

University of Houston Clear Lake

Archives and Special Collections

HSF-63 Robert V. Grilli Papers

[Human Space Flight Collection]

Collection Number: HSF-63

Title: Robert V. Grilli Papers

Dates: 1971, 1973, 1978, 1980-1997, undated

Creator: Robert V. Grilli; National Aeronautics and Space Administration; and various other creators

Abstract

The Robert V. Grilli Papers is composed of reports, memos, notes, technical manuals and handbooks, checklists, guides, schedules, technical requirements records, technical documents, directories, training manuals, meeting logs, telephone directories, plans, charts, reel-to-reel audiotapes, and other materials, documenting the career of Robert V. Grilli as a contractor with Philco-Ford, Ford Aerospace and Communications Corporation, Rockwell Space Operations Company, and United Space Alliance at Johnson Space Center in coastal Houston, Texas. Grilli worked as a contractor at Johnson Space Center from 1962 to 2011.

Most of this collection covers his work on the Space Shuttle Program from 1978 to 1997. Most of the records and manuals document Grilli's work as a Shuttle program engineer in program requirements, payloads system, telemetry, command data, and communications between 1980 and 1995. There are also Grilli's personal original reel-to-reel audiotapes of portions of the Apollo 15 mission, Skylab mission, and Skylab 4 mission.

Extent: 3.95 linear feet (includes 16 reel-to-reel audiotapes)

Language(s): English

Repository

University of Houston-Clear Lake Archives and Special Collections, Alfred R. Neumann Library, 2700 Bay Area Blvd., Houston, TX 77058-1002

Restrictions on Access: There are no known restrictions on accessing this collection.

Restrictions on Use

There are no known restrictions on using this collection. Some of the technical and scientific information in this collection may fall under the International Traffic in Arms Regulations (ITAR) of the United States government. As such, it cannot be placed shared online, digitally, or in hardcopy format with individuals residing in, citizens of, or representatives of the countries deemed as being restricted for U.S. citizens to share such information. Researchers interested in publication of the technical and scientific information are required to consult the appropriate NASA officials prior to doing so; otherwise, researchers who do not receive permission from NASA may face federal prosecution for breaking ITAR regulations.

Preferred Citation

[Item name or title], [Box Numbers], [Folder Numbers], Robert V. Grilli Papers, HSF-63, University of Houston-Clear Lake Archives and Special Collections, Alfred R. Neumann Library, 2700 Bay Area Blvd., Houston, TX 77058-1002

Acquisition

The collection was donated to the University of Houston-Clear Lake Archives and Special Collections by Robert V. Grilli of Houston, Texas, in two separate deposits in July and October 2017.

Technical Access:

The 5-inch and 7-inch reel-to-reel audiotapes were left stored in their original tape boxes, with the collection number, collection title, and reel number written in pencil on the cover of the boxes. These reels cannot be played or accessed onsite by researchers, as UHCL Archives does not have playback or digitization equipment for this audio format. Should researchers wish to listen to the audio recordings, they will be required to select a vendor from an approved list to contract with for the digitization and cleaning work of the audio reels, with the researcher paying the vendor directly.

The vendor will have to agree to abide by handling and storage guidelines from the UHCL Archives, and sign a loan agreement for the audio reels while they are in their possession for the digitization process. As part of this arrangement, the vendor will provide the UHCL Archives with a master and access audio digital file for the original recordings, as well as providing requested formats to the researcher. If the researcher does not agree to the costs or this process, the UHCL Archives will not be able to arrange for the digitization of these audio reels. Should the research want access to original Apollo 15 and Skylab mission recordings, they are encouraged to contact NASA Headquarters Archives or the NASA Oral History Lead at Johnson Space Center to acquire digitized versions of those recordings.

Processing Information

The collection was originally received with loose order of materials stored together from common usage of the records by the donor. Most of the materials had been stored in an area where they were exposed to pests over time. Most of the manuals and handbooks were stored in three-ring binders, with the plastics covers sticking to the paper contents, the metal rings rusting heavily, and the dirt and bug debris built up in the spine of the binders. This is common damage seen in materials stored in the coastal Houston, Texas, region. Silverfish especially ate the interior portions of the covers of the three-ring binders where the adhesive was, and caused surface damage to a number of manuals and booklets in the collection.

The processing archivist shook loose as much of the debris as possible from all the archival materials, though some remains stuck in between pages of various documents. Many of the very thick NASA manuals and handbooks were removed from their bindings or three-ring binders, and divided between two or more folders since the manuals or handbooks were too wide to fit if stored in a single archival folder. The folders were labeled in the folder titles as “Part 1” and “Part 2” in parentheses after the manual or handbook title. The order of materials in the manuals or handbooks were not changed when they were divided to fit in two separate folders for long-term storage. Several of the manuals were received by the Archives missing title covers or whole sections of the binders. In the absence of titles, the processing archivist assigned general titles to materials based on the indicating content of the documents.

A number of contractor materials and manuals, along with communication infrastructure materials for several NASA centers, were removed from the collection in keeping with the UHCL Archives’ collection policy.

Processed by: Matthew M. Peek, November-December 2022.

Arrangement

The collection is arranged by purpose and topic of the materials in folders, with loose chronological order within series where possible. The materials are arranged in the following series: Series I: Space Shuttle Payload Records; Series II: STS Communications and Data Systems Records; Series III: National Space Transportation System Materials; Series IV: Space Shuttle Cargo Systems Materials; Series V: Miscellaneous NASA Manuals and Records; Series VI: Goddard Network Operations Support Plan Books; Series VII: U.S. Air Force Records; Series VIII: NASA Contractor Materials; Series IX: Miscellaneous Materials; and Series X: Manned Spacecraft Center Audio Reels.

Biographical Note

Robert Vincent Grilli (who goes by “Bob”) grew up on Long Island in New York City, New York. He attended and graduated from Sewanhaka High School in Floral Park, New York, in 1954. After high school, Grilli entered military service in the U.S. Navy during the Cold War era after the Korean War, serving for six years in naval aviation. Grilli would be stationed out of U.S. Naval Air Station Jacksonville in Jacksonville, Florida, assigned to Strike Fighter Squadron

14 (VFA-14), which was nicknamed the “Tophatters.” Grilli worked as a fire control technician on the fighter aircraft, fixing the aircrafts’ electronics equipment. His unit traveled aboard the USS *Forrestal* (CVA-59) during its first Mediterranean cruise in 1957.

After leaving the Navy, Grilli was hired by the Radio Corporation of America (RCA) on January 11, 1959, to work with the RCA Range Tracking and Data Transmission Group in Cape Canaveral, Florida. While there, he was a control recorder working for Wernher von Braun, when the United States was testing satellites there less than two years after the Soviet Union’s launch of Sputnik. Grilli went to work with the Philco electronics company (later Philco-Ford) in September 1959, working as a Philco transmitting area supervisor with the U.S. Air Force Satellite Control Facility Tracking Station on Kodiak Island, Alaska. This location was responsible for tracking the Air Force’s Discover, SAMOS, and MIDAS satellite programs. Grilli worked there until July or August 8, 1962, as a systems modifications person who developed modifications to existing practices and systems that helped the station operate more efficiently.

Robert Grilli moved with Philco-Ford company to Houston, Texas, either in July or August 1962. There, he was assigned as an Apollo Program Lunar Module (LM) Research and Development engineer, working out of a building off Telephone Road in an office complex on Wheeler Street in Southeast Houston, that served as the home for many NASA personnel until the completion of the Manned Spacecraft Center for operational functions between 1963 and 1964. Grilli was assigned to the NASA Instrumentation Electronics Systems Division, and assisted with Philco-Ford’s contract to build the electronic equipment and install the consoles for the new Mission Control Center at the Manned Spacecraft Center. Grilli was one of the men who crawled under the console desks to wire the systems together.

According to Grilli while putting together the Mission Control Center MCC, the Philco-Ford contractors were having to pull a lot of electrical and computer cables together through the third floor of Building 30. The men had to lift up each of floor boards and pull the cables through, which was taking a lot of time. Grilli took a messenger line (which is a light cord or rope used to pull heavier cables across a gap or through a tube or duct), and pulled the cables under the floor boards with the messenger line. This step saved the contracted about a week of physical work, and they were able to finish the work in half a day. Grill also notes that he was the first person to give a tour of the new Mission Control Center once the installation was completed in 1964.

Grilli worked in a number of positions in the 1960s and 1970s at the Manned Spacecraft Center as a Philco-Ford contractor. Early on, he worked in the Simulation Control and Training System (SCATS) Command for the Mercury and Gemini programs. He would be working as a Command and Telemetry Systems (CCATS) telemetry controller in Mission Control by the Apollo/Saturn 201 (AS-201) test flight in February 1966. Grilli would serve as the Prime Telemetry Instrumentation controller for the Apollo 11 and Apollo 12 missions; then he moved to being a tracking controller for Apollo 13 through Apollo 17 missions. During Apollo, Grilli was a senior tiger team “trouble-shooter” He would work as an operations supervisor for the joint NASA-U.S. Department of Agriculture’s Large Area Crop Inventory Experiment (LACIE), initiated in 1974. This multiagency project was to develop, test, and demonstrate in a “quasi-

operational” environment the technology to produce agricultural crop production information on a global scale.

Robert Grilli served as the configurations supervisor in the Mission Control Center at Johnson Space Center (JSC) during the Skylab mission. He would then serve as the operations manager in Mission Control Center during the Apollo-Soyuz Test Project; and in the same role with the STS Approach and Landing Tests (ALT) taxi and flight trials of the prototype Space Shuttle *Enterprise* in 1977. Having not attended college due to military service, Grilli attended and received an Associate in Arts (AA) degree in engineering from San Jacinto Junior College (now San Jacinto College) in Pasadena, Texas. He would complete a bachelor in science degree in physics from the University of Houston in 1977.

During his entire time working at Johnson Space Center, Robert Grilli worked at NASA as a contractor for Philco-Ford, which became Ford Aerospace and Communications Corporation in 1976. From 1978 through 1985, Grilli worked on the Space Shuttle (STS) Program, starting with the STS Orbital Flight Tests in the network/ground control unit. He served as a program requirements engineer for the STS program through around 1984. Eventually by 1984, he was now working as a Space Shuttle payloads system engineer at Johnson Space Center.

In December 1985, Grilli left Ford Aerospace after 26.5 years to work for Rockwell Space Operations Company (RSOC) as a Space Flight Operations Contract (SFOC) contractor as a manager. His job title was in payload operations. He also worked on the secure television systems for the Space Shuttle cargo systems; and he reverted to his early career work in telemetry by working on Space Shuttle telemetry, command data, and communications in the late 1980s to early 1990s. Grilli was working in the JSC Payload Support Planning Section as of October 1990. When the United Space Alliance (USA) was established in August 1995, Rockwell Space Operations Company was part of the Alliance, and Grilli worked for USA at JSC. He would serve as a member of the Space Shuttle Review Board at NASA. Robert Grilli retired from the United Space Alliance and NASA in 2011. As of this writing, Grilli resides in the Clear Lake City region of Houston, Texas.

Scope and Content

The collection is composed of reports, memos, notes, technical manuals and handbooks, checklists, guides, schedules, technical requirements records, technical documents, directories, training manuals, meeting logs, telephone directories, plans, charts, reel-to-reel audiotapes, and other materials, documenting the career of Robert V. Grilli as a contractor with Philco-Ford, Ford Aerospace and Communications Corporation, Rockwell Space Operations Company, and United Space Alliance at Johnson Space Center in coastal Houston, Texas. Grilli worked as a contractor at Johnson Space Center from 1962 to 2011. Most of this collection covers his work on the Space Shuttle Program from 1978 to 1997. Most of the records and manuals document Grilli’s work as a Shuttle program engineer in program requirements, payloads system, telemetry, command data, and communications between 1980 and 1995. There are also Grilli’s personal original reel-to-reel audiotapes of portions of the Apollo 15 mission, Skylab mission, and Skylab 4 mission.

The collection is arranged in the following ten series: Series I: Space Shuttle Payload Records; Series II: STS Communications and Data Systems Records; Series III: National Space Transportation System Materials; Series IV: Space Shuttle Cargo Systems Materials; Series V: Miscellaneous NASA Manuals and Records; Series VI: Goddard Network Operations Support Plan Books; Series VII: U.S. Air Force Records; Series VIII: NASA Contractor Materials; Series IX: Miscellaneous Materials; and Series X: Manned Spacecraft Center Audio Reels.

Subject Terms

Personal/Family Name

Grilli, Robert V. (Robert Vincent)

Corporate Names

Ford Aerospace & Communications Corporation
Lyndon B. Johnson Space Center
Philco Corporation
Rockwell International. Space Division
Rockwell Space Operations Company
United Space Alliance
United States. National Aeronautics and Space Administration

Geographic Name

Houston (Tex.)

Topical Term

Aerospace telemetry
International Space Station
Manned space flight--History
Manned Spacecraft Center (U.S.)
Spacelab Program
Space shuttles--United States--History
Space--Social aspects--History
United States. National Aeronautics and Space Administration--History

Genre/Physical Characteristic

Checklists
Directories
Handbooks
Memorandums
Operating manuals
Publications

Schedules
 Technical drawings
 Technical manuals
 Technical reports
 Training manuals

Collection Inventory

Series I: Space Shuttle Payload Records

Series I consists of reports, notes, technical manuals and handbooks, guides, technical requirements records, directories, training manuals, used by Robert Grilli while working as a contractor with Ford Aerospace and Communications Corporation and Rockwell Space Operations Company at Johnson Space Center. All of the materials document the payloads commands and data operations for the Space Shuttle program, used mostly while Grilli worked at JSC as a Shuttle requirements engineer and later a payloads system engineer. Most of the materials cover the time period 1980 to 1992.

Box/Folder	Description	Date
1/1	STS Flight PRD Volume II, Payloads Annex 10-WESTAR Document	1983
1/2	STS OPS Flight PRD Volume II, Payloads	1984
1/3	STS Flight PRD Volume II, Payloads Annex 12-LDEF (Long Duration Exposure Facility)	March 1984
1/4	STS Flight PRD Volume II, Payloads Annex SYNCOM IV	April 1984
1/5	Space Shuttle Payload Data Handling and Communication Description and Performance Document	March 1980
1/6	Orbiter Middeck Payload Provisions Handbook (Revision A)	September 1980
1/7	Cargo Systems Manual Development Guidelines Handbook: All Payloads	February 1987
1/8	Grilli's Payload Command Overview (PAYCOM) Binder (Part 1)	[1980s]
1/9	Grilli's Payload Command Overview (PAYCOM) Binder (Part 1)	[1980s]

1/10	Payload Communication Workbook (MOD)	February 1987
1/11	MOD Payload Dictionary: STS Operations (Revision A)	December 1992
2/1	Miscellaneous Johnson Space Center Space Shuttle Payload Operations White Papers	1989-1990, undated
2/2	Space Shuttle Program Payload Bay Payload User's Guide—Basic	December 2000
2/3	Grilli's Miscellaneous Payload Command Records Folder Materials	Various dates

Series II: STS Communications and Data Systems Records

Series II consists of technical documents, technical manuals and handbooks, guides, technical requirements records, training manuals, and miscellaneous materials, used by Robert Grilli at Johnson Space Center while he served as a Space Shuttle requirements engineer and later a payloads system engineer. Grilli worked at JSC as a Shuttle requirements engineer and later a payloads system engineer when these materials were being used for the most part. Most of these records relate to the communications, data systems, and telemetry for the Space Shuttle (STS) Program in the 1980s.

Box/Folder	Description	Date
2/4	NASA STS Communications and Data Systems Integration (CADSI) End-to-End Configuration Book (Part 1)	July 1980
2/5	NASA STS Communications and Data Systems Integration (CADSI) End-to-End Configuration Book (Part 2)	July 1980
2/6	STS Program Requirements Document Volume II—Miscellaneous Versions	August 1982, May 1983
2/7	Communications Ground Rules and Loop Directory, Revision 9: STS Dual OPS	March 1, 1984
2/8	Miscellaneous Flight Operations Requirements Manuals (STS-11, STS-13, STS-41D)	1983-1984
3/1	STS Communications and Data Systems Integration (CADSI) End-to-End Configuration Book—VAFB Annex	June 1985
3/2	STS-51L Flight Documents	1985

3/3	Space Shuttle Telemetered and Recorded Data Format Requirements (Revision K)	January 1989
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Series III: National Space Transportation System Materials

Series III consists of handbooks, training manuals, and documents, used by Robert Grilli at Johnson Space Center while he served as an engineer and manager there with the Space Shuttle program. Most of these records relate to the telemetry and command data used as part of the National Space Transportation System with the Space Shuttle (STS) Program between the late 1980s and mid-1990s.

Box/Folder	Description	Date
3/4	National Space Transportation System: Space Shuttle Telemetry and Command Data Characteristics Handbook—Telemetry Downlink, Volume 1 (Revision D) (Part 1)	August 15, 1988
3/5	National Space Transportation System: Space Shuttle Telemetry and Command Data Characteristics Handbook—Telemetry Downlink, Volume 1 (Revision D) (Part 2)	August 15, 1988
3/6	POCC Capabilities Document—National Space Transportation System	June 1990
4/1	Subsystem Codes Manuals: National Space Transportation System and Space Shuttle	November 1989, March 1994

Series IV: Space Shuttle Cargo Systems Materials

Series IV consists of two manuals and binders of records for the Space Shuttle cargo systems secure television system and cargo data systems in the 1980s. These were used by Robert Grilli while he served as an engineer and manager there with the Space Shuttle program. These records document the program by NASA to add cargo bay closed circuit television (CCTV) cameras for payloads on the Space Shuttle.

Box/Folder	Description	Date
4/2	Cargo Systems Manual Secure Television System (Preliminary)	November 1988
4/3	Grilli's The Cargo Integration Review Process Binder (Part 1)	Various dates
4/4	Grilli's The Cargo Integration Review Process Binder (Part 2)	Various dates

Series V: Miscellaneous NASA Manuals and Records

Series V consists of training manuals, technical manuals and handbooks, guides, technical requirements records, technical documents, training manuals, and miscellaneous materials, used by Robert Grilli while he worked as a contractor at Johnson Space Center on the Space Shuttle Program between 1980 and 1995. Some of these records document the implementation of the Shuttle cargo bay secure television system. Some of these records document the telemetry and command data flows for Shuttle and NASA facility communications. A number of the records focus on computer and data systems, which is what Grilli had begun working with in the aerospace field in the late 1950s.

Box/Folder	Description	Date
4/5	Shared Service TDRSS (SSTDRSS) Program: Support Instrumentation Requirements Document	January 1980
4/6	Shuttle Mission Control Center External Communications Interface Control Document: Volume 1, JSC/GSFC Operational Communications Interface Control Document for Shuttle Orbital Flight Test	February 1, 1980
4/7	Flight Control Command Modules Workbook: Ground Systems User Tools	March 1, 1980
4/8	POCC Command Overview Presentation—Copy	March 1, 1980
5/1	Orbiter Avionics Mass Memory Unit Computer Program Integration Plan (MIP) Manuals	June 1981
5/2	Space Shuttle Interface Control Document Level II (Revision A Issue)	1981
5/3	Guidance and Control Sensors: GNC Systems Training Manual Sensors 2102	January 1985
5/4	Rendezvous/Proximity Operations Workbook	February 1985
5/5	Guidance and Control Systems Training Manual: G&C—Insertion, Onorbit and Deorbit	October 1985
5/6	Ground Data Flow Textbook: Network Overview 2102	October 1986
5/7	Flight Operations Support Annex: Secure Television System	October 1988
5/8	The Autonomous Systems Flight Controller (Systems	circa 1980s

	Division)	
5/9	Standard JSC to CSTC Joint Operations Interface Procedures (Final, Revision B)	September 1991
5/10	Mission Operations Directorate CSR Handbook (Partial) (Final)	December 1993
5/11	Johnson Space Center MAPS Familiarization Slides	November 19, 1993
5/12	Ground Systems Command Data Flow Workbook	January 1994
5/13	Ground Systems Telemetry Data Flow Workbook (Revision A)	September 1994
5/14	Generic Joint Operations Interface Procedures for Spacelab (Final, Revision B)	September 1995
5/15	Grilli's DH6 Library Command Training and Reference Materials Binder (Part 1)	Various dates
6/1	Grilli's DH6 Library Command Training and Reference Materials Binder (Part 2)	Various dates
6/2	Grilli's DH6 Library Command Training and Reference Materials Binder (Part 3)	Various dates
6/3	Command Applications Initialization/SWCO Operations/ DELOG Procedures Binder	Undated

Series VI: Goddard Network Operations Support Plan Books

Series VI consists of two plan books for the Goddard Space Flight Center in Greenbelt, Maryland, covering the Goddard network operations support plan for the Space Shuttle Program between 1980 and 1985. These plan books were used by Robert Grilli at Johnson Space Center in his role as a contractor serving as a Space Shuttle requirements engineer and later a payloads system engineer.

Box/Folder	Description	Date
6/4	Goddard Network Operations Support Plan for the Space Shuttle Plan Books (Part 1)	1983-1985
6/5	Goddard Network Operations Support Plan for the Space Shuttle Plan Books (Part 2)	1980, 1982-1983, 1985, undated

7/1	Goddard Network Operations Support Plan for the Space Shuttle Plan Book: Revision 4 (Part 1)	September 1984
7/2	Goddard Network Operations Support Plan for the Space Shuttle Plan Book: Revision 4 (Part 2)	September 1984

Series VII: U.S. Air Force Records

Series VII consists of three U.S. Air Force manuals and documents, showing the role the Air Force had in partnering with NASA and Johnson Space Center for various instrumentation and communications systems. Two manuals are from Wright-Patterson Air Force Base's 4950th Test Wing on Advanced Range Instrumentation Aircraft (ARIA) in 1981. One document features the Air Force's satellite control facility and its Johnson Space Center interface control for space travel in 1987.

Box/Folder	Description	Date
7/3	Wright-Patterson Air Force Base 4950th Test Wing Advanced Range Instrumentation Aircraft (ARIA) Manuals	1981
7/4	Air Force Satellite Control Facility JSC Interface Control Document for the Space Transportation (Draft)	July 1987

Series VIII: NASA Contractor Materials

Series VIII consists of documents, manuals, and telephone directories, kept by and used by Robert Grilli while he served as a contractor for Rockwell Space Operations Company and United Space Alliance at Johnson Space Center between 1993 and 1997. The materials include external interface control documents used by NASA contractors for the operational communications standards between Johnson Space Center and Goddard Space Flight Center. There is a United Space Alliance manual on Space Shuttle cargo systems for a microgravity science laboratory to be flown aboard STS-83. There are several telephone directories from Rockwell Houston Operations and United Space Alliance Houston Operations, while Grilli worked there.

Box/Folder	Description	Date
8/1	External Interface Control Document: JSC/GSFC Operational Communications ICD for Space Shuttle Missions	August 26, 1993
8/2	Spacehab Module Subsystems Ready Reference Booklet	December 1994
8/3	External Interface Control Document: JSC-Remote POCC Operational Communications ICD for Mission Control	October 31, 1995

Center Systems

8/4	External Interface Control Document: JSC-GSFC Operational Communications ICD for Mission Control Center Systems	November 1, 1995
8/5	United Space Alliance Cargo Systems Manual: Microgravity Science Laboratory-1, STS-83 (Final)	March 27, 1997
8/6	Rockwell Houston Operations Telephone Directories	1995-1996
8/7	United Space Alliance Houston Operations Telephone Directory	1997

Series IX: Miscellaneous Materials

Series IX consists of several documents, telephone directories, and biographical information, created by or kept by Robert Grilli that did not fit within the other series. One document is a period copy of a Mission Control Center document on timing delays in communications in 1978 at the start of the Space Shuttle Program. There are several telephone directories for Johnson Space Center that Grilli kept. There are two different notes and information sheets written by Robert Grilli containing his biographical information (some of which is incorrect or contradicts the other document's information, but together the two provide a complete work history for Grilli).

Box/Folder	Description	Date
8/8	Mission Control Center (MCC) Timing Delays Document	February 9, 1978
8/9	Johnson Space Center Telephone Directories	1993-1994, 1996
8/10	Robert Grilli: Official Biographical Notes and Information Sheets	Undated

Series X: Manned Spacecraft Center Audio Reels

Series X consists of 16 original 5-inch and 7-inch reel-to-reel audiotapes of recordings of several NASA missions that were made for or by Robert Grilli while he worked in the Mission Control Center at Johnson Space Center. According to an interview by the UHCL Archives with Grilli in December 2022, the audio tape reels were a result of the following: "My job was ground control at the Mission Control Center, and I had a partner that we shared the ground control operations [from Apollo 15 through Skylab 4]. Some of the recordings I have, I called to the Communications Control [at the Manned Spacecraft Center] and asked them to make them a tape of particularly interesting happenings. Extra tapes made were for [my] personal use. Since I controlled all the operations people, the Comm Control people had to do what I asked. I treated them [the audio reels] as special backup tapes."

5 reels cover three of the first four days of the Apollo 15 mission to the Moon at the end of July 1971. 1 reel is supposed to have a recording from an April 1973 date for the Skylab program (though the program did not launch until May 1973). 1 reel has a recording of the Skylab 3 mission on August 7, 1973.

The most significant audio reels are 9 7-inch reels documenting the Skylab 4 mission while it was in orbit on December 28, 1973. They are confirmed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control Center at Johnson Space Center. One of the reels is missing a label, while the other is dated December 29 (but its listed runtimes match the December 28 reels' sequence). All of these reels are Grilli's personal backup copies—though original copies made at the same time as the missions—given to Grilli in his role as a tracking controller in Ground Control for Apollo 15, and as a configurations supervisor for the Skylab programs.

Box/Audio Reel	Description
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Box 9	
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	AR-1: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Apollo 15 mission on Day 2 of its trip to the Moon on July 27, 1971. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 1 of 2 reels for this day's recording. Recording time: Start 0500 0823; Stop 0823 1146 (1 7/8 tape speed).
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	AR-2: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Apollo 15 mission on Day 2 of its trip to the Moon on July 27, 1971. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 2 of 2 reels for this day's recording. Recording time: Start 1146; Stop 1300 (1 7/8 tape speed).
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	AR-3: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Apollo 15 mission on Day 3 of its trip to the Moon on July 28, 1971. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 1 of 2 reels for this day's recording. Recording time: Start 0500 0850; Stop 0850 1244 (1 7/8 tape speed).
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	AR-4: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Apollo 15 mission on Day 3 of its trip to the Moon on July 28, 1971. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 2 of 2 reels for this day's recording. Recording time: Start 1244; Stop 1300 (1 7/8 tape speed).
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	AR-5: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Apollo 15 mission on Day 4 of its trip to the Moon on July 29, 1971. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is
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reel 1 of 1 for this day's recording. Recording time: Start 0500 0937; Stop 0937 1300 (1 7/8 tape speed).

AR-6: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Skylab program [allegedly, though mission had not launched on date listed on recording] on April 28, 1973. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 1 of 1 for this day's recording. Recording time: Start 1210; Stop 1247 (3 3/4 tape speed).

AR-7: 1 original 5-inch reel, 1/4-inch wide polyester reel-to-reel audiotape recording of the Skylab 3 mission while it was in orbit on August 7, 1973. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 1 of 1 for this day's recording. Recording time: Start 219-0019; Stop 219-0031 (1 7/8 tape speed).

Box 10

AR-8: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 28, 1973 [reel is dated "December 29, 1973," but other reels in the same time recording sequence are for December 28). This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 1 of 8 reels for this day's recording. Recording time: Start 362 1313; Stop 362 1346 (7.5 tape speed).

AR-9: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 28, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 2 of 8 reels for this day's recording. Recording time: Start 362 1346; Stop 362 1434 (7.5 tape speed).

AR-10: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 28, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 3 of 8 reels for this day's recording. Recording time: Start 362 1434; Stop 362 1520 (7.5 tape speed).

AR-11: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 29, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 4 of 8 reels for

this day's recording. Recording time: Start 362 1520; Stop 362 1639. This tape is marked "MCS Special" (7.5 tape speed).

AR-12: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 29, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Manned Spacecraft Center was made for Robert V. Grilli. This is reel 5 of 8 reels for this day's recording. Recording time: Start 362 1639; Stop 362 1814. This tape is marked "MCS Special" (7.5 tape speed).

AR-13: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 29, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 6 of 8 reels for this day's recording. Recording time: Start 362 1814; Stop 362 1952 (7.5 tape speed).

Box 11

AR-14: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 29, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 7 of 8 reels for this day's recording. Recording time: Start 362 1950; Stop 362 2107 (7.5 tape speed).

AR-15: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording of the Skylab 4 mission while it was in orbit on December 29, 1973. This is believed to contain the recording of the December 28 astronaut strike and break from communications with Mission Control. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli. This is reel 8 of 8 reels for this day's recording. Recording time: Start 362 2107; Stop 362 2132 (7.5 tape speed).

AR-16: 1 original 7-inch reel, 1/4-inch wide Ampex Professional 641 polyester reel-to-reel audiotape recording that is unlabeled and undated [original label ripped off]. It is believed that this reel might be part of the set of recordings of the Skylab 4 mission while it was in orbit on December 28, 1973. This copy of the recording from NASA Johnson Space Center was made for Robert V. Grilli.