Advanced Communication Systems Nasa

This book offers a thorough review of research on intelligent communication systems, focusing on the applications of artificial intelligence to telecommunications that help realize user-friendly interfaces. Intelligent Communication Systems presents the direct result of more than a decade of the author's experiences, research activity, and education in applying artificial intelligence to telecommunications technology. In this book, several fundamental research areas are covered. Some of the areas covered are human-friendly interfaces for telecommunication services with such concepts as Telesensation and HyperReality, computer vision, and the telecommunication description method based on state space. In artificial intelligence research state space is the set of all attainable states of a problem and the possible alternative courses of action to determine the best solution to the problem.

The Experiment Control and Monitor (EC&M) software was developed at NASA Lewis Research Center to support the Advanced Communications Technology Satellite (ACTS) High Burst Rate Link Evaluation Terminal (HBR-LET). The HBR-LET is an experimenter's terminal to communicate with the ACTS for various investigations by government agencies, universities, and industry. The EC&M software is one segment of the Control and Performance Monitoring (C&PM) software system of the HBR-LET. The EC&M software allows users to initialize, control, and monitor the instrumentation within the HBR-LET using a predefined sequence of commands. Besides instrument control, the C&PM software system is also responsible for computer communication between the HBR-LET and the ACTS NASA Ground Station and for uplink power control of the HBR-LET to demonstrate power augmentation during rain fade events. The EC&M Software User's Guide, Version 1.0 (NASA-CR-189160) outlines the commands required to install and operate the EC&M software. Input and output file descriptions, operator commands, and error recovery procedures are discussed in the document. The EC&M Software Maintenance Manual, Version 1.0 (NASA-CR-189161) is a programmer's guide that describes current implementation of the EC&M software from a technical perspective. An overview of the EC&M software, computer algorithms, format representation, and computer hardware configuration are included in the manual. Reinhart, Richard C. Unspecified Center ACTS; COMPUTER PROGRAMS; DATA LINKS; HUMAN-COMPUTER INTERFACE; MANUALS; UPLINKING; ALGORITHMS; COMPUTER PROGRAMMING; FORTRAN; GROUND STATIONS; MAINTENANCE; SUPPORT SYSTEMS...

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The Communication Protocol Software was developed at the NASA Lewis Research Center to support the Advanced Communications Technology Satellite High Burst Rate Link Evaluation Terminal (ACTS HBR-LET). The HBR-LET is an experimenters terminal to communicate with the ACTS for various experiments by government, university, and industry agencies. The Communication Protocol Software is one segment of the Control and Performance Monitor (C&PM) Software system of the HBR-LET. The Communication Protocol Software allows users to control and configure the Intermediate Frequency Switch Matrix (IFSM) on board the ACTS to yield a desired path through the spacecraft payload. Besides IFSM control, the C&PM Software System is also responsible for instrument control during HBR-LET experiments, uplink power control of the HBR-LET to demonstrate power augmentation during signal fade events, and data display. The Communication Protocol Software User's Guide, Version 1.0 (NASA CR-189162) outlines the commands and procedures to install and operate the Communication Protocol Software. Configuration files used to control the IFSM, operator commands, and error recovery procedures are discussed. The Communication Protocol Software Maintenance Manual, Version 1.0 (NASA CR-189163, to be published) is a programmer's guide to the Communication Protocol Software. This manual details the current implementation of the software from a technical perspective. Included is an overview of the Communication Protocol Software, computer algorithms, format representations, and computer hardware configuration. The Communication Protocol Software Test Plan (NASA CR-189164, to be published) provides a step-by-step procedure to verify the operation of the software. Included in the Test Plan is command transmission, telemetry reception, error detection, and error recovery procedures. Reinhart, Richard C. Unspecified Center NAS3-25776; RTOP 679-50-0A...

This special report focuses on the emerging legal regime for orbital debris mitigation. It contains an overview of the relevant laws, policies, and regulations on orbital debris mitigation and aims to serve as a useful reference for the space community.

The Internet Encyclopedia in a 3-volume reference work on the internet as a business tool, IT platform, and communications and commerce medium.

This document communicates NASA’s strategy and progress to learn about the Red Planet, to inform us more about our Earth’s past and future, and may help answer whether life exists beyond our home planet. Together with NASA’s partners in academia and commercial enterprises, NASA’s vision is to pioneer Mars and answer some of humanity’s fundamental questions: • Was Mars home to microbial life? Is it today? • Could it be a safe home for humans one day? • What can it teach us about life elsewhere in the cosmos or how life began on Earth? • What can it teach us about Earth’s past, present, and future?

Deep Space Telecommunications Systems EngineeringSpringer Science & Business Media

The challenge of communication in planetary exploration has been unusual. The guidance and control of spacecraft depend on reliable communication. Scientific data returned to earth are irreplaceable, or replaceable only at the cost of another mission. In deep space, communications propagation is good, relative to terrestrial communications, and there is an opportunity to press toward the mathematical limit of microwave communication. Yet the limits must be approached warily, with reliability as well as channel capacity in mind. Further, the effects of small changes in the earth's atmosphere and the interplanetary plasma have small but important effects on propagation time and hence on the measurement of distance. Advances are almost incredible. Communication capability measured in 18 bits per second at a given range rose by a factor of 10 in the 19 years from Explorer I of 1958 to Voyager of 1977. This improvement was attained through ingenious design based on the sort of penetrating analysis set forth in this book by engineers who took part in a highly detailed and amazingly successful pro gram. Careful observation and analysis have told us much about limitations on the accurate measurement of distance. It is not easy to get busy people to tell others clearly and in detail how they have solved important problems. Joseph H. Yuen and the other contribu tors to this book are to be commended for the time and care they have devoted to explicating one vital aspect of a great adventure of mankind.

A collection of some of the Jet Propulsion Laboratory's space missions selected to represent the planetary communications designs for a progression of various types of missions The text uses a case study approach to show the communications link performance resulting from the planetary communications design developed by the Jet Propulsion Laboratory (JPL). This is accomplished through the description of the design and performance of six representative planetary missions. These six cases illustrate progression through time of the communications system's capabilities and performance from 1970s technology to the most recent missions. The six missions discussed in this book span the Voyager for fly-bys in the 1970s, Galileo for orbiters in the 1980s, Deep Space 1 for the 1990s, Mars Reconnaissance Orbiter (MRO) for planetary orbiters, Mars Exploration Rover (MER) for planetary rovers in the 2000s, and the MSL rover in the 2010s. Deep Space Communications: Provides an overview of the Deep Space Network and its capabilities Examines case studies to illustrate the progression of system design and performance from mission to mission and provides a broad overview of the missions systems described Discusses actual flight mission telecom performance of each system Deep Space Communications serves as a reference for scientists and engineers interested in communications systems for deep-space telecommunications link analysis and design control.

This handbook consists of six core chapters: (1) systems engineering fundamentals discussion, (2) the NASA program/project life cycles, (3) systems engineering processes to get from a concept to a design, (4) systems engineeringprocesses to get from a design to a final product, (5) crosscutting management processes in systems engineering, and (6) special topics relative to systems engineering. These core chapters are supplemented by appendices that provide outlines, examples, and further information to illustrate topics in the core chapters. The handbook makes extensive use of boxes and figures to define, refine, illustrate, and extend concepts in the core chapters without diverting the reader from the main information. The handbook provides top-level guidelines for good systems engineering practices; it is not intended in any way to be a directive. NASA/SP-2007-6105 Rev1 supersedes SP-6105, dated June 1995

Infrared and Millimeter Waves, Volume 9: Millimeter Components and Techniques, Part I compiles the work of several authors while focusing on certain aspects of infrared and millimeter waves, such as sources of radiation, instrumentation, and millimeter systems. This volume deals with millimeter components and techniques. Chapter 1 covers millimeter wave communications, and then the succeeding chapter discusses a comparative study of millimeter waves and transmission lines. This book then tackles dielectric waveguide electrooptic devices, as well as millimeter-wave propagation and remote sensing of the atmosphere, which are covered in Chapter 4. The fifth chapter presents the technology of large radio telescopes for millimeter and submillimeter. The next chapter explains a gyrotron study program, and the last chapter discusses multimode analysis of quasi-optical gyrotrons and gyroklystrons. This book will be of great use for researchers or professionals whose work involves infrared and millimeter waves.