STS RECORDATION BIBLIOGRAPHY

National Aeronautics and Space Administration
Johnson Space Center

Prepared by:

Archaeological Consultants, Inc.
Sarasota, Florida

Joan Deming, RPA, Principal Investigator
Trish Slovinac, Architectural Historian

Under Contract IHA-BOA-09-009-A

December 2010

PREFACE

NASA's Space Shuttle Program (SSP) has served America's science and research programs for over 30 years. In the three decades since it became a reality, NASA's Space Transportation System (STS), first launched in April 1981, is the only reusable spacecraft capable of delivering and returning large payloads and scientific experiments to and from space. The space shuttle fleet, comprised of Discovery, Atlantis and Endeavour, is scheduled for retirement in 2010.

The removal of the Space Transportation System from active service will result in the ending of the SSP. With the support of the SSP and various NASA centers, recordation of the space shuttle "stack," including the orbiters, external fuel tank, space shuttle main engines, and reusable solid rocket motor/solid rocket boosters, is underway. NASA plans to document the STS in accordance with the Department of the Interior's standards for a Level II Historic American Engineering Record (HAER). NASA recordation activities will cover the historic phases for engineering of the stack from concept development to retirement, including design, test and operations; the unique features of the three active orbiters; the ferry operations for the Shuttle Carrier Aircraft; and major design modifications and mission operations post Challenger and Columbia.

The STS Recordation Bibliography was prepared as a companion to the STS Recordation HAER document. It is not intended to be an encyclopedic reference guide to the SSP. Rather, the references focus primarily on the technological evolution of the STS, including the orbiter vehicle and major propulsion elements. Since it is intended as a reference guide suitable for use by the general public, listings for highly technical materials are not included.

The STS Recordation Bibliography is organized topically into five major sections: General History; the Orbiter Vehicles; the Space Shuttle Main Engines; the Solid Rocket Boosters/Solid Rocket Motors/ Reusable Solid Rocket Motors; and the External Tank. Within each section, references are grouped by the general information type, i.e., books, pamphlets, journals, and presentation materials; cultural resource inventories and historic contexts; internet sources; oral histories; and video, film, and DVD. As appropriate, reference materials also are grouped by the source repository, specifically the archives at the University of Houston – Clear Lake, the Kennedy Space Center Library, and the Marshall Space Flight Center History Office.

This bibliography is designed to capture the basics of the technological evolution of the shuttle stack. For additional information, a wealth of archival and current materials about the Space Shuttle Program and the Space Transportation System is available at NASA's World Wide Web site - http://www.nasa.gov/.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Section 1. GENERAL HISTORY OF THE SPACE TRANSPORTATION SYSTEM

"I can't think of any single program in our country that has done more, made more overall contributions to society, than the space program. It's been the driver of technology for the last half of the century, it has been an important instrument of international relations, it has built the reputation of our nation among all the nations, and it has generated spin-offs that have made untold contributions to society. To consider that we, for less than 1 percent of the national budget, could have gotten that return on the investment to me is nothing short of miraculous. Looking back on things that I have done, I like to think that I've been a part of something that has benefited not only a small group of people but has benefited all of society."

William R. Lucas, Huntsville, Alabama – July 21, 2010

(Interview by Rebecca Wright,
NASA STS Recordation Oral History Project Oral History Transcript)

Section 1: GENERAL HISTORY OF THE SPACE TRANSPORTATION SYSTEM

Books, Journals, Pamphlets, and Presentation Materials

Anonymous. "First Shuttle Base." *Spaceflight* Volume 19, No. 6, June 1977: 218-227.

Baker, David. "A Schedule for the Shuttle." *Spaceflight* Volume 13, No. 12, December 1971: 454-455.

Baker, David. "Evolution of the Space Shuttle Part 1." *Spaceflight* Volume 15, No. 6, June 1973: 202-210.

Baker, David. "A Chronology of the Space Shuttle. *Spaceflight* Volume 15, No. 6, June 1973: 210-214.

Baker, David. "Evolution of the Space Shuttle." North American Rockwell - Part 2. *Spaceflight* Volume 15, No. 7, July 1973: 264-268.

Baker, David. "A Chronology of the Space Shuttle - 2." *Spaceflight* Volume 15, No. 7, 1973: 268-270.

Baker, David. "A Chronology of the Space Shuttle - 3." *Spaceflight* Volume 15, No. 8, 1973: 312-314, 319.

Baker, David. "Evolution of the Space Shuttle. North American Rockwell - Part 3." *Spaceflight* Volume 15, No. 9, 1973: 344-352.

Baker, David. "A Chronology of the Space Shuttle - 4." *Spaceflight* Volume 17, Nos. 8-9, August-September 1975: 335-337.

Baker, David. "A Chronology of the Space Shuttle - 5." *Spaceflight* 1976: 23-25.

Baker, David. "A Chronology of the Space Shuttle – 5 (continued)." *Spaceflight* Volume 18, Nos. 7-8, July-August 1976: 294-298.

Baker, David. "Evolution of the Space Shuttle Part 4." *Spaceflight* Volume 18, No. 9, September 1976: 304-338.

Baker, David. "Evolution of the Space Shuttle Part 5. Approach and Landing Test Program." *Spaceflight* Volume 19, No. 6, June 1977: 213-217.

Baker, David. "Evolution of the Space Shuttle Part 6. Free Flight Tests Begin." *Spaceflight* Volume 20, No. 1, January 1978: 21-28, 40.

Boeing. *Space Exploration – Palmdale, CA: AF Plant 42, Site 1 North*. Palmdale: Boeing, 2006.

Bromberg, Joan Lisa. *NASA and the Space Industry*. Baltimore: Johns Hopkins University Press, 1999.

Burrows, William E. *This New Ocean, The Story of the First Space* Age. New York: Random House, 1998

Dethloff, Henry C. *Suddenly, Tomorrow Came…A History of the Johnson Space Center*. The NASA History Series. Houston: Johnson Space Center, 1993.

Dethloff, Henry C. The Space Shuttle's First Flight: STS-1. In *From Engineering Science to Big Science: The NACA and NASA Collier Trophy Research Project Winners*. NASA SP-4219, Edited by Pamela E. Mack. Washington, D.C.: Government Printing Office, 1998.

Duggins, Pat. *Final Countdown: NASA and the End of the Space Shuttle Program.* Gainesville: University Press of Florida. 2007.

Dunar, Andrew J. and Stephen P. Waring. *Power to Explore: A History of Marshall Space Flight Center 1960-1990*. The NASA History Series, NASA SP-4313, Washington, D.C.: NASA, 1999.

Ezell, Linda Neuman. *NASA Historical Databook Volume III Programs and Projects 1969-1978.* The NASA History Series, NASA SP-4012, Washington, D.C.: NASA History Office, 1988.

Green, Barbara E. *25th Anniversary United States Space Shuttle Firsts.* NASA, Kennedy Space Center Library Archives, KSC Historical Report 19, April 2006.

Hallion, Richard P. and Michael H. Gorn. *On the Frontier: Experimental Flight at NASA Dryden.* 2nd Edition. Washington and London: Smithsonian Books, 2003.

Harland, David M. *The Story of the Space Shuttle.* Chichester, UK: Praxis Publishing, 2004.

Heppenheimer, T. A. *Countdown, A History of Space Flight.* New York: John Wiley and Sons, Inc., 1997.

Heppenheimer, T. A. *The Space Shuttle Decision: NASA's Search for a Reusable Space Vehicle.* NASA SP-4221. Volume One of *History of the Space Shuttle*, Washington, D.C.: Smithsonian Institution Press, 2002a.

Heppenheimer, T. A. *Development of the Space Shuttle, 1972-1981*. Volume Two of *History of the Space Shuttle*, Washington, D.C.: Smithsonian Institution Press, 2002b.

Herring, Mack R. *Way Station to Space: A History of the Johns C. Stennis Space Center*. The NASA History Series, NASA SP-4310, Washington, D.C.: NASA, 1997.

Jenkins, Dennis R. *Space Shuttle, The History of the National Space Transportation System. The First 100 Missions*. Cape Canaveral, Florida: Specialty Press, 2001.

Joels, Kerry Mark, Gregory P. Kennedy and David Larkin. *The Space Shuttle Operator's Manual, revised edition*. New York: Ballantine Books, 1988.

Launius, Roger D. and Aaron K. Gillette. *Toward a History of the Space Shuttle: An Annotated Bibliography.* Washington, D.C.: NASA History Office, Studies in Aerospace History Number 1, 1992. (also available at http://www.hq.nasa.gov/office/pao/History/shuttlebib/.

Logsdon, John M., Ray A. Williamson, Roger D. Launius, Russell J. Acker, Stephen J. Garber, and Jonathan L. Friedman (Editors). *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program Volume IV: Accessing Space*. NASA SP-4407. Washington, D.C.: Government Printing Office, 1999.

Merlin, Peter W. "Free Enterprise: Contributions of the Approach and Landing Test (ALT) Program to the Development of the Space Shuttle Orbiter." Paper presented at the AIAA Space Conference of 2006, San Jose, California, 20-21 September.

McDonald, Allan J. and James R. Hansen. *Truth, Lies, and O-Rings: Inside the Space Shuttle Challenger Disaster*. Gainesville: University Press of Florida. 2009.

National Aeronautics and Space Administration. "Space Transportation System Contractors." in *NSTS 1988 News Reference Manual*. pp. 971-990.

Reichhardt, Tony (editor). *Space Shuttle, The First 20 Years*. Washington, D.C.: Smithsonian Institution, 2002.

Rockwell International. Orbiter Project Resident Office. Memorandum to the Lyndon B. Johnson Space Center. 29 January 1990. [Included in presentation materials provided by Boeing, September 2006.]

Rockwell International. Space Systems Group. *Space Shuttle System Summary*. May 1980.

Rockwell International. *Press Information, Space Shuttle Transportation System*, March 1982.

Rumerman, Judy A., with Stephen J. Garber. *Chronology of Space Shuttle Flights 1981-2000*. HHR-70. Washington, D.C.: NASA History Division, Office of Policy and Plans, October 2000.

Veris, S. Jenise. "2001 Columbia celebrates 20 years of service." *AeroSpace Frontiers*, April 2001:7.

Wallace, Lane E. Flights *of Discovery. 50 Years at the NASA Dryden Flight Research Center*, The NASA History Series, NASA SP-4309, NASA History Office, Washington, D.C., 1996.

Williamson, Ray A. "Developing the Space Shuttle." In *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume IV: Accessing Space*, Edited by John M. Logsdon. Washington, D.C.: U.S. Printing Office, 1999.

Wright, Mike, with Bob Jaques. *Towards Liftoff: A Brief History and Chronology of the Marshall Space Flight Centers' Role in Designing, Developing, and Testing the Space Shuttle Propulsion Elements for STS-1*. Huntsville: Marshall Space Flight Center, 2001.

Documents at the Kennedy Space Center Library Archives

Chrysler Corporation Space Division. *Project SERV A Space Shuttle Feasibility Study*, 19 November 1969.

Chrysler Corporation Space Division. *Final Report on Project. Single-stage Earth-orbital Reusable Vehicle Space Shuttle Feasibility Study*, Volumes 1-5, Contract NAS8-26341, 30 June 1971.

Griner, Roland F., Joseph M. Carlton, Hans J. Nein, Richard L. Beck, and Robert S. White. *Space Shuttle Solid Rocket Booster Pictorial Representations*, Revision C, NASA, George C. Marshall Space Flight Center, October 1976.

Grumman Aerospace Corporation. *Alternate Space Shuttle Concepts Study. Part II Technical Summary, Volume I Shuttle Definition Final Report*, Contract NAS9-11160, 6 July 1971.

Grumman Aerospace Corporation. *Alternate Space Shuttle Concepts Study. Design Requirements and Phased Programs Evaluation, Midterm Report*, 1 September 1971.

Grumman Aerospace Corporation. *Space Shuttle System Program Definition, Phase B Extension Final Report,* Volume I Executive Summary, Contract NAS9-11160, 15 March 1972.

Guilmartin, John F., Jr. and John Walker Mauer. *A Shuttle Chronology 1964 --- 1973 Abstract Concepts to Letter Contracts,* Volumes I – V, National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, JSC-23309, December 1988.

Lockheed Missiles & Space Company. *Integral Launch and Reentry Vehicle, Final Report,* Executive Summary, LMSC-A959837, 22 December 1969.

Lockheed Missiles & Space Company. *Study of Alternate Space Shuttle Concepts Final Report,* Volume I Executive Summary, Contract NAS8-26362, 4 June 1971.

Lockheed Missiles & Space Company. *Alternate Space Shuttle Concepts Study 3 November Review,* Contract NAS8-26362, 4 June 1971.

Lockheed Missiles & Space Company. *Alternate Concepts Study Extension, Final Report,* Volume I Executive Summary, Contract NAS8-26362, 15 November 1971.

Martin Marietta Corporation, Denver Division. *Spacemaster A Two-Stage Fully Reusable Space Transportation System. Phase A Final Report.* December 1969.

McDonnell Douglas Astronautics Company. *A Two-Stage Fixed Wing Space Transportation System, Final Report,* Volume I Condensed Summary, Contract NAS9-9204, 15 December 1969.

North American Rockwell, Space Division. *Study of Integral Launch and Reentry Vehicle System Final Report,* Volume I Summary Report – Second Phase, Contract NAS9-9205, December 1969.

North American Rockwell, Space Division. *Space Shuttle Program Phase B Final Report,* Volume I Executive Summary, Contract NAS9-10960, 25 June 1971.

North American Rockwell, Space Division. *Space Shuttle Program Phase B Extension Mid-Term Review,* 1 September 1971.

North American Rockwell, Space Division. *Space Shuttle Program Phase B Final Report,* Volume I Executive Summary, Contract NAS9-10960, 15 March 1972.

Rockwell International, Space Division. *Space Shuttle Solid Rocket Booster Preliminary Design Book,* SD 73-SH-0111, Rev. 22 June 1973.

Thiokol, Wasatch Division. Solid Rocket Motor Launch Site Operations at Kennedy Space Center, Publication No. 573-73307, May 1973.

Documents at the Marshall Space Flight Center History Archives

Chrysler Corporation Space Division. *Project SERV Final Review. Phase A Space Shuttle Study,* Contract NAS8-26341, 1 July 1971.

Day, L.E. “The Space Shuttle. A New Approach to Space Transportation.” No date.

Day, L.E. and B.G. Noblitt. "Logistics Transportation for Space Station Support." Paper presented at the IEEE EASCON Session on Earth Orbiting Manned Space Station, Washington, D.C., October 29, 1969. 1969 Correspondence (No box number).

Frosch, Robert A., NASA. Statement before the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives, June 28, 1979. Drawer 26, Program/Project Files, Series: SPACE SHUTTLE, Folder Jan – July 1979.

Garber, Steve. "Shuttle Brief Chronology." 20 March 2001.

Jeffs, George W., President, North American Aerospace Operations Corporate Vice President, Rockwell International Corporation. Statement before the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives, June 28, 1979. Drawer 26, Program/Project Files, Series: SPACE SHUTTLE, Folder Jan – July 1979.

Moore, Jesse W., NASA Headquarters, Associate. Administrator for Space Flight. Memorandum to KSC, JSC, MSFC Directors and Program Managers, December 23, 1985, SUBJECT: Continued Improvements to Shuttle Turnaround. Drawer 27, SPACE SHUTTLE Program 1986, No Folder Number.

Mrazek, W.A. Memorandum to Dr. Wernher von Braun, July 2, 1969, Subject: Summary Report of the Space Shuttle Activities for Period of June 13 to July 2, 1969. 1969 Correspondence (No box number).

Mueller, George, Associate Administrator for Manned Space Flight. Letter to Dr. Wernher von Braun, Director, MSFC, May 28, 1969. 1969 Correspondence (No box number).

Mueller, George, Associate Administrator for Manned Space Flight. Letter to Dr. Wernher von Braun, Director, MSFC, July 3, 1969, Subject: "*Space Shuttle Technology Plan.*" 1969 Correspondence (No box number).

Mueller, George E. Mueller, Associate Administrator for Office of Manned Space Flight. Memorandum to Acting Associate Administrator for Office of Advanced Research and Technology, August 25, 1969, Subject: Joint OART/OMSF Effort on Space Shuttle. 1969 Correspondence (No box number).

Murphy, James T., Associate Director for Management Program Development, PD-DIR, Memorandum to Dr. Rees, DEP-T and Mr. Gorman, DEP_M, August 29, 1969, Subject: Review of MSFC Procurement Plan for SSME by NASA Headquarters. 1969 Correspondence (No box number).

NASA. *NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond, Final Edition.* 15 May 2007.

NASA. *NASA Space Vehicle Design Criteria (Structures). Structural Design Criteria Applicable to a Space Shuttle*. January 1971, Revised March 1972.

NASA. *National Space Transportation System, An Overview*. September 1988.

NASA. *Space Shuttle*. October 1972.

NASA, Headquarters. Space Shuttle Service Life Extension Program. Summit I. "Delivering a Comprehensive Strategy and Implementation Plan. Identify and Prioritize Safety, Supportability, and Performance. Technology Push, Requirements Pull, Operations Support." March 2003.

NASA, MSFC. Oral Interviews: Space Shuttle History Project. Transcript Collection (December 1988), *Marshall History Report* (MHR)-16, Compiled by Management Operations Office, Contract NAS8-35900.

NASA, Office of Manned Space Flight. "Statement of Work. Space Shuttle System Program Definition (Phase B)." October 1969.

NASA, Space Shuttle Task Group. *NASA Space Shuttle Summary Report*, July 31, 1969 (rev). 1969 Correspondence (No box number).

North American Rockwell, Space Division. *Proposal for Space Shuttle Program, Technical Proposal* Volume III. RFP 9-BC421-67-2-40P. 12 May 1972.

North American Rockwell, Space Division. *Space Shuttle Program, Phase B Final Report*. Volume I, Executive Summary. 25 June 1971.

Rockwell International, Space Division, Public Relations. "Space Shuttle Major Events." June 1976.

Stone, James M., Group Vice President Government Systems, Thiokol Corporation. Statement before the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives, June 28, 1979. Drawer 26, Program/Project Files, Series: SPACE SHUTTLE, Folder Jan – July 1979.

Yardley, John F. Yardley, Associate Administrator for Space Transportation Systems. Memorandum to MH-7, Director, Space Shuttle Program RE: Engine Certification Requirements, August 9, 1979. Drawer 26, Program/Project Files, Series: Space Shuttle, Folder: Shuttle – Major Tests (MPT and MVGVT).

MSFC History Office, Space Shuttle History Project, Historical Documents Collection, Microfiche

General Dynamics Convair Division. *Reusable Launch Vehicle/Spacecraft Concept*, Report No. GDC-DCB-68-017, November 1968. SHHDC-23.

General Dynamics Convair Division. *Space Shuttle Final Technical Report*, Volume I Condensed Summary, Report No. GDC-DCB69-046, Contract NAS9-9207, 31 October 1969. SHHDC-1021.

Grumman Aerospace Corporation. *Orbiter External Hydrogen Tank Study, Mid-Term Review*, NASA-MSC, 12 May 1971. SHHDC-2996.

Grumman Aerospace Corporation. *Shuttle Systems Evaluation and Selection, Mid-Term Briefing*, Volume I – Executive Summary, Contract NAS9-11160, 15 December 1971. SHHDC-41.

Grumman Aerospace Corporation. *Alternate Space Shuttle Concepts Mid-Tem Report*, Volume I – Executive Summary, Contract NAS9-11160, 31 December 1970. SHHDC-42.

Grumman Aerospace Corporation. *Alternate Space Shuttle Concepts Study, Final Report*, Part I Executive Summary, Contract NAS9-11160, 6 July 1971. SHHDC-43.

Lockheed Missiles & Space Company, Inc. *Alternative Space Shuttle Development Approaches*, 24 November 1969. SHHDC-771.

Lockheed Missiles & Space Company, Inc. Integral Launch and Reentry Vehicle, Final Oral Presentation, Contract NAS9-9206, 7 November 1969. SHHDC-773.

Lockheed Missiles & Space Company, Inc. *Space Shuttle Final Review*, 22 February 1972. SHHDC-205.

McDonnell Douglas Astronautics Company. *Integral Launch and Reentry Vehicle System*, Executive Summary, Contract NAS9-9204, November 1969. SHHDC-46.

McDonnell Douglas. *Phase B System Study Extension Final Report*, 15 November 1971. Report MDC EO497. SHHDC-212.

McDonnell Douglas. *Space Shuttle Booster & Orbiter Main Propulsion Systems*, no date. SHHDC-2891.

"MSC Orbiter – 040A System Definition and Analysis." 13 September 1971. SHHDC-2909.

"MSFC LOX/RP Reusable Booster." 21 September 1971. SHHDC-2995.

NASA. *NASA Preliminary Contract End Item (CEI) Specification Space Shuttle Main Engine*, 29 September 1969. SHHDC-154.

NASA, MSFC. *External Tank Project Statement of Work*, Contract NAS8-30300, 19 September 1983. SHHDC-766.

NASA, MSFC. *Space Shuttle External Tank and Solid Rocket Booster Quarterly Review*, 6 March 1973. SHHDC-293.

NASA, MSFC, Program Development. *Phase A Shuttle Studies, Comparisons of Alternate Shuttle Concepts and Approaches*, 15 December 1970. SHHDC-1.

NASA, MSFC, Program Development. *Technology and Development Underway at MSFC Which Could Support the Space Shuttle*, 9 June 1970. SHHDC-16.

NASA, MSFC, Shuttle Projects Office, *Space Shuttle Main Engine. Management Council Meeting SSME Project Review*, 11 July 1974. SHHDC-111.

NASA, MSFC, Shuttle Projects Office, Management Integration. MSFC Projects Review Management Council Meeting, 7 February 1974. SHHDC-242.

NASA, MSFC, Shuttle Projects Office. Management Council Meeting, 8 May 1974. SHHDC-247.

NASA, MSFC. *MSFC Shuttle Projects Schedules Status Report*, (Various for 1984). SHHDC-2827, -2830 through -2835.

NASA, Space Shuttle Task Group. *NASA Space Shuttle Summary Report*, 31 July 1969 (revised). SHHDC-780.

Pratt & Whitney Aircraft. *Space Shuttle Engine Baseline Configuration Preliminary Design*, 16 April 1970. SHHDC-1010.

Rockwell International. *Flight Engine Modifications and Acceptance Test Requirements*. 4 April 1980. SHHDC-252.

"Space Shuttle Enterprise Starts Launch Vibration Test Series." *Astronomy*, August 1978. Microfiche No. 6254.

Truly, Richard H. Statement Before the Subcommittee on Space Science and Applications of the Committee on Science, Space and Technology, House of Representatives, 16 September 1987, Results of the Development Motor 8 Test Firing, U.S. Government Printing Office, Washington, D.C., 1987. SHHDC-3161.

Documents at the University of Houston – Clear Lake Archives

Lockheed Propulsion Company. *Data Requirement MA-02 Final Report, Technical Report Analysis and Design Study of Solid Rocket Motors for a Space Shuttle Booster*, Contract No. NAS8-28429, 15 March 1972. Shuttle Series, Lockheed Documents, Section 035, Box 14, March 15, 1972.

Mathews, Charles W. "Concluding Remarks." Paper presented at the Space Shuttle Symposium, Smithsonian Museum of Natural History, Washington, D.C., October 16-17, 1969.

McDonnell Douglas Astronautics Company. *Space Shuttle System Study Extension Final Report Part IV Solid Rocket Motor Interim Booster Concepts*, Contract No. NAS8-26016, October 1971. Shuttle Series, McDonnell Douglas, Section 036, Box 18, October 1971.

Rockwell International. *Thermal Protection System Test Plan*, Volume I Materials Characterization Test Program, Contract NAS9-14000, 13 May 1974. Shuttle Series, Rockwell Downey Orbiter Documents, UHCL Box 26.

Marshall Star

"1977 Was a Busy Year for Marshall." (18, 16) 21 December 1977: 3.

"1st Manned Shuttle Flight Set for September 1979." (19, 3) 27 September 1978: 1.

"Aerospace Firms Enter Space Shuttle Proposals." (13, 38) 6 June 1973: 2.

"All Engines Fire in 1st MPTA Test." (18, 32) 26 April 1978: 1.

"Automatic Cutoff Ends MPT Firing." (20, 21) 6 February 1980: 1, 4.

"Back on Columbia." (20, 47) 6 August 1980: 1, 2.

"Bids Requested for Space Shuttle Fuel Cells Development." (13, 38) 6 June 1973: 2.

"Big Test Structure for Space Shuttle is Delivered Here." (17, 38) 1 June 1977: 1, 4.

"Canada to Develop Remote Manipulator." (15, 37) 28 May 1975: 3.

"Columbia Rolls Out." (21, 12) 26 November 1980: 1.

"Complete Shuttle Mating Scheduled Later This Week." (19, 4) 4 October 1978: 1.

"Dynamics Stand is Being Changed For New Series." (18, 46) 2 August 1978: 1.

"Ferry Flight Test." (19, 26) 21 March 1979: 3.

"Final Assembly Stage." (16, 23) 18 February 1976: 1.

"First Checkout." (19, 10) 15 November 1978: 1.

"First Complete Vehicle. Shuttle Assembled in Dynamics Stand." (19, 5) 11 October 1978: 1.

"First Shuttle Ground Test Hardware Arrives at MSFC." (15, 31) 16 April 1975: 1.

"First Shuttle Launch is Set for March 1981." (20, 47) 6 August 1980: 1, 2.

"First Shuttle Launch Now Slated for November 9." (19, 18) 24 January 1979: 1, 4.

"Frosch: First Quarter '80 Is 'Most Probable' Period For Launch 1st Shuttle." (19, 33) 9 May 1979: 2.

"Frosch Tells Subcommittee Shuttle is 'Well on Its Way'." (20, 7) 24 October 1979: 3.

"Ground Vibration Test Series Starts Monday." (18, 34) 10 May 1978: 1, 2.

"Ground Vibration Testing of Entire Shuttle Vehicle Began Friday at Marshall." (19, 7) 25 October 1978: 1, 4.

"Ground Vibration Tests Underway." (18, 38) 7 June 1978: 1.

"Homemade Orbiter to Make Practice Runs at Marshall." (18, 12) 23 November 1977: 4.

"Major Milestone Reached in Space Shuttle Program." (15, 42) 2 July 1975: 1, 4.

"Marshall Center Prepares for 'Short Stack' Tests." (17, 42) 28 June 1977: 1, 2.

"Marshall Hoists Simulator Into Vibration Test Stand." (18, 17) 11 January 1978: 1.

"MSC Shuttle Contract Is Awarded to MIT." (13, 25) 7 March 1973: 4.

"MSFC Will Install Shuttle Elements in Stand Shortly." (18, 29) 5 April 1978: 1.

"MSFC Prepares for Arrival of Space Shuttle Orbiter." (16, 47) 4 August 1976: 1.

"MSFC's Elements for First Shuttle Delivered to KSC." (19, 46) 9 August 1979: 1.

"MVGVT First Phase Completes July 14." (18, 45) 26 July 1978: 2.

"NAR Selected for Shuttle Negotiations." (12, 46) 2 August 1972: 2.

"NASA F477 Overall Budget Allows Continued Progress." (16, 21) 4 February 1976: 4.

"NASA Extends Shuttle Test and Operational Flight Dates." (20, 27) 28 May 1980: 1.

"NASA Awards Final Major Shuttle Program Contract." (17, 17) 5 January 1977: 1, 2.

"Nashville Firm Gets $3.2 Million Shuttle Contract." (15, 40) 18 June 1975: 4.

"Nozzle Plugs Tested." (20, 29) 2 April 1980: 2.

"OSF FY-77 Budget Request to Impact Shuttle and STS." (16, 23) 18 February 1976: 4.

"Preliminary Study of Shuttle Thrust Increase is Begun." (19, 25) 14 March 1979: 1.

"Proposal Sought for Last Major Shuttle Contract." (16, 29) 31 March 1976: 1.

"Proposed\ NASA Budget is up $100 Million for F$75." (14, 21) 6 February 1974: 1, 4.

"Quotations Sought for Shuttle Range Safety Receivers." (16, 46) 28 July 1976: 1.

"SCA is Due Here Monday on Shuttle Dry Run Flight." (18, 20) 1 February 1978: 1.

"SCA Ferry Validation Completed." (18, 13) 30 November 1977: 1.

"Shuttle 747 Here for Facility Check." (18, 21) 8 February 1978: 1.

"Shuttle Acoustic Testing Shifts to AF Configuration." (16, 45) 21 July 1976: 2.

"Shuttle Assembled In Dynamics Stand." (19, 5) 11 October 1978: 1.

"Shuttle Baseline Acoustic Test Series Is Completed." (19, 31) 25 April 1979: 2.

"Shuttle Booster, External Tank Review Underway." (13, 14) 13 December 1972: 1.
"Shuttle Functional Test Model." (15, 10) 13 November 1974: 4.

"Shuttle Inert ALT May Stop Early Due to Success." (17, 25) 2 March 1977: 1, 3.

"Shuttle Manned ALT Scheduled." (17, 26) 8 March 1977: 1.

"Shuttle Model Test Firing." (17, 11) 17 November 1976: 1.

"Shuttle OMS Engine Fired." (19, 3) 27 September 1978: 1.

"Shuttle Review Attracts About 400 Attendees." (13, 25)7 March 1973: 1.

"Shuttle Review." (13, 38) 6 June 1973: 4.

"Shuttle Scale Model Tests Study Sound Wave Effects." (16, 4) 1 October 1975: 1, 4.

"Shuttle Simulation Gear is Delivered." (18, 32) 26 April 1978: 1.

"Shuttle Status." (21, 4) 1 October 1980: 1.

"Shuttle Status." (21, 9) 5 November 1980: 1, 2.

"Shuttle Status." (21, 11) 19 November 1980: 1.

"Shuttle Status." (21, 12) 26 November 1980: 1.

"Shuttle Status." (21, 13) 3 December 1980: 1.

"Shuttle Status." (21, 14) 10 December 1980: 1.

"Shuttle Status." (21, 15) 17 December 1980: 1.

"Shuttle Status." (21, 17) 7 January 1981: 1.

"Shuttle Status." (21, 19) 21 January 1981: 1.

"Shuttle Status." (21, 20) 28 January 1981: 1.

"Shuttle Status." (21, 21) 4 February 1981: 1.

"Shuttle Status." (21, 22) 11 February 1981: 1.

"Shuttle Status." (21, 23) 18 February 1981: 1.

"Shuttle Status." (21, 27) 18 March 1981: 1.

"Shuttle Status." (21, 29) 1 April 1981: 1.

"Shuttle Status." (21, 50) 26 August 1981: 1.

"Shuttle Vibration Tests to Resume." (19, 17) 17 January 1979: 1, 4.

"Shuttle Vibration Testing in Liftoff Configuration Completed at Marshall." (19,13) 6 December 1978: 1.

"Signal Conditioner Modules Contract Awarded to Eldec." (16, 16) 24 December 1975: 1.

"Space Shuttle Committee Given Program Status Reports." (16, 13) 3 December 1975: 1, 3.

"Space Shuttle Takes Shape, Vertical Integration Begins." (21, 9) 5 November 1980: 1, 2.

"Space Shuttle Interface Test Completed at KSC." (21, 16) 24 December 1980: 2.

"Space Shuttle Wings First Trip is a Long, Slow Haul." (15, 36) 21 May 1975: 2.

"Sperry Rand Gets Shuttle Contract." (15, 45) 23 July 1975: 4.

"Star Year-end Review." (21, 16) 24 December 1980: 4.

"Structural Test Data Acquisition System Nearing Completion." (16, 33) 28 April 1976: 1, 5.

"Studies Underway to Improve Shuttle." (16, 45) 21 July 1976: 1.

"Team Check Out Early Test Cutoff." (21, 9) 5 November 1980: 1, 2.

"Tests Underway in Calif. To Aid Shuttle Development." (13, 21) 7 February 1973: 1, 2.

"Unique Heat Shield Will Protect Space Shuttle Travelers." (17, 13) 24 November 1976: 4.

"Vibration Tests Here Completed." (19, 23) 28 February 1979: 1.

"Vibration Tests Provide Valuable Data on Shuttle." (19, 24) 7 March 1979: 1, 4.

"Water Impact Test." (13, 31) 18 April 1973: 1.

"Yardley Outlines FY 1978 Programs and Money Needs." (17, 23) 16 February 1977: 2, 8.

Roundup/Space News Roundup

"747 Selected for Shuttle Orbiter Ferry Flights." (13, 15) 21 June 1974: 4.

"Advanced Solid Rocket Facilities to be Built." (29, 22) 1 June 1990: 4.

"Agency Gets Go-ahead to Develop Shuttle." (11, 4) 7 January 1972: 1.

"Alternate Heat Protection to be Studied by Rockwell." (19, 12) 13 June 1980: 1.

"Another Captive Test Precedes Free Flight." (16, 14) 8 July 1977: 1.

"Booster Assembly Firm Chosen." (16, 1) 7 January 1977: 1.

"Brains of the Shuttle are the "Flight Critical" 5 Onboard Computers." (19, 20) 3 October 1980: 1, 4.

Carr, Jeff. "Ferry Fleet Doubles in Size." (29, 46) 16 November 1990: 1, 4.

"Center Gears up for Lead Role in Developing Space Shuttle." (11, 5) 21 January 1972: 4.

"Center Lets Two Shuttle Contracts." (10, 22) 10 September 1971: 3.

Copley, Linda. "JSC Extends, Supplements Lockheed Pact." (28, 19) 12 May 1989: 4.

"Crew Escape System Works Safely in Test." (16, 2) 21 January 1977: 1.

"Drag Chute Test Glides to Success." (29, 30) 27 July 1990: 1.

"End of ALT Program Makes Orbital Missions More Imminent." (16, 23) 11 November 1977: 1.

"First Manned Captive Test Flight is Delayed." (16, 12) 10 June 1977: 1.

"First Manned Orbiter Test Flight nears. Haise, Fullerton to Test Systems on Captive Active 1." (16, 8) 15 April 1977: 1.

"First Shuttle Orbital Flight Paced by Main Engine Testing." (17, 15) 4 August 1978: 1.

"First Tailcone-Off Flight is Oct. 12." (16, 21) 14 October 1977: 1.

"Flight Test Extensions Slip Operational Status." (19, 11) 30 May 1980: 1.

Fluegel, Karl. "Shuttle Cockpit to be Upgraded. NASA Awards Contract for State-of-the-Art Displays." (31, 37) 25 September 1992: 1.

"Free Flight 5 Concludes Successful ALT Program." (16, 22) 28 October 1977: 1.

"FRF Triumph Lead Way to April Launch." (20, 5) 27 February 1981: 1, 4.

"Frosch, Yardley Cover New Space Technology in STS Development." (19, 19) 19 September 1980: 1, 4.

"GE Get Orbiter ACE Contract." (14, 21) 10 October 1975: 4.

"IBM Get Shuttle Avionics Contract." (12, 23) 12 October 1973: 3.

"Initial Shuttle Flights Will Land in California." (13, 24) 25 October 1974: 1.

"JSC Awards Shuttle-Related Contracts." (27, 2) 15 January 1988: 2.

"JSC Enters Into Several Contracts, Negotiations." (16, 24) 25 November 1977: 1, 2.

"JSC Invites Lockheed to Test Shuttle." (12, 22) 28 September 1973: 2.

"JSC Processes Largest One-Time Purchase." (27, 5) 26 February 1988: 1.

"JSC Requests 31 Proposals." (13, 15) 21 June 1974: 2.

"JSC Selects Pratt and Whitney." (12, 17) 6 July 1973: 3.

"JSC Signs Support Contract with Rockwell." (29, 3) 19 January 1990: 1, 4.

"Main Engine, Solid Rocket Motor Undergo More Tests." (26, 21) 23 October 1987: 1, 2.

"McDonnell Douglas Awarded Contract." (13, 11) 26 April 1974: 3.

"MSC Awards Three Contracts for Shuttle Surface Materials." (10, 18) 16 July 1971: 1.

"NAR Shuttle Study Modifications Include Structural Test Programs." (10, 4) 18 December 1970: 1, 2.

"NASA and NR Ink Shuttle Pact." (11, 20) 18 August 1972: 1.

"NASA and Rockwell Sign Contract." (12, 12) 27 April 1973.

"NASA Buys Second Shuttle Carrier Jet." (12, 22) 12 August 1988: 4.

"NASA/McDonnell Douglas Negotiate Contract for Space Shuttle Support." (13, 10) 12 April 1974: 2.

"NASA Outlines Recovery: First Flight Set for 1988." (25, 13) 25 July 1986: 1, 3.

"NASA, Rockwell Sign Supplemental Contract." (16, 2) 21 January 1971: 1.

"NASA Seeks Alternate TPS for Shuttle." (19, 8) 21 April 1980: 2.

"NASA Signs Pact for Two Orbiters." (14, 21) 10 October 1975: 1.

"NASA Studies a New Approach to Developing Space Shuttle System." (10, 17) 2 July 1971: 1, 3.

"New Shuttle Work Invited, Awarded." (11, 11) 14 April 1972: 2.

"New Shuttle Work Let, Bids Asked." (11, 9) 17 March 1972: 1, 3.

"New Target Date Puts First Flight in Early August." (27, 3) 29 January 1988: 1, 2.

"No Time for Sightseeing on Busy Third Free Flight." (16, 20) 30 September 1977: 1.

"NR Contracts for Design Aid." (11, 23) 1972: 3.

"Officials Report on Status of Shuttle." (13, 15) 21 June 1974: 1.

"Orbiter System Study Requested." (11, 10) 31 March 1972: 2.

"Orbiter Contract Expanded." (16, 12) 10 June 1977: 1.

"Orbiter Contract Modified." (16, 13) 24 June 1977: 2.

"Orbiter in Shake Tests, Main Engine Burn Set." (17, 9) 12 May 1978: 1.

"Orbiter Makes ATL Flights at JSC (1/40th Scale, That Is)." (14, 25) 5 December 1975: 4.

"Orbiter Nears Flight Readiness for First Captive Active Test." (16, 10) 13 May 1977: 1.

"Orbiter Retests Continue as Launch Grows Near." (20, 6) 13 March 1981: 1, 4.

"Oxygen System Builder Chosen." (15, 20) 8 October 1976: 2.

"Orbiter to Separate from 747, Glide to Lakebed Landing Aug. 12." (16, 16) 5 August 1977: 1.

"Orbiter to Take its First Flight Today. Shuttle Vehicle Set for 'Piggy-back' Ride Atop 747." (16, 4) 18 February 1977: 1, 4.

"Payload Bay Now Complete." (14, 7) 28 March 1975: 4.

"Re-usable Shuttle is Planned for Late 70's." (9, 3) 28 November 1969: 4.

"Rockwell Secures Contract to Build Replacement Orbiter." (26, 16) 14 August 1987: 1.

"Second Free Flight Tests Aerodynamic Capabilities." (16, 19) 16 September 1977: 1.

"Second Jetliner to Ferry Shuttle." (27, 6) 11 March 1988: 1.

"Shuttle Flight Hardware at KSC for Assembly." (18, 17) 24 August 1979: 1.

"Shuttle Maneuver Engine Tested at White Sands." (17, 18) 15 September 1978: 1.

"Shuttle Test Article Nearly Complete." (12, 21) 14 September 1973: 2.

"Shuttle Update." (17, 22) 10 November 1978: 1.

"Shuttle Update." (20, 2) 16 January 1981: 4.

"Shuttle Vibration Tests Begin: Main Engine Test Scheduled." (17, 11) 9 June 1978: 1.

"Solid Rocket Problem Delays STS-26 Launch." (27, 1) 1 January 1988: 1, 2.

"Space Shuttle Liquid Booster Designs Studied." (29, 19) 25 September 1987: 1, 2.

"Space Shuttle Test Performed.' (13, 11) 26 April 1974: 2.

"Space Shuttle Update." (19, 19) 19 September 1980: 1, 4.

"STS Update." (18, 5) 9 March 1979: 1.

"STS Update: System Tests at KSC; Crowds at Kelly; Booster Design Advances." (18, 7) 6 April 1979: 1.

"STS Update. Tests Prove Structure, Avionics, Procedures; March Launch Possible with Sept. Rollout." (19, 13) 27 June 1980: 1, 2.

"STS Update: Tests, Tiles, & Contracts." (19, 4) 22 February 1980: 1.

"STS Update: Tests Training, and Review." (18, 11) 1 June 1979: 1.

"Study Shows Many Potential Uses." (10, 5) 15 January 1971: 4.

"Successful Flights Mark Captive Inert Test Series." (16, 5) 4 March 1977: 1.

"Successful Return to Flight Highlights 1988." (28, 1) 6 January 1989: 1, 4.

"Target Date for First Shuttle Set for 9/79, Barring Delays." (17, 19) 29 September 1978: 1.

"Third Captive Active Test Slated July 26." (16, 15) 22 July 1977: 1.

"Three Firms to Study Space Shuttle Concepts." (9, 19) 17 July 1970: 1, 3.

"Wind Tests Set for Orbiter Model." (14, 12) 5 June 1975: 1.

"Work Forges Ahead on Rest of Space Shuttle Fleet." (27, 26) 30 September 1988: 1.

Spaceport News

Barrett, Anita. "The 90's: A Decade of Renewal for NASA." (46, 14) 13 July 2007: 9.

Grinter, Kay. "30 Years Ago: First Free Flight for Shuttle Orbiter Draws a Crowd." (46, 16) 10 August 2007:7.

Grinter, Kay. "Remembering Our Heritage. 27 Years Ago: Space Shuttle Program's Last Development Flight." (46, 13) 29 June 2007: 4.

Grinter, Kay. "747 Took on Jumbo Task 35 Years Ago." (49, 1) 2009: 7.

Grinter, Kay. "First KSC Shuttle Landing 25 Years Ago." (49, 3) 2009: 7.

Herridge, Linda. "1980-89: Space Shuttle, ELV Programs Accomplish Many Firsts."(46, 14) 13 July 2007: 8.

Herridge, Linda. "Processing "Firsts" Sets Stage for STS-127 Launch. " (49, 15) 24 July 2009: 3.

X-Press

"Change Made in Overland Shuttle Orbiter Route." (19, 11) 4 June 1976: 2.

"First Shuttle Hardware Arrives." (18, 6) 28 March 1975: 2.

"Flight Loads Laboratory Prepares for Shuttle Tests." (25, 11) 15 October 1982: 2.

"Inflight Refueling Tests for Shuttle Ferry Flights." (26, 3) 3 February 1984: 3-4.

Levine, Jay. "Modifications and maintenance near end in Palmdale." (40, 17) 18 September 1998: 4.

"Limited Visibility Tests for Shuttle Use." (15, 8) 14 April 1972: 4.

"Overland Move for Orbiter Studied." (19, 3) 13 February 1976: 2.

"Overland Route Tests." (20, 1) 14 January 1977: 2.

"Shuttle Impact on Center under Study." (15, 2) 21 January 1972: 3-4.

"Shuttle Success! Dryden Success!" (24, 2) 1 May 1981: 2.

Cultural Resource Inventories and Historic Contexts

Archaeological Consultants, Inc. (ACI). *Survey and Evaluation of the Historic Facilities within the Industrial, Launch Complex 39 (LC-39), Vehicle Assembly Building (VAB), and Shuttle Landing Facility (SLF) Areas of the John F. Kennedy Space Center (KSC), Brevard County, Florida, with a Reassessment of the Existing National Register of Historic Places LC-39 Site*, NASA KSC, 1998.

ACI. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Lyndon B. Johnson Space Center, Texas.* November 2007a.

ACI. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, White Sands Test Facility, Las Cruces, New Mexico*. November 2007b.

ACI. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, John H. Glenn Research Center at Lewis Field, Cleveland and Plum Brook Station, Sandusky, Ohio*. November 2007c.

ACI. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, John F. Kennedy Space Center, Brevard County, Florida*. November 2007d.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Dryden Flight Research Center, California*. November 2007a.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Canoga Park Facility, Canoga Park, California. November* 2007b.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Santa Susana Field Laboratory, Ventura County, California*. November 2007c.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Marshall Space Flight Center, Huntsville, Alabama*. November 2007d.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, Air Force Plant 42, 1 North, Palmdale, California*. November 2007e.

ACI and Weitze Research. *NASA-wide Survey and Evaluation of Historic Facilities in the Context of the U.S. Space Shuttle Program: Roll-Up Report.* July 2008.

Butowsky, Harry A. *Reconnaissance Survey: Man in Space*. Washington, D.C.: National Park Service, 1981.

Butowsky, Harry. *Man in Space National Historic Landmark Theme Study*. Washington, D.C.: National Park Service, 1984.

Cleveland, M. Todd. *Evaluation of Resources Associated with the Space Shuttle Program, Michoud Assembly Facility, New Orleans, Louisiana*. TRC, Atlanta, Georgia. May 2007.

Page & Turnbull, Inc. *Space Shuttle Program NASA Ames Research Center Moffett Field, California.* February 23, 2007.

Science Applications International Corporation. *Space Shuttle Program Historic Eligibility Survey Report for NASA Langley Research Center, Hampton, Virginia.* November 2006.

Stennis Space Center. *Shuttle Survey Historic Eligibility Report for the Stennis Space Center, Hancock County, Mississippi*. April 2007.

Trnka, Joseph and Laura Taylor Lambros. *Historic Building Inventory and Evaluation: Air Force Plant 42 Palmdale, California*. Colton, California: Earth Tech and Research Management Consultants, Inc., March 1997.

Weitze, Karen J. *Historical Assessment for the Equipment Boneyards Marshall Space Flight Center*. San Diego: EDAW, Inc. and Weitze Research. October 2004.

Internet Sources

Aeroengineer. "Lockheed Aircraft Corporation in 1975: Lockheed Pathways to the Stars." February 2007. www.aeroengineer.net/history/lockheed/index.html

Allaway, Howard. *The Space Shuttle at Work*, NASA History Office, SP-432/EP-156, 1979. http://www.history.nasa.gov/SP-432/sp432.htm

Boeing. "History of Rocketdyne Division." December 2006a. www.boeing.com/history/bna/rocketdyne.htm

Boeing. "North American History. Chronology." December 2006b. www.boeing.com/history/bna/chron.html

Boeing. "North American History. Post-War Developments: 1946-1966." December 2006c. www.boeing.com/history/bna/postwar.html

Boeing. "Redstone Rocket Engine." December 2006d. www.boeing.com/history/bna/redstone.htm

California State Military Museum. "Historic California Posts: Lockheed Air Terminal." February 2007. www.militarymuseum.org/LockheedAirTerminal.html

Columbia Accident Investigation Board. *Report Volumes I and II*, August 2003. http://spaceflight.nasa.gov/shuttle/archives/sts-107/investigation/CAIB_lowres_ full.pdf.

Columbia Accident Investigation Board. "Orbiter Major Modification Review." October 2003. http://www.nasa.gov/Columbia/caib/PDFS/VOL2/D14.PDF

Dismukes, Kim. "STS-103 Payloads Servicing Mission 3A Configuration." Updated April 4, 2002. http://spaceflight.nasa.gov/shuttle/archives/sts-103/cargo/ index.html

Dumoulin, Jim. "Pathfinder." Last updated June 7, 1995. http://science.ksc.nasa.gov/shuttle/resources/orbiters/pathfinder.html

Garber, Stephen J. "The Flight of STS-1." 2005 http://history.nasa.gov/sts1/

Klesius, Michael. "Evolution of the Space Shuttle." *Air & Space Magazine*, 1 July 2010. http://www.airspacemag.com/space-exploration/Evolution-of-the-Space-Shuttle.html

Lethbridge, Cliff. "STS-1 Fact Sheet." 1998. http://spaceline.org/shuttlechron/shuttle-sts1.html

Lethbridge, Cliff. "History of the Space Shuttle Program." 2001.
http://spaceline.org/rocketsum/shuttle-program.html

Lindroos, Marcus. "President Nixon's 1972 Announcement on the Space Shuttle." NASA Office of Policy and Plans, NASA History Office, updated April 14, 2000.
http://history.nasa.gov/stsnixon.htm

Lockheed Martin Space Systems. "Space Shuttle Flight Information. 26 Years of Space Shuttle Flights." Updated August 2007.
www.lockheedmartin.com/data/assets/ssc/michoud/8-14-07ShuttleFlightInfo.pdf

NASA. "Development History of Space Shuttle." http://spaceflight.nasa.gov/history/shuttle-mir/spacecraft/s-orb-history-main.htm

NASA. *NASA Shuttle Reference Manual*. 1988.
http://spaceflight.nasa.gov/shuttle/reference/shutref/index.html

NASA. "Glass Cockpit." http://www.nasa.gov/centers/langley/news/factsheets/Glasscockpit.html

NASA. "Human Space Flight – The Shuttle. Background and Status."
http://spaceflight.nasa.gov/shuttle/reference/shutref/sts/background.html

NASA. "Future Missions – Launch Schedule." http://www.nasa.gov/missions/highlights/schedule.html

NASA. "Mission Chronology." http://www-pao.ksc.nasa.gov/shuttle

NASA. "NASA Shuttle Mission Archives, STS-107."
http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/archives/sts-107.html

NASA, Dryden Flight Research Center. Fact Sheet, "Space Shuttles." Last updated July 21, 2006.
http://www.nasa.gov/centers/dryden/news/FactSheets/FS-015-DFRC.html

NASA, Headquarters. "The Vision for Space Exploration." February 2004.
http://history.nasa.gov/Vision_for_Space_Exploration.pdf

NASA, History Office, NASA Headquarters. "Report of the Space Task Group, 1969."
http://www.hq.nasa.gov/office/pao/History/taskgrp.html

NASA, JSC. Space Shuttle Technical Conference. NASA Conference Publication 2342, Parts 1 and 2, Norman Chaffee, Compiler, 1985. http://ntrs.nasa.gov/search.jsp

NASA, KSC. "1981-1999 Space Shuttle Mission Chronology."
http://www.nasa.gov/centers/kennedy/pdf/167716main_1981-99Volume1.pdf

NASA, KSC. "KSC Press Release 113-94 and Shuttle Status Report 10/10/94."
http://science.ksc.nasa.gov/shuttle/resources/orbiters/columbia\ html

NASA, KSC. "The MILA Spaceflight Tracking and Data Network." NASA Facts, FS-2005-03-009-KSC (Rev. 2006).
http://www-pao.ksc.nasa.gov/kscpao/nasafact/pdf/MILA-06.pdf

NASA, MSFC. "A Walk Around the Space Shuttle." Fact Sheet No.: FS-1995-07-013-MSFC, Release date: 07/95. http:www1.msfc.nasa.gov/NEWSROOM/background/facts/walkaround.html

NASA, Stennis Space Center. "Chronology of Significant Events." Last updated October 5, 2007. http://www.nasa.gov/centers/stennis/about/history/chronology/chronology.html

"Space Shuttle Pathfinder." Last modified December 11, 2006. http://en.wikipedia.org/wiki/Space_Shuttle_Pathfinder

The White House. "A Renewed Spirit of Discovery – The President's Vision for Space Exploration." January 2004. http://www.whitehouse.gov/space/renewed_spirit.html

Wells, Helen T., Susan H. Whiteley, and Carrie E. Karegeannes. *Origins of NASA Names*. The NASA History Series, SP-4402, NASA History Office, Washington, D.C. 1976. http://history.nasa.gov/SP-4402/ch6.htm

Interviews and Oral Histories

JSC Space Shuttle Program Tacit Knowledge Capture Project (20 oral histories, April-July 2008, available at http://www.jsc.nasa.gov/history/oral_histories/ssp.htm)

Lindstrom, Robert E. Interview by Jennifer Ross-Nazzal. 19 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Lucas, William R. Interview by Rebecca Wright. 21 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Odom, James B. Interview by Rebecca Wright. 20 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Singer, Jody A. Interview by Jennifer Ross-Nazzal. 21 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Schwinghamer, Robert J. Interview by Rebecca Wright. 20 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Films, Videos and DVDs

NASA. *25 Years of Space Shuttle Flight* (DVD), 12 April 2006.

NASA. *How Things Work* (DVD, KSC TV), 20 April 2010.

NASA. *NASA Landsat/Enterprise Begins Vibration Tests* (DVD, MSFC History Archives), April 1978.

NASA. *Space Shuttle Enterprise Approach and Landing Tests (Aeronautics and Space Report #148)* (DVD, MSFC History Archives), no date.

Space Shuttle Propulsion, Long Version and Short Version. SS Main Engine, ET, SRB, Shuttle Experience, STS-114 Launch Highlights (DVD, MSFC History Archives), no date.

Section 2. THE ORBITER VEHICLES

"I think for the average person looking at it, an orbiter is an orbiter is an orbiter – they all look the same. But it's like a race car driver, he knows the difference between the cars and the way they handle."

Gerald Blackburn, Downey, California – August 24, 2010

(Interview by Rebecca Wright,
NASA STS Recordation Oral History Project Oral History Transcript)

Section 2: THE ORBITER VEHICLES

Books, Journals, Pamphlets, and Presentation Materials

Benningfield, Damond. "How Things Work: Shuttle Tiles." *Air & Space*, April/May 2006: 48, 49.

Li, Allen. "Space Shuttle Safety. Update on NASA's Progress in Revitalizing the Shuttle Workforce and Making Safety Upgrades." United States General Accounting Office, Testimony before the Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation, U.S. Senate. September 6, 2001.

National Research Council, Committee on Space Shuttle Upgrades. *Upgrading the Space Shuttle.* Washington, D.C.: National Academy Press. 1999.

United Space Alliance (USA). *Orbiter Modifications*. May 25, 2010.

Documents at the Marshall Space Flight Center History Archives

"Discovery lifts off with upgraded SSME; crew deploys TDRS-G." *Aerospace Daily*, 14 July 1995. Microfiche No. 5884.

Rockwell International, Space Division. *Orbiter 101 Alt Design Certification Review Volume I (Formal Dry Run),* SSV76-29, Contract NAS9-14000, 5 November 1976.

"Space Shuttle Enterprise Starts Launch Vibration Test Series." *Astronomy*, August 1978.

Marshall Star

"Columbia Flies." (21, 31) 15 April 1981: 1, 2.

"Contract Signed for Orbiters." (19, 21) 14 February 1979: 2.

"Enterprise Due Here March 13." (18, 23) 22 February 1978: 1.

"Enterprise Moved to Kennedy Center." (19, 29) 11 April 1979: 1.

"Enterprise Will Begin First Trip Next Monday." (17, 20) 26 January 1977: 1, 4.

"First Shuttle Orbiter under Assembly." (16, 13) 3 December 1975: 4.

"Last Flight of 'Enterprise' Begins Friday at Kennedy." (19, 46) 9 August 1979: 1.

"Orbiter 101 Flies Today With Tailcone Removed." (18, 6) 12 October 1977: 1.

"Orbiter 101 Takes to the Air and Lands Without Incident." (17, 24) 23 February 1977: 1.

"Orbiter Gets a Nose Cap." (16, 36) 19 May 1976: 7.

"Orbiter Columbia to be Readied for Flight to Kennedy." (19, 24) 7 March 1979: 1, 4.

"Orbiter is Readied For Test Lab Move." (18, 28) 29 March 1978: 1.

"Orbiter Rollout." (21, 13) 3 December 1980: 1.

"Orbiter Simulator Delivered to NSTL." (17, 43) 6 July 1977: 1.

"Orbiter Simulator Almost Complete in Building 4755." (18, 3) 21 September 1977: 1.

"Rockwell Selects Subcontractors for Shuttle Orbiter." (13, 30) 11 April 1973: 4.

"Shuttle Engine Compartment." (12, 49) 23 August 1972: 2.

"Shuttle Orbiter." (14, 49) 3 April 1974: 2.

"Space Shuttle Orbiter 101 Rollout Set for Next Week." (17, 1) 8 September 1976: 1, 4.

"Third Orbiter Passes Tests." (20, 6) 17 October 1979: 1, 4.

Roundup/ Space News Roundup

"099 Passes Rigorous Testing." (18, 10) 18 May 1979: 1.

"4th Orbiter Ok's. President Charts New Commercial Policy." (25, 15) 22 August 1986: 1, 2.

"Ablative Material to be Carried Onboard in On-Orbit Tile Repair Kits for later Flights." (19, 3) 8 February 1980: 1.

"All You Want to Know About Tiles." (19, 7) 4 April 1980: 1, 4.

Alloway, Pam. "Contract adds extended duration for *Columbia*." (30, 3) 19 January 1991: 4.

Alloway, Pam. "*Endeavour* delivery to fill out shuttle fleet." (30, 16) 19 April 1991: 1, 4.

Alloway, Pam. "NASA Awards Contract for *Endeavour* Drag Chute." (30, 2) 11 January 1991: 4.

"Back in Action." (34, 14) 7 April 1995: 4.

"*Columbia* & 747 Flying. They Wait Only on the Weather." (18, 6) 23 March 1979: 1.

"*Columbia* Begins Tests of Dynamic Stability." (19, 17) 22 August 1980: 1.

"*Columbia* Gets Thumbs Up for Rollout to VAB Nov. 23." (19, 23) 14 November 1980: 4.

"*Columbia's* Success Restores Workhorse to Shuttle Rotation." (28, 33) 18 August 1989: 1, 4.

"*Columbia* Tile Work Advancing." (19, 8) 21 April 1980: 1.

"*Columbia* to become research platform." (24, 17) 27 September 1985: 7.

"*Columbia* to remain at Palmdale." (23, 11) 15 June 1984: 2.

"*Columbia* to Undergo "All Systems" Test." (18, 25) 14 December 1979: 1.

"*Discovery* Engines Fail to Get Start Order." (27, 21) 5 August 1988: 1, 4.

"*Discovery* Fix Going Smooth." (27, 29) 16 September 1988: 1.

"*Discovery* Get Final Fixes. Minor Repairs Bring STS-26 Closer to Launch." (27, 30) 23 September 1988: 1.

"*Discovery* Gets New Controller, Launch Target." (28, 10) 10 March 1989: 1.

"*Discovery* Readied: Solid Rocket 'Cold' Test Slated Today." (28, 3) 20 January 1989: 1.

"*Discovery* Ready for Engine Firing. Oxidizer Leak Not Expected to Cause Major Launch Delay."(27, 19) 22 July 1988: 1, 4.

"*Discovery* Ready for Packing." (27, 24) 26 August 1988: 1, 4.

"*Discovery's* Test Firing Big Stride." (27, 22) 12 August 1988: 1, 4.

"GO! *Discovery*. Return to Flight Launch is Perfect." (27, 31) 30 September 1988: 1.

Hartsfield, James. "*Atlantis* to Get California Refit After Next Flight." (31, 27) 10 July 1992: 1, 4.

Hartsfield, James. "*Columbia* Passes 32-Million-Mile Checkup." (31, 6) 7 February 1992: 1, 4.

Hartsfield, James. "*Discovery* Slightly Ahead of Schedule." (30, 2) 11 January 1991: 1.

Hartsfield, James. "*Discovery* Takes Center Stage Tuesday. Valve Problem Traced to Rubber-Like Contamination." (32, 13) 5 April 1993: 1, 4.

Hartsfield, James."*Discovery* Thrusters Replaced." (30, 5) 1 February 1991: 1.

Hartsfield, James. "*Endeavour*'s Main Engines to be Replaced." (31, 15) 10 April 1992: 1, 4.

Hartsfield, James. "Improved *Columbia* returns to service." (40, 5) 9 March 2001: 2.

Hartsfield, James. "Refitted *Atlantis* ready for return to Florida coast." (33, 21) 27 May 1994: 1.

Hartsfield, James. "Team Efforts Devised *Discovery* Fixes." (27, 34) 21 October 1988: 4.

Hartsfield, James. "Technicians wind countdown clock for Monday start." (30, 35) 6 September 1991: 1, 4.

Hartsfield, James. "Third Time May Be Charm for *Discovery*." (32, 30) 2 August 1993: 1, 4.

Hartsfield, James. "Top Engineers Tackle *Columbia*'s Hydrogen Leaks." (29, 38) 21 September 1990: 1, 4.

Herring, Kyle. "*Endeavour* Assembly Advances." (28, 24) 16 June 1989: 3.

Herring, Kyle. "Extending Duration. Alteration Will Make *Columbia* First True Extended Duration Orbiter." (29, 22) 1 June 1990: 3.

"Landing Gear Tests Start With JSC Idea. Aircraft to Duplicate Shuttle Landing Speeds, Loads." (28, 21) 26 May 1989: 1, 4.

"Lightweight Radiator Panels are Constructed in Dallas." (17, 7) 14 April 1978: 1.

"Orbiter 101 Takes First Trip to DRFC." (16, 3) 4 February 1977: 1.

"Orbiter 101 Undergoes Critical Design Review." (14, 23) 7 November 1975: 1.

"Orbiter Aft Fuselage Trucked to Palmdale." (14, 19) 12 September 1975: 4.

"Orbiter APU Runs Successful." (18, 23) 16 November 1979: 1.

"Orbiter Insulation Production Begins." (15, 19) 24 September 1976: 2.

"Orbiter Insulation Tiles Pass 100-Reentry Heat Chamber Tests." (15, 10) 21 May 1976: 1, 2.

"Orbiter Wings En Route to Palmdale." (14, 10) 9 May 1975: 1, 4.

"OV-102 to undergo mods at Palmdale." (23, 2) 27 January 1984: 1.

"OV 105 to Incorporate Latest Advances." (25, 15) 22 August 1986: 1.

"Shuttle Orbiter Rolls Out Next Friday. New Era of Space Transportation Beginning." (15, 18) 10 September 1976: 1.

"Space News Briefs. Orbiter *Atlantis* Powers Up." (27, 1) 1 January 1988: 2.

"STS Update: *Columbia* Gets One Step Closer." (19, 15) 25 July 1980: 1.

Spaceport News

Grinter, Kay. "Discovery joined fleet 25 years ago." (48, 22), 31 October 2008: 7.

Grinter, Kay. "Discovery first shuttle docking with ISS 10 years ago." (49, 12) 12 June 2009: 7.

Grinter, Kay. "Enterprise was first space shuttle to roll out to pad." (49, 9) 1 May 2009: 7.

Grinter, Kay. "STS-26 put shuttle back in business." (48, 19) 19 September 2008: 7.

Heiney, Anna. "Discovery modifications take over a million hours." (43, 6) 12 March 2004: 4.

Heiney, Anna. "Orbiter undergoes multiple inside modifications." (43, 7) 26 March 2004: 6.

Heiney, Anna. "Discovery maintenance from nose cap to body flap." (43, 8) 9 April 2004: 7.

Heiney, Anna. "Are you aware of the Space Shuttle Return to Flight updates?" (43, 21) 22 October 2004: 4.

Herridge, Linda. "STS-118 Crew Members Proud of Modified *Endeavour*." (46, 16) 10 August 2007: 1, 4.

Herridge, Linda. "Kennedy Workers to Process *Discovery* on Both Coasts." (49, 19) 18 September 2009: 1, 3.

"Journey through Atlantis." (37, 20) 9 October 1998: 1, 5.

Marconi, Elaine. "Technology, safety for orbiter fleet evolves." (45, 8) 14 April 2006: 4.

"Upgrades to Space Shuttle fleet continue." (43, 23) 19 November 2004: 6.

"Where next, Columbia? Palmdale, California." (38, 19) 17 September 1999: 1, 4, 5.

X-Press

"Dryden to Test Advanced FRSI Shuttle Quilt." (25, 10) 17 September 1982: 2.

"Enterprise Tests to Prevent Failures." (25, 11) 1 October 1982: 2, 4.

Levine, Jay. "Columbia begins a 10-month overhaul." (41, 16) 15 October 1999: 1.

"New Orbiter Challenger at NASA Dryden." (25, 5) 2 July 1982: 2.

"Orbiter Wings to Arrive in Palmdale Today." (18, 10) 23 May 1975: 2.

Internet Sources

"Enterprise." http://www.astronautix.com/craft/entprise.htm

Levine, Jay. "Inside Atlantis. Modifications and maintenance near end in Palmdale." The Dryden X-Press, 18 September 1998: 4. http://www.dfrc.nasa.gov/Newsroom/X-Press/1998/Sep18-TX/page4-TX.html

Levine, Jay. "Space Shuttle Columbia gets TLC." The Dryden X-Press, 30 March 2001. http://www.dfrc.nasa.gov/Newsroom/X-Press/2001/Mar30/newsart2.html

"Maintenance, Mods and New Components for the Shuttle." Aerospace Technology Innovation (7, 6) November/December 1999. http://www.nctn.hq.nasa.gov/innovation/Innovation_76/mods.htm

Malik, Tariq. "NASA Targets March 12 for Space Shuttle Launch."http://www.space.com/missionlaunches/090225-sts119-shuttle-launch-update.html

NASA. "A Walk Around the Space Shuttle." NASA Fact Sheet." http://quest.nasa.gov/space/frontiers/activities/aeronautics/fact.html

NASA. "From Nose Cap to Body Flap." http://www.nasa.gov/missions/shuttle/f_omdp3.html

NASA. "Into the Orbiter." http://www.nasa.gov/missions/shuttle/f_omdp2.html

NASA. "My Shuttle's in the Shop." http://www.nasa.gov/missions/shuttle/f_omdp1.html

NASA. "Orbiter manufacturing and Assembly." In NSTS Shuttle Reference Manual, 1988. http://science.ksc.nasa.gov/shuttle/technology/sts-newsref/srs_asm.html

NASA. "Shuttle Payloads and Related Information." KSC Factoids. Revised November 18, 2002. Accessed at http://www-pao.ksc.nasa.gov/kscpao/factoids/relinfo1.htm

NASA. "Space Shuttle Orbiter Systems Thermal Protection System." In *NASA Shuttle Reference Manual*, 1988. http://science.ksc.nasa.gov/shuttle/technology/sts-newsref/sts_sys.html

NASA, DFRC. "Columbia scheduled to arrive for major modifications in Palmdale." NASA Dryden News Release, Release No. 99-35, 23 September 1999. http://www.nasa.gov/centers/dryden/news/NewsReleases/1999/99-35_pf.html

NASA, Headquarters. "Follow-up Audit on Orbiter Maintenance Down Periods at KSC, IG-98-016." 1998. http://www.hq.nasa.gov/office/oig/hq/audits/reports/FY98/executive_summaries/ig-98-016e

NASA, JSC. "Space Shuttle Atlantis Modification Work to be Performed at Palmdale Facility." NASA News Release: 97-11. http://www.nasa.gov/centers/johnson/news/releases/1996_1998/97-11.html

NASA, KSC. "Atlantis (OV-104)." http://science.ksc.nasa.gov/shuttle/resources/orbiters/atlantis.html

NASA, KSC. "Atlantis Scheduled to Depart KSC for Major Modifications in Palmdale, CA." NASA News Release On Line, KSC Release No. 212-97, 10 November 1997. http://www-pao.ksc.nasa.gov/kscpao/release/1997/212-97.htm

NASA, KSC. "Challenger: Setback and Recovery." Kennedy Space Center Story, Chapter 15, 1991 Edition. http://www.nasa.gov/centers/kennedy/about/history/story/ch15.html

NASA, KSC. "Columbia (OV-102)." ttp://science.ksc.nasa.gov/shuttle/resources/orbiters/columbia.html

NASA, KSC. "Discovery (OV-103)". http://science.ksc.nasa.gov/shuttle/resources/orbiters/discovery.html

NASA, KSC. "Discovery Scheduled to Depart KSC for Orbiter Modifications in Palmdale, California." NASA News Release On Line, Release No. 94-95, September 22, 1995. http://www-pao.ksc.nasa.gov/kscpao/release/1995/94-95.htm

NASA, KSC. "Discovery set to return to KSC next week." NASA News Release On Line, Release No. 80-96, 21 June 1996. http://www-pao.ksc.nasa.gov/kscpao/release/1996/80-96.htm

NASA, KSC. "Endeavour (OV-105)." http://science.ksc.nasa.gov/shuttle/resources/orbiters/endeavour.html

NASA, KSC. "Enterprise (OV-101)." http://science.ksc.nasa.gov/shuttle/resources/orbiters/enterprise.html

NASA, KSC. "Endeavour Scheduled to Depart KSC for Orbiter Modifications in Palmdale, CA." NASA News Release On Line, KSC Release No. 87-96, 26 July 1996. http://www-pao.ksc.nasa.gov/kscpao/release/1996/87-96.htm

NASA, KSC. "Space Shuttle Challenger." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/challenger-info.html

NASA, KSC. "Space Shuttle Columbia." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/columbia_info.html

NASA, KSC. "Space Shuttle Overview: Atlantis (OV-104)." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/atlantis-info.html

NASA, KSC. "Space Shuttle Overview: Challenger (OV-099)." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/challenger-info.html

NASA, KSC. "Space Shuttle Overview: Columbia (OV-102)." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/columbia-info.html

NASA, KSC. "Space Shuttle Overview: Discovery (OV-103)." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/discovery-info.html

NASA, KSC. "Space Shuttle Overview: Endeavour (OV-105)." http://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/endeavour-info.html

"Orbiter Major Modifications Review." Columbia Accident Investigation Board Report Volume II, October 2003, Appendix D.14. http://www.nasa.gov/columbia/caib/PDFS/VOL2/D14.pdf

Stathopoulos, Vic. "Space Shuttle Discovery." http://www.aerospaceguide.net/spaceshuttle/discovery.html

Interviews and Oral Histories

Barauskas, Stan M. Interview by Jennifer Ross-Nazzal. 24 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Blackburn, Gerald. Interview by Rebecca Wright. 24 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Emde, Wendall D. Interview by Jennifer Ross-Nazzal. 27 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Emero, Donald H. Interview by Rebecca Wright. 26 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Ferris, Frances A. Interview by Rebecca Wright. 24 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Kahl, Robert H. Interview by Rebecca Wright. 25 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Moser, Thomas L. Interview by Rebecca Wright. 9 April, 2010, The Woodlands, Texas. NASA STS Recordation Oral History Project Oral History Transcript.

Roberts, William J. Interview by Jennifer Ross-Nazzal. 25 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Roberts, William J. Interview by Jennifer Ross-Nazzal. 26 August, 2010, Downey, California. NASA STS Recordation Oral History Project Oral History Transcript.

Roberts, Bill. Personal communication, 8 July 2008. The Boeing Company, Huntington Beach, California.

Films, Videos and DVDs

NASA. *Atlantis Retrospective* (DVD), 5/28/2010.

NASA. *Johnson Space Center. Endeavour Retrospective* (DVD; KSC Multimedia), 20 February 2010.

NASA. *Johnson Space Center. Discovery Retrospective* (DVD; KSC Multimedia), 22 April 2010.

NASA. *Orbiter Processing Flow* (DVD; KSC Multimedia), 25 January 2005.

NASA. *Space Shuttle Columbia (Aeronautics and Space Report #171)* (DVD; MSFC History Archives), May 1979.

NASA. *Space Shuttle Tiles (Aeronautics and Space Report #176)* (DVD; MSFC History Archives), October 1979.

NASA. *STS-33/Discovery, Breakfast/Suit-up/Walkout/Launch/ Landing* (DVD; KSC Multimedia), 27 November 1989.

NASA. *STS-128 Discovery, Shuttle Returns to KSC Aboard 747 and Demate* (DVD; KSC TV & Multimedia), 21 September 2009.

NASA. *STS-132/Atlantis Mission Handout Launch Activities & Replays* (Disc 1 of 2) (DVD; KSC TV & Multimedia), 14 May 2010.

NASA. *STS-132/Atlantis Mission Handout On-Orbit Activities & Landing* (Disc 2 of 2), (DVD; KSC TV & Multimedia), 14 May 2010.

NASA. *STS-132/Atlantis Final Inspection Team (up-close on Launch day)* (DVD; KSC-TV & Multimedia), 14 May 2010.

NASA. *STS -132 Towback/SCO* (DVD; KSC TV & Multimedia), 26 May 2010.

Section 3. THE SPACE SHUTTLE MAIN ENGINE (SSME)

"One thing that surprises a lot of people about the SSME is that each of those engines burns 1,000 pounds of propellants a second. When you combust hydrogen and oxygen, the exhaust is water vapor. So when they run a test, there'll be a big cloud of exhausted water vapor. If the wind conditions were right, and the cloud vapor floated over you, it would condense because it was cooler in the atmosphere than the exhaust, and it would pour down rain on you. We got wet once in a while."

George D. Hopson, Huntsville, Alabama – July 20, 2010

(Interview by Jennifer Ross-Nazzal,
NASA STS Recordation Oral History Project Oral History Transcript)

Section 3: THE SPACE SHUTTLE MAIN ENGINE

Books, Journals, Pamphlets, and Presentation Materials

Biggs, Bob. "Missions and Means." *Fifty Years of Smoke and Fire 1950:2000*. Dedicated issue of the Boeing journal *Threshold*. (Number 19) Winter 2000: 14-19.

Biggs, Robert E. "Space Shuttle Main Engine, The First Ten Years." In *History of Liquid Rocket Engine Development in the United States, 1955-1980*. American Aeronautical Society History Series, Volume 13, Stephen E. Doyle, editor, Part 3, Chapter 4, pages 69-122. 1992.

Biggs, Robert E. "Space Shutle Main Engine: The First Twenty Years and Beyond." In AAS History Series, Volume 29. 2008.

Collins, Dewayne. "SSME – SSFL Exit Plan." Huntsville, Alabama: NASA, 12 April 2006.

Cook, Jerry, Dewayne Collins, and Daniel McCranie. "SSME Historical Recordation." Huntsville: Marshall Space Flight Center presentation materials provided by Daniel McCranie. June 12, 2009.

Covault, Craig. "Shuttle Engine Passes Critical Milestone." *Aviation Week & Space Technology*, 30 June 1975: 37-42.

Covault, Craig. "Shuttle Firing Test Count Starts." *Aviation Week & Space Technology*, 9 February 1981: 24-26.

"Getting Ready For A 10-Million Mile Tune-Up." (photo caption) *Rockwell News* (11, 2), 4 February 1983:1).

Jue, Fred and Fritz Kuck. "Space Shuttle Main Engine (SSME) Options for the Future Shuttle." The Boeing Company, Canoga Park, California. AIAA 2002-3758. Paper presented at the 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, July 7-10, 2002, Indianapolis, Indiana.

Kranzel, Harold. "Shuttle Main Engine Story." *Spaceflight* (30), October 1988:378-380.

NASA, MSFC. "Space Shuttle Main Engine Enhancements." FS-2002-03-60-MSFC, March 2002.

Pratt & Whitney Rocketdyne. "SSME Space Shuttle Main Engine," No date.

"Rocketdyne is SSME builder." *Rockwell News*, April 1981: 3.

"Rocketdynes's SSMEs complete second series of full power tests." *Rockwell News* (10, 12), 25 June 1982:2.

Rockwell International. *NASA Space Shuttle Technical Information. Space Shuttle Press Information*, 1982.

Rockwell International. *The Hill: Santa Susana Field Laboratory*. Canoga Park, California: Rockwell, 1987.

Ryan, Richard. "Lessons in Systems Engineering – The SSME Weight Growth History." No date. Presentation materials provided by Daniel McCranie, NASA, MSFC, Huntsville, Alabama, June 12, 2009.

"Space Shuttle: A Revolutionary Evolution." *Skyline*, Volume 33, No. 2, 1975.

Documents at the Marshall Space Flight Center History Archives

Goodrum and Wade. *Shuttle Facilities Test Stand Allocation*. Huntsville: Marshall Space Flight Center, 1 December 1969. Microfiche: Shuttle History Historical Documents Collection (SHHDC)-132. (No additional details are available for identification of the authors.)

Hansen Grant L., Department of the Air Force, Assistant Secretary, R&D. Letter to George E. Mueller, October 30, 1969, Subject: Air Force review of the Space Shuttle Main Engine Scope of Work, Phase B dated Sept. 29, 1969. 1969 Correspondence (No box number).

Harwood, William. "Shuttle's Engine Upgrade Misses Mark in Tests." *Space News* 27 February – 5 March 1995. Microfiche No. 4887.

Mitchell, C.M. Memorandum for the Record. "Rocketdyne Testing Capability for Space Shuttle Engine at SSFL." Huntsville: Marshall Space Flight Center, 19 September 1969. Microfiche: SHHDC-146.

Mitchell, C.M. Memorandum for the Record. "Space Shuttle Engine Test Facilities." Huntsville: Marshall Space Flight Center, 31 October 1969. Microfiche: SHHDC-146.

Mitchell, C.M. Memorandum for the Record. "Space Shuttle Engine Test Facilities." Huntsville: Marshall Space Flight Center, 10 November 1969. Microfiche: SHHDC-146.

Rockwell International, Rocketdyne Division. "Space Shuttle Main Engine Turnaround Maintenance and Activities." SHHDC-5576, 3 March 1982.

Rockwell International, Rocketdyne Division. "SSME Facilities Review Meeting." SHHDC-260, 20 February 1974.

Rockwell International, Rocketdyne Division. "SSME Test Stand Capability." News Release. SHHDC-3543, ca.1978-1979.

Rockwell International Corporation, Rocketdyne Division. "Space Transportation System Technical Manual. SSME Description and Operation (Input Data). Space Shuttle Main Engine. Part Number RS007001," Contract NAS8-27980, 1 September 1983.

Ryan, R.S. and L.A. Gross. "Developmental Problems and Their Solution for the Space Shuttle Main Engine Alternative Liquid Oxygen High-Pressure Turbopump: Anomaly or Failure Investigation the Key." NASA Technical Paper 3553. May 1995.

Sanchini, D.J. and H.I. Colbo. "Space Shuttle Main Engine Development." Presented at the 1980 SAE Aerospace Congress and Exposition, 13-16 October 1980, Los Angeles, California. Microfiche No. SHHDC-3542, MSFC History Office, Space Shuttle History Project, Historical Documents Collection

"Shuttle Flies with Block 1." *Aviation Week & Space Technology*, 17 July 1995. Microfiche No. 5878.

"SSME Pump Slowdown Will Put 120 Workers, Three Pumps, In Limbo." *Aerospace Daily*, 17 January 17 1992. Microfiche No. 6844.

United States Civilian Space Programs 1958-1978 Report Prepared for the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives, Ninety-Seventh Congress, Volume I. January 1981.

Lagniappe

"500th SSME Test Conducted at NSTL." (3, 12) 26 November 1980: 1, 5.

"MPT Provides Useful Data." (2, 7) 15 June 1979: 1, 6.

"MPTA Firing Set for November." (3, 11) 29 October 1980: 1.

"Space Shuttle Main Engine 0009 to Complete PFC Test Series." (3, 9) 22 August 1980: 1, 3.

"Space Shuttle Main Engine reaches milestone." (27, 1) January 2004: 5.

"Space Shuttle Test Program Marked by Success." (3, 7) 18 June 1980: 1, 4, 6).

"SSC plays vital role in history of NASA space flight." (27, 1) January 2004: 1, 5.

"Test Series Under Way on Shuttle Engines." (3, 11) 29 October 1980: 1.

"Two MPTA Firings Set for December." (3, 12) 26 November 1980: 1, 5).

Marshall Star

"Amendment to Contract Ups SSME Total to 19." (20, 8) 31 October 1979: 2.

"Columbia Engine Fires Reaffirm Flight Readiness." (20, 40) 18 June 1980: 1.

"Columbia Engine Tested, Cluster Firing Scheduled." (19, 34) 16 May 1979: 1, 4.

"Eighth Main Propulsion Test is Successful." (20, 28) 26 March 1980: 1.

"Engine Returned to Support MPT." (21, 4) 1 October 1980: 4.

"Engine Test Position." (19, 7) 25 October 1978: 3.

"First Shuttle Engine Igniter." (15, 39) 11 June 1975: 4.

"First Shuttle Main Engine Completed a Month Early." (15, 28) 26 March 1975: 1, 4.

"First SSME Mainstage Test Fired at NSTL." (16, 22) 11 February 1976: 1.

"First SSME Nozzle Successfully Tested." (16, 45) 21 July 1976: 1.

"High Altitude SSME Tests Start at NSLT." (17, 18) 12 January 1977: 2.

"Main Engine Completes Fourth Certifying Series." (21, 14) 10 December 1980: 2.

"Main Engine Recertification Tests Started." (20, 38) 4 June 1980: 2.

"Main Engine, Vibration Tests Resumed Jan. 30." (19, 20) 7 February 1979: 1.

"Main Propulsion Test Successful." (20, 38) 4 June 1980: 2.

"Main Propulsion Test Successful." (21, 14) 10 December 1980: 1.

"Main Propulsion Test Short and Successful." (19, 39) 20 June 1979: 2.

"Marshall Lab Tests Shuttle Main Engine." (21, 6) 15 October 1980: 4.

"Marshall's Simulator 'Flies' Shuttle Engines." (21, 30) 8 April 1981: 7.

"MPT Failure Cause: Weak Weld Metal." (20, 11) 21 November 1979: 3.

"MPT Firing." (19, 39) 20 June 1979: 2.

"MPT Firing Ended After Nine Seconds." (20, 9) 7 November 1979: 1, 2.

"MPT Firing Friday 'Very Successful' in 15-Second Run." (18, 36) 24 May 1978: 1.

"MPT Firing Set Jan. 16; SRBs Stacked.: (20, 17) 9 January 1980: 1, 4.

"MPTA Series is Completed." (18, 46) 2 August 1978: 1, 3.

"NASA Awards Contract for Shuttle Engine." (12, 31) 19 April 1972: 2.

"NASA Buying 9 Additional Main Engines." (18, 37) 31 May 1978: 3.

"New 'Firsts' Achieved in Second Full Duration Main Propulsion Test." (20, 25) 4 March 1980 : 1

"Rocket Test Firings to Resume at NSTL." (15, 32) 23 April 1975: 1.

"Rocketdyne Lets $1.2 Million in Subcontracts." (13, 38) 6 June 1973: 2.

"Rocketydyne SSME Contract Modified." (16, 39) 9 June 1976: 1.

"Shuttle Main Engine Passes 5,000 Seconds in Firings." (19, 3) 27 September 1978: 1.

"Sixth Shuttle MPT is Slated for Today." (20, 7) 24 October 1979: 1.

"Space Shuttle Main Engine Contract Signed with NAR." (12, 49) 23 August 1972: 1, 2.

"Space Shuttle Main Engine Is Throttled Successfully." (17, 29) 30 March 1977: 1, 4.

"Splawn Assigned to Canoga Park." (14, 51) 4 September 1974: 2.

"SSME Cluster." (18, 1) 7 September 1977: 4.

"SSME Completes Three RPL Firings for Full Duration." (19, 1) 13 September 1978: 1.

"SSME Component Has First Firing." (14, 32) 24 April 1974: 2.

"SSME Controller Delivered to MSFC." (16, 36) 19 May 1976: 2.

"SSME Fired 60 Seconds at Rated Thrust Conditions." (17, 27) 16 March 1977: 1.

"SSME Fires Six Minutes at 109 Percent Thrust Level." (20, 29) 2 April 1980: 2.

"SSME Flight Certification Testing Done." (19, 41) 4 July 1979: 1.

"SSME Passes Launch About Test at NSTL." (19, 9) 8 November 1978.

"SSME Passes New Development Mark." (20, 23) 20 February 1980: 1, 2.

"SSME: Powerful, Efficient, Reusable." (19, 5) 11 October 1978: 3.

"SSME Runs Flight Duration at 100%." (18, 35) 24 May 1978:1.

"SSME Simulation Facility Being Prepared at MSFC." (15, 5) 9 October 1974: 1, 2.

"SSME Tested at Full Power." (20, 27) 19 March 1980: 1.

"SSME Test Firing Lasts 650 Seconds." (17, 5) 6 October 1976: 1.

"SSME Update." (19, 40) 27 June 1979: 1.

"STS-1 Main Engines Fire Successfully." (21, 24) 25 February 1981: 1, 4.

"Three SSME Tests Mark Big Day in Busy Schedule." (20, 8) 31 October 1979: 2.

"Three SSME Tests Run Last Weekend." (15, 15) 18 December 1974: 2.

"Third Shuttle Main Engine on its Way to Mississippi." (19, 28) 4 April 1979: 1.

"West Coast Marshall Employees Doing Essential Shuttle Work." (16, 20) 28 November 1976: 1, 3.

Roundup/Space News Roundup

"Engine Success Ratio High." (19, 22) 31 October 1980: 1, 4.

"Engine Update." (19, 9) 2 May 1980: 1.

"Engines OK for Flight." (19, 13) 27 June 1980: 1.

"Engines to be Retested at NSTL before Flight." (19, 10) 16 May 1980: 1.

"Final Test Article Firing a Success at NSTL." (20, 3) 30 January 1981: 1.

"First Space Shuttle Engine Ignition Test is Successful." (14, 13) 20 June 1975: 4.

"Flight Engines Fires 2 Successful Runs." (19, 12) 13 June 1980: 1.

"Hercules Gets Contract to Better Nozzles. Program's Objective is Higher Rocket Success." (27, 15) 24 June 1988: 4.

"Longer Test Firings Begun on Shuttle's Main Engine." (15, 21) 22 October 1976: 2.

"Main Engine, Solid Rocket Motor Undergo More Tests." (26, 21) 23 October 1987: 1, 2.

"News Briefs. SSME Test Fired." (25, 12) 11 July 1986: 1.

"Orbiter Engines Test OK." (17, 13) 7 July 1978: 1.

"Orbiter in Shake Tests, Main Engine Burn Set." (17, 9) 12 May 1978: 1.

"Shuttle Main Engines Test Fired April 21." (17, 8) 28 April 1978: 1.

"Space Shuttle Status. Main Engines Passing Tests; New Target November." (19, 5) 11 January 1980: 1.

"Space Shuttle Updates. Engine Test-Firing Advances." (19, 7) 4 April 1980: 1, 4.

"STS Status. Breakthroughs in Test Engine Burns." (19, 21) 17 October 1980: 1, 4.

"STS Update: Cluster Tests Delayed, R&D Engine Damaged." (18, 10) 16 May 1979: 1.

"STS-26 Main Engine Tests Begin at NSTL." (16, 18) 11 September 1987: 1.

"Test Firing Takes Engine to Breakthrough." (17, 19) 29 September 1978: 1.

"Test Pushed Main Engine 2,000 Seconds. Firing Four Times Longer Than Mission Duration." (27, 25) 2 September 1988: 4.

Spaceport News

"KSC completes first full Shuttle main engine." (43, 17) 13 August 2004: 8.

Internet Sources

Jue, Fred. "Space Shuttle Main Engine – Thirty Years of Innovation." The Boeing Company, Rocketdyne Propulsion & Power, Canoga Park, California. No date. http://www.engineeringboeing.com/dataresources/SpaceShuttleMainEngineThirtyYearsofInnovation.doc

NASA. "Space Shuttle Basics, Space Shuttle Main Engines." http://spaceflight.nasa.gov/shuttle/reference/basics/ssme/index.html

NASA. "Space Shuttle Main Engines." http://www.nasa.gov/returntoflight/system/system_SSME.html

NASA, History Program Office. "Space Shuttle Main Engine (SSME)." http://history.nasa.gov/sts25th/tech.html

NASA, KSC. "Boeing Completes First Fully Assembled Shuttle Main Engines at Kennedy Space Center." KSC Release: 61-04. http://www.nassa.gov/centers/kennedy/news/releases/2004/61-04.html

NASA, MSFC. "Space Shuttle Main Engine." http://shuttle.msfc.nasa.gov/SSME.cfm

NASA, MSFC. "Space Shuttle Main Engine Advanced Health Management System." NASA Facts, Rev. B August 2007, FS-2007-08-085-MSFC. http://www.nasa.gov/centers/marshall/pdf/186582main_REV_B_AHMS_Fact_Sheet_STS-118.pdf

NASA, MSFC. "Space Shuttle Main Engine (SSME) Enhancements." NASA Facts, March 2002, FS-2002-03-60-MSFC. http://www.nasa.gov/centers/marshall/pdf/174534main_ssme.pdf

NASA, MSFC. "Space Shuttle Main Engine Turbopump." NASA Facts, April 2005, FS-2005-04-026-MSFC. http://www.nasa.gov/centers/marshall/pdf/113012main_shuttle_turbopump.pdf

NASA, Stennis Space Center. John C. Stennis Space Center History, "Chronology of Significant Events." http://www.nassa.gov/centers/stennis/about/history/chronology/chronology.html

"New Main Shuttle Engine Promises Safer Ride." 26 April 2001. http://www.space.com/businesstechnology/technology/new_shuttle_engine_010426.html

Pratt & Whitney. "Shuttle Atlantis Flies With Three New P&W Fuel Turbopumps." Press release dated April 8, 2002. http://64.40.104.17/news/viewerpr.html?pid=7942

Interviews and Oral Histories

Goetz, Otto K. Interview by Jennifer Ross-Nazzal. 20 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Hopson, George D. Interview by Jennifer Ross-Nazzal. 20 July, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Films, Videos and DVDs

Adamski, Dan. *SSME Knowledge Transfer Series. Lessons Learned – Challenger & Columbia* (DVD), 31 August 2006.

Biggs, Bob. *Space Shuttle Main Engine Development History* (DVD), 11 May 2006.

Boeing. *Space Shuttle Main Engine. Engine Orientation. SSME Quality* (DVD), 13 May 2005.

Burroughs, Paul and Robert Wagner. *SSME Knowledge Transfer Series. Manufacturing* (DVD), 10 August 2006.

Carlson, Mike. *SSME Operation & Control Agenda* (DVD), No date.

SSME Evolutionary and Major Tests (DVD), no date.

Section 4. THE SOLID ROCKET BOOSTER/SOLID ROCKET MOTOR/REUSABLE SOLID ROCKET MOTOR (SRB/SRM/RSRM)

I got much involved in the decision of how we would prevent the components in the solid rocket booster from being destroyed on recovery. The parachutes of course brought it down but they were still moving pretty fast, and every time that thing splashed in the ocean it buggered up everything in the aft skirt. So we investigated several foams and we finally found one that was very good at cushioning and we sprayed the components with this cushioning foam and after that we could reuse the hardware.

Robert J. Schwinghamer – Huntsville, Alabama – July 20, 2010

(Interview by Rebecca Wright,
NASA STS Recordation Oral History Project Oral History Transcript)

Section 4: THE SOLID ROCKET BOOSTER, SOLID ROCKET MOTOR, AND REUSUABLE SOLID ROCKET MOTOR (SRB/SRM/RSRM)

Books, Journals, Pamphlets, and Presentation Materials

ATK. "FSM-17 Pre-Brief." Presentation materials from MSFC, April 8, 2010.

ATK. "RSRM Overview." Presentation materials from MSFC, April 8, 2010.

ATK. "RSRM SLEP History." Presentation materials from MSFC, April 8, 2010.

Documents at the Marshall Space Flight Center History Archives

Aerojet Solid Propulsion Company. *Study of Solid Rocket Motor for a Space Shuttle Booster, Final Report*. 15 March 1972.

Barenstein, Seth. "NASA Belatedly Discovers Problem in Shuttle's Reusable Boosters." *Orlando Sentinel*, 21 July 1995. Microfiche No. 5379.

"Bendix Selected for SRB Integrated Electronics Assemblies Contract." NASA MSFC, NASA NEWS For Release: Release No. 75-106, June 4, 1975. Drawer 27, SRB 1975.

Chapman, John S. and Michael B. Nix. "Overview of The Manufacturing Sequence of the Advanced Solid Rocket Motor." NASA, MSFC. AIAA 92-1275. AIAA Space Programs and Technologies Conference, March 24-27, 1992, Huntsville, Alabama. 1992, Box 1992A.

"Contractor Selected for SRB Decelerator Subsystem Contract." NASA MSFC News Release No. 76-96, May 28, 1976. Drawer 27, SRB 1976.

"Cramer sees renewed hope for ASRM." *Huntsville News*, 9 September 1993, Page A-3. Microfiche No. 5796.

Dunnavant, Robert. "Marshall manager finds no flaws with redesigned shuttle booster." *The Birmingham News*, 10 October 1988. Microfiche No. 6301.

Eckols, David. "USA-SRB, Materials Replacement, Shuttle Environmental Assurance Initiative." 14 September 2004.

"First SRB Motor Case Segment Delivered." NASA News, MSFC Release No. 76-173, September 29, 1976. Drawer 27, SRB 1976.

Kenitzer, Allen and Jim Sahli. "Solid Rocket Motor to be Test Fired September 26 at Marshall Space Flight Center." MSFC Release No. 91-170. Sept. 24, 1991. Microfiche No. 5615.

Lucas, W.R. Memorandum to DFRC attn: David R. Scott, March 24, 1976, Subject: MOA between MSFC and DFRC for the Shuttle SRB Parachute Drop Test Program. Drawer 27, SRB 1976.

McKenna, James T. "NASA Weighs Impact of SRB O-Ring Damage." *Aviation Week & Space Technology*, 31 July 1995. Microfiche No. 5866.

McKenna, James T. "NASA Seeks Fix for SRB Nozzle Leaks." *Aviation Week & Space Technology*, 7 August 1995. Microfiche No. 5876.

Morton Thiokol, Inc. "Building the Space Shuttle Solid Rocket Motor. America's Reusable Propulsion System for Space Transportation." No date.

Morton Thiokol, Inc. "Space Shuttle Solid Rocket Motor Redesign Program Fact Sheet." No date.

Morton Thiokol, Inc. "Thirty-Two Months To Discovery." 1986. Box 1986H.

"MSFC Seeks Proposals on SRB Assembly." NASA MSFC News Release No. 76-52, March 25, 1976. Drawer 27, SRB 1976.

"NASA awards contracts for solid rocket booster designs." *Florida Today*, 7 September 1986. Microfiche No. 5605.

"NASA Eyes New Booster for Shuttle." *Huntsville Times*, 20 July 1986. Microfiche No. 5607.

"NASA: No damage found to Space Shuttle's O-rings." *The Decatur Daily*, 10 October 1988. Microfiche No. 6303.

NASA. *Space Shuttle Advanced Solid Rocket Motor Acquisition Plan*. March 31, 1988.

NASA, MSFC. "Investigation Board Report STS-4 Solid Rocket Boosters Recovery System Failure," June 27, 1982, Part I. Box 1982A.

"Quotations Sought for Solid Rocket Booster Multiplexers." NASA MSFC, News Release No. 75-45, March 3, 1975. Drawer 27, SRB 1975.

Ray, William L. "Space Shuttle Redesigned Solid Rocket Motor Familiarization Training Course." August 1991.

"SRB Parachutes Undergoing Dynamic Strip-Out Tests." NASA MSFC, News Release No. 77-45, 11 March 1977, Microfiche SHHDC-0924.

"Testing Begins on Shuttle Motor Bearing." NASA MSFC News Release No. 76-95, May 26, 1976. Drawer 27, SRB 1976.

"Tests of Solid Rocket Booster Steering System Begin." NASA News, MSFC Release No. 76-163, September 3, 1976. Drawer 27, SRB 1976.

Thiokol/Wasatch Division. "Space Shuttle Program. SRM Project. Solid Propellant Rocket Motor Orientation Course. Phase I. General Familiarization with the SRM." Instructor's Book. March 1976.

"Three Firms Selected for Contract Negotiations on Shuttle Booster." NASA News, MSFC Release No. 76-159, September 1, 1976. Drawer 27, SRB 1976.

United Space Alliance. "Solid Rocket Booster Illustrated Systems Manual." PMC-0001 Version 2.0, May 2005.

United Technologies Chemical Systems. *Space Shuttle Solid Rocket Motor Block II Conceptual Design Studies Summary Report*. January 10, 1987.

Marshall Star

"2nd SRM Static Test Scheduled." (18, 18) 18 January 1978: 1.

"8 Empty SRM Case Segments Delivered Here." (19, 10) 15 November 1978: 1.

"Ablators Applied to SRB Nose Cap." (18, 18) 18 January 1978:3.

"Agreement Reached on SRB Parachute System Testing." (16, 36) 19 May 1976: 1, 2.

"Air Drop Test Set for SRB Parachutes." (18, 31) 19 April 1978: 3.

"Bendix is Awarded Booster Contract." (15, 51) 3 September 1975: 2.

"Bendix Selected for $7 Million Shuttle Contract." (17, 9) 3 November 1976: 1.

"Bendix Selected for SRB Contract." (15, 39) 11 June 1975: 2.

"Contractor Chosen for Shuttle Booster Separation Motors." (15, 48) 13 August 1975: 1, 3.

"Drop Tests Being Conducted." (17, 18) 12 January 1977: 4.

"Final Development Test Firing of SRM is Conducted Saturday." (19, 22) 21 February 1979: 1.

"Final SRM Development Firing Slated." (19, 21) 14 February 1979: 1.

"Final SRM Qualification Firing is Set." (20, 21) 6 February 1980: 1, 4.

"Firm Chosen to Produce Solid Booster Structures." (15, 50) 27 August 1975: 1.

"First Production Motor Case Segment for Shuttle Shipped." (16, 33) 28 April 1976: 1, 2.

"First Qualification Firing or SRB Scheduled Today." (19, 38) 13 June 1979: 1.

"First Solid Rocket Motor Firing Said Near Perfect." (17, 45) 20 July 1977: 1.

"First Thrust Vector Control System Fired." (19, 36) 30 May 1979: 1.

"Fourth SRB Parachute Drop Test is Success." (18, 37) 31 May 1978: 2.

"From Saturns to SRBs." (17, 38) 1 June 1977: 1.

"Hot Firing Tests Begin on SRB Steering System." (17, 2) 15 September 1976: 1.

"Large Scale SRB Test Model Being Prepared for Testing." (16, 26) 10 March 1976: 2.

"Marshall Contracts for SRB Forgings." (15, 44) 16 July 1975: 3.

"Marshall Lab Scrutinizes SRB Trajectory, Re-entry." (16, 22) 11 February 1976: 4.

"Marshall Seeks Proposals for Booster Parachutes." (Vol. 16 No. 18) 14 January 1976: 1.

"Martin Marietta gets $9 Million SRB Contract." (16, 46) 28 July 1976: 1.

"Martin Receives $1.9 Million Shuttle Contract." (15, 50) 27 August 1975: 1.

"Martin Selected for SRB Contract." (16, 38) 2 June 1976: 1.

"Most Major Structural Elements of First Two SRBs Delivered to KSC." (19, 10) 15 November 1978: 1.

"Motor Segment for Structural Testing." (18, 5) 5 October 1977: 1.

"MSFC Conducting Shuttle Booster Tow Rope Tests." (16, 1) 10 September 1975: 2.

"Parachute Drop Test Successful." (18, 47) 9 April 1978: 3.

"Proposal Sought for Booster APU." (15, 30) 9 April 1975: 1.

"Second SRM Qualification Test Passed." (20, 4) 3 October 1979: 1, 4.

"Shuttle Booster Assembly Manpower Begins Build-Up." (17, 24) 23 February 1977: 1, 4.

"Shuttle Solid Rocket Booster Test." (13, 25) 7 March 1973: 4.

"Sled Runs to Test Parachute System for Shuttle's SRB." (18, 19) 25 January 1978: 4.

"Solid Rocket Passes Final Static Firing." (20, 23) 20 February 1980: 1, 2.

"Solid Rocket Motor to get First Firing Test July 18." (17, 44) 13 July 1977: 1, 2.

"SRB Facility Deactivation Begins Here." (20, 39) 11 June 1980: 1.

"SRB Hardware Due at MSFC." (17, 46) 27 July 1977: 1.

"SRB Mockup Installed. Fast Work Completed." (15, 5) 9 October 1974: 1, 2.

"SRB Multiplexer Quotations Sought from Industry." (16, 28) 24 March 1976: 1.

"SRB Parachutes Recovery Systems Passes Drop Test." (19, 2) 20 September 1978: 1, 4.

"SRB Parachute Drop Tests Set." (17, 39) 8 June 1977: 1, 4.

"SRB Recovery System Tested." (17, 42) 28 June 1977: 1.

"SRB Servoactuator Proposals Sought." (15, 32) 23 April 1975: 3.

"SRB Segments Being Used for Platform Check at KSC." (19, 22) 21 February 1970: 4.

"SRB Separation Motor Contract is Planned." (15, 31) 16 April 1975: 7.

"SRB Skirt Mounted." (18, 51) 6 September 1978: 1.

"SRB Test Article Takes Shape." (18, 11) 16 November 1977: 3.

"SRB Tow Tests." (15, 23) 19 February 1975: 1.

"SRB Wind Tunnel Test Model Completed for Tests at Ames." (16, 43) 7 July 1976: 1, 2.

"SRM Passes Second Test Successfully." (18, 19) 25 January 1978: 1.

"SRM Flex-Bearing Testing Entering Full-Scale Phase." (16, 37) 26 May 1976: 2.

"Test Series on SRB Run at Marshall." (18, 24) 1 March 1978: 2.

"Third Air-drop Set for SRB System." (18, 13) 30 November 1977: 1.

"Third State Test Set For Solid Rocket Motor." (19, 6) 18 October 1978: 1, 3.

"Third Solid Rocket Motor Test Firing Is Successful." (19, 7) 25 October 1978: 2.

"Thiokol Awarded SRM Contract." (15, 36) 21 May 1975: 4.

"Three Firms are Selected On Shuttle SRB Contract." (16, 51) 1 September 1976: 1.

"Two SRB Contracts Exceed $2 Million." (16, 39) 9 June 1976: 1.

"Variety of Tests Proving SRB Flight Worthy." (18, 25) 8 March 1978: 4.

Roundup/Space News Roundup

"Advanced Solid Competition Opens. Firms Will Vie to Build Replacement Space Shuttle Boosters." (27, 24) 26 August 1988: 1.

"Barrier O-Rings Stop Hot Gas in Solid Rocket Test." (27, 11) 20 May 1988: 1, 2.

"Cold Weather Solid Rocket Firing Succeeds." (29, 4) 27 January 1989: 1, 4.

"*Discovery* Readied: Solid Rocket "Cold" Test Slated Today." (28, 3) 20 January 1989: 1.

"Final Solid Motor Test Before STS-26 Done Thursday." (27, 29) 16 September 1988: 1, 4.

"Final SRB Motor Test-Fire to Occur Near Pioneer Site." (19, 3) 8 February 1980: 1.

"Full-Scale Firing Goes Well at Thiokol." (26, 11) 5 June 1987: 1, 2.

Hartsfield, James. "Solid Rocket Stacks Drive STS-26 Date." (27, 12) 3 June 1988: 1, 2.

"Inspections Bear Out Solid Rocket Redesign." (27, 34) 21 October 1988: 1, 4.

"NASA Awards SRM Contracts." (25, 17) 19 September 1986: 1.

"NASA Funds Advanced Solid Rocket Motor Studies." (26, 16) 14 August 1987: 1.

"NASA Seeks Advanced Solid Rocket Motor for Space Shuttle." (26, 7) 10 April 1987: 3.

"NASA Will Use Horizontal Method for SRB Testing." (25, 19) 17 October 1986: 1, 2.

"Redesigned SRM Passes First Major Test." (26, 18) 11 September 1987: 1.

"Rodney Lists Safety Concerns. Solid Rocket Recertification 'Most Singular' Problem." (27, 3) 29 January 1988: 1, 2.

"Second Redesigned Solid Rocket Motor Firing is Tomorrow." (26, 25) 18 December 1987: 2.

"Solid Rocket Motor Firing Tests O-Rings." (27, 9) 22 April 1988: 1, 2.

"SRB: Flight-type Motor Attains Launch Thrust." (18, 20) 5 October 1979: 1.

"SRB Motor Fires Like a Master." (17, 21) 27 October 1978: 1.

"SRB Tests Underway." (25, 16) 5 September 1986: 1.

"Test Validates Solid Rocket Motor Design Changes." (26, 15) 31 July 1987: 1.

"Two Centers Test SRB 'Chutes." (15,10) 21 May 1976: 4.

Internet Sources

NASA. "Reusable Solid Rocket Motor and Solid Rocket Boosters." http://www.nasa.gov/mission_pages/shuttle/vehicle/rsrm_srbs.html

NASA. "SRB Overview." http://spaceflight.nasa.gov/shuttle/reference/shutref/srb/srb.html

NASA, MSFC. "Bolt Catcher Modifications on the Solid Rocket Booster." NASA Facts, FS-2005-04-033-MSFC. April 2005. http://www.nasa.gov/centers/marshall/pdf/114018main_Bolt_Catcher_FS.pdf

NASA, MSFC. "Most powerful Space Shuttle Solid Rocket Motor ever tested proves it can be pushed close to edge, yet still perform." Release: 03-186. http://www.nasa.gov/ceners/marshall/news/news/releases/2003/03-186.html

NASA, MSFC. "Space Shuttle External Tank and Solid Rocket Booster Camera Systems." NASA Facts, FS-2005-04-036-MSFC. April 2005. http://www.nasa.gov/centers/marshall/pdf/114016main_ET_SRB_Cam_FS.pdf

NASA, MSFC. "Space Shuttle Solid Rocket Booster. Frangible Nut Crossover System." NP-2008-09-143-MSFC. November 2008. http://www.nasa.gov/centers/marshall/pdf/290339main_8-388221J.pdf

NASA, MSFC. "Successful test leads way for safer Shuttle Solid Rocket Motor." http://www.nasa.gov/centers/marshall/news/news/releases/2004/04-163.html

Interviews and Oral Histories

Mitchell, Royce. Interview by Jennifer Ross-Nazzal. 30 June, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Thomas, John. Interview by Jennifer Ross-Nazzal. 29 June, 2010, Huntsville, Alabama. NASA STS Recordation Oral History Project Oral History Transcript.

Films, Videos and DVDs

MSFC Space Shuttle Projects Office presents a Space Shuttle Propulsion Elements Orientation: The Solid Rocket Booster (DVD; MSFS History Archives), no date.

Space Shuttle Element Orientation, Solid Rocket Booster (DVD; MSFC History Archives), 1990.

United Space Alliance. *Space Shuttle Atlantis STS-132. Last Flight*, no date.

United Space Alliance. *STS-131 Discovery. USA SRB Element*, no date.

United Space Alliance. *SRB Retrieval At-Sea Operations*, January 2010.

Section 5. THE EXTERNAL TANK (ET)

One thing that's unique—and I'm not sure the public ever really understood—was if you visualize the tank sitting on the pad, it's bolted down by the two solid rocket motors. You've got the tank in the middle, then you've got the orbiter hanging off to the side. So here you got 250,000 pounds hanging on the side of this fairly rigid tank and solid [rocket motors]. When you light the orbiter engines first, it actually pushes the tank over, it bends it about three or four feet. The top of the tank actually goes off vertical about three or four feet, then you light the solids. Once they pressurize, it wants to pop it back straight, and you time all of that such that it lifts off when it's vertical. I still love just watching, but for the casual observer you would never notice that detail. It literally launches when it comes back vertical.

*****

We painted the first two or three tanks because we didn't know how long it was going to be on the pad, and that foam is very susceptible to ultraviolet light so the longer it's on the pad, the foam will start to deteriorate, and little minute surfaces will start to shed off. To avoid that, we painted the first two white. It was like 1,500 pounds of paint we put on it, basically a flat latex paint. You wouldn't believe the ugly letters I got when we took the paint off. "That old ugly colored tank." Most of them were from ladies that just thought it really looked good before.

James B. Odom – Huntsville, Alabama – July 20, 2010

(Interview by Rebecca Wright,
NASA STS Recordation Oral History Project Oral History Transcript)

Section 5: THE EXTERNAL TANK

Books, Journals, Pamphlets, and Presentation Materials

Baker, David. "Evolution of the Space Shuttle Part 7. External Tank Design - 1. "*Spaceflight* (20, 2), February 1978: 60-66.

Baker, David. "Evolution of the Space Shuttle Part 8. External Tank Design - 2." *Spaceflight* (20, 3), March 1978: 110-115.

Kolcum, Edward H. "Space Shuttle Lightweight Tank Production Begins." *Aviation Week & Space Technology*, McGraw-Hill, Inc., 16 November 1981: 131-135.

Pessin, Myron A. "Lessons Learned From Space Shuttle External Tank Development – A Technical History of the External Tank," 30 October 2002.

Weymueller, Carl R. "King-size fuel tank boosts spacemen into orbit." *Welding Design & Fabrication*, May 1979: 176-178.

Documents at the Marshall Space Flight Center History Archives

"External Tank Segment Successfully Tested." NASA News, MSFC, Release No. 77-212, 11 November 1977. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1977.

Lindstrom, Robert A. Letter to NASA Headquarters, 8 August 1978, Subject: External Tank 7 (ET-&) Configuration for Development Flight Instrumentation (DFI). Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1978.

Lockheed Martin. Space Shuttle External Tank. *System Definition Handbook SLWT*. Layout Drawings Volume II, December 1997.

"Martin-Marietta to develop Space Shuttle Tank." NASA News Release No. 73-163, 16 August 1973. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: Space Shuttle – External Tank # 1 1972-1973.

Martin Marietta. "Space Shuttle External Tank Project," No date.

Martin Marietta. *System Definition Handbook. Configuration and Operation. Space Shuttle External Tank*, Contract NAS8-30300, November 1975.

Martin Marietta Corporation. *Space Shuttle External Tank (Lightweight Model).* Volume 1, Rev. A, April 1983.

Martin Marietta. *Space Shuttle External Tank (Lightweight Model).* Layout Drawings. Volume II, April, 1983

Martin Marietta. *Space Shuttle External Tank. System Definition Handbook.* Volumes I and II, August 1987.

Martin Marietta. *Space Shuttle External Tank. System Definition Handbook.* Volume III, October 1988.

McCool, A.A., Chairman, MVGVT Incident Investigation Team, *Final Report on MVGVT Lox Tank Incident,* May 31, 1978. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1978.

"Michoud Plant Nearing ET Production Capability." NASA News, MSFC, Release No. 76-60, 6 August 1976. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1976.

"MSFC Awards Support Contract to Martin Marietta." NASA MSFC News Release No. 74-157, 28 August 1974. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: SHUTTLE – External Tank Aug – Dec 1974.

"NASA Asks Proposals for Shuttle ET." NASA News Release No. 73-64, 2 April 1973. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: Space Shuttle – External Tank # 1 1972-1973.

"NASA Awards Martin Marietta $230 Million Contract for Production of Shuttle External Tanks." NASA News, MSFC, Release No. 80-90, 30 June 1980. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1979 and 1980

"Shuttle External Tank Rollout Scheduled." NASA News, MSFC, Release No. 77-160, 30 August 1977. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1977.

"Shuttle Structural Hardware Shipped to Marshall Center." NASA News, MSFC, Release No. 77-30, 25 February 1977. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1977.

"Space Shuttle External Tank Project." 2 September 1972. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: Space Shuttle – External Tank # 1 1972-1973.

"Space Shuttle External Tank Work Proceeds According to Plan." NASA News, MSFC, Release No. 77-119, 27 June 1977. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: ET 1977

"Tank weld assembly team prepares for test schedule." Martin Marietta Manned Space Systems, *Mission Success Bulletin,* 23 August 1994: 1 and 2.

Thompson, Robert F., Manager, Space Shuttle Program. Letter to MSFC ATTN: Manager, Shuttle Projects Office, 14 August 1974, RE: System Sizing Baseline, Subject: External Tank Control Weight. Drawer 23, Programs/Projects SPACE SHUTTLE, Folder: SHUTTLE – External Tank Aug – Dec 1974.

Marshall Star

1st Shuttle ET Set for Rollout Sept. 9." (18, 1) 7 September 1977: 1, 2.

"Assembly Now Underway to Lighten External Tank." (21, 14) 10 December 1980: 2.

"Contract Issued for ET Project." (15, 22) 12 February 1975: 1.

"ET Intertank Test Article to Arrive at MSFC March 11." (17, 26) 8 March 1977: 1, 4.

"ET Liquid Hydrogen Tank Tests Start." (18, 48) 16 August 1978: 1.

"ET Production Contact Let." (20, 42) 2 July 1980: 1.

"ET Test Hardware Arrives." (17, 27) 16 March 1977: 4.

"ETs Tanking Test at NSTL is Successful." (18, 17) 11 January 1978: 4.

"ET-1 Moves to Final Checkout." (19, 39) 30 June 1979: 4.

"External Tank Assembly Begun." (16, 46) 28 July 1976: 1.

"External Tank Structural Testing Begins at MSFC." (17, 50) 24 August 1977: 1.

"External Tank to be Lightened." (20, 42) 2 July 1980: 1.

"First External Tank." (18, 1) 7 September 1977: 1.

"First Flight ET Is ready for Rollout." (19, 40) 27 June 1979: 1.

"First Liquid Hydrogen Tank Complete Test." (17, 35) 11 May 1977: 1.

"First Shuttle Liquid Oxygen Tank Tested." (17, 30) 6 April 1977: 1, 2.

"Intertank Passes Tests." (18, 11) 16 November 1977: 1.

"Last Flight Tank." (19, 46) 9 August 1979: 1.

"Liquid Hydrogen Tank Assembly." (17, 18) 12 January 1977: 1.

"LOX Tank Delivered to MSFC." (18, 12) 23 November 1977: 3.

"Martin Marietta to Develop Space Shuttle External Tank." (13, 49) 29 August 1973: 2.

"Major Tank Test Article Shipped." (17, 25) 2 March 1977: 3.

"Modifications Continue at MAF for ET Production." (15, 21) 5 February 1975: 2.

"Saturn Test Stand Ready for Shuttle ET Test Program." (17, 10) 10 November 1976: 1, 2.

"Shuttle Booster, External Tank Underway." (13, 14) 13 December 1972: 1.

"Shuttle ET Review Being Held Here." (14, 20) 30 January 1974: 1, 2.

"Shuttle ET Test Articles Near Completion at MAF (17, 43) 6 July 1977: 2.

"Shuttle External Tank to Arrive This Week." (18, 24) 1 March 1978:1 and 3.

"Shuttle External Tank Tests Being Conducted at Marshall." (16, 47) 4 August 1976: 4.

"Shuttle Tank Effort." (13, 26) 14 March 1973: 2.

"Shuttle Tank Tooling-up Underway at New Orleans." (16, 7) 22 October 1975:1, 2.

"Space Shuttle External Tank Proposals Released." (13, 29) 4 April 1973: 1, 4.

"Structural Testing of Liquid Oxygen Tank Begins Here." (19, 43) 18 July 1979: 1, 2.

"Test ET Leaves MSFC Enroute to Kennedy." (19, 26) 21 March, 1979: 1.

"Test Tank Arrives." (18, 25) 8 March 1978: 1.

"Towering Tank." (18, 22) 15 February 1978: 1

Roundup/Space News Roundup

"NASA Contract to Reduce Weight of External Tank." (19, 15) 25 July 1980: 4.

Spaceport News

"ET is shipped from New Orleans." 6 July 1979: 1.

"Last external fuel tank arrives for STS-134 mission." (50, 20) 1 October 2010: 1.

"SRB retrieval ships to begin towing external tank." 29 August 1997: 1 and 8.

"Traveling tank." 13 August 1993: 7.

Internet Sources

Bergin, Chris. "Multiple External Tank modifications cancelled." March 31, 2008. http://www.nasaspaceflight.com/2008/03/multipple-external-tank-modifications-cancelled/

Bergin, Chris. "SCRUB: Weather delays Endeavour 24 hours – ET-134 sports final tank mods." February 6, 2010. http://www.nasaspaceflight.com/2010/02/live-sts-130-attempt-1-tank-mods/

Braukus, Michael and June Malone. "Shuttle Super Lightweight Fuel Tank Completes Test Series." NASA, July 1996. http://findarticles.com/p/articles/mi_pasa/is_199607/ai_238988282

Campion, Ed and June Malone. "Super Lightweight External Tank Certification Testing to Begin." NASA, February 1996. http://findarticles.com/p/articles/mi_pasa/is_199602/ai_901012153

Lockheed Martin Corporation. "External Tank." 2010. http://www.lockheedmartin.com/ssc/michoud/ExternalTank/index.html

Lockheed Martin Space Systems Company. "Space Shuttle Super Lightweight External Tank." May 2007. http://www.lockheedmartin.com/data/assets/9166.pdf

NASA. "The External Tank." http://www.nasa.gov/returntoflight/system/system_ET.html

NASA. "STS-120 Harmony: A Global Gateway." October 2007. http://www.nasa.gov/pdf/192725main_STS-120_Shuttle_Press_Kit.pdf

NASA. "Last Shuttle External Tank Rolling Out on July 8." July 7, 2010. http://www.nasa.gov/connect/chat/last_tank_rollout2.html

NASA, MSFC. "Super Lightweight External Tank." NASA Facts, April 2005. FS-2005-04-025-MSFC http://www.nasa.gov/centers/marshall/pdf/113020main_shuttle_lightweight.pdf

NASA, MSFC. "External Tank Liquid Hydrogen Tank/Intertank Flange" NASA Facts, April 2005. FS-2005-04-09-MSFC. http://www.nasa.gov/centers/marshall/pdf/113323main_FLANGE_FACT_SHEET.pdf

NASA, MSFC. "External Tank Protuberance Air Load (PAL) Ramps." NASA Facts, April 2005. FS-2005-04-08-MSFC. http://www.nasa.gov/centers/marshall/pdf/114015main_PAL_FS.pdf

NASA, MSFC. "External Tank Thermal Protection System." NASA Facts, April 2005. FS-2005-04-10-MSFC. http://www.nasa.gov/centers/marshall/pdf/114022main_TPS_FS.pdf

NASA, MSFC. "External Tank Forward Bipod Fitting." NASA Facts, April 2005. FS-2005-04-035-MSFC. http://www.nasa.gov/centers/marshall/pdf/114020main_ET_Bipod_FS.pdf

NASA, MSFC. "External Tank Liquid Oxygen Feedline Bellows." NASA Facts, May 2005. FS-2005-06-84-MSFC. http://www.nasa.gov/centers/marshall/pdf/119015main_revLOX_FS.pdf

NASA, MSFC. "Improvements to the Space Shuttle's External Tank." NASA Facts, June 2005. FS-2005-06-87-MSFC http://www.nasa.gov/centers/marshall/pdf/119016main_Shuttle_ET_FS

NASA, MSFC. "Return to Flight External Tank, ET-119." NASA Facts, June 2005. FS-2005-06-87-MSFC http://www.nasa.gov/centers/marshall/pdf/119016main_Shuttle_ET_FS

NASA, MSFC. "Preparing the External Tank ET-118." NASA Facts, March 2006. FS-2006-03-31-MSFC. http://www.nasa.gov/centers/marshall/pdf/150034main_Shuttle_ET-119_FS.pdf

NASA, MSFC. "Space Shuttle External Tank ET-120, STS-120." NASA Facts, October 2007. FS-2007-10-133-MSFC. http://www.nasa.gov/centers/marshall/pdf/193201main_Space_Shuttle_External_Tank_ET-120_STS-120.pdf

NASA, MSFC. "Space Shuttle External Tank ET-128, STS-124." NASA Facts, FS-2008-05-87-MSFC. http://www.nasa.gov/centers/marshall/pdf/228641main_8-368946(2).pdf

NASA, MSFC. "NASA Extends Shuttle External Tank Contract with Lockheed Martin to September 2008." NASA News Release, MSFC Release # 02-150, 6/12/02. http://www.msfc.nasa.gov/news/news/releases/2002/02-150.html

"Space Shuttle's External Tank Flies with Improved Welds." Welding Magazine, March 3, 2010. http://weldingdesign.com/news/top-story/space-shuttle-external-tank-improved-welds-0303/

Interviews and Oral Histories

Pessin, Myron "Mike" A. Interview by Rebecca Wright. 30 June, 2010, Huntsville, Alabama, Texas. NASA STS Recordation Oral History Project Oral History Transcript.

Films, Videos and DVDs

A New Era - the Super Lightweight Tank (DVD), June 1998 (STS-91 Post Launch Package; MSFC History Office, 51000584).

External Tank Explanation and Evaluation (DVD), 1981(MSFC History Office, 51000582).
History of Michoud, First Edition (DVD), 1984.

History of Michoud, Second Edition (DVD), 1992.

Martin Marietta Facilities Contract Overview (DVD), 1989.

NASA. *Space Shuttle External Tank (INF 367)* (DVD), no date (MSFC History Archives).

NASA. *Space Shuttle External Tank Project* (DVD), 1 April 1977 (MSFC History Archives).

Space Shuttle Element Orientation, External Tank (DVD), 1990 (MSFC History Archives, 51000550).