

CENTER SERIES

JOHN ALRED PAPERS

This subseries contains materials relating to plume impingement and rocket exhaust research from the 1960's to 1980's, both generally in regards to effects and calculations and specifically in regards to shuttle payloads and even space station applications. Also contained in this subseries are space station design studies from 1967 to 1986, and more specifically a large amount of material on tethers and tether applications related to the space station from 1983-1987. Finally, some internal finance and budget papers from 1979-1988 are included. The provenance for the majority of this material is John Alred, an engineer in the Systems Engineering Division of the Systems Integration Branch in the Engineering Directorate. This division eventually became the Advanced Programs Office of the Systems Definition Branch. Papers of other engineers in this division, namely David Kanipe, Barney Roberts, and Mark Craig, were interspersed throughout the collection, but they were not as extensive or numerically significant as those of Mr. Alred. Mr. Alred first appears in the August 1983 JSC phone directory, but his papers go back well into the 1970's. He became technical assistant to the chief of the Advanced Programs Office by January 1989, and by October 1989 was in the Exploratory Planet Surface and Human Systems Office of the New Initiatives Office. What is strikingly apparent from examination of the collection is that the materials represent the many assignments and projects required and assigned an engineer at JSC from the 1970's to 1980's. Anything and everything related to the above-mentioned subjects contains one or more of the following: mathematical calculations, charts, schematic drawings, computer program designs and readouts, 3-D graphics of systems and designs, meeting minutes, research materials, studies, simulation tests and results, memos, and notes. Materials originally arrived in clearly marked folders, and these folder titles have been maintained. Description of different items contained in the folders usually follows the folder title in parentheses. Many of the folders contained overhead presentations; these were copied and placed in the original folder and the overheads were discarded. A half-box of microfiche containing computer results of simulation tests and program runs were also discarded. The plume impingement materials comprise the majority of the collection and were placed first. A chronological presentation of plume-related papers and projects precedes a subject area division of plume-related materials. These subject areas are listed below. All are arranged chronologically except for the STS flights, which are arranged by flight number. Skylab materials STS flights Induced Environment Contamination Monitor (IECM) JANNAF Standard Plume Flowfield (SPF) Manned Manuevering Unit (MMU) Nozzle Plumes Plasma Diagnostic Package (PDP) Particle Energy Detection Experiment (PEDE) Reacting and Multi-Phase Computer Program (RAMP) Reaction Control System (RCS) Remote Manipulator System (RMS) Shuttle Engineering Simulator (SES) Spartan Satellite Various satellite and experiment deployments Finally, almost five boxes of research papers and materials related to plumes are organized alphabetically. Some documents related to Contract NAS9-15302, Space Shuttle Propellant Dynamics, follow in chronological order. Materials related to space station designs begin the section of the collection related to the space station. This design subsection of the collection is one of the most interesting, because it contains many 3-D graphics and computer-generated images of space station design at this point in time (1983-1987)(see especially Hidden Line presentations folder). A number of space station documents follow in chronological order, along with a section on the Evolutionary Space Station series arranged by volume number. A few research documents regarding the space station are arranged chronologically. Finally, three boxes of papers related to tethers and tether applications for the space station are arranged chronologically. Major topics include the tethered elevator, tethered pointing platform, and tethered orbital refueling. The collection ends with three folders containing budget and finance RTOPs for various programs from 1979-1988. Other collections to examine for plume impingement are the Mark K. Craig documents in the shuttle series, and the space station series should also be examined for related collections.

Inventory

SubHeading:	Box Number: 01	
	Plume Heating Analysis (memos, charts, calculations, copy of NASA TR R-224, Technical Information Release)	1969-1979
	Satellite Approach Problem (studies, calculations, charts, computer printouts, stationkeeping reports, some LDEF materials)	1975-1977
	MDAC Plume Studies (various technical reports on plumes by McDonnell Douglas)	1976-1980
	JSC 13965 John Lobb's paper - Impingement Effect of Service Module Reaction Control System Engine Plumes	April 1978
	Vernier Jets (reports, calculations, presentations, computer printouts, graphs, charts, illustrations)	1977-1982

	Kalman Filter (crew training book, general description sheet)	August 1, 1978
	MPTA Cooling Ring	November-December 1978
	Pressure Transducers (literature, calculations)	1978
	Orbiter Impingement FTR (RCS Program, charts, calculations, reports)	1979
	Core ICD RIDs (charts, notes)	1979
	OMS, SSME Impingement (calculations, microfiche (4) containing computer program)	1980
SubHeading:	Box Number: 02	
	Plume Plans (NASA, JANNAF, and AFRPL)	1980-1983
	Thruster Plume Impingement	July 1981
	Math Pack (SSPLIB)(and IMSL)	December 21, 1981
	Payload Handling Flight Test Article (PFTA)	1981
	Plume Contamination Meeting	August 17-18, 1982
	PRCB presentation information	1982
	ACIP Data (computer printouts, reports, STS-6 information, 1 sleeve of microfiche)	1982-1983
	Plumes (studies, computer printouts, research articles, calculations, charts, etc.)	1982-1984
	STS-11 Rendezvous Balloon	March 16, 1983
	Hydrazine in RCS Plumes	December 1983
	DTO-316: KU Band Attach	1983
	Review of Vibration Test Results for the Plume Witness Plate Experiment	January 13, 1984
	Centaur Ice	1985
	Plume tasks (status report, RAMP code, Plume Analysis meeting)	1986
	Contingency Abort (drawings, charts, calculations)	n/d
	Dynamic Pressure Contours (charts)	n/d
	HP 25 stuff (charts, calculations)	n/d
SubHeading:	Box Number: 03	
	Steam Tables (blueprints)	n/d
	Plooms for Sonic Booms, or, Plumes for Sonic Bumes	n/d
	Pitot Tube Correction Factor	n/d
SKYLAB MATERIALS	Skylab Docking Manuever (shuttle, Skylab models)	1976
SKYLAB MATERIALS	TRS (Skylab retrieval)	1978
SKYLAB MATERIALS	Source Flow Plume Verification (Skylab)	1980
STS FLIGHTS	On Orbit Derivation of Orbiter Mass Properties (calculations, reports, memos, presentations) STS-1	1980-1981
STS FLIGHTS	STS-1 On-Orbit Analysis (activities timeline, microfiche (3), charts, calculations, Aerodynamic Coefficient Identification Package (ACIP)	1981
STS FLIGHTS	Materials on STS-2 plumes	1982
STS FLIGHTS	Thrust due to H2O evaporation from tiles - STS-4	July 6, 1982

STS FLIGHTS	STS-4 plume material	March-April 1983
STS FLIGHTS	STS-7 (SPAS-01) plume materials (charts, calculations, memos, drawings, JSC-14024 (STS and SPAS-01 Payload Integration Plan), 1 color plate, computer printouts)	1977-1979
STS FLIGHTS	SPAS-01 SES Checkout (drawings, calculations, computer printouts, blueprints)	1979-1980
SubHeading:	Box Number: 04	
STS FLIGHTS	STS-7/SPAS material (reports, crew debrief, quick-look, Rockwell STS-7 News, STS-7 flight log by Alred, post-flight analyses, calculations, computer printouts, RCS plume impingement data)	1983
STS FLIGHTS	SPAS RCS Plume Test - Raw Data	1984
INDUCED ENVIRONMENT CONTAMINATION MONITOR (IECM)	IECM, v. 1 - reports, drawings, calculations	1976-1979
INDUCED ENVIRONMENT CONTAMINATION MONITOR (IECM)	IECM Checkout	1980-1981
INDUCED ENVIRONMENT CONTAMINATION MONITOR (IECM)	IECM, v. 2 - JSC-16412 (Cargo Systems Manual: IECM STS-4), plume animation frames, STS-4 materials, charts, diagrams, calculations, reports	1981-1982
INDUCED ENVIRONMENT CONTAMINATION MONITOR (IECM)	IECM plume survey	1982-1983
SubHeading:	Box Number: 05	
JANNAF STANDARD PLUME FLOWFIELD (SPF)	JANNAF SPF - Overview and Operational Information for First Version (2 plume reports)	1979-1981
JANNAF STANDARD PLUME FLOWFIELD (SPF)	JANNAF SPF	April 1981
MANNED MANUEVERING UNIT (MMU)	Primary Life Support Subsystem (PLSS) on the MMU - plume effects, orifice thrust (MMU drawings and descriptions)	1978
MANNED MANUEVERING UNIT (MMU)	MMU - computer printouts, Working Group minutes, reports, calculations, drawings	1979-1984
NOZZLE PLUMES	Nozzle Design (articles, research reports, drawings, calculations)	1967-1973
NOZZLE PLUMES	ORS Vent Nozzle	1983
PLASMA DIAGNOSTIC PACKAGE (PDP)	PDP Simulation Model (STS-21) - reports, studies, calculations, computer printouts	1984
PARTICLE ENERGY DETECTION EXPERIMENT (PEDE)	PEDE Project Plan - color flowchart, JSC-16897, reports	1980-1982
REACTING AND MULTI-PHASE COMPUTER PROGRAM (RAMP)	RAMP Update to Aero Data book	1979-1984
SubHeading:	Box Number: 06	
REACTING AND MULTI-PHASE COMPUTER PROGRAM (RAMP)	RAMP Reaction Control System (RCS) - plume models	1982-1984
REACTING AND MULTI-PHASE COMPUTER PROGRAM (RAMP)	RAMP - NAS9-17318 (Development of a Nozzle/Plume and Plume Impingement Code)	1983-1985
REACTING AND MULTI-PHASE COMPUTER PROGRAM (RAMP)	RAMP (Re-Acting Multi-Phase Computer Program) - full description and presentation of system	n/d
REACTING AND MULTI-PHASE COMPUTER PROGRAM (RAMP)	RAMP VRCS	n/d
REACTION CONTROL SYSTEM (RCS)	RCS drawings (blueprints)	1973-1974
REACTION CONTROL SYSTEM (RCS)	RCS Vacuum Impingement Values	1973-1981
REACTION CONTROL SYSTEM	OA99 RCS Test	1974

(RCS)		
SubHeading:	Box Number: 07	
REACTION CONTROL SYSTEM (RCS)	RCS High Altitude Tests at White Sands (13 color photographs)	1978
REACTION CONTROL SYSTEM (RCS)	RCS Test at White Sands Test Facility (book on WSTF included)	1978-1979
REACTION CONTROL SYSTEM (RCS)	MOC-RCS	1979
REACTION CONTROL SYSTEM (RCS)	Plume Comparison (RCS to RCS Source Flow)	1983
REACTION CONTROL SYSTEM (RCS)	Reaction Control Thruster (RCT) Plume	1983
REACTION CONTROL SYSTEM (RCS)	Plume Experiment (RCS)	1986
REACTION CONTROL SYSTEM (RCS)	RCS Aft Orbiter Geometry	n/d
SubHeading:	Box Number: 08	
REMOTE MANIPULATOR SYSTEM (RMS)	RMS (JSC 11875, JSC 13049, JSC 12597, JSC 12776, JSC 16588, Canadarm description)	1976-1978
REMOTE MANIPULATOR SYSTEM (RMS)	RMS III Simulation	1977-1978
REMOTE MANIPULATOR SYSTEM (RMS)	RMS Plume Model	1981
SHUTTLE ENGINEERING SIMULATOR (SES)	SES Materials	1977-1979
SHUTTLE ENGINEERING SIMULATOR (SES)	LDEF-SES Checkout	n/d
SPARTAN SATELLITE	Spartan Satellite material	1983-1985
SPARTAN SATELLITE	Spartan - SES Plume Models	1985-1986
SubHeading:	Box Number: 09	
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	Data Acquisition Camera (DAC)	1977-1980
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	Solar Maximum Mission (SMM) Satellite	1977-1983
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	Cosmic Dust Collector	1980-1984
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	PEDE Experiment	1982-1983
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	Space Telescope, Security materials (JSC 17873, Baseline and Rev. A)	1982-1983
VARIOUS SATELLITE AND EXPERIMENT DEPLOYMENTS	PALAPA, WESTAR Recovery	1984
RESEARCH MATERIALS ON PLUMES	AEDC-TDR-64-214 Altitude-Velocity Table and Charts for Imperfect Air	January 1965
RESEARCH MATERIALS ON PLUMES	Analysis of Exhaust Plumes from Skylab - Configurations R-4D Attitude Control Motors (with charts)	March 1970
SubHeading:	Box Number: 10	
RESEARCH MATERIALS ON PLUMES	Analytical Comparison with Results of an Oxidizer-to-Fuel Ratio Gradient Sonic Orifice Impingement Pressure Survey in the MSFC Impulse Base Flow Facility	September 1971
RESEARCH MATERIALS ON PLUMES	JSC 09366 An Analytical Estimate of On-Orbit RCS Impingement to the Orbiter Including a Comparison with Experimental Data	December 16, 1974
RESEARCH MATERIALS ON PLUMES	Apollo RCS Influence on Soyuz	1977
RESEARCH MATERIALS ON PLUMES	AEDC-TR-79-6 Applications of the Aerotherm BLIMP Boundary- Layer Program to Nonablating Reentry Flight Conditions	July 1979

RESEARCH MATERIALS ON PLUMES	NASA TN D-473 NASA TN D-1737 Chemical Equilibrium Compositions (CEC)	1960-1963
RESEARCH MATERIALS ON PLUMES	AEDC-TDR-64-43 Charts of Normal Shock Wave Properties in Imperfect Air	March 1964
RESEARCH MATERIALS ON PLUMES	NASA SP-273 Computer Program for Calculation of Complex Chemical Equilibrium Compositions, Rocket Performance, Incident and Reflected Shocks, and Chapman-Jouguet Detonations	1971
RESEARCH MATERIALS ON PLUMES	Contamination by plumes (various articles and reports)	1967-1970
RESEARCH MATERIALS ON PLUMES	Definition of Solid Plume Flow Fields of the Space Shuttle Interim Upper Stage (IUS, SSUS-A, SSUS-D) Solid Booster Motors	November 1977
RESEARCH MATERIALS ON PLUMES	Forces Due To A Command Service Module Reaction Control Motor Plume Impinging on the Saturn V Cluster Arrangement (Dry Workshop Version) (with extensive notes)	August 1969
RESEARCH MATERIALS ON PLUMES	N62-17372 A General IBM 704 or 7090 Computer Program for Computation of Chemical Equilibrium Compositions, Rocket Performance, and Chapman-Jouguet Detonations	October 1962
SubHeading:	Box Number: 11	
RESEARCH MATERIALS ON PLUMES	High-Altitude Plumes - pt. 1	1952-1976
RESEARCH MATERIALS ON PLUMES	High-Altitude Plumes - pt. 2	1965-1978
RESEARCH MATERIALS ON PLUMES	Improvement of Rocket Engine Plume Analysis Techniques - Final Report	January 1982
RESEARCH MATERIALS ON PLUMES	Interaction of High-Energy Gas Molecules with Solid Surfaces	August 1963
RESEARCH MATERIALS ON PLUMES	Interactive Flowfield Analysis - Final Report (with color computer charts)	September 1984
RESEARCH MATERIALS ON PLUMES	JANNAF Boundary Layer Integral Matrix Procedure (BLIMP)	July 1975
RESEARCH MATERIALS ON PLUMES	JANNAF Handbook - Rocket Exhaust Plume Technology Chapter 6 - Spacecraft Plume Contamination	February 1983
SubHeading:	Box Number: 12	
RESEARCH MATERIALS ON PLUMES	JANNAF Plume Technology Handbook Final Report - Volume II (Supplement to Volume I)	n/d
RESEARCH MATERIALS ON PLUMES	Monte Carlo Simulation Method	1978-1985
RESEARCH MATERIALS ON PLUMES	Nuclear Jet Injection (JI)	1985-1986
RESEARCH MATERIALS ON PLUMES	NASA CR-481 Numerical Calculations of Gas-Surface Interactions	May 1966
RESEARCH MATERIALS ON PLUMES	Plume Boundary for Source Flow	1978
RESEARCH MATERIALS ON PLUMES	Plume Impingement - References	1968-1972
RESEARCH MATERIALS ON PLUMES	Single-Phase Flow Experiment	1973
RESEARCH MATERIALS ON PLUMES	Report 1135 - Equations, Tables, and Charts for Compressible Flow	n/d
RESEARCH MATERIALS ON PLUMES	Research on Gas-Surface Interactions 1966-67 Part I - Project Summary	December 1967
RESEARCH MATERIALS ON PLUMES	Research on Gas-Surface Interactions 1966-67 Part II - Numerical Experiments on Scattering of Noble Gases from Single Crystal Silver	November 1967

SubHeading:	Box Number: 12 *	
RESEARCH MATERIALS ON PLUMES	JANNAF Rocket Exhaust Plume Technology Handbook (v. 1) // All 263 pages have been scanned.	January 1975
SubHeading:	Box Number: 13	
RESEARCH MATERIALS ON PLUMES	NASA TN D-3667 Solid Rocket Performance	October 1966
RESEARCH MATERIALS ON PLUMES	SSME Operation and Maintenance Documentation Space Shuttle Main Engine Part Number RS007001	December 20, 1976
RESEARCH MATERIALS ON PLUMES	Space Shuttle / Spinning Solid Upper Stage (SSUS)	1976-1977
RESEARCH MATERIALS ON PLUMES	TBL ICRPG Turbulent Boundary Layer Nozzle Analysis Computer Program	July 1968
RESEARCH MATERIALS ON PLUMES	A Theoretical Approach to the Prediction of Molecule Surface Interaction	August 1963
RESEARCH MATERIALS ON PLUMES	Two-Phase Flow Development (Final Report)	January 31, 1974
RESEARCH MATERIALS ON PLUMES	Two Phase Flow Experiments	1968-1981
SubHeading:	Box Number: 13 *	
RESEARCH MATERIALS ON PLUMES	NASA TM X-53579 Review of Thermal Radiation from Liquid and Solid Propellant Rocket Exhausts // All 292 pages have been scanned.	February 20, 1967
RESEARCH MATERIALS ON PLUMES	Space Shuttle Solid Rocket Motor Sea Level Exhaust Plume Definition // This 70 page document has been scanned.	January 1981
RESEARCH MATERIALS ON PLUMES	SRM and SSME Plume Definition // All 124 pages have been scanned.	n/d
SubHeading:	Box Number: 14	
RESEARCH MATERIALS ON PLUMES	Two Phase Flow - Theoretical	1973-1986
RESEARCH MATERIALS ON PLUMES	User's Guide for TRAN72 Computer Code Modified for Use with RAMP and VOFMOC Flowfield Codes	October 1974
RESEARCH MATERIALS ON PLUMES	Development of High Altitude Plume Impingement Analysis for Calculating Heating Rates, Forces and Moments (v. 1 - Final Report)	March 1971
RESEARCH MATERIALS ON PLUMES	User's Manual and Description of a Computer Program for Calculating Heating Rates, Forces and Moments Acting on Bodies Immersed in Rocket Exhaust Plumes (v. 2)	March 1971
RESEARCH MATERIALS ON PLUMES	User's Manual - Description of a Digital Computer Program for Nozzle and Plume Analysis by the Method of Characteristics	December 11, 1966
RESEARCH MATERIALS ON PLUMES	Various papers on Shuttle systems	1978-1986
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Request of Propellant Dynamics	1970-1985
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Analysis and Test for Space Shuttle Propellant Dynamics (and other papers)	1971-1979
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Numerical Methods for Hyperbolic Systems	December 1973
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Transonic Flow Computations	December 1974
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Constraint Surfaces (Slosh Surfaces)	1977-1978
SubHeading:	Box Number: 15	
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Analysis and Test for Space Shuttle Propellant Dynamics - Interim Report	March 1978

SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	NASA CR 3683 Analysis and Test for Space Shuttle Propellant Dynamics (rough draft)	June 1983
SPACE SHUTTLE PROPELLANT DYNAMICS NAS9-15302	Alternative Propellant Dynamics	1983
SPACE STATION MATERIAL, DESIGNS	Space Station Solar Panel Dynamics (rough drafts, calculations, Evolutionary Space Station status report)	1983
SPACE STATION MATERIAL, DESIGNS	Hidden Line presentations (many 3-dimensional computer printouts of station, some color photographs, computer program description)	1983
SPACE STATION MATERIAL, DESIGNS	Space Station Plume Technology (Orbiter/Space Station Docking Study (OSDS), 3-D Station graphics)	1984
SubHeading:	Box Number: 16	
SPACE STATION MATERIAL, DESIGNS	Space Station Rigid Body Dynamics - References (MMDA Spacecraft Integrated Analysis Program (SCIAP), research articles, Station Mass Properties, Skunk Works reports, Space Station Schedule to 2000, Integrated Analysis Capability (IAC), 3-D graphics of station, Mass Properties Reports)	1984
SPACE STATION MATERIAL, DESIGNS	Space Station Source Flow Plume Impingement Model (SFPLIMP) - Test Case 1-8 computer printouts, etc.)	1984-1985
SPACE STATION MATERIAL, DESIGNS	SES OSDS reports	1985
SPACE STATION MATERIAL, DESIGNS	Dual Keel reports	1985-1986
SPACE STATION MATERIAL, DESIGNS	SS Tag	May-June 1986
SPACE STATION MATERIAL, DESIGNS	SS Impacts of SIL (Announcement of SS Program Director)	June-August 1986
SPACE STATION MATERIAL, DESIGNS	Transportation Node (3 reports, 1 on future mission uses for the Space Station (Lunar Base, Mars projects))	1986-1987
SubHeading:	Box Number: 17	
SPACE STATION MATERIAL, DESIGNS	SS Concepts / Concerns / CETV (Contingency Return Vehicle documents (CRV), 3-D graphics of dual keel with 5 meter truss space station, Soviet MIR papers)	1986-1987
SPACE STATION DOCUMENTS	Computer Program Documentation, Program E178 Space Station Stability	May 1968
SPACE STATION DOCUMENTS	JSC 19333 Structures and Control Dynamics Panel Preliminary Configuration Study	September 1983
SPACE STATION DOCUMENTS	Conceptual Design and Evaluation of Selected Space Station Concepts (v. 1)	December 1983
SPACE STATION DOCUMENTS	Conceptual Design and Evaluation of Selected Space Station Concepts (v. 2?)	December 1983
SPACE STATION DOCUMENTS	JSC-20414 Delta Space Station	March 31, 1985
EVOLUTIONARY SPACE STATION DOCUMENT SERIES	Evolutionary Space Station v. 1 System Description (Final version)	January 15, 1984
SubHeading:	Box Number: 18	
EVOLUTIONARY SPACE STATION DOCUMENT SERIES	Thermal and Environmental Control Panel Study Task Report v. 2 (or 11), part 1: Environmental Control and Life Support System	January 1984
EVOLUTIONARY SPACE STATION DOCUMENT SERIES	Evolutionary Space Station v. 5, pt. 1: Communications, Tracking, and Navigation Systems Study Reports	September 1983

EVOLUTIONARY SPACE STATION DOCUMENT SERIES	JSC 19313 Evolutionary Space Station v. 5, pt. 2: Communications, Tracking, and Navigation Systems	September 1983
EVOLUTIONARY SPACE STATION DOCUMENT SERIES	Evolutionary Space Station Study v. 8: Electrical Power, Fluids Management and Onboard Propulsion: Section 8a - Electrical Power	n/d
SPACE STATION RESEARCH MATERIALS	A Mathematical Model for Investigating Space Station Pointing Accuracies Using Control Moment Gyros	November 9, 1967
SPACE STATION RESEARCH MATERIALS	A Model for Investigating the Effects of Flexibility on the Dynamics of a Multi-Bodied Satellite	January 15, 1968
SPACE STATION RESEARCH MATERIALS	STAR reports (also Monte Carlo papers of Bird)	1970-1982
SPACE STATION RESEARCH MATERIALS	NASA Reference Publication 1009 An Introduction to Orbit Dynamics and its Application to Satellite-Based Earth Monitoring Missions	November 1977
SPACE STATION RESEARCH MATERIALS	NASA TM 86254 Interactive Systems Design and Synthesis of Future Spacecraft Concepts	June 1984
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Orbital Refueling Study Technical Proposal - v. 1	August 1983
SubHeading:	Box Number: 19	
SPACE STATION - TETHERS, TETHER APPLICATIONS	UNIVAC/Class VI/Computer in general (UNIVAC flowchart with template included)	1983-1985
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Orbital Refueling Study	1983-1985
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Satellite System (Working Group meetings, Tethered Satellite Simulation (TSS))	1984
SPACE STATION - TETHERS, TETHER APPLICATIONS	Panel Presentation on Dynamics of Tethered Constellations in Earth Orbit	October 15-17, 1985
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Elevator and Platforms as Space Station Facilities Systems Studies and Demonstrative Experiments	October 15-17, 1985
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Pointing Platform and Space Elevator Mechanisms - Analysis of the Key Concepts for SATP and Scaled SATP	October 15-17, 1985
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Orbital Refueling Study Interim Report	October 1985
SubHeading:	Box Number: 20	
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethers (research on tethers, reports, long range planning goals for tethers on space station, working group minutes)	1985-1987
SPACE STATION - TETHERS, TETHER APPLICATIONS	Final Report on An Investigation of the Kinetic Isolation Tether Experiment	January 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Analytical Investigation of the Dynamics of Tethered Constellations in Earth Orbit (Phase II)(Quarterly Report #3)	February 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	TSS Concept Applications Program First Progress Meeting	March 4, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	TSS Concept Applications Program	March 18-19, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	SATP User's Requirements Report	March 21, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Scaled Science and Application Tethered Platform Definition Study	March 21, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Analytical Investigation of the Dynamics of Tethered Constellations in Earth Orbit (Phase II)(Quarterly Report #4)	March 1986

SPACE STATION - TETHERS, TETHER APPLICATIONS	Tether Application Briefing - STS Tether Deorbit Influence on Optimum SS Altitude	April 2, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Propellant Resupply Depot Study	April 24, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Orbital Refueling Study Final Report	April 1986
SubHeading:	Box Number: 21	
SPACE STATION - TETHERS, TETHER APPLICATIONS	Dynamical Efforts of Tether Structural Damping: A Preliminary Model	n/d
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tether Analysis, Phase I Appendix A, End Weight Perturbed	n/d
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tether Analysis, Phase II Appendix B, Tether Perturbed	n/d
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tether Analysis, Phase III Appendix C, Tether Stabilization	n/d
BUDGET, RTOPS	RTOPs (Plumes)	1979
BUDGET, RTOPS	1223's (reports on various projects, funding projections for FY87, budget plans)	1985-1986
BUDGET, RTOPS	Research and Technology Objectives and Plans (RTOPs)(reports, descriptions, financial needs of future space programs)	1986-1988
SPACE STATION - TETHERS, TETHER APPLICATIONS	Selected Tether Applications in Space Phase III Study - Final Review Briefing	August 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	NASA/AIAA/PSN papers on tethers (4)	September 17-19, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	The Use of Motion Analysis in Support of Tether Development	September 16, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Selected Tether Applications in Space, v. 1 Executive Summary, Phase III, Final Report	September 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Selected Tether Applications in Space, v. 2 Phase III, Final Report	September 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Concepts for a Tether Deployment Monitoring System (Final Report, Phase I)	September 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	NASA Cable Tether System Final Report	December 5, 1986
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tether Applications in Space Program Plan 1986-1991	May 1987
SPACE STATION - TETHERS, TETHER APPLICATIONS	Tethered Elevator and Pointing Platform Demonstrations: A Shuttle Flight Test of Scaled Engineering Models	n/d
SPACE STATION - TETHERS, TETHER APPLICATIONS	Gravity Gradient Enhancement During Tethered Payload Retrieval	n/d
SPACE STATION - TETHERS, TETHER APPLICATIONS	Disturbance Propagation in Orbiting Tethers	n/d