University of Houston Clear Lake

Archives and Special Collections

HSF-21
John W. Kiker Papers

[Human Space Flight Collection]

Collection Number: HSF-21

Title: John W. Kiker Papers

Dates: 1945, 1961-1998, undated

Creator: John W. Kiker

Abstract

The John W. Kiker Papers is composed of correspondence, technical notes, technical records, memorandums, reports, studies, meeting minutes, historical information, design documents, concept drawings, charts, mechanical prints, and miscellaneous materials, that were either collected, created, or used by John W. Kiker during his professional career at NASA. Kiker worked at NASA with the Space Task Group and the Manned Spacecraft Center (later Johnson Space Center) from 1960 to 1979, with much of his time as assistant chief or chief of various mechanical and landing systems branches. Most of his work was related to development of emergency escape equipment, descent and deceleration systems, and parachute systems, for spacecraft.

He is most known for contributing to the design and development of the Gemini and Apollo spacecraft parachute landing systems; and for developing the landing and docking systems for the lunar and command modules for the Apollo Program. His most well-known contribution was his proposal and design for the Space Shuttle Carrier Aircraft (SCA) to transport the Shuttle orbiter on the back of a modified 747 aircraft. The materials in the collection largely document the operations, development, and history of the systems Kiker worked on for NASA.

Extent: approximately 6.75 linear feet

Language: 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 restrictions on accessing this collection.

Restrictions on Use

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Preferred Citation

[Item name or title], [Box Numbers], [Folder Numbers], John W. Kiker Papers, HSF-21, 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 Charles Lowery in November 2005.

Separated Material

Box 5 is located on a top shelf separated from the rest of HSF-21 in UHCL Archives Closed Stacks A. Box 6 (Corrugated Roll Storage Boxes) is located stored currently on top of one of the UHCL Archives Map Cases in Closed Stacks B.

Related Material

“John W. Kiker” Biographical File (1964, 1980), Box 69, General History Files, General Reference Series, Johnson Space Center History Collection, University of Houston-Clear Lake Archives and Special Collections, Alfred R. Neumann Library, 2700 Bay Area Blvd., Houston, TX 77058-1002

"John W. Kiker" Biographical Data Sheet, NASA Johnson Space Center Oral History Project, Johnson Space Center History Collection, University of Houston-Clear Lake Archives and Special Collections, Alfred R. Neumann Library, 2700 Bay Area Blvd., Houston, TX 77058-1002

"John W. Kiker" page, Smithsonian National Air and Space Museum Wall of Honor website, viewed online at https://airandspace.si.edu/support/wall-of-honor/john-w-kiker

Processing Information

The original collection was numbered according to a pre-2022 numbering system, which was the accession number for the collection. This was composed of the year in which the collection was accessioned into the UHCL Archives' holdings, and the number of the collection in the order it was accessioned. For example, the collection number "2016-0012" should be interpreted as "Year 2016, 12th collection accessioned that year." Folders in the collection were numbered using a number for the box number, followed by a short dash, followed by the folder number, placed on the far-right side of the folder tab. For example, Box 1, Folder 1, would be written as 1-1.

Processed by: Erin Henry, 2016; updated by Robert Nañes and Matthew M. Peek, March-May 2023.

Arrangement

The collection is arranged into the following 10 small series based on the topics of the materials: Series I: Early Apollo Materials; Series II: Miscellaneous Orbiter Deceleration and Braking Systems Materials; Series III: Shuttle Development Materials; Series IV: SRB Recovery Materials; Series V: Berthing and Docking Materials; Series VI: Shuttle Drag Chute Materials; Series VII: Miscellaneous Aircract and Spacecraft Technology; Series VIII: CRV Materials; Series IX: Oversize Materials; and Accrual A: 2018 Addition.

Biographical Note

John William Kiker was born on August 4, 1925, in the town of Wadesboro in Anson County, NC, to Paul Jones and Ethel York Kiker. By 1930, Paul Kiker was working as an insurance agent in Wadesboro, and by 1940 was listed as a secretary for a fire insurance company. John Kiker loved flying so much (having had a plane before he owned a car), that he became a pilot and commercial flight instructor for the Georgia Air Service in Bennettsville, SC, from 1943 to 1944. He would end up leaving this positition due to the war.

During World War II, John Kiker was inducted into the U.S. Army Air Forces as an Air Cadet on December 9, 1943, with entrance into active duty on April 12, 1944. He served as an Air Cadet through September 7, 1945, when he was released from duty in order to accept a commission as a 2nd Lieutenant in the U.S. Army Air Forces, working as a pilot trainer flying North American B-25 Mitchell medium bomber aircraft. Kiker was honorably discharged from active duty on February 8, 1946.

After the war, John Kiker returned to Wadesboro to work as a pilot and commercial flight instructor for the W and L Airways between 1946 and 1947. He would then attend college at North Carolina State College of Agriculture and Engineering (later North Carolina State University) in Raleigh, NC. He graduated in 1951 with a bachelor of science degree in mechanical engineering. After college, Kiker went to work as an engineer in the Research Section of the Parachute Branch of the Aeronautical Accessories Laboratory at Wright-Patterson Air Force Base in Fairborn, Ohio. He worked there from 1951 to 1959. In 1959, he became an aeronautical engineer for the Aviation Division of the U.S. Army Aviation Transportation Research and Engineering Command (TRECOM) at Fort Eustis, Virginia. There, he worked on the development of emergency escape equipment and aircraft deceleration systems for military aircraft.

In November 1960, John Kiker began working at the Space Task Group (the precursor to NASA's Manned Spacecraft Center) at Langley Field, Virginia, after the Space Task Group recruited Kiker to work on the Mercury Program. He was an aerospace engineer in the Mechanical Systems Section, Systems Engineering Branch, of the Flight Systems Division. Kiker worked in this capactity until 1962, when he became the Head of the Landing and Impact Section, Mechanical Systems Branch, in the Systems Evaluation and Development Division.

His primary work was designing the parachute and descent/deceleration systems for spacecraft to help astronauts safely return to the Earth. He is created with contributing significantly to the design and development of the Gemini spacecraft parachute landing system, which involved the recovery of a 5,000-pound spacecraft with a single 84-foot diameter ringsail parachute. In 1963, John Kiker became the Assistant Chief of the Mechanical and Landing Systems Branch, Structures and Mechanics Division, in the Engineering and Development Directorate at the new NASA Manned Spacecraft Center in coastal Houston, Texas.

In 1965, he became the Chief of the Landing Technical Branch, Structures and Mechanics Division. In 1966, Kiker became the Chief of the Landing and Docking Mechanics Branch, Structures and Mechanics Division, where he helped design the landing and docking systems for the lunar and Apollo command modules for the Apollo Program. Kiker was a major factor in the leading the redevelopment of the Gemini spacecraft landing parachute system to apply to the Apollo spacecraft, which was significantly heavier than Gemini. He worked in this position through 1971.

In 1971, Kiker was appointed the Chief of the Mechanical Systems Branch, Spacecraft Design Division, Advanced Planning and Design Assistant Directorate, in the Engineering and Development Directorate. He served in this capacity through 1976, with a brief stint between 1972 and 1973 as the Chief of the Mechanical Systems Branch, Structures and Mechanics Division at Johnson Space Center. From 1976 to 1979, Kiker served as the Chief in the Mechanisms Branch, Spacecraft Design Division, Program Development Assistant Directorate, in the Engineering and Development Directorate.

One of Kiker's most significant engineer contributions to NASA was the proposal of the "piggy-back concept" or "piggyback Shuttle" for transporting and releasing a Space Shuttle orbiter

vehicle. Despite initial skepticism from his JSC colleagues, his proposal to transport the Space Shuttle attached to the back of a modified Boeing 747 was successfully demonstrated with the Space Shuttle *Enterprise* tests at Edwards Air Force Base in October 1977. This system became known as the Shuttle Carrier Aircraft (SCA), and was used to transport Shuttle orbiters to Kennedy Space Center for launch into orbit. The design he developed was estimated to have saved the U.S. government 30 million dollars as of the late 1970s.

John Kiker retired from NASA Johnson Space Center in Decemeber 1979. He was married to Isabel Kiker. John W. Kiker continued to serve as a consultant for NASA after retirement until he passed away on May 6, 2005, in Houston, Texas.

Scope and Content

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Subject Terms

Personal/Family Name

Kiker, John W. (John William), 1925-2005

Corporate Names

Rockwell International

United States. National Aeronautics and Space Administration

Topical Terms

Apollo Soyuz Test Project
International Space Station
Lyndon B. Johnson Space Center
Manned space flight--History
Manned Spacecraft Center (U.S.)
Project Apollo (U.S.)
Space shuttles--United States--History
Space--Social aspects--History
United States. National Aeronautics and Space Administration—History

Genre/Physical Characteristic

Books
Charts
Correspondence
Memorandums
Minutes
Operating manuals
Publications
Technical drawings
Technical manuals
Technical reports

Collection Inventory

Series I: Early Apollo Materials

Series I contains diagrams, technical note, memo, and miscellaneous records, mostly collected and/or used by John Kiker while he worked at NASA Johnson Space Center. Most of the materials are undated, but relate to the early stages of the Apollo Program. The series includes technical diagrams of Apollo spacecraft designs. It also includes a NASA technical note on the Lunar Module's landing gear subsystem. A 1989 book titled "Apollo: The Race to the Moon" by Charles Murray and Catherine Bly Cox, provides a historical account of the program and was owned by Kiker.

Box/Folder	Description	Date
1/1	Technical Diagrams	Undated
1/2	"NASA Technical Note: Apollo Experience Report Lunar Module Landing Gear Subsystem" by William F. Rogers	January 1, 1972

1/3	"Apollo: The Race to the Moon" by Charles Murray and Catherine Bly Cox	1989
1/4	Memo: Capsule Selective Orientation for Impact" from	Undated

Series II: Miscellaneous Orbiter Deceleration and Braking Systems Materials

Series II contains studies, technical note, and miscellaneous documents, related to aircraft and the Space Shuttle orbiter flight and systems information. The series includes descriptions of the Shuttle orbiter landing deceleration system and brake hardware that Kiker helped to develop.

Box/Folder	Description	Date
1/5	"National Aeronautics and Space Administration Proposed Technical Note: An Evaluation of the Flying Qualities of Seven General Aviation Aircraft" by Marvin Barber, Charles K. Jones, Thomas R. Sisk and Fred W. Haise	Undated
1/6	Figure index	Undated
1/7	Orbiter Brake Hardware Description by J. McCullough	June 1, 1987
1/8	Landing/Deceleration System Modifications/ Improvements Evaluation by J. McCullough	June 1, 1987
1/9	Orbiter Landing Deceleration System by C.C. Campbell	Undated
1/10	MLG Load Relief Study (Phase I) by Rockwell International	Undated

Series III: Shuttle Development Materials

Series III consists of studies, historical information, memorandums, reports, and technical records, about the development of the Space Shuttle Program, aimed at creating a reusable spacecraft for low-Earth orbit missions. Most of the materials date from 1967 to 1986. Some of the documents discuss aspects of the Shuttle Program, such as crew escape systems, landing/deceleration systems, and natural environment design requirements.

Box/Folder	Description	Date
1/11	History and Background	Undated
1/12	Phase B Shuttle Studies	1967-1973

1/13	Memorandums	1973-1986
1/14	"Shuttle Systems Evaluation and Selection: Mid-Term Briefing Vol. I Executive Summary"	December 15, 1971
1/15	"Shuttle Development Key Decision Points: My Recollections" by Steve Andrich	1969-1973
1/16	Space Shuttle Orbiter Approach and Landing Test: Final Evaluation Report	February 1, 1978
1/17	"Advanced Manned Launch System Comparisons" by William M. Piland and Theodore A. Talay	October 1, 1989
1/18	"STS Crew Egress and Escape Study Presentation to STS Program Manager."	June 1, 1986
1/19	"Landing/Deceleration System Improvements" by William C. Schneider	June 1, 1987
1/20	"Appendix E: Natural Environment Design Requirements"	Undated
1/21	Shuttle Orbiter Mechanisms	Undated
1/22	Frangible Nut on ET Side Configuration	Undated
1/23	Shear Flange Separation Bolt Configuration	Undated

Series IV: SRB Recovery Materials

Series IV contains two reports related to the Solid Rocket Boosters (SRBs) used in the Space Shuttle Program and their associated recovery efforts. These reports were authored by experts in the field Royce Mitchell and W.R. Pinnell, who discuss the characteristics of the SRMs and the evaluation of recovery subzones for the Shuttle Program.

Box/Folder	**Description**	**Date**
1/24	SRM Characteristics and Recovery by Royce Mitchell	1972
1/25	Subzone Evaluator's Report by W. R. Pinnell	May 30, 1972

Series V: Berthing and Docking Materials

Series V contains correspondence, design documents, concept drawings, reports, studies, meeting minutes, and miscellaneous materials, related to the design and analysis of docking and berthing mechanisms for space vehicles. The documents cover requirements, system designs,

testing, and proposals for new berthing mechanisms related to the Apollo-Soyuz Test Project and a potential American Space Station. Most of the materials date to the early-mid 1970s during the Apollo-Soyuz Test Project, and the mid-1980s during NASA's development of an American Space Station design.

Box/Folder	Description	Date
2/1	"Apollo Experience Report: The Docking System" by Robert D. Langley	June 1, 1972
2/2	"Statement of Work for Preliminary Design Layout and Analysis of Shuttle/ISF Docking System."	Undated
2/3	Correspondence	1984-1985
2/4	"Joint Review of Specific Design Issue"	August 1, 1984
2/5	"Berthing Mechanisms Program Requirements Review" (Meeting Minutes)	October 29-30, 1985
2/6	"Space Station Berthing Mechanisms—Design Concepts"	November 18, 1985
2/7	"Requirements for Spacecraft Docking and Berthing"	October 1, 1983
2/8	"Construction/Docking Technology" by W.F Rogers	September 1, 1983
2/9	"Berthing Mechanisms for Industrial Space Facility" C.C. Johnson	August 21, 1984
2/10	"Apollo-Soyuz Docking System Sequence of Docking and Undocking"	May 1, 1975
2/11	"Apollo-Soyuz Test Project: Criteria for Docking Initial Contact"	August 15, 1974
2/12	"Docking System of Androgynous and Peripheral Type" by V.S. Syromatnikov	Undated
2/13	"Berthing Mechanism Proposal Outline" by Gene Burns	January 31, 1985
2/14	"Berthing/Docking for Orbital Assembly"	September 5, 1984
2/15	"Operational Characteristics of the Docked Configuration" by Homer Dotts et al.	Undated
2/16	"Customer Training: Apollo J-Mission CSM	April 15, 1971

	112-113- 114: Docking and Crew Transfer System Description"	
2/17	"Neuter Docking Mechanism Study" by James C. Jones	Undated
2/18	"Dynamic Testing of Docking System Hardware" by Wade C. Dorland	Undated
2/19	"Dynamic Analysis of Apollo Salut/Soyuz Docking" by John A. Schliesing	Undated
2/20	"Docking Devices for Soyuz-Type Spacecraft" by V.S Syromatnikov	Undated
2/21	Final Report	November 17-18, 1977
2/22	Concept Drawings	Undated
2/23	"Gemini Summary Conference" (Incomplete)	February 1-2, 1967

Series VI: Shuttle Drag Chute Materials

Series VI contains various documents related to the design, testing, and analysis of the drag chute used during the landing of the Space Shuttle orbiter. The documents cover the orbiter's flight history, landing/deceleration materials, wind tunnel tests, design reviews, loads analysis, riser systems, and parachute systems records.

Box/Folder	**Description**	**Date**
2/24	Flight History Summary	November 17, 1992
2/25	Landing/Deceleration Materials	1989-1992
2/26	Wind Tunnel Tests	1988-1993
2/27	Wake Studies	1993
3/1	Parachute Design Considerations	1986-1989
3/2	"Orbiter Drag Chute Project: Preliminary Design Review"	October 24-28, 1988
3/3	"Orbiter Drag Chute: Delta Preliminary Design Review"	January 20, 1989
3	Book: "Orbiter Drag Chute Project: Critical Design	June 5-9, 1989

	Review”	
3/4	Drag Chute Tests	1989-1992
3/5	Loads Analysis	June 14, 1905
3/6	Riser Systems	1992-1993
3/7	“Refurbishment of Orbiter Drag Parachute System Components”	June 10, 1993
3/8	Parachute Reuse	1992-1994
3/9	“Parachute Manufacturing Seminar” by T.W Knacke	1986
4/1	Correspondence	1992
4/2	Meeting Minutes	1989-1990

Series VII: Miscellaneous Aircract and Spacecraft Technology

Series VII contains documents related to airplane spin-recovery parachute systems, hypersonic technology, U.S. parachute development efforts, low-altitude flight tests, ejection systems, and motorless flight research. There is also a 1961 letter related to aerospace technology.

Box/Folder	**Description**	**Date**
4/3	“Summary of Design Considerations for Airplane Spin-Recovery Parachute Systems” by Sanger M. Burk Jr.	May 25, 1972
4/4	“The Hypersonic Revolution: Eight Case Studies in the History of Hypersonic Technology” vols. I-II	1987
4/5	“Current Efforts in U.S. Parachute Development” by R.E. Meyerson	Undated
4/6	“Note on Analysis of the Opening Shock of Parachutes at Various Altitudes” by Dr. Theodore von Karman	1945
4/7	“A Summary of the Low Altitude Flight Tests of the Viking Decelerator System” by Clinton V. Eckstrom and Harold N. Murrow	January 16, 1974
4/8	Ejection Systems	1986
4/9	Correspondence	November 29, 1961

Series VIII: CRV Materials

Series VIII contains documents related to the development of the NASA Crew Return Vehicle (CRV) in the 1990s. Materials include potential applications of high-performance parachutes, development schedules, landing and recovery technology project summaries, interface requirements, flight test techniques, instrumentation for parafoils, and a final report from the X-38 Project Review Board.

Box/Folder	Description	Date
4	Book: NASA Contractor Report: Motorless Flight Research	1972
4/10	Paper on Potential Application of High-Performance Parachute to CRV	1998
4/11	CRV Development Schedules	1997-1998
4/12	"Landing and Recovery: Technology Project Summary- 'Soft Landing Project Initiative'"	March 29, 1991
4/13	"International Space Station (ISS)-Crew Return Vehicle (CRV)-Interface Requirements Document"	January 1, 1998
4/14	"Flight Test Techniques and Instrumentation for Large Scale Parafoils" by John F. Muratore	Undated
4/15	"X-38 Project Review Board Final Report"	May 1, 1998

Series IX: Oversize Materials

Series IX includes various charts, correspondence, and development plans, related to the launch and landing configuration of the Space Shuttle orbiter program. It also contains an analysis spreadsheet on degradation limits and a document on the physical interface requirements for the Apollo-Soyuz mission.

Box/Folder	Description	Date
5/1	Correspondence	1998
5/2	Performance Characteristics of Components	Undated
5/3	"Launch Abort" Charts	Undated
5/4	"Landing Configuration" Charts	Undated

5/5	"Landing Systems" Charts	Undated
5/6	"Condensation of Study Contractor's Support Recommendations"	Undated
5/7	Development Plan Charts	1962-1970
5/8	Engineering Master Schedule	1974-1981
5/9	Orbiter Program Schedule	January 28, 1974
5/10	ET/SRB Separation Configuration	Undated
5/11	Payload Bay Doors/Radiator Configuration	Undated
5/12	ET Separation Configuration	Undated
5/13	"Apollo-Soyuz Physical Interface Requirements"	Undated
5/14	Degradation Limit Analysis Spreadsheet	May 1994

Accrual A: 2018 Addition

Accrual A consists of six large mechanical prints of spacecraft designs produced by Boeing for NASA. These prints are located in a corrugated roll storage box stored on top of the UHCL Archives Map Cases.

Tube	**Description**	**Date**
Oversized Rolled Storage Box (Labeled as Box 6)	6 Large Mechanical Prints, Boeing	1974-1975