

HISTORY OF ORBITAL RENDEZVOUS

The following documents provide a historical overview of orbital rendezvous, proximity operations, and docking, as performed in Gemini, Apollo, Skylab, and STS.

OVERVIEW

- "The Roots of Rendezvous", J. Oberg
- "History of USA Space Rendezvous", B. Becker, selected charts, 8/20/1990
- Rendezvous Profile Evolution (Kramer/Jackson)

PRE-SPACEFLIGHT

- Introduction (J. Oberg)
- "The Idea of Orbital Rendezvous, 1929-1961", Barton Hacker, 1968.
- Draft chapter for Gemini history, "The Idea of Rendezvous", Hacker, 1968
- Excerpts from "Orbital Bases", H.E. Ross, Journal of the British Interplanetary Society, January 1949
- The Genesis of Orbital Rendezvous, H.E. Ross, Spaceflight, May 1976
- Wernher von Braun, "Prelude to Space Travel", 1951, section excerpt
- Arthur C. Clarke, The Exploration of Space, 1951, several sections

EARLY SPACE AGE

- John Houbolt Interview, 1966
- "The Background of Rendezvous", Hacker, 1966, excerpt from NASA's Gemini history, "On the Shoulders of Titans"
- Project SAINT, excerpted from The Militarization of Space: U.S. Policy, 1945-84, by Paul B. Stares, Cornell University Press, Ithaca, New York, 1985, pp. 112-117
- "Challenge from the Field", Hacker op. cit.
- "Problems and Potentials of Space Rendezvous", John Houbolt, ASTRONAUTICA ACTA, 1961
- "Approaches to Rendezvous", Donald Heaton, Astronautics, April 1962
- "Saturn C-5 Flight Profile for Rendezvous", P.J. deFries, Astronautics, April 1962
- "Simulating Manual and Automatic Rendezvous", Smith & McPhail, Astronautics, April 1962
- Excerpt from Chariots for Apollo, on NASA acceptance of LOR
- LUNAR ORBIT RENDEZVOUS, News Conference on Apollo Plans at NASA Headquarters, July 11, 1962
- "Investigation of a manual rendezvous technique", Paul Kramer, Manned Spacecraft Center, Sep 24, 1962
- "Line-of-Sight Guidance Techniques for Manned Orbital Rendezvous", Edwin Aldrin, MIT PhD thesis summary and background sections, 1964.
- This New Ocean, excerpts on tethered balloon experiment, MA-7

GEMINI

- Introduction (J. Oberg)
- Gemini III rendezvous plans, Hacker, op. cit.
- Gemini IV prox ops with Titan-II (from mission report)
- Gemini IV results, Hacker, op. cit., and Aldrin, Men From Earth
- "GT-5 Will Test Rendezvous System", Missiles & Rockets, June 28, 1965
- Gemini-V rendezvous plans, NASA Press Kit
- "GT-5 Proves U.S. Rendezvous Ability", Missiles & Rockets, Aug 30, 1965
- Gemini VI preparations, Hacker, op. cit., and Aldrin, Men From Earth
- Gemini VI-A Rendezvous Mission Planning, E.C. Lineberry, "Gemini Mid-Program Conference"
- Rendezvous of Gemini VII and Gemini VI-A, T.P. Stafford et al., op. cit.
- Results of Gemini VI rendezvous, Hacker, op. cit.
- Gemini 8 docking, Hacker, op. cit.
- Planning for Gemini-9, Hacker, op. cit.
- Results of Gemini-9, Hacker, op. cit.
- Planning for Gemini-10, Hacker, op. cit.
- Detailed Gemini-10 rendezvous plan report (TRW)
- Results of Gemini-10, Hacker, op. cit.
- Excerpts from Michael Collins, LIFTOFF, on GT-10
- Gemini-X rendezvous whifferrill (from mission report)
- Planning Gemini-11, Hacker, op. cit.
- Gemini-11 results, Hacker, op. cit.
- Gemini-12 results, Hacker, op. cit.
- Gemini-12 narrative, Aldrin, Men from Earth
- Summary of Rendezvous Operations, W.B. Evans and M.R. Czarnik, "Gemini Program Summary Conference"
- "An Assessment of Rendezvous Accomplishments", John Houbolt, Applied Mechanics Reviews, January 1967.
- PROJECT GEMINI: A Technical Summary, sections on rendezvous (plus details on usage of onboard backup charts)
- "Onboard Operations for Rendezvous", Kramer, Aldrin, Hayes, GPSC.

APOLLO

- Introduction (J. Oberg)
- "Apollo Experience Report - Evolution of the Rendezvous-Maneuver Plan for Lunar-Landing Missions", Becker & Alexander, TN-D-7388, Aug 1973.
- "Rendezvous and Docking", Apollo Program Summary Report, Apr 1975, JSC-09423, pp. 6-12,13
- Apollo-7 rendezvous with S-IVb, APOLLO-7 MISSION REPORT, Dec 1968
- "Apollo 9 Rendezvous , Docking Plot", Aviation Week, Feb 24, 1969.
- D Mission LM Rendezvous Procedures (FDF), Jan 31, 1969, Section 2 ("Major Events") plus relative motion plot
- CSM/LM transposition/docking, typical, from Apollo-10 mission report
- F Mission LM Rendezvous Procedures (FDF), Apr 28, 1969, relative motion plot for Apollo-10 CSM/LM maneuvers in lunar orbit
- First lunar orbit rendezvous, from Apollo-10 Mission Report
- G Mission LM Rendezvous Procedures (FDF), June 20, 1969, relative motion plots and section 3 ("Discussion of Major Events")
- Apollo-11 LM RNDZ on-board timeline (4 pages)
- Excerpt from Michael Collins, LIFTOFF, on Apollo-11 rendezvous plans
- Apollo-11 lunar orbit rendezvous, crew report and mission report
- Apollo LM Abort Rendezvous relative motion plots (Apollo-12, typical)
- Apollo-14 rendezvous, Mission Report, first "short" LOR
- Apollo-16 "brute force" re-rendezvous
- Apollo-16 rendezvous, Mission Report
- Apollo-11 rendezvous checklist (optional section)
- Skylab rendezvous profile
- Operational Trajectory of SL-4, MPAD, Oct 16, 1973
- Skylab rendezvous checklist (Kramer/Mosel FDF)
- SL-3 mission report, section 10 ("Rendezvous")
- SL-3 Crew Debriefing, section 4.0 ("Rendezvous & Docking")
- SL-4 Crew Debriefing, section 4.0 ("Rendezvous & Docking")
- Apollo/Soyuz rendezvous and proximity operations overview
- ASTP Mission Report, section 10.1.3 (Rendezvous/Docking)
- Apollo Command Module On-board RNDZ nav/tgt flight software (optional)

USSR

- Memo for the record, J. Oberg, Aug 16, 1990

SHUTTLE

- Peculiarities of STS Rendezvous Operations
- "Mission 3A/3B", 1973
- "Rendezvous/Proximity Operations", astronaut office, Nov 16, 1977
- The Skylab Reboost Mission (1977-8)
- STS prop-saving +RBAR approach (Mosel), 1978
- "Typical Rendezvous Plan", Fred Haise, June 29, 1979
- "The Evolution/Revolution of STS Rendezvous Design, 1982-3", J. Oberg
- "STS Rendezvous/Prox Ops Experience", Appendix A, Rendezvous and Proximity Operations Handbook, James E. Oberg, May 16, 1988.
- STS-32 mission design (Slifer)
- STS-32 navigation anomaly
- "STS-32/LDEF Retrieve, Day-of-rendezvous On-board Operations", James E. Oberg, Orbit Flight Techniques, May 4, 1990.
- Real-time HST sep re-analysis, memo for the record