



Wings In Orbit

*Scientific and Engineering
Legacies of the Space Shuttle*

1971-2010

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Wings In Orbit Scientific And Engineering Legacies Of The Space Shuttle

**Wayne Hale, Helen Woods Lane, United
States. National Aeronautics and
Space Administration**

Wings In Orbit Scientific And Engineering Legacies Of The Space Shuttle:

Wings in Orbit Government Printing Office, 2011-04-08 NOTE NO FURTHER DISCOUNT FOR THIS PRINT PRODUCT
OVERTOCK SALE Significantly reduced list price *Wings in Orbit* is an authoritative documentation of the many accomplishments of the NASA Space Shuttle Program Starting with a foreword written by astronauts John Young and Robert Crippen this compelling book provides accurate authentic and easily understood accounts from NASA's best subject matter experts and external resources The book captures the passion of those who devoted their energies to the Program's success for more than three decades It focuses on their science and engineering accomplishments the rich history of the program and the shuttle as an icon in U S history No other book on the market has accumulated as many experts and resources on this subject nor broken it down in such easy to understand language with compelling imagery With the Shuttle Program coming to a close consumers will be inclined to purchase this book as it provides comprehensive information on this historic program as it ends its 30 year run The promotions for this book will definitely benefit from the publicity of this historic event Other related products NASA's Contributions to Aeronautics Vols 1 2 is available here <https://bookstore.gpo.gov/products/sku/033000013345> Leadership in Space Selected Speeches of NASA Administrator Michael Griffin May 2005 October 2008 is available here <https://bookstore.gpo.gov/products/sku/033000013141> Dressing for Altitude U S Aviation Pressure Suits Wiley Post to Space Shuttle ePub format is available for purchase through the Apple iBookstore Please use ISBN 9780160915604 to search for this title in their platform Revolutionary Atmosphere The Story of the Altitude Wind Tunnel and the Space Power Chambers is available here <https://bookstore.gpo.gov/products/sku/033000013426> Other products produced by NASA can be found here <https://bookstore.gpo.gov/agency/550> Wings in Orbit National Aeronautics Administration, 2012-11-15 This publication Authoritatively documents the many accomplishments of NASA's Space Shuttle Program from its origins to the present Beginning with a Foreword by astronauts John Young and Robert Crippen this compelling book provides clear accurate and authentic accounts from NASA's best subject matter experts including aerospace engineers who worked with the shuttle program and leading experts from the science and academic communities The book captures the passion of those who devoted their energies to the program's success for more than three decades It focuses on their science and engineering accomplishments the rich history of the program and the shuttle as an icon in U S history Its comprehensive overview of the shuttle and its accomplishments combined with its lucid prose makes *Wings in Orbit* a unique resource for anyone interested in the history and achievements of American space exploration The first great age of space exploration culminated with the historic lunar landing in July 1969 Following that achievement the space policymakers looked back to the history of aviation as a model for the future of space travel The Space Shuttle was conceived as a way to exploit the resources of the new frontier Using an aviation analogy the shuttle would be the Douglas DC 3 of space That aircraft is generally considered to be the first commercially successful air transport The shuttle was to be the first commercially successful space transport This

impossible leap was not realized an unrealistic goal that appears patently obvious in retrospect yet it haunts the history of the shuttle to this day Much of the criticism of the shuttle originates from this overhyped initial concept In fact the perceived relationship between the history of aviation and the promise of space travel continues to motivate space policymakers In some ways the analogy that compares space with aviation can be very illustrative If the first crewed spacecraft of 1961 are accurately the analog of the Wright brothers first aircraft the Apollo spacecraft of 1968 should properly be compared with the Wright brothers 1909 Model B their first commercial sale The B was the product of 6 years of tinkering experimentation and adjustments but were only two major iterations of aircraft design In much the same way Apollo was the technological inheritor of two iterations of spacecraft design in 7 years The Space Shuttle of 1981 coming 20 years after the first spaceflights could be compared with the aircraft of the mid 1920s In fact there is a good analogy in the history of aviation the Ford Tri Motor of 1928 But here the aviation analogy breaks down In aviation history advances are made not just because of the passage of calendar time but because there are hundreds of different aircraft designs with thousands of incremental technology advances tested in flight between the B and the Tri Motor Even so the aviation equivalent compression of decades of technological advance does not do justice to the huge technological leap from expendable rockets and capsules to a reusable winged hypersonic cargo carrying spacecraft This was accomplished with no intermediate steps Viewed from that perspective the Space Shuttle is truly a wonder No doubt the shuttle is but one step of many on the road to the stars but it was a giant leap indeed That is what this book is about not what might have been or what was impossibly promised but what was actually achieved and what was actually delivered Viewed against this background the Space Shuttle was a tremendous engineering achievement a vehicle that enabled nearly routine and regular access to space for hundreds of people and a profoundly vital link in scientific advancement The vision of this book is to take a clear eyed look at what the shuttle accomplished and the shuttle s legacy to the world This book will serve as an excellent reference for building future space vehicles

Wings in Orbit Wayne Hale, Helen Lane, Gail Chapline, Kamlesh Lula, 2011-06-10 The Space Shuttle is an engineering marvel perhaps only exceeded by the station itself The shuttle was based on the technology of the 1960s and early 1970s It had to overcome significant challenges to make it reusable Perhaps the greatest challenges were the main engines and the Thermal Protection System The program has seen terrible tragedy in its 3 decades of operation yet it has also seen marvelous success One of the most notable successes is the Hubble Space Telescope a program that would have been a failure without the shuttle s capability to rendezvous capture repair as well as upgrade Now Hubble is a shining example of success admired by people around the world As the program comes to a close it is important to capture the legacy of the shuttle for future generations That is what Wings In Orbit does for space fans students engineers and scientists This book written by the men and women who made the program possible will serve as an excellent reference for building future space vehicles We are proud to have played a small part in making it happen Our journey to document the scientific and

engineering accomplishments of this magnificent winged vehicle began with an audacious proposal to capture the passion of those who devoted their energies to its success while answering the question What are the most significant accomplishments of the longest operating human spaceflight program in our nation s history This is intended to be an honest accurate and easily understandable account of the research and innovation accomplished during the era *Wings in Orbit* N. Wayne Hale,Nasa Technical Reports Server (Ntrs),Et Al,2013-06 This Space Shuttle book project reviews Wings In Orbit scientific and engineering legacies of the Space Shuttle The contents include 1 Magnificent Flying Machine A Cathedral to Technology 2 The Historical Legacy 3 The Shuttle and its Operations 4 Engineering Innovations 5 Major Scientific Discoveries 6 Social Cultural and Educational Legacies 7 Commercial Aerospace Industries and Spin offs and 8 The Shuttle continuum Role of Human Spaceflight *Wings In Orbit, Scientific and Engineering Legacies of the Space Shuttle, NASA/SP-2010-3409, 1971-2010, *. ,2011* *Wings in Orbit* Wayne Hale,Helen Woods Lane,United States. National Aeronautics and Space Administration,2010 Explains how the space shuttle works and describes a shuttle trip from lift off to touchdown **Select astronaut observations and highlights of Space Shuttle Program payloads and experiments** Helen Lane,2011

Space Shuttle Stories Tom Jones,2023-10-31 Experience all 135 NASA space shuttle missions ever flown through the words of the astronauts themselves in this spectacularly illustrated volume With more than 600 photos from the NASA archives this guide is perfect for fans of space history and spaceflight Winner of the American Astronautical Society s 2023 Eugene M Emme Award and the International Academy of Astronautics 2024 Social Sciences Book Award NASA s space shuttle was the world s first reusable spacecraft accomplishing many firsts and inspiring generations across its 30 year lifespan as America s iconic spaceship In *Space Shuttle Stories* shuttle astronaut Tom Jones interviewed more than 130 fellow astronauts for personal vignettes from each mission complemented by their written accounts for all 135 space shuttle missions from Columbia s maiden flight in 1981 to the final launch of Atlantis in 2011 The book is a major contribution to the historical record of a momentous era of spaceflight Each mission profile includes An astronaut narrative that immerses the readers in their personal mission experience Data about the mission crew launch landing duration and highlights Captivating photographs rarely seen by the public The Space Shuttle program s 6 orbiter vehicles Enterprise Columbia Challenger Discovery Atlantis and Endeavour carried a total of 355 astronauts into orbit on 135 missions aimed at cutting edge scientific research satellite launch retrieval and repair collaborative work with the Russian Mir station the launching and servicing of the Hubble Space Telescope and the construction of the International Space Station *Space Shuttle Stories* focuses on the lived human experiences of larger than life space missions It s a definitive oral history that captures the importance wonder and exhilaration of the Space Shuttle era **After Apollo?** John M. Logsdon,2015-04-02 Once the United States landed on the moon in July 1969 it was up to President Nixon to decide what to do in space after Apollo This book chronicles the decisions he made including ending space exploration and approving the space shuttle Those decisions determined the

character of the US human space flight program for the next forty years

The Rise of the Commercial Space Industry
 Brian C. Odom, 2024-09-13 This collection explores the evolution of the commercial space industry from the beginning of the space age through the early twenty first century Today the space industry is taking on an increased leadership and innovation role in both space access and exploration The growth of commercial space over the past decades offers a potential new paradigm for space exploration one in which industry transitions from supplier to partner However many questions remain This book seeks to bring to light these questions which span from the most seemingly consequential how will humanity explore the Moon and Mars to the most basic what is commercial space To further develop the historical context of commercial space and thereby better inform decision making at NASA in the future this volume examines a broad range of questions related to the history of commercial space operations including but not limited to how has the concept of commercial space evolved in different fields and disciplines What have been the major events and milestones in the emergence and evolution of commercial space activities in the USA and internationally How has the US Government assisted or impeded the emergence and evolution of commercial space activities Providing contributions from a range of different disciplines and backgrounds the authors of this volume offer valuable insights for scholars researching the history of space and space policy as well as decision makers working at NASA or within the wider space industry

The People's Spaceship
 Amy Paige Kaminski, 2025-07-15 When the Apollo 11 astronauts returned from humanity's first voyage to the moon in 1969 NASA officials advocated for more ambitious missions But with the civil rights movement environmental concerns the Vietnam War and other social crises taking up much of the public's attention they lacked the support to make those ambitions a reality Instead the space agency had to think more modestly and pragmatically crafting a program that could leverage the excitement of Apollo while promising relevance for average Americans The resulting initiative the space shuttle would become the centerpiece of NASA human space flight activity for forty years opening opportunities for the public to engage with and participate in space projects in new ways The People's Spaceship traces how and why NASA painstakingly connected the vehicle to so many segments of society Underscoring the successes and challenges endured in the process Amy Paige Kaminski shares the story of how the space shuttle became an American technological icon

The Air Force Law Review, 2016
Wheels Stop Rick Houston, 2020-04-01 Humanity's first reusable spacecraft and the most complex machine ever built NASA's Space Shuttle debuted with great promise and as a dependable source of wonder and national pride But with the Challenger catastrophe in 1986 the whole Space Shuttle program came into question as did NASA itself so long an institution that was seemingly above reproach *Wheels Stop* tells the stirring story of how after the Challenger disaster the Space Shuttle not only recovered but went on to perform its greatest missions From the Return to Flight mission of STS 26 in 1988 to the last shuttle mission ever on STS 135 in 2011 *Wheels Stop* takes readers behind the scenes as the shuttle's crews begin to mend Cold War tensions with the former Soviet Union conduct vital research deploy

satellites repair the Hubble Space Telescope and assist in constructing the International Space Station It also tells the heart wrenching story of the Columbia tragedy and the loss of the magnificent STS 107 crew As complex as the shuttle was the people it carried into orbit were often more so and this is their story too Close encounters with astronauts flight controllers and shuttle workers capture the human side of the Space Shuttle s amazing journey and invite readers along for the ride Browse more spaceflight books at atupinspace.org Purchase the audio edition

Dark Star Matthew H. Hersch, 2023-12-26 A captivating history of NASA s Space Transportation System the space shuttle chronicling the inevitable failures of a doomed design In Dark Star Matthew Hersch challenges the existing narrative of the most significant human space program of the last 50 years NASA s space shuttle He begins with the origins of the space shuttle a century long effort to develop a low cost reusable rocket powered airplane to militarize and commercialize space travel which Hersch explains was built the wrong way at the wrong time and for all the wrong reasons Describing the unique circumstances that led to the space shuttle s creation by President Richard Nixon s administration in 1972 and its subsequent flights from 1981 through 2011 Hersch illustrates how the space shuttle was doomed from the start While most historians have accepted the view that the space shuttle s fatal accidents including the 1986 Challenger explosion resulted from deficiencies in NASA s management culture that lulled engineers into a false confidence in the craft Dark Star reveals the widespread understanding that the shuttle was predestined for failure as a technology demonstrator The vehicle was intended only to give the United States the appearance of a viable human spaceflight program until funds became available to eliminate its obvious flaws Hersch s work seeks to answer the perilous questions of technological choice that confront every generation and it is a critical read for anyone interested in how we can create a better world through the things we build

Space Technology Thomas F.

Mütsch, Matthias B. Kowalski, 2016-05-24 Das Buch beschreibt die Grundlagen der Raumfahrt und erklärt Einzelheiten der technischen Umsetzung Diese spielen sich im Randbereich des technisch Machbaren ab Es werden die Randbedingungen der Raumfahrt erklärt und wesentliche Elemente der Raketenantriebe und Energieversorgung näher beschrieben Die Erreichbarkeit der Himmelskörper wird tabellarisch dokumentiert und im Ausblick wird als große Vision der Raumfahrt Menschen zum Planeten Mars zu bringen erläutert Im Anhang befindet sich auch eine umfangreiche Formelsammlung Aufbau Grundlagen Antriebssysteme Missionen Materialien und Prozesse Produkte und Projekte Ausblick Formelsammlung

Celebrating 30 Years of the Space Shuttle Program United States. National Aeronautics and Space Administration, 2012

NOTE NO FURTHER DISCOUNT FOR THIS PRINT PRODUCT OVERSTOCK SALE Significantly reduced list price The Space Shuttle fleet set high marks of achievement and endurance through 30 years of missions from its first on April 12 1981 to its last on July 21 2011 Beginning with the orbiter Columbia and continuing with Challenger Discovery Atlantis and Endeavour the National Aeronautics and Space Administration s NASA Space Shuttle has carried people into orbit launched recovered and repaired satellites conducted cutting edge research and helped build the largest human made structure in space the

International Space Station Replete with images and facts of each mission and crew this book is a tribute to everything accomplished during the 30 years of operation of the Space Shuttle program that defined NASA for an entire generation Other related products NASA Historical Data Book V 7 NASA Launch Systems Space Transportation Human Spaceflight and Space Science can be found here <https://bookstore.gpo.gov/products/sku/033-000-01309-4> Revolutionary Atmosphere The Story of the Altitude Wind Tunnel and the Space Power Chambers can be found here <https://bookstore.gpo.gov/products/sku/033-000-01342-6> Leadership in Space Selected Speeches of NASA Administrator Michael Griffin May 2005 October 2008 can be found here <https://bookstore.gpo.gov/products/sku/033-000-01314-1> Our Changing Atmosphere Discoveries From EOS Aura Booklet can be found here <https://bookstore.gpo.gov/products/sku/033-000-01345-1> Dressing for Altitude U S Aviation Pressure Suits Wiley Post to Space Shuttle ePub format can be found here <https://bookstore.gpo.gov/products/sku/999-000-44444-5> Wings in Orbit Scientific and Engineering Legacies of the Space Shuttle 1971 2010 Hardcover format can be found here <https://bookstore.gpo.gov/products/sku/033-000-01347-7> MOBI format can be found here <https://bookstore.gpo.gov/products/sku/033-300-00008-5> ePub format can be found here <https://bookstore.gpo.gov/products/sku/033-300-00007-7> and here <https://bookstore.gpo.gov/products/sku/999-000-44444-2> Other products produced by NASA can be found here <https://bookstore.gpo.gov/agency/550>

Life in Space Maura Phillips Mackowski, 2022-05-24 This book explores the many aspects and outcomes of NASA's research in life sciences a little understood endeavor that has often been overlooked in histories of the space agency

Spaceflight in the Shuttle Era and Beyond Valerie Neal, 2017-06-27 An exploration of the changing conceptions of the Space Shuttle program and a call for a new vision of spaceflight The thirty years of Space Shuttle flights saw contrary changes in American visions of space Valerie Neal who has spent much of her career examining the Space Shuttle program uses this iconic vehicle to question over four decades worth of thinking about and struggling with the meaning of human spaceflight She examines the ideas images and icons that emerged as NASA Congress journalists and others sought to communicate rationales for or critiques of the Space Shuttle missions At times concurrently the Space Shuttle was billed as delivery truck and orbiting science lab near Earth station and space explorer costly disaster and pinnacle of engineering success The book's multidisciplinary approach reveals these competing depictions to examine the meaning of the spaceflight enterprise Given the end of the Space Shuttle flights in 2011 Neal makes an appeal to reframe spaceflight once again to propel humanity forward Neal may be the one person who knows the space shuttle program better than the astronauts who flew this iconic vehicle Her book casts new light on the program exploring its cultural significance through a thoughtful analysis As one who lived this history I gained much from her broader perspective and deep insights Kathryn D Sullivan retired NASA astronaut and former Administrator of the National Oceanic and Atmospheric Administration A much needed look at how to create a cultural narrative for human spaceflight that resonates with millennials rather than the Apollo generation Quite valuable Marcia Smith Editor SpacePolicyOnline.com

Ronald Reagan and the Space Frontier John M.

Logsdon,2018-11-26 When Ronald Reagan was elected in 1980 limits on NASA funding and the lack of direction under the Nixon and Carter administrations had left the U S space program at a crossroads In contrast to his predecessors Reagan saw outer space as humanity s final frontier and as an opportunity for global leadership His optimism and belief in American exceptionalism guided a decade of U S activities in space including bringing the space shuttle into operation dealing with the 1986 Challenger accident and its aftermath committing to a permanently crewed space station encouraging private sector space efforts and fostering international space partnerships with both U S allies and with the Soviet Union Drawing from a trove of declassified primary source materials and oral history interviews John M Logsdon provides the first comprehensive account of Reagan s civilian and commercial space policies during his eight years in the White House Even as a fiscal conservative who was hesitant to increase NASA s budget Reagan s enthusiasm for the space program made him perhaps the most pro space president in American history [NASA Spaceflight](#) Roger D. Launius,Howard E. McCurdy,2017-10-11 This book presents the first comprehensive history of innovation at NASA bringing together experts in the field to illuminate how public private and international partnerships have fueled new ways of exploring space since the beginning of space travel itself Twelve case studies trace the messy risky history of such partnerships exploring the role of AT all have challenged conventional methods of doing the public s business in space Together these essays offer new insights into how innovation happens with invaluable lessons for policymakers investors economists and members of the space community

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