

CENTER SERIES SPACE SUITS

This subseries contains materials related to the development of space suits for intravehicular and extravehicular activity. As may be expected, the earliest space suits for the Mercury program descended from military pressure suits, in particular the Goodrich Navy Mark IV full pressure suit. The suit functioned primarily as protection against a sudden change in cabin pressure. It had no moveable bearings at the neck and wrist as did subsequent suits. The Gemini suit, too, is a version of a military suit developed by the David Clark Company for the USAF. Two versions, the G3C and G4C suits, were developed for intravehicular and extravehicular activity respectively. An additional suit, the G5C was developed for long duration flights. Since Gemini astronauts performed activities outside of the spacecraft, their space suits required thermal and micrometeoroid protection. Long term comfort also became necessary as mission duration increased. Naturally, the unique requirements of a lunar landing dictated changes in the space suits worn during lunar exploration excursions. The Apollo EMU (extravehicular mobility unit) required unlimited mobility, thermal, micrometeoroid and visual protection systems, a four hour lunar surface time, and compatibility with the CSM under pressurized and unpressurized conditions. The EMU included a water cooled under garment and a backpack (PLSS) housing all life support, communications and biomedical telemetry systems. Hamilton Standard had overall responsibility for the Apollo suit and portable life support system. International Latex Corporation held the production contract. Life support systems for the AAP / Skylab program were developed and built by the Garrett Corporation. The suit is a modification of the Apollo ILC A7L suit. This subseries is strongest in materials related to the Gemini and Apollo suits. Correspondence, meeting minutes, and contractor reports document the development and test of these suits. Documents are arranged by program. Photographs and motion picture films are filed at the end of the subseries. Documents related to NASA contract NAS9-3642, a production improvement and modification project for space suit assemblies, have been filed separately. Materials are dated from 1959 through 1981. See also Shuttle Series, Manned Maneuvering Unit Documents

Inventory

SubHeading:	Box Number: 01	
	A Guide to Aircrew Personal and Aircraft Installed Equipment	October 1957
MERCURY SUITS	Mercury Pressure Suit (Space Suit) Development Correspondence	1959 - 1960, 1963
GEMINI SUITS	Gemini Space Suit Development Correspondence	1962 - 1963
GEMINI SUITS	Gemini Space Suit Development Correspondence (including Gemini astronaut suit assignments)	1964 - 1966, n.d.
GEMINI SUITS	Gemini and Apollo Suit Development Milestones and Schedules	1965 - 1967
GEMINI SUITS	Gemini Space Suit Requirements	October 1, 1962
GEMINI SUITS	Procurement Plans, Project Gemini Space Suit Program and Extravehicular Pressurization Ventilation System	April 1963
GEMINI SUITS	Gemini Project Space Suit Assembly and Extravehicular Pressurization Ventilation System Statement of Work	May - June 1963
GEMINI SUITS	Garrett Airesearch, Technical Proposal - Project Gemini Extravehicular Pressurization Ventilation System	November 24, 1963
SubHeading:	Box Number: 01 *	
MERCURY SUITS	Project Mercury Pressure Suit Evaluation, Wright Air Development Center * This 80 page document has been scanned	July 1959
SubHeading:	Box Number: 02	
GEMINI SUITS	Statement of Work, Gemini Space Suit Reliability Testing Program	November 29, 1963
GEMINI SUITS	Gemini Space Suit Assembly Program Plan	c. 1963
GEMINI SUITS	Preliminary Gemini Space Suit Assembly Qualification Test Plan for Gemini Titan Flight No. 3	February 11, 1964

GEMINI SUITS	Gemini Program Technical Manual - Maintenance, Repair and Testing of Space Suit Type G-2C-24 (NAS9-1396)	April 1964
GEMINI SUITS	David Clark Co. Neck Dam Development for the Gemini Space Suit	May 5, 1964
GEMINI SUITS	David Clark Co. Phase A Study Report - Suit G-2C Gemini Program	May 14, 1964
GEMINI SUITS	David Clark Co. Gemini Space Suit Technical manual Illustrated Parts Breakdown S-954 Space Suit	July 15, 1964
GEMINI SUITS	Request for Proposal - Gemini Flight Space Suit Assemblies	August 19, 1964
GEMINI SUITS	David Clark Co. Field Maintenance Instructions for Gemini Space Suit Type G-3C	October 1, 1964
GEMINI SUITS	Brief Mobility Analysis of the Gemini 4C Space Suit Assembly	January 12, 1965
SubHeading:	Box Number: 03	
GEMINI SUITS	AVCO Corporation, Progress Reports NAS9-3625, Space Environment Testing of Gemini Space Suit Components and Materials	March - November 1965
GEMINI SUITS	David Clark Co., Gemini G-3C and G-4C Space Suit Material Analysis Records	July 8, 1965
GEMINI SUITS	LTV Astronautics, Preliminary Report of the Plume Heating Qualification Test on the Gemini MMU Extravehicular Coverall	October 11, 1965, n.d.
GEMINI SUITS	Proof Test of Meteoroid Protective Cover Layer for GT-8	October - November 1965
GEMINI SUITS	Gemini Space Suit NAS9-1396 Contract Change Notices	1965 - 1966, n.d.
GEMINI SUITS	Failure Mode and Effect Analysis, Extravehicular Mission Equipment, Gemini GT-8	January 3, 1966
GEMINI SUITS	Gemini - Apollo Space Suit Field Support Negotiations	1966, n.d.
GEMINI SUITS	Garrett Airesearch, Gemini Environmental Control System	n.d.
GEMINI SUITS	Gemini Space Suit Post Flight Testing	n.d.
GEMINI SUITS	Gemini Space Suit Temperature, Thermal Characteristics, Heat	n.d.
SubHeading:	Box Number: 03 *	
GEMINI SUITS	David Clark Co., Final Report - Gemini Space Suit Program * This 76 page document has been scanned	June 1967
SubHeading:	Box Number: 04	
GEMINI SUITS	Gemini Space Suit - GT-3 Related	1963 - 1965, n.d.
GEMINI SUITS	Gemini Space Suit - GT-4 Related	1964 - 1965, n.d.
GEMINI SUITS	Gemini Space Suit - GT-5 Related	1965, n.d.
GEMINI SUITS	Gemini Space Suit - GT-7 Related	1966
GEMINI SUITS	Gemini Space Suit - GT-6 Related	1966, n.d.
GEMINI SUITS	Gemini Space Suit - GT-8 Related	1966
GEMINI SUITS	Gemini Space Suit - GT-9 Related	1966, n.d.
GEMINI SUITS	Gemini Space Suit - GT-10 Related	1966, n.d.
GEMINI SUITS	Gemini Space Suit - GT-11 Related	1966
GEMINI SUITS	Gemini Space Suit - GT-12 Related	1966, n.d.
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APOLLO SUITS	Apollo Space Suit Correspondence	1962 - 1965, n.d.
APOLLO SUITS	Astronaut Office Correspondence re Apollo EMU and PGA	1967 - 1968
APOLLO SUITS	Garrett Airesearch, Space Suit Assembly Development Technical Proposal	March 28, 1962
APOLLO SUITS	General Electric A Program for the Development of the Apollo Space Suit Assembly	March 29, 1962
APOLLO SUITS	Minutes of the NASA - Apollo Space Suit Assembly Contractor Meeting Held at NASA MSC	September 24 - 26, 1962
APOLLO SUITS	Hamilton Standard, Monthly Progress Report for Apollo Space Suit Assembly, NAS9-723	February 1963
APOLLO SUITS	Kincaide, William C. Development of the Apollo Portable Life Support System	February 7, 1964
SubHeading:	Box Number: 05 *	
APOLLO SUITS	Mobility Range and Ventilation Study, Apollo Space Suit A-3H-024 and AXH-4H-025 Helmet * This 47 page document has been scanned	July 15, 1964
APOLLO SUITS	Hamilton Standard, Progress Report for the Apollo Space Suit System, NAS9-723 and NAS9-3535 * This 33 page document has been scanned	August - September 1964
APOLLO SUITS	Apollo Space Suit Intravehicular Mobility Task Evaluation (Grumman and NAA) * This 37 page document has been scanned	September 1964
SubHeading:	Box Number: 06	
APOLLO SUITS	Hamilton Standard, Apollo Space Suit System - Apollo Spacecraft Interface Specification, Revision F	October 30, 1964
APOLLO SUITS	Apollo Extravehicular Mobility Unit Design and Performance Specification, MSC-CSD-A-017	December 28, 1964
APOLLO SUITS	Hamilton Standard, Apollo Extravehicular Mobility Unit - Apollo Spacecraft Interface Specification, Revision G	December 31, 1964
APOLLO SUITS	Apollo Space Suit Qualification	1962 - 1964
APOLLO SUITS	Space Suit Assembly Design Performance Specification	1964
SubHeading:	Box Number: 06 *	
APOLLO SUITS	Final Review Copy Apollo Space Suit Assembly Design and Performance Specification, CSD-A-017 * All 195 pages have been scanned.	October 12, 1964
SubHeading:	Box Number: 07	
APOLLO SUITS	An X-Ray Study of Mobility in the Apollo 0-24 Space Suit Assembly CPS-65-02	January 15, 1965
APOLLO SUITS	Goodman, Jerry and Matthew Radnofsky, Lunar Surface and Free Space Hazards Relating to Space Suit Design	April 23, 1965
APOLLO SUITS	NASA Development Study of the Apollo Helmet Assembly CPS-65-13	July 16, 1965
APOLLO SUITS	Hamilton Standard NASA - Furnished Equipment Performance and Interface Specification (Apollo EMU)	1965
APOLLO SUITS	Conceptual Design Apollo Thermal Boot	March 17, 1966
APOLLO SUITS	Oral History Transcript Matthew I. Radnofsky	March 21, 1966

APOLLO SUITS	Quality Control and Reliability Program Plan and Manual for Apollo Block I Space Suit 3 volumes	April 22, 1966
SubHeading:	Box Number: 07 *	
APOLLO SUITS	Hamilton Standard, Performance and Design Requirements for the Extravehicular Mobility Unit, Apollo General Specification, SVHS 3007A // * All 240 pages have been scanned.	January 29, 1965
SubHeading:	Box Number: 08	
APOLLO SUITS	Apollo Medical Injector Study HFS-66- 12	September 22, 1966
APOLLO SUITS	Evaluation of RX-3 Hard Suit HES-67- 13	May 3, 1967
APOLLO SUITS	RX-4 Hard Suit Development	1967, n.d.
APOLLO SUITS	Garrett Airesearch Apollo Block II ECS Components	March 1968
APOLLO SUITS	Crew Systems Engineering Reports for the Apollo Space Suit Development	1968 - 1969
APOLLO SUITS	Test Report, David-Clark Moveable Visor Helmet IV and EV Impact Test	January 17, 1969
APOLLO SUITS	Test Report, Toluene Exposed Apollo Helmet Intravehicular Impact Test	January 1969
APOLLO SUITS	Douglas Paper 10206, ECGS High Performance Liquid Phase Change Space Suit Garment Cooling System Development	May 1969
APOLLO SUITS	Mission H Dual EVA Evaluation Test Procedure	June 6, 1969
APOLLO SUITS	Crew Systems Division Pressure Garment Assembly and Liquid Cooling Garment Cleanliness, Specification for	June 11, 1970
APOLLO SUITS	Webb Associates, Automatic Controllers for the Apollo LCG	June 1970
APOLLO SUITS	Oral History Transcript Al Gross, TLSA Engineer	April 4, 1972
APOLLO SUITS	Study of Apollo Space Suit Electrical Fire Hazard	n.d.
APOLLO SUITS	Hamilton Standard, Project Apollo Portable Life Support System (description)	n.d.
SubHeading:	Box Number: 08 *	
APOLLO SUITS	Familiarization and Operations Manual, Model A7L - Apollo Block II Contract End Items * This 99 page document has been scanned	November 8, 1967
APOLLO SUITS	Test Report, Apollo F. Borman Helmet Intravehicular Impact Test // * All 40 pages have been scanned.	January 17, 1969
APOLLO SUITS	Apollo EMU Garment Program Monthly Progress Report, NAS9-6100, ILC Industries * This 149 page document has been scanned	June - July 1970
APOLLO SUITS	Hamilton Standard Apollo PLSS - Environmental Control of the Smallest Manned Space Vehicle I * This 51 page document has been scanned	1971, n.d.
SubHeading:	Box Number: 08A	
SKYLAB SUITS	Skylab Space Suit Development Correspondence (including MOL related material)	1966 - 1972
SKYLAB SUITS	Skylab Program Space Suit Briefing	March 3, 1970
SKYLAB SUITS	Preliminary Report on Skylab Experiment M509, (Astronaut Maneuvering Equipment), Skylab Results and Future Applications	May 14, 1974

SHUTTLE SUITS	Shuttle Space Suit Development Correspondence	1970 - 1981
SHUTTLE SUITS	Sutton, James G. Shuttle Extravehicular Life Support Equipment	September 1973
SHUTTLE SUITS	Development of an EVA Systems Cost Model, Design Guides Synopsis	July 1974
SHUTTLE SUITS	Advanced Extravehicular Systems description (AES, AX-2, RX-4)	c. 1975
SHUTTLE SUITS	Satellite Services Catalog (Shuttle Crew Aids, Devices, Tools and Support Equipment	April 1983
SHUTTLE SUITS	JSC-20466, EVA Catalog Tools and Equipment	November 4, 1985
SPACE SUITS - GENERAL	Space Suit Development Summaries	1969, n.d.
SubHeading:	Box Number: 09	
SPACE SUITS - GENERAL	Royal Aircraft Establishment (Farnborough) Design Principles of Full Pressure Suits	April 1962
SPACE SUITS - GENERAL	Fritz, Eugene Description and Evaluation of a Space Vehicle Protective Suit Assembly	October 1962
SPACE SUITS - GENERAL	Kimball, Charles R. Pressure Suit Using Cord Restrained Joint	August 1963
SPACE SUITS - GENERAL	Effective Life Support Helmets, Office of Naval Research	November 1963
SPACE SUITS - GENERAL	Royal Aircraft Establishment The Development of Water Conditioned Suits	April 1964
SPACE SUITS - GENERAL	NASA General Working Paper No. 10,058 Comparison and Evaluation of American - Russian Space Suit Technological Developments // This 318 page document is scanned * See Center-SpaceSuits-9-NASA Working Paper No. 10,058.pdf	January 31, 1966
SPACE SUITS - GENERAL	C. C. Lutz, Space Suits and Support Equipment	February 7, 1966
SPACE SUITS - GENERAL	NASA TN-D-3291, Johnson, Correale, and Radnofsky, Space Suit Development Status	February 1966
SPACE SUITS - GENERAL	Webb Associates, Bio-Thermal Responses to Varied Work Programs in Men Kept Thermally Neutral by Water Cooled Clothing	November 1966
SPACE SUITS - GENERAL	Application of Conductive Cooling for Working Men in Thermally Isolated Environment	c. 1966
SPACE SUITS - GENERAL	Litton Systems, Proposal for a Fabric Extravehicular Space Suit Assembly, Attachment A	June 1967
SPACE SUITS - GENERAL	ITT Research Institute, Research and Development of Extravehicular Protective Assemblies, Quarterly Status Report	August 1967
SPACE SUITS - GENERAL	Carlton Control Corporation, Space Suit Ventilation Contract NAS9-7646	November - December 1967
SPACE SUITS - GENERAL	Arrowhead Products, Shoulder Cable Transfer Bearing Assembly Contract and RFP NAS9-7615	1967
SPACE SUITS - GENERAL	Oral History Transcript Forrest R. Poole, David Clark Co.	May 1, 1968
SPACE SUITS - GENERAL	Evaporative Cooling Garment System Space Suit	June 1968, n.d.
SubHeading:	Box Number: 09 *	
SPACE SUITS - GENERAL	B. F. Goodrich, Design, Development, and Fabrication of Prototype Pressure	February 1, 1965

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SPACE SUITS - GENERAL	NAS9-7251, Extravehicular Glove Development Program Technical Specification and Final Technical Report	1968
SPACE SUITS - GENERAL	Tucker, Elton M. Papers on Space Suit and Life Support System Development	1968, n.d.
SPACE SUITS - GENERAL	Technical Data Package for the Improved Extravehicular Gloves	April 2, 1975
SPACE SUITS - GENERAL	Man / System Design Requirements for Weightless Environments, MSFC STD-512	c. 1975
SPACE SUITS - GENERAL	Hamilton-Standard, Extravehicular Mobility Unit (EMU) Cost Proposal, Volume II & III	April 1988
SPACE SUITS - GENERAL	Life Support Systems	n.d.

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SPACE SUITS - GENERAL	Crew Equipment Branch Project List	n.d.
SPACE SUITS - GENERAL	Johnston, Richard and Edward L. Hays, The Development and Operation of Extravehicular Equipment	n.d.
SPACE SUITS - GENERAL	Correale, James L. Space Suits	December 1962
SPACE SUITS - GENERAL	Johnston, Richard S. Life Support Systems	n.d.
SPACE SUITS - GENERAL	Vykukal, Hubert C. Advanced Developments in Hard Space Suit Technology	n.d.
SPACE SUITS - GENERAL	Soviet Space Suits	n.d.
SPACE SUITS - GENERAL	Space Suit News Releases and Fact Sheets	1976, 1982, 1988, n.d.
SPACE SUITS - GENERAL	NAS9-3642 Contract Supplemental Agreements	1965 - 1968
SPACE SUITS - GENERAL	NAS9-3642, David Clark Company Technical Proposal, Advanced Design Components for Space Suit Assemblies (including list of required GFE Equipment and Manpower Loading Charts)	March 1967
SPACE SUITS - GENERAL	NAS9-3642 David Clark Company Cost and Manpower Information	1967, n.d.
SPACE SUITS - GENERAL	NAS9-3642, David Clark Company, Advanced Component Development for Space Suit Development, Monthly Progress Reports	May - November 1967
SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Design Review Meeting Minutes	April - August 1967
SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Design Study for Pressure Sealing Closure	n.d.
SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Study and Development of Pressure Sealing Closure - Final Report	December 1967
SPACE SUITS - GENERAL	NAS9-3642, Evaluation of Thermal Grid System Developed by the David Clark Company, Inc.	November 1967

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SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Thermal Grid Development for Liquid Cooled Garments	December 1967
SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Study and Development of Mobility Joint - Final Report	December 1967
SPACE SUITS - GENERAL	NAS9-3642, David Clark Co., Component Development for Space Suit Assemblies, Master Program Plan	n.d.

SubHeading:	Box Number: 13	
SPACE SUITS - GENERAL	Wiley Post Winnie Mae Flight Suit Photos	n.d.
SPACE SUITS - GENERAL	Mercury Space Suit Photos	1962
SPACE SUITS - GENERAL	Crew Equipment and Life Systems Branch Facilities Photos	1962
SPACE SUITS - GENERAL	Gemini Space Suit Testing Photos	1962
SPACE SUITS - GENERAL	Apollo Space Suit Testing Photos	1962
SPACE SUITS - GENERAL	Apollo B Suit Testing Photos John Young	1963
SPACE SUITS - GENERAL	Apollo Space Suit Testing Photos (4 folders)	1963
SubHeading:	Box Number: 14	
	Apollo Space Suit Photos - Modified AX-5H Hamilton Standard	1965
SPACE SUITS - GENERAL	Gemini Space Suit Testing Photos	1963 - 1964
SPACE SUITS - GENERAL	Urine Collection System and Food Port Photos (unknown suit)	1964
SPACE SUITS - GENERAL	HT-002 Thermal Garment After Exposure in SESL (plume heating) Photos	1964
SPACE SUITS - GENERAL	Gemini / Apollo Space Suit Photos	1964 - 1965
SPACE SUITS - GENERAL	Helmet Impact Test Photos (pre - GT-4)	1965
SPACE SUITS - GENERAL	Apollo Space Suit Mobility Test Photos	1965
SPACE SUITS - GENERAL	Gemini EVA Space Suit (G-5C) Photos	1966
SPACE SUITS - GENERAL	Apollo RX-3 Hard Space Suit Presentation	1966
SPACE SUITS - GENERAL	Apollo Space Suit Photos	1966 - 1969
SPACE SUITS - GENERAL	David Clark Co., S-1021 Space Suit Assembly Mobility Range Study (NAS9-3642) Photos	January 1968
SPACE SUITS - GENERAL	Space Suit Photos	1970 - 1972
SPACE SUITS - GENERAL	Gemini EVA Cover Layer Gemini G-2C Space Suit Assembly Photos	n.d.
SPACE SUITS - GENERAL	Gemini Space Suit Training Photos	n.d.
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SPACE SUITS - GENERAL	MSC (Wright Patterson AFB) Apollo Space Suit Donning and Doffing (motion picture film, 127 ft)	January 8, 1964
SPACE SUITS - GENERAL	Gemini Space Suit - Apollo CSM Mockup Interface (motion picture film, 8 minutes)	April 30, 1964
SPACE SUITS - GENERAL	RX2A Hard Suit Mobility Demonstration (motion picture film, 227 ft)	January 26, 1965
SPACE SUITS - GENERAL	Apollo Donning and Doffing (motion picture film, 400 ft)	January 28, 1965
SubHeading:	Box Number: 16	
SPACE SUITS - GENERAL	Apollo Space Suit Donning and Doffing (motion picture film, 700 ft)	January 28, 1965
SPACE SUITS - GENERAL	Apollo EMU Status Report (motion picture film, 18 minutes)	February 1965
SPACE SUITS - GENERAL	RX-3 Hard Suit Qualification LEM Ingress and Egress (motion picture film, 400 ft)	March 2, 1967
SPACE SUITS - GENERAL	Space Suit Maintenance, Huntsville Program? (motion picture film, length unknown)	n.d.