.gov/alsj/ALSJ-FlightPLSS.pdf>



Figure 36 The Buddy Life Support System (BLSS)
(Courtesy United Technologies Aerospace Systems)

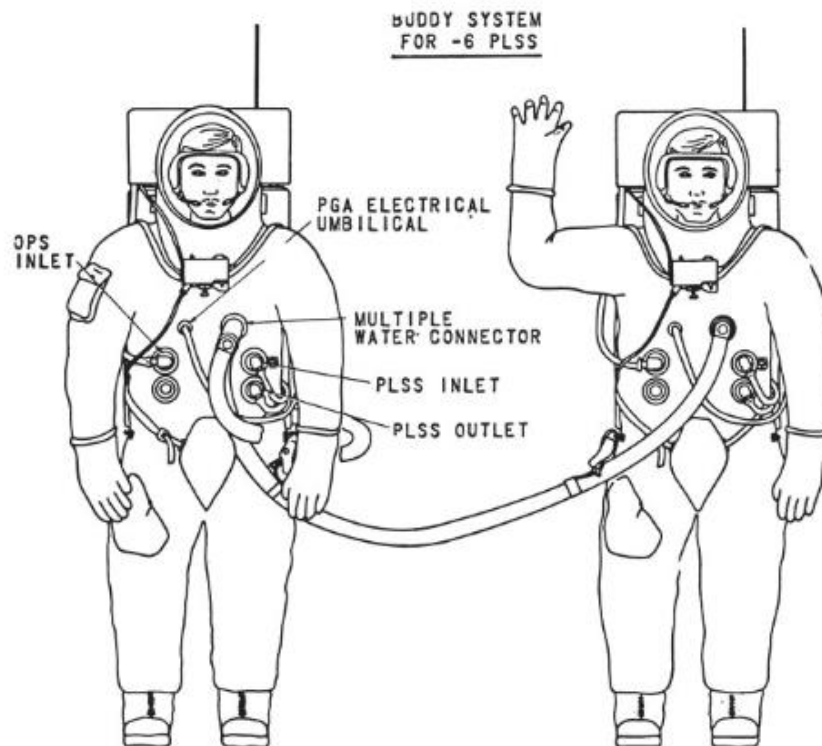


Figure 37 The BLSS Use Concept (Courtesy K. Thomas)

Don't Fart!