

Space Shuttle Decision Timeline

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04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

ISS

Return to Flight US Core Complete IP Core Complete

Utilization

Sustain

Return To Flight?

Return To Assembly/US Core Complete?

Assembly

Continue to IP Complete?

Assembly

Node 3 Enhancement?

Utilization Plan



Utilization Phase

RTF

3 vehicles

- 2 Flyer
- 1 ORP

7+ RTF
Missions

15
Missions

Node 3 Enhancement?

Assembly Complete / Modify Shuttle?

AAS Assumes Logistics Up Mass

OSP Assumes Crew Transfer

Heavy Lift Spare/Science Support?

- Reduce Crew?
- Add Crew Escape?
- Develop Autonomous Capability?

Mission
Flight
Rate

6 Shuttle Flights Year

Actual Flight Experience/Mid Life Cost/ SLEP Investment - TBD

Fight Rate/Missions TBD!

Stand Down Shuttle?

- Science down mass requirements?
- Large/Heavy Spares Requirements?

AAS Decision?

AAS Development

AAS Initial Cargo Capability ?

Down Mass Capability?

Up Mass Logistic Support

OSP
Decision

OSP Development

Initial CRV

OSP Initial Crew Transfer Capability ?

Crew Transfer

Legend

Operations

Assembly

Crew Transfer

Support

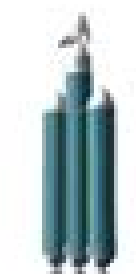
Heavy Lift
Spare Up/Down Mass
Science Down Mass

Logistics Up Mass

Space
Station



Space
Shuttle



Alternate
Access/
OSP

The Space Shuttle Decision

**National Aeronautics and Space
Administration, T. A. Heppenheimer**



The Space Shuttle Decision:

The Space Shuttle Decision T. A. Heppenheimer, 1999 **The Space Shuttle Decision** National Aeronautics and Space Administration, T. A. Heppenheimer, 2013-11

The Space Shuttle took shape and won support and criticism as part of NASA's search for a post Apollo future. NASA had grown rapidly during the 1960s and the success of the piloted moon landings brought insistent demands that NASA should shrink considerably. In facing those demands and in overcoming them to a degree, NASA extended our manned presence in space. Before anyone could speak seriously of a space shuttle, there had to be a widespread awareness that such a craft would be useful and perhaps even worth building. A shuttle would necessarily find its role within an ambitious space program, and while science fiction writers had been prophesying such wonders since the days of Jules Verne, it was another matter to present such predictions in ways that smacked of realism. This book portrays NASA's search for continued manned space exploration after the success of Apollo. During 1969, with Nixon newly elected and the first astronauts setting foot on the Moon, NASA Administrator Thomas Paine led a push for a future in space that promised to be expansive. He aimed at nothing less than a piloted expedition to Mars propelled by nuclear rocket engines that were already in development. En route to Mars, he expected to build space stations and large space bases. Almost as an afterthought, he expected to build a space shuttle as well to provide low cost flight to these orbiting facilities. Soon after Neil Armstrong made his one small step in the lunar Sea of Tranquility, Paine received a cold bath in the Sea of Reality. Nixon's budget director Robert Mayo chopped a billion dollars from Paine's request. This brought an end to NASA's hopes for a space base and for flight to Mars. It appeared possible, however, to proceed with the space station and the Shuttle as a joint project. The Shuttle drew particular interest within the Air Force, which saw it as a means to accomplish low cost launches of reconnaissance satellites and other military spacecraft. Congress, however, was deeply skeptical toward the proposed shuttle station, as both the House and Senate came close to killing it in 1970. NASA responded to this near death experience by placing the station on the shelf and bringing the Shuttle to the forefront. Its officials needed political support that could win over doubters in Congress, and they found this support within the Department of Defense. The Air Force now found itself in a most unusual position. Its generals had worked through the 1960s to pursue programs that could put military astronauts in space. These programs had faltered. Yet here was NASA offering the Pentagon a piloted space shuttle. The Air Force gave its political support to the Shuttle, and NASA went on to quell the opposition on Capitol Hill. The OMB was a tougher opponent. These critics forced NASA to abandon plans for a shuttle with two fully reusable liquid fueled stages and to set out on a search for a shuttle design that would cost half as much to develop. Budget officials demanded a design that would be smaller and less costly, even though such a shuttle would have significantly less capability than the Air Force wanted. By shrinking the Shuttle, however, NASA won support where it counted. Caspar Weinberger, the OMB's deputy director, gave his endorsement late in 1971. Nixon also decided that the nation should have a shuttle. On the eve of decision, the key player proved to be OMB.

Director George Shultz He decided that since the shuttle was to serve the entire nation it should have the full capability for which NASA hoped and the Air Force demanded Shultz's decision reinforced Nixon's putting an end to the OMB's continuing demands to downsize the design The consequence was the Space Shuttle as we know it today *The Space Shuttle Decision* T. A. HEPPENHEIMER, 2009-11-18 This significant new study of the decision to build the Space Shuttle explains the Shuttle's origins and early development In addition to internal NASA discussions this work details the debates in the late 1960s and early 1970s among policymakers in Congress the Air Force and the Office of Management and Budget over the roles and technical designs of the Shuttle Examining the interplay of these organizations with sometimes conflicting goals the author not only explains how the world's premier space launch vehicle came into being but also how politics can interact with science technology national security and economics in national government The weighty policy decision to build the Shuttle represents the first component of the broader story future NASA volumes will cover the Shuttle's development and operational histories **The Space Shuttle Decision** National Aeronautics and Space Administration, T. A.

Heppenheimer, 2013-08 *The Space Shuttle Decision* NASA's search for a reusable space vehicle National Aeronautics and Space Administration T. A. Heppenheimer Before anyone could speak seriously of a space shuttle there had to be a widespread awareness that such a craft would be useful and perhaps even worth building A shuttle would necessarily find its role within an ambitious space program and while science fiction writers had been prophesying such wonders since the days of Jules Verne it was another matter to present such predictions in ways that smacked of realism After World War II however the time became ripe Everyone knew of the dramatic progress in aviation which had advanced from biplanes to jet planes in less than a quarter century Everyone also recalled the sudden and stunning advent of the atomic bomb Rocketry had brought further surprises as the Germans bombarded London with long range V 2 missiles late in the war Then in 1952 a group of specialists brought space flight clearly into public view The concept of a space station took root during the 1920s in an earlier era of technical change that focused on engines As recently as 1885 the only important prime mover had been the reciprocating steam engine The advent of the steam turbine yielded dramatic increases in the speed and power of both warships and ocean liners Internal combustion engines powered by gasoline led to automobiles trucks airships and airplanes Submarines powered by diesel engines showed their effectiveness during World War I After that war two original thinkers envisioned that another new engine the liquid fuel rocket would permit aviation to advance beyond the Earth's atmosphere and allow the exploration and use of outerspace These inventors were Robert Goddard a physicist at Clark University in Worcester Massachusetts and Hermann Oberth a teacher of mathematics in a gymnasium in a German speaking community in Romania Goddard experimented much wrote little and was known primarily for his substantial number of patents Oberth contented himself with mathematical studies and writings His 1923 book *Die Rakete zu den Planetenraumen* The Rocket into Interplanetary Space laid much of the foundation for the field of astronautics *The Space Shuttle Decision* National

Aeronautics and Space Administration (NASA), World Spaceflight News (WSN), U. S. Government, 2017-10-23

This NASA report presents a fascinating history of the decision to proceed with the Space Shuttle program

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The Space Shuttle took shape and won support and criticism as part of NASA's search for a post Apollo future As with the Army and Navy in World War II NASA had grown rapidly during the 1960s Similarly just as those military services saw a sharp falloff in funding in the wake of victory the success of the piloted Moon landings brought insistent demands that NASA should shrink considerably In facing those demands and in overcoming them to a degree NASA established itself as a permanent player in Washington During 1969 with Nixon newly elected and the first astronauts setting foot on the Moon NASA Administrator Thomas Paine led a push for a future in space that promised to be expansive He aimed at nothing less than a piloted expedition to Mars propelled by nuclear rocket engines that were already in development En route to Mars he expected to build space stations and large space bases Almost as an afterthought he expected to build a space shuttle as well to provide low cost flight to these orbiting facilities Soon after Neil Armstrong made his one small step in the lunar Sea of Tranquility Paine received a cold bath in the Sea of Reality Nixon's budget director Robert Mayo chopped a billion dollars from Paine's request This brought an end to NASA's hopes for a space base and for flight to Mars It appeared possible however to proceed with the space station and the shuttle as a joint project The shuttle

drew particular interest within the Air Force which saw it as a means to accomplish low cost launches of reconnaissance satellites and other military spacecraft **SPACE SHUTTLE DECISION V1 PB** HEPPENHEIMER TA,2002-05-17

Heppenheimer looks back at the shuttle's technical antecedents such as the X-15 rocket plane and rocket booster technologies and illuminates the principal personalities involved in the space shuttle decision and their motivations. He traces NASA's evolving programme goals, the technical calculations, political maneuvering and fiscal constraints and explains the myriad designs that preceded the shuttle concept. In closing, he looks in detail at the circumstances leading to the politically charged development decision of 1972.

The Space Shuttle Decision T. A. Heppenheimer, 1999

Long before the NASA was the throes of planning for the Apollo voyages to the Moon, many people had seen the need for a vehicle that could access space routinely. The idea of a reusable space shuttle dates at least to the theoretical rocketplane studies of the 1930s, but by the 1950s it had become an integral part of a master plan for space exploration. The goal of efficient access to space in a heavy lift booster prompted NASA's commitment to the space shuttle as the vehicle to continue human space flight. By the mid 1960s, NASA engineers concluded that the necessary technology was within reach to enable the creation of a reusable winged space vehicle that could haul scientific and applications satellites of all types into orbit for all users. President Richard M. Nixon approved the effort to build the shuttle in 1972, and the first orbital flight took place in 1981. Although the development program was risky, a talented group of scientists and engineers worked to create this unique space vehicle, and their efforts were largely successful. Since 1981, the various orbiters Atlantis, Columbia, Discovery, Endeavour, and Challenger, lost in 1986 during the only Space Shuttle accident, have made early 100 flights into space. Through 1998, the space shuttle has carried more than 800 major scientific and technological payloads into orbit, and its astronaut crews have conducted more than 50 extravehicular activities, including repairing satellites and the initial building of the International Space Station. The shuttle remains the only vehicle in the world with the dual ability to deliver and return large payloads to and from orbit and is also the world's most reliable launch system. The design, now almost three decades old, is still state of the art in many areas, including computerized flight control, airframe design, electrical power systems, thermal protection system, and main engines. This significant new study of the decision to build the space shuttle explains the shuttle's origin and early development. In addition to internal NASA discussions, this work details the debates in the late 1960s and early 1970s among policymakers in Congress, the Air Force, and the Office of Management and Budget over the roles and technical designs of the shuttle. Examining the interplay of these organizations with sometimes conflicting goals, the author not only explains how the world's premier space launch vehicle came into being, but also how politics can interact with science, technology, national security, and economics in national government.

The Space Shuttle Decision T. A. Heppenheimer, 1999

History of the Space Shuttle, Volume Two T. A. Heppenheimer, 2014-09-30

Basing his work on virtually untapped NASA archives, T. A. Heppenheimer has produced the second volume of his definitive history of the space shuttle. Volume Two traces the

development of the shuttle through a decade of engineering setbacks and breakthroughs program management challenges and political strategizing culminating in the first launch in April 1981 The focus is on the engineering challenges propulsion thermal protection electronics onboard systems and the author covers in depth the alternative vehicles developed by the U S Air Force and European countries The first launch entailed a monumental amount of planning and preparation that

Heppenheimer explains in detail **History of the Space Shuttle: The space shuttle decision, 1965-1972** T. A.

Heppenheimer,2002 The Space Shuttle Decision, Etc., NASA SP-4221, 1999 ,1999* *SPACE SHUTTLE DECISION V1*

PB HEPPENHEIMER TA,2002-05-17 **DEV M SPACE SHUTTLE** Heppenheimer Ta,2002-05-17 SPACE SHUTTLE

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DEV M SPACE SHUTTLE V2 Heppenheimer Ta,2002-05-17 Space Shuttle Decision, 1965-1972 T. A.

Heppenheimer,2002-05-01 Heppenheimer looks back at the shuttle s technical antecedents such as the X 15 rocket plane and rocket booster technologies and illuminates the principal personalities involved in the space shuttle decision and their motivations He traces NASA s evolving program goals the technical calculations political maneuvering and fiscal constraints and explains the myriad designs that preceded the shuttle concept In closing he looks in detail at the circumstances leading to the politically charged development decision of 1972

Apollo Hangover Robert David Seibert,2000 The Space

Station Decision Howard E. McCurdy,2007-12-12 Outstanding Academic Title 1991 Choice Magazine Although building a space station has been an extraordinary challenge for America s scientists and engineers the securing and sustaining of presidential approval congressional support and long term funding for the project was an enormous task for bureaucrats The Space Station Decision examines the history of this controversial initiative and illustrates how bureaucracy shapes public policy Using primary documents and interviews Howard E McCurdy describes the events that led up to the 1984 decision to build a permanently occupied international space station in low Earth orbit As he follows the trail of the space station proposal through the labyrinth of White House policy review McCurdy explains the evolution of the presidential budget review process the breakup of the cabinet system the proliferation of subcabinets and Executive Office interagency the involvement of White House staff in framing issues for presidential review and the role of bureaucracy in advancing administration legislation on Capitol Hill Comparing the space station decision to earlier decisions to go to the moon and to build the space shuttle McCurdy shows how public officials responsible for long term science and technology policy maneuvered in a political system that demanded short term flexibility The Space Station Decision Howard E.

McCurdy,1990-08 Selected by Choice Magazine as an Outstanding Academic Title Outstanding Academic Title 1991 Choice Magazine Although building a space station has been an extraordinary challenge for America s scientists and engineers the securing and sustaining of presidential approval congressional support and long term funding for the project was an enormous task for bureaucrats The Space Station Decision examines the history of this controversial initiative and illustrates

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The Space Shuttle Decision Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**The Space Shuttle Decision**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we shall delve to the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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