Advanced Missile Technology Nasa

MONICA AUBREE

Liquid Rocket Metal Tanks and Tank Components Butterworth-Heinemann
This study was undertaken in response to a request by the U.S. Air Force that the National Research Council (NRC) examine whether the technologies that underlie the concept of a hypersonic, air-launched, air-breathing, hydrocarbon-fueled missile with speeds up to Mach 81 can be demonstrated in time to be initially operational by 2015. To conduct the study, the NRC appointed the Committee on Review and Evaluation of the Air Force Hypersonic Technology Program, under the auspices of the Air Force Science and Technology Board.
Advance Missile Technology Research AIAA (American Institute of Aeronautics & Astronautics)
Throughout most of the twentieth century, electric propulsion was considered the technology of the future. Now, the future has arrived. This important new book explains the fundamentals of electric propulsion for spacecraft and describes in detail the physics and characteristics of the two major electric thrusters in use today, ion and Hall thrusters. The authors provide an introduction to plasma physics in order to allow readers to understand the models and derivations used in determining electric thruster performance. They then go on to present detailed explanations of: Thruster principles Ion thruster plasma generators and accelerator grids Hollow cathodes Hall thrusters Ion and Hall thruster plumes Flight ion and Hall thrusters Based largely on research and development performed at the Jet Propulsion Laboratory (JPL) and complemented with scores of tables, figures, homework problems, and references, Fundamentals of Electric Propulsion: Ion and Hall Thrusters is an indispensable textbook for advanced undergraduate and graduate students who are preparing to enter the aerospace industry. It also serves as an equally valuable resource for professional engineers already at work in the field.
Space Nuclear Power and Propulsion National Academies Press
Space propulsion systems have a great influence on our ability to travel to other planets or how cheap a satellite can provide TV programs. This book provides an up-to-date overview of all kinds of propulsion systems ranging from classical rocket technology, nuclear propulsion to electric propulsion systems, and further to micro-, propellantless and even breakthrough propulsion, which is a new program under development at NASA. The author shows the limitations of the present concepts and how they could look like in the future. Starting from historical developments, the reader is taken on a journey showing the amazing technology that has been put on hold for decades to be rediscovered in the near future for questions like how we can even reach other stars within a human lifetime. The author is actively involved in advanced propulsion research and contributes with his own experience to many of the presented topics. The book is written for anyone who is interested in how space travel can be revolutionized.
Liquid Rocket Valve Components www.Militarybookshop.CompanyUK
NASA's Office of the Chief Technologist (OCT) has begun to rebuild the advanced space technology program in the agency with plans laid out in 14 draft technology roadmaps. It has been years since NASA has had a vigorous, broad-based program in advanced space technology development and its technology base has been largely depleted. However, success in executing future NASA space missions will depend on advanced technology developments that should already be underway.

Reaching out to involve the external technical community, the National Research Council (NRC) considered the 14 draft technology roadmaps prepared by OCT and ranked the top technical challenges and highest priority technologies that NASA should emphasize in the next 5 years. This report provides specific guidance and recommendations on how the effectiveness of the technology development program managed by OCT can be enhanced in the face of scarce resources.

Defense Advanced Research Projects Agency JHU Press

In January 2004, President George W. Bush announced the Vision for Space Exploration (VSE), which instructed NASA to "Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations," among other objectives. As acknowledged in the VSE, significant technology development will be necessary to accomplish the goals it articulates. NASA's Exploration Technology Development Program (ETDP) is designed to support, develop, and ultimately provide the necessary technologies to meet the goals of the VSE. This book, a review of the ETDP, is broadly supportive of the intent and goals of the VSE, and finds the ETDP is making progress towards the stated goals of technology development. However, the ETDP is operating within significant constraints which limit its ability to successfully accomplish those goals-the still dynamic nature of the Constellation Program requirements, the constraints imposed by a limited budget, the aggressive time scale of early technology deliverables, and the desire to fully employ the NASA workforce.

NASA Space Technology Roadmaps and Priorities Government Printing Office

The National Aerospace Initiative (NAI) was conceived as a joint effort between the Department of Defense (DOD) and the National Aeronautics and Space Administration (NASA) to sustain the aerospace leadership of the United States through the acceleration of selected aerospace technologies: hypersonic flight, access to space, and space technologies. The Air Force became concerned about the NAI's possible consequences on Air Force programs and budget if NAI program decisions differed from Air Force priorities. To examine this issue, it asked the NRC for an independent review of the NAI. This report presents the results of that assessment. It focuses on three questions asked by the Air Force: is NAI technically feasible in the time frame laid out; is it financially feasible over that period; and is it operationally relevant.

Inventing Accuracy National Academies Press

In the past five years, Russia, China, and others have accelerated their development of hypersonic missiles to threaten U.S. forces in the homeland and abroad. The current Ballistic Missile Defense System, largely equipped to contend with legacy ballistic missile threats, must be adapted to this challenge. The same characteristics that make hypersonic missiles attractive may also hold the key to defeating them. This CSIS report argues how a new hypersonic defense architecture should exploit hypersonic weapons’ unique vulnerabilities and employ new capabilities, such as a space sensor layer, to secure critical nodes. These changes are not only necessary to mitigate the hypersonic threat but to defeat an emerging generation of maneuvering missiles and aerial threats.

Facing the Heat Barrier Springer Science & Business Media

Hypersonics is the study of flight at speeds where aerodynamic heating dominates the physics of the problem. It is an engineering science with close links to supersonics and engine design. Within this field, many of the most important results have been experimental. The principal facilities have been wind tunnels and related devices, which have produced flows with speeds up to orbital velocity. Why is this important? Hypersonics has had two major applications. The first has been to provide thermal protection during atmospheric reentry. Success in this enterprise has supported ballistic-missile nose cones, has returned strategic reconnaissance photos from orbit and astronauts from the Moon, and has even dropped an instrument package into the atmosphere of Jupiter. The second application has involved high-speed propulsion and has sought to develop the scramjet as an advanced airbreathing ramjet. Atmospheric entry today is fully mature as an engineering discipline, but work with its applications continues to reach for new achievements. Studies of scramjets still seek full success, in which such engines can accelerate a vehicle without the use of rockets. Hence, there is much to do in this area as well.

A Constrained Space Exploration Technology Program National Academies Press

This is a new release of the original 1960 edition.

A Review of United States Air Force and Department of Defense Aerospace Propulsion Needs Springer

The similarities between the airplane and the missile extend beyond their flying capabilities, and at higher operational speeds, the configuration distinctions become even less apparent. " Missile Aerodynamics," a classic now available from AIAA and Nielsen Engineering and Research, Inc., combines the best of missile and airplane aerodynamics, drawing extensively from numerous technical papers to present a rational and unified account of the principles behind missile projection. Evaluate the missile versus the airplane in a multitude of areas, from longitudinal acceleration, wing loading, roll and dynamic stability, guidance and navigation, and more. J.N. Nielsen covers every aspect of missile aerodynamics, from the classification of missiles and basic formulas to innovative aerodynamic controls. In one reliable reference, readers will find hundreds of schematics, equations, and tables with practical applications in missile design and engineering. Originally published by Nielsen Engineering and Research, Inc.

Maintaining U.S. Leadership in Aeronautics DIANE Publishing

NASA's robotic solar system exploration program requires a new generation of science instruments. Design concepts are now judged against stringent mass, power, and size constraints--yet future instruments must be highly capable, reliable, and, in some applications, they must operate for many years. The most important single constraint, however, is cost: new instruments must be developed in a tightly controlled design-to-cost environment. Technical innovation is the key to success and will enable the sophisticated measurements needed for future scientific exploration. As a fundamental benefit, the incorporation of breakthrough technologies in planetary flight hardware will contribute to U.S. industrial competitiveness and will strengthen the U.S. technology base. The Workshop on Advanced Technologies for Planetary Instruments was conceived to address these challenges, to provide an open forum in which the NASA and DoD space communities could become better acquainted at the working level, and to assess future collaborative efforts. Over 300 space scientists and engineers participated in the two-and-a-half-day meeting held April 28-30, 1993, in Fairfax, Virginia. It was jointly sponsored by NASA's Solar System Exploration Division (SSED), within the Office of Space Science (OSS); NASA's Office of Advanced Concepts and Technology (OACT); DoD's Strategic Defense Initiative Organization (SDIO), now called the Ballistic Missile Defense Organization (BMDO); and the Lunar and Planetary Institute (LPI). The meeting included invited oral and contributed poster presentations, working group sessions in four sub-disciplines, and a wrap-up panel discussion. On the first day, the planetary science community described instrumentation needed for missions that may go into development during the next 5 to 10 years. Most of the second day was set aside for the DoD community to inform their counterparts in planetary science about their interests and capabilities, and to describe the BMDO...

Orbital Refueling System (ORS) National Academies Press

This is the story of the work of the original NASA space pioneers; men and women who were suddenly organized in 1958 from the then National Advisory Committee on Aeronautics (NACA) into the Space Task Group. A relatively small group, they developed the initial mission concept plans and procedures for the U. S. space program. Then they boldly built hardware and facilities to accomplish those missions. The group existed only three years before they were transferred to the Manned Spacecraft Center in Houston, Texas, in 1962, but their organization left a large mark on what would follow.Von Ehrenfried's personal experience with the STG at Langley uniquely positions him to describe the way the group was structured and how it reacted to the new demands of a post-Sputnik era. He artfully analyzes how the growing space program was managed and what techniques enabled it to develop so quickly from an operations perspective. The result is a fascinating window into history, amply backed up by first person documentation and interviews.

Rocket Development University of Illinois Press

This classic on space travel was first published in 1953, when interplanetary space flight was considered science fiction by most of those who considered it at all. Here the German-born scientist Wernher von Braun detailed what he believed were the problems and possibilities inherent in a projected expedition to Mars. Today von Braun is recognized as the person most responsible for laying the groundwork for public acceptance of America's space program. When President Bush directed NASA in 1989 to prepare plans for an orbiting space station, lunar research bases, and human exploration of Mars, he was largely echoing what von Braun proposed in The Mars Project.

Workshop on Advanced Technologies for Planetary Instruments John Wiley & Sons

While the glories and tragedies of the space shuttle make headlines and move the nation, the story of the shuttle forms an inseparabe part of a lesser-known but no less important drama—the search for a reusable single-stage-to-orbit rocket. Here an award-winning student of space science, Andrew J. Butrica, examines the long and tangled history of this ambitious concept, from it first glimmerings in the 1920s, when technicians dismissed it as unfeasible, to its highly expensive heyday in the midst of the Cold War, when conservative-backed government programs struggled to produce an operational flight vehicle. Butrica finds a blending of far-sighted engineering and heavy-handed politics. To the first and oldest idea—that of the reusable rocket-powered single-stage-to-orbit vehicle—planners who belonged to what President Eisenhower referred to as the military-industrial complex.added experimental ("X"), "aircraft-like" capabilties and, eventually, a "faster, cheaper, smaller" managerial approach. Single Stage to Orbit traces the interplay of technology, corporate interest, and politics, a combination that well served the conservative space agenda and ultimately triumphed—not in the realization of inexpensive, reliable space transport—but in a vision of space militarization and commercialization that would appear settled United States policy in the early twenty-first century. -- D. M. Ashford

Advanced Missile Technology National Academies Press

Full color publication. This document has been produced and updated over a 21-year period. It is intended to be a handy reference document, basically one page per flight, and care has been exercised to make it as error-free as possible. This document is basically "as flown" data and has been compiled from many sources including flight logs, flight rules, flight anomaly logs, mod flight descent summary, post flight analysis of mps propellants, FDRD, FRD, SODB, and the MER shuttle flight data and inflight anomaly list. Orbit distance traveled is taken from the PAO mission statistics.

Review and Evaluation of the Air Force Hypersonic Technology Program MIT Press

"Commissioned by the European Space Agency."--P. [4] of cover.

Launching Science National Academies Press

Additive manufacturing has the potential to positively affect human spaceflight operations by enabling the in-orbit manufacture of replacement parts and tools, which could reduce existing logistics requirements for the International Space Station and future long-duration human space missions. The benefits of in-space additive manufacturing for robotic spacecraft are far less clear, although this rapidly advancing technology can also potentially enable space-based construction of large structures and, perhaps someday, substantially in the future, entire spacecraft. Additive manufacturing can also help to reimagine a new space architecture that is not constrained by the design and manufacturing confines of gravity, current manufacturing processes, and launch-related structural stresses. The specific benefits and potential scope of additive manufacturing remain undetermined. The realities of what can be accomplished today, using this technology on the ground, demonstrate the substantial gaps between the vision for additive manufacturing in space and the limitations of the technology and the progress that has to be made to develop it for space use. 3D Printing in Space evaluates the prospects of in-space additive manufacturing. This report examines the various technologies available and currently in development, and considers the possible impacts for crewed space operations and robotic spacecraft operations. Ground-based additive manufacturing is being rapidly developed by industry, and 3D Printing in Space discusses government-industry investments in technology development. According to this report, the International Space Station provides an excellent opportunity for both civilian and military research on additive manufacturing technology. Additive manufacturing presents potential opportunities, both as a tool in a broad toolkit of options for space-based activities and as a potential paradigm-changing approach to designing hardware for in-space activities. This report makes recommendations for future research, suggests objectives for an additive manufacturing roadmap, and envisions opportunities for cooperation and joint development.

The Mars Project National Academies Press

Progress in space safety lies in the acceptance of safety design and engineering as an integral part of the design and implementation process for new space systems. Safety must be seen as the principle design driver of utmost importance from the outset of the design process, which is only achieved through a culture change that moves all stakeholders toward front-end loaded safety concepts. This approach entails a common understanding and mastering of basic principles of safety design for space systems at all levels of the program organisation. Fully supported by the International Association for the Advancement of Space Safety (IAASS), written by the leading figures in the industry, with frontline experience from projects ranging from the Apollo missions, Skylab, the Space Shuttle and the International Space Station, this book provides a comprehensive reference for aerospace engineers in industry. It addresses each of the key elements that impact

on space systems safety, including: the space environment (natural and induced); human physiology in space; human rating factors; emergency capabilities; launch propellants and oxidizer systems; life support systems; battery and fuel cell safety; nuclear power generators (NPG) safety; habitat activities; fire protection; safety-critical software development; collision avoidance systems design; operations and on-orbit maintenance. The only comprehensive space systems safety reference, its must-have status within space agencies and suppliers, technical and aerospace libraries is practically guaranteed Written by the leading figures in the industry from NASA, ESA, JAXA, (et cetera), with frontline experience from projects ranging from the Apollo missions, Skylab, the Space Shuttle, small and large satellite systems, and the International Space Station Superb quality information for engineers, programme managers, suppliers and aerospace technologists; fully supported by the IAASS (International Association for the Advancement of Space Safety)
NASA Space Flight Program and Project Management Handbook Government Printing Office
This book is in full-color - other editions may be in grayscale (non-color). The hardback version is ISBN 9781680920512 and the paperback version is ISBN 9781680920505. The NASA Space Flight Program and Project Management Handbook (NASA/SP-2014-3705) is the companion document to NPR 7120.5E and represents the accumulation of knowledge NASA gleaned on managing program and projects coming out of NASA's human, robotic, and scientific missions of the last decade. At the end of the historic Shuttle program, the United States entered a new era that includes commercial missions to low-earth orbit as well as new multi-national exploration missions deeper into space. This handbook is a codification of the "corporate knowledge" for existing and future NASA space flight programs and projects. These practices have evolved as a function of NASA's core values on safety, integrity, team work, and excellence, and may also prove a resource for other agencies, the private sector, and academia. The knowledge gained from the victories and defeats of that era, including the checks and balances and initiatives to better control cost and risk, provides a foundation to launch us into an exciting and healthy space program of the future.

Research and Evaluation of Advanced Missile Component Technologies Cambridge University Press
After the completion of the National Research Council (NRC) report, Maintaining U.S. Leadership in Aeronautics: Scenario-Based Strategic Planning for NASA's Aeronautics Enterprise (1997), the National Aeronautics and Space Administration (NASA) Office of Aeronautics and Space Transportation Technology requested that the NRC remain involved in its strategic planning process by conducting a study to identify a short list of revolutionary or breakthrough technologies that could be critical to the 20 to 25 year future of aeronautics and space transportation. These technologies were to address the areas of need and opportunity identified in the above mentioned NRC report, which have been characterized by NASA's 10 goals (see Box ES-1) in "Aeronautics & Space Transportation Technology: Three Pillars for Success" (NASA, 1997). The present study would also examine the 10 goals to determine if they are likely to be achievable, either through evolutionary steps in technology or through the identification and application of breakthrough ideas, concepts, and technologies.

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