

# NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

## BIOGRAPHICAL DATA SHEET

**NAME:** Mark K. Craig

**ORAL HISTORY:** 24 March 2006, 11 April 2006, 2 May 2006

### **EDUCATION:**

- B.S. Aeronautical & Astronautical Engineering, Purdue University (1971)
- Engineering Graduate Study, Rice University (1974-1983)
- Program for Senior Executives, MIT Sloan School (1992)

### **NASA CAREER:**

2002-2005 *Associate Center Director, Space Development and Commerce, Johnson Space Center*; for the Center Director, responsible for identifying and enabling strategic investments in space development and commerce; for HQ led integration of the Space Shuttle Service Life Extension Program (SLEP) investment plan and led integration of Agency Strategic Roadmaps.

2001-2002 *Director (Acting), Stennis Space Center*;

1995-2002 *Deputy Director, Stennis Space Center*; responsible for management of the Center's rocket propulsion test, Earth science, and commercial remote sensing programs and for management of its federal, state, university, and commercial resident Agency environment; Space Shuttle Launch Mission Management Team member; founding Chairman of the National Rocket Propulsion Test Alliance with the Dept. of Defense; for HQ supported development of human space exploration strategy.

1993-1995 *Architect, NASA Strategic Plan (NASA HQ)*; on the Administrator's staff, facilitated Agency senior leadership in creation of and architected the NASA Strategic Plan and Strategic Management Handbook; creator of the Strategic Enterprise concept and the Human Exploration and Development of Space (HEDS) Enterprise; architect of the HEDS strategy.

1991-1993 *Manager for Space Station Technical Projects (NASA JSC)*; led integrated Long Duration Orbiter/Space Station study to increase early on-orbit capability; led assessment of JSC program control capability; served on Administrator's "Red Teams" for assessing NASA strategy, human spaceflight programs and NASA Center roles and missions.

1990-1991 *Director for Space Exploration (Acting) (NASA HQ)*;

1989-1990 *Assistant Administrator, Exploration (Acting) (NASA HQ)*; led NASA's planning and research in response to President George H. W. Bush's Space Exploration Initiative (SEI) to establish a lunar base and to send humans to Mars; served as NASA's SEI liaison with the White House National Space Council and its Synthesis Group chaired by Gen. Tom Stafford; led NASA's coordination on SEI with the Dept. of Defense, Dept. of Energy, National Science Foundation, and National Institutes of Health; created initial draft of the Space Council's multi-agency policy on the Space Exploration Initiative.

**NASA CAREER (CONTINUED):**

1989-1990 *Manager, Lunar and Mars Exploration Program* (NASA JSC);

1987-1989 *Manager, Lunar and Mars Exploration* (NASA JSC); led development of NASA's integrated strategy for exploration of the Moon and Mars and for enabling research, technology, and infrastructure; led NASA technical support to White House staff in developing the Space Exploration Initiative (SEI) announced by President George H. W. Bush on the Apollo 11 20<sup>th</sup> anniversary in 1989; for the NASA Administrator and JSC Director led the Agency integration and writing of NASA's internal "90 Day Study" as NASA's response to that announcement.

1987-1989 *Deputy Manager, Mars Rover Sample Return Project* (NASA JSC/JPL); led JSC concept development, technology, and science efforts; with the Jet Propulsion Lab (JPL) project manager, responsible for project management and technical negotiations with Europe and the Soviet Union on project participation.

1987 *Special Assistant for Shuttle to the Director of Engineering* (NASA JSC); Directorate focal point for support to both the Space Shuttle program and Orbiter project, and was Engineering Directorate representative on their respective management boards; after Challenger created for and presented to the Administrator a history of crew escape design.

1986-1987 *Manager, Space Station Program System Engineering and Integration (Acting)* (NASA JSC); led SE&I of the integrated Space Station system, including international partners; chaired the Space Station Systems Integration Board; supported Program Office transition to Reston, VA.

1985-1986 *Assistant Manager (Engineering), Space Station Program System Engineering and Integration* (NASA JSC); principal advisor to the SE&I Manager on engineering issues; engineering representative in negotiations to create partnerships with Europe, Japan and Canada.

1984-1985 *Space Station "Skunk Works"* (NASA JSC); supported formation of the Space Station Level B Program Office at JSC and its transition from the HQ Space Station Task Force.

1983-1984 *Space Station Task Force Concept Development Group (CDG)* (NASA HQ); led a multi-Center and contractor team exploring Space Station configuration options, and led 11 other teams performing various technical and programmatic analyses.

1981-1984 *Head, Space Shuttle Flight Debris Team* (NASA JSC); formed and led the Space Shuttle program debris team created by the Shuttle Program Manager after STS-1 to identify sources of and eliminate damage caused by launch, flight, and landing debris; led its pre-launch Red Team and post-landing vehicle inspection teams.

1978-1983 *Integration Manager, Space Shuttle Solid Rocket Booster (SRB) Separation System* (NASA JSC);

1976-1978 *Subsystem Manager, Space Shuttle Solid Rocket Booster (SRB) Separation System* (NASA JSC); led the design, development, test, and evaluation (DDT&E) of the integrated Space Shuttle SRB staging system which performed successfully on each of its 134 flights; staging flight software principal function manager; formulated and sponsored the state-of-the-art supersonic wind tunnel test campaign at AEDC that involved three bodies and active gas plumes to create the SRB separation aerodynamic database.

**NASA CAREER (CONCLUDED):**

1973-1983 *Aerospace Engineer*, Engineering Directorate (NASA JSC); developed and executed Shuttle performance/sizing math models to support vehicle concept studies; supported analysis of Space Shuttle Solid Rocket Booster (SRB) separation dynamics and aerodynamics; invented and implemented the "hypercube" technique to efficiently acquire and access 8-dimensional Shuttle SRB separation aerodynamic data; led math modelling and a "zero-g" aircraft test campaign of Space Shuttle External Tank large amplitude propellant dynamics to support analysis of Return to Launch Site (RTLS) aborts.

1972-1973 *Apollo-Soyuz Docking Working Group*, Engineering Directorate (NASA MSC then JSC); as a member of U.S./Soviet Working Group #3 performed docking dynamics simulations and mechanism capture boundary analyses; developed initial Russian to English translations of Working Group documents.

1971-1972 *Space Shuttle Phase B Concept Definition Team*, Engineering Directorate (NASA MSC); developed and executed integrated vehicle performance/sizing math models to support Space Shuttle Phase B vehicle concept studies.

1967-1971 *Co-op student* (NASA MSC); supported Astronaut training equipment redesign after the Apollo 1 fire; performed parametric Venus entry trajectory study with recent Soviet Venera spacecraft atmosphere data; youngest member of Max Faget's 1969 Space Shuttle Phase A concept development "skunk works."

**BEYOND NASA CAREER:**

2016- *Pro-bono Strategy Consultant and Mentor*; provides consultation and mentoring service to enterprises that advance the exploration and private sector development of space. To date enterprises include the Astronaut Scholarship Foundation, Space Angels, the Mars Affordability & Sustainability Workshops, and the Lunar Exploration Analysis Group.

2008-2015 *NASA Account Manager* (Science Applications International Corporation, SAIC); managed SAIC's relationship with NASA; worked to increase NASA human space exploration's value to the Nation and sustainability by helping to shape and socialize the bi-partisan NASA Authorization Act of 2010 and its mandated National Academies study; also by helping to organize the 2014 Atlantic Council/SAIC Final Frontier event, the 2015 Pioneering Space National Summit, and various conferences including the TED-like AAS Imagine'09; led rebranding of the Mars Affordability Workshop as the Mars Affordability and Sustainability Workshop.

2005-2008 *Vice President, Manager of Space and Ocean Systems Solutions Operation* (Science Applications International Corporation, SAIC); managed SAIC's civil space and Earth science business with NASA and other federal agencies.

**BEYOND NASA CAREER (CONCLUDED):**

1997- *Museum & Themed Attraction Space Exploration Consultant*; as member of the creative team, provides space exploration expertise to museums and themed attractions developing space projects. Clients to date include Chicago's Museum of Science and Industry, Space Centre Bremen (Germany), and the NASA Kennedy Space Center Visitor Complex's Shuttle Launch Experience attraction and Space Shuttle Atlantis Exhibit.

**CAREER MOUNTAINTOP EXPERIENCES:**

- Learning human spaceflight from people who invented it;
- A one-on-one meeting with Neil Armstrong the day he was named Apollo 11 commander, and being interrupted by Gene Cernan to congratulate him;
- Being detained at Apollo 11's launch pad for an hour at T-9 hours; experiencing its launch;
- Conversations with Gene Cernan over 20 years about his emotions, thoughts, and experiences while on the Moon;
- Leading inspections of the fully fueled Space Shuttle on its launch pad at T-3 hours;
- In the White House, Lunar-Mars exploration meetings with the Vice President;
- Being on console in the KSC Launch Control Firing Room; experiencing 30 Shuttle launches;
- Experiencing weightlessness on NASA's "zero-g" aircraft leading a Shuttle test campaign;
- Being terminated (RIFed) in 1972 due to Apollo's cancellation, having been in 1971 MSC's last hire ... and then having the RIF notice retracted one week before the exit date because I had taken Russian at Purdue and the Apollo-Soyuz agreement had just been signed.

**SELECT CAREER CONTRIBUTIONS:**

- Helping to create policy and strategy to sustain NASA human space exploration based on its continuing value to America so that, unlike Apollo, reaching a destination does not result in program termination;
- My 50 year career archive housed in Purdue's Barron Hilton Flight and Space Exploration Archives with those of Amelia Earhart, Neil Armstrong, and Gene Cernan, and used as a teaching resource;
- Led engineering negotiations that resulted in Space Station partnerships with Europe, Japan, and Canada;
- Led the design, development, and test of the Space Shuttle integrated solid rocket booster staging system that was successful on each of its 134 flights;
- Led pan-NASA, multi-agency studies of integrated Lunar-Mars human exploration;
- Founding Chair of the National Rocket Propulsion Test Alliance with the Dept. of Defense;
- Negotiated and was NASA signatory to an agreement with the National Science Foundation on joint Antarctic Lunar-Mars research;
- For the White House National Space Council, created the initial draft of its multi-agency policy on the Space Exploration Initiative (SEI);
- Startup team member of the Space Shuttle in 1969 as a co-op student, Space Station in 1983 as lead engineer, and the Space Exploration Initiative in 1989 as Assistant Administrator;
- Member of the creative teams of the KSC Visitor Complex's Shuttle Launch Experience attraction and of the Shuttle Atlantis Exhibit.

**PROFESSIONAL & HONORARY SOCIETIES:**

- International Academy of Astronautics (IAA)
- American Astronautical Society (AAS): President (2005-2007), Executive Vice President (2003-2005), Vice President - Technical (2002-2003)
- American Institute of Aeronautics and Astronautics (AIAA): National Student Activities Committee (1976-1981), Houston Section Councilor (1974-1975)
- NASA Alumni League
- National Eagle Scout Association
- College Art Association

**SELECT HONORS & AWARDS:**

- Rotary National Award for Space Achievement Stellar Award (2016)
- A flag flown over the U.S. Capitol at the request of Congressman Joseph P. Kennedy III to honor Mark Craig's 48 years of service to the Nation's space program (2015)
- American Astronautical Society President's Recognition Award (2015)
- World Space Week Pioneer Award (2008)
- Fellow, American Astronautical Society (2006)
- NASA Distinguished Service Medal (2005)
- Distinguished Engineering Alumnus, Purdue University (2002)
- Outstanding Aerospace Engineer, Purdue University (2000)
- Presidential Meritorious Executive Rank Award (1994, 1999)
- NASA Outstanding Leadership Medal (1992)
- Elected to the International Academy of Astronautics (1992)
- Federal Engineer of the Year Award, National Society of Professional Engineers (1991)
- NASA Exceptional Service Medal (1981, 1990)
- Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA) (1981)
- Professional Service Award, AIAA Houston Section (1978)
- Community Service Award, AIAA Houston Section (1976)
- U.S. Navy Science Cruiser Award (1966)

**SELECT PUBLICATIONS:**

*Settling Space: Building Multinational and Public-Private Partnerships*; The International MoonBase Summit, Kohala Coast Island of Hawaii, October 1-5, 2017.

*NASA Beware ... Mars AND Bust*; The Space Review, June 26, 2017.

*Report of The Fourth Community Workshop on Achievability and Sustainability of Human Exploration of Mars (AM IV)*; Monrovia CA, December 6-8, 2016, April 2017 (with Senior Editor H. Thronson et al).

**SELECT PUBLICATIONS (CONTINUED):**

*Report of The Third Mars Affordability and Sustainability Workshop (AMIII);* The Space Policy Institute, George Washington University, Washington DC, December 2-4, 2015, March 2016, (with Senior Editors H. Thronson, C. Carberry, and R. Zucker et al).

*Issues and Challenges in Sustainability;* Third Community Workshop on Mars Affordability and Sustainability, Washington DC, December 2015 (with M. L. Dittmar, D. Dumbacher, and A. Zulkosky).

*Sustainable Pathways to Space: Challenges, Options and Opportunities;* The Next Giant Leap: Leveraging Lunar Assets for Sustainable Pathways to Space Conference; South Kohala Island of Hawaii, November 2014.

*The Exploration <-> Development of Space "Engine;"* IAA Paper No. IAA - WAS0401, International Academy of Astronautics Space Exploration Conference, Washington DC, January 2014.

*How to Reduce Churn in NASA Human Space Exploration;* Space News Op/Ed, Dec. 14, 2011.

*NASA's Value to the Nation: 50 years of Lessons on Sustainability;* AIAA paper No. 2007-9931, AIAA SPACE 2007 Conference, September 2007.

*Achieving Profound Public Engagement - The Ultimate Source of Exploration Vision Sustainability;* AIAA paper No. 2005-2568, 1<sup>st</sup> Space Exploration Conference, January 2005.

*Re-Energizing Relevance: Building the Psychological Highway to Space;* IAA/ESA Workshop on Next Steps in Exploring Deep Space, October 2003, Noordwijk, Netherlands (with R. Rogers).

*NASA Exploration and Discovery for the New World.* Branding and Re-branding for the 21st Century Conference, University of Texas at Austin, May 2003.

*Idea Generation and NASA Strategy: Approaches, Technologies, Results;* CIES Annual Executive Congress, Dublin Ireland, June 2000 and CIES MDP Annual Congress, Edinburgh Scotland, October 2000.

*Space Activity in the 21st Century;* 3<sup>rd</sup> United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna Austria, July 1999.

*Setting Program Requirements; NASA Program/Project Management Conference Report,* NASA SP-6101-07, 1993, p. 13.

*The Space Exploration Initiative;* Paper No. 91-428, 42nd IAF International Congress, Montreal, Canada, October 1991 (with A. Aldrich and D. O'Handley).

*The Outbound Trail - Human Exploration of the Moon and Mars;* Association of Space Explorers, 7<sup>th</sup> Planetary Congress, Berlin Germany, October 1991.

*Technology Needs of the Exploration Initiative;* Paper No. 90-032, 41st IAF International Congress, Dresden, Germany, October 1990 (with A. Aldrich, R. Rosen, and J. Mankins).

**SELECT PUBLICATIONS (CONTINUED):**

*A Vision for Space*; Bicentennial Celebration of U.S. Patent and Copyright Laws, Bicentennial Celebration of U.S. Patent and Copyright Laws - Proceedings, Events and Addresses, Port City Press, 1990, p. 685-693.

*An International Mars Exploration Program*; Paper No. 89-493, 40th IAF International Congress, Malaga, Spain, October 1989 (with D. Rea, G. Cunningham, and H. Conway).

*The Diverse Role of Unmanned Precursors in Supporting Manned Missions to Mars*; Paper No. 89-496, 40<sup>th</sup> IAF International Congress, Malaga, Spain, October 1989.

*The Case for a Multinational Mars Surveyor Program*; The Planetary Report, Vol. IX, No.5, 1989, p. 12-15 (with D. Rea and M. Carr).

*Integrated Strategies for the Exploration of Mars*; Paper No. 88 391, 39th IAF International Congress, Bangalore, India, October 1988.

*Strategic Options for a Lunar Base*; Paper No. 88-615, 39<sup>th</sup> IAF International Congress, Bangalore, India, October 1988 (with B.B. Roberts).

*Mars Rover Sample Return Mission*; Committee on Space Research (COSPAR), Helsinki Finland, July 1988 (with D. Rea, M. Carr, and J. Martin).

*Exploration of the Solar System: Opportunities and Pathways*; American Astronautical Society 21st Century in Space Symposium, St. Louis Mo., 1988.

*Definition Status of the U.S. Space Station System*; Paper No. 86-32, 37th IAF International Congress, Innsbruck Austria, October 1986

*Space Station Design - Innovation and Compromise*; Aerospace America, Vol. 22, No. 9, Sept. 1984, p. 70-72 (with L. Powell and A. Cohen).

*Problems and Concepts of Space Station Guidance, Navigation and Control*; Paper No. 84-1139, AIAA Space Systems Technology Conf., Costa Mesa, Ca., June 1984 (with A. Guha).

*Rocket Exhaust Plume-Induced Flowfield Interaction Experiences with the Space Shuttle*; Paper No. 83-1549, AIAA Thermophysics Conference, Montreal, Canada, June 1983 (with B. Roberts, R. Wallace, and D. Kanipe).

*Shuttle Booster Separation Aerodynamics*; Space Shuttle Performance Lessons Learned Conference Report, NASA CP-2283, 1983, p. 139-157 (with H. Dresser).

*Shuttle Launch Debris - Sources, Consequences, Solutions*; Space Shuttle Performance Lessons Learned Conference Report, NASA CP-2283, 1983, p. 159-185.

*The Space Shuttle Vehicle Ascent Aerodynamic Challenges - Configuration Design and Data Base Development*; Space Shuttle Technical Conference Report, NASA CP-2342, 1983, p. 151-176 (with C.C. Dill, J.C. Young, B.B. Roberts, J.T. Hamilton, and W.W. Boyle)

**SELECT PUBLICATIONS (CONCLUDED):**

*Shuttle Small Self-Contained Payloads: "Getaway" to the Educational Opportunities of Space,* Paper No. 78-135, AAS Future of the United States Space Program Conference, Houston, TX, Oct. 1978 (with T. Murtagh and C. Jacobson).

*An Analysis of Atmospheric Entry Trajectories for Manned and Unmanned Missions to the Planet Venus;* NASA TN D-7316, 1973 (with R. Gonzales).

*Vehicle Performance Impact on Space Shuttle Design and Concept Evaluation;* Space Shuttle Aerothermodynamics Technology Conference Report, NASA TM X-2509, 1971.

*A Design Parameter Synthesis Derived from a Mathematical Analysis of a Hypothetical Lunar Flying Vehicle,* NASA GWP 10084, 1969 (with W. Jacqmein and D. Hall).

*Apollo Spacecraft 105 Testing.* Purdue Engineer, Vol. 64, No. 1, October 1967, p. 52-56.

**PERSONNEL FILE ADMINISTRATIVE RECORD**

Note: These personnel records document title/position in the table of organization. A title/position may not have been documented if that table was in flux. Also, a stated date may lag the actual date of entering and/or exiting a position due to change processing.

NASA Manned Spacecraft Center/Johnson Space Center, Houston, TX (1967-1983)

- Co-op, Aerospace Engineer, Test Facilities Branch, Engineering Division, Assistant Director for Administration (1967-1968)
- Co-op, Aerospace Engineer, Flight Performance & Dynamics Branch, Advanced Spacecraft Technology Division (1968-1969)
- Co-op, Aerospace Engineer, Flight Technology Branch, Engineering Analysis Office (1969-1971)
- Aerospace Engineer, Flight Performance Section, Flight Technology Branch, Engineering Analysis Division, Director of Engineering and Development (1971-1972)
- Aerospace Engineer, Preliminary Design Office, Spacecraft Design Division (1972-1973)
- Aerospace Engineer, Analytical Support Section, Engineering Technology Branch, Spacecraft Design Division (1973)
- Aerospace Engineer, Launch Analysis Section, Integrated Flight Analysis Branch, Engineering Analysis Division, Director of Engineering and Development (1973-1974)
- Aerospace Engineer, Aerodynamic Systems Analysis Section, Aerodynamics Branch, Engineering Analysis Division, Director of Engineering and Development (1974-1979)
- Aerospace Engineer, Integrated Entry Analysis Branch, Engineering Analysis Division, Director of Engineering and Development (1979-1982)
- Aerospace Engineer, Systems Integration Branch, Systems Engineering Division (1982-1983)

NASA Headquarters, Washington, D. C. (1983-1984)

- Space Station Task Force, Concept Development Group



**PERSONNEL FILE ADMINISTRATIVE RECORD (CONCLUDED):**

NASA Johnson Space Center, Houston, TX (1984-1990)

- Aerospace Engineer, Systems Integration Branch, Systems Engineering Division (1984-1985)
- Aerospace Engineer, Systems Engineering and Integration Office, Space Station Program Office (1985)
- Acting Manager, System Engineering and Integration Office, Space Station Program Office (1986-1987)
- Special Assistant to the Director, Engineering Directorate (1987)
- Manager, Lunar & Mars Exploration Office, New Initiatives Office, Office of the Director (1987-1990)
- Manager, Lunar & Mars Exploration Program Office, Office of the Director (1990-1991)

NASA Headquarters, Washington, D. C. (1991-1992)

- Acting Director for Space Exploration, Special Assistant for Exploration, Aeronautics Exploration and Technology (1991)
- Office of Aeronautics and Space Technology (1992)

NASA Johnson Space Center, Houston, TX (1992-1995)

- Manager for Technical Projects, Space Station Projects Office (1992-1995)

NASA Stennis Space Center, Bay Saint Louis, MS (1995-2002)

- Deputy Director, Center Director's Office (1995-2001)
- Acting Director, Center Director's Office (2001-2002)

NASA Johnson Space Center, Houston, TX (2002-2005)

- Associate Director, Space Development and Commerce, Office of the Director

**BIOGRAPHICAL REFERENCES:**

Mark K. Craig collection in The Barron Hilton Flight and Space Exploration Archives at Purdue University, <http://collections.lib.purdue.edu/flight-and-space/index.php>

Mark K. Craig, et. al., eds., Human Exploration & Development of Space: Strategic Plan (Washington, D.C.: NASA, 2000).

“1999 Meritorious Executive Award,” U.S. Office of Personnel Management Homepage, Online, <http://www.opm.gov/ses/99merit.asp> (Accessed 25 May 2005).

“Awards and Honors,” Purdue Engineering Homepage, Online, [https://engineering.purdue.edu/Engr/AwardsAndHonors/DEA/DEA\\_2002/craig](https://engineering.purdue.edu/Engr/AwardsAndHonors/DEA/DEA_2002/craig) (Accessed 26 May 2005).

Assistant Director for Administration (February 1966), Organizational Charts (Boxes 13 and 14), Organizational Files, Center Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, TX.

“Craig gets high post at Stennis,” Space News Roundup (NASA Lyndon B. Johnson Space Center), 10 February 1995, 4.

**BIOGRAPHICAL REFERENCES (CONCLUDED):**

Engineering Division (1 December 1965), Organizational Charts (Boxes 13 and 14), Organizational Files, Center Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, TX.

Johnson Space Center Announcement, "Key Personnel Announcement – Mr. Mark K. Craig," JSC 02-048, 11 October 2002, <http://announcements.jsc.nasa.gov/02-048.html> (Accessed 25 May 2005).

Johnson Space Center Announcement, "Organization and Personnel Assignments of the Spacecraft Design Division," JSC 73-126, 20 September 1973, Box GR1015, General Reference Series, JSC History Collection, U of H -Clear Lake, University Archives, Houston, Texas.

Johnson Space Center Management Instruction, "Functions and Organization-Engineering Analysis Division," JSC 1142.21A, 19 July 1979, Box GR1020, General Reference Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, Texas.

Mark K. Craig, interview by Howard E. McCurdy, 15 March 1991, Transcript, Oral History Collection, JSC History Collection, U of H - Clear Lake, University Archives, Houston, TX, 103-109.

Manned Spacecraft Center Announcement, "Reorganization and Personnel Assignments Engineering Analysis Division Engineering and Development Directorate," MSC 73-1, 12 January 1973, Box GR1015, General Reference Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, Texas.

Mark K. Craig Service Record Card, Mark K. Craig Personnel File, Human Resources Office, NASA Lyndon B. Johnson Space Center, Houston, TX.

NASA Headquarters Telephone Directories (1984, 1991-1992) Organization Files, Center Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, TX.

NASA Lyndon B. Johnson Space Center Telephone Directories (1973-2002), Organization Files, Center Series, JSC History Collection, U of H - Clear Lake, University Archives, Houston, TX.

NASA Manned Spacecraft Center Telephone Directories (1967-1972), Organization Files, Center Series, JSC History Collection, U of H - Clear Lake, University Archives, Houston, TX.

"NASA recognizes 150 from JSC with Honor Awards," Space News Roundup (NASA Lyndon B. Johnson Space Center), 17 April 1992.

NASA Stennis Space Center Telephone Directory (1996) Organization Files, Center Series, JSC History Collection, University of Houston-Clear Lake, University Archives, Houston, TX.

"S&MA SAIC Team Newsletter; March/April 2005," Johnson Space Center Safety and Mission Assurance Homepage, Online, <http://sma.jsc.nasa.gov> (Accessed 16 June 2005).

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