ALBUM NASA MANUSCRIPT

Album Description

Session TPS Teachers Network Albums -

LOC NASA Manuscript/Print/Mixed Media

LOC NASA Newspaper

LOC NASA Images

LOC NASA Videos

Library of Congress Resources -

Primary Source Analysis Tool

Getting Started Teaching with Primary Sources

Resources for Family Engagement

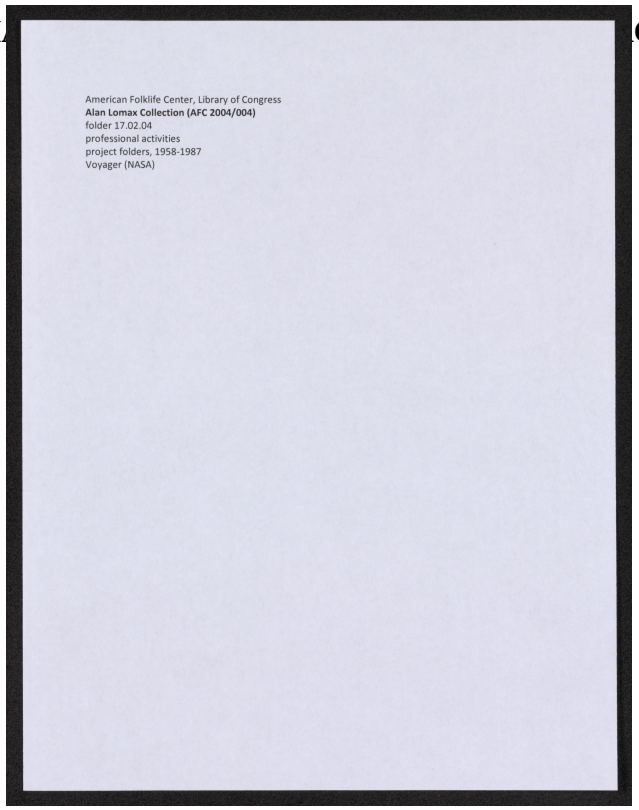
NASA -

Engineering Design Process

NASA Educator Guide to the Engineering Design Process

Resources at the Library of Congress can be used alone or in conjunction with NASA images to promote STEM and space education. Materials can be used as a form of research and inspiration for design challenges. The resources also help students connect to the past of space exploration and the people who made it possible. Students can examine the evolution of space exploration by analyzing past and present documentation. They can then take the next step in imagining the future.

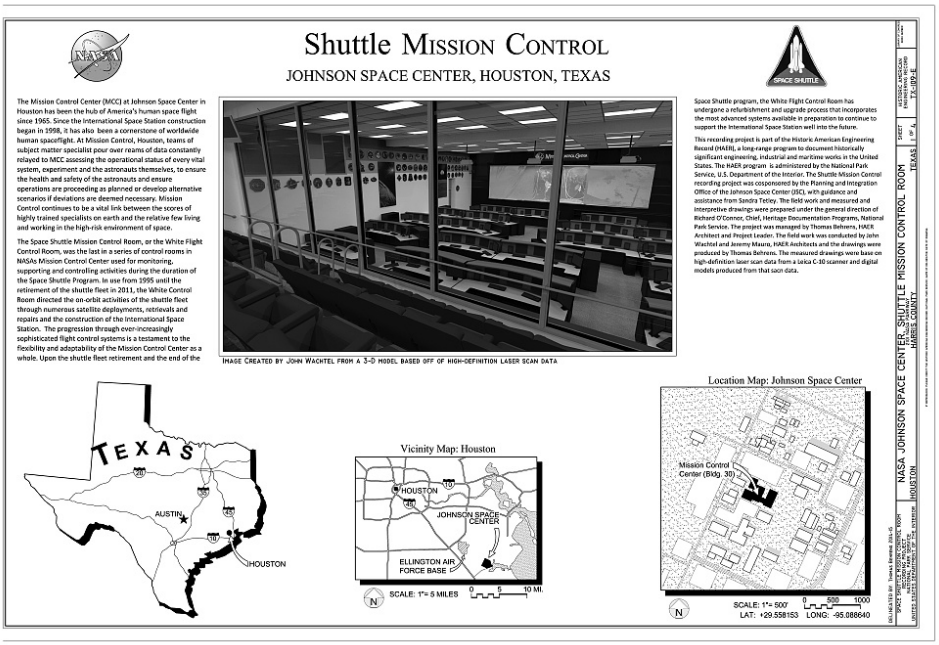
ALAN LOMA GER (NASA)



Reference Link: http://www.loc.gov/item/afc2004004.ms170204/

Contributor Names: Lomax, Alan, 1915-2002 (Collector)
Created / Published: 1977-1992
Subject Headings: - United States
- correspondence
- notes
- project files
- press releases
- research (document genres)
- professional papers
Genre: correspondence
notes
project files
press releases
research (document genres)
professional papers
Notes: - 1977-1992; Carl Sagan; Warner New Media, Blake Lewin; Random House
Repository: American Folklife Center

NASA JOHNSON SPACE CENTER, SHUTTLE MISSION CONTROL ROOM, 2101 NASA PARKWAY, HOUSTON, HARRIS COUNTY, TX



Reference Link: http://www.loc.gov/item/tx1182/

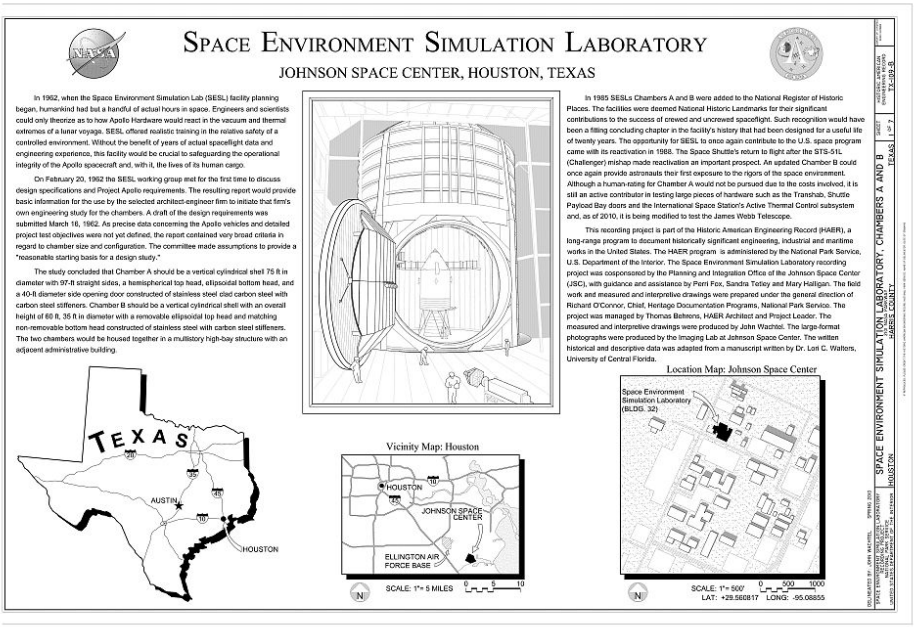
Contributor Names: Historic American Engineering Record, creator
Behrens, Thomas, project manager
Wachtel, John, delineator
Mauro, Jeremy T, field team
Behrens, Thomas, delineator
NASA - Photo Operations Group - JSC, photographer
Johnson Space Center, Planning and Integration Office, sponsor
Created / Published: Documentation compiled after 1968
Subject Headings: - national space program
- space flight
- man in space
- control rooms
- Shuttle Program
- Texas -- Harris County -- Houston
Notes: - Significance: The Mission Control Center (MCC) at Johnson Space Center in Houston has been the hub of America's human space flight since 1965. Since the International Space Station construction began in 1998, it has also been a cornerstone of worldwide human spaceflight. At Mission Control, Houston, teams of subject matter specialists pour over reams of data constantly relayed to MCC assessing the operational status of every vital system, experiment, and the astronauts themselves, to ensure the health and safety of the astronauts and ensure operations are proceeding as planned or develop alternative scenarios if deviations are deemed necessary. Mission Control continues to be a vital link between the scores of highly trained specialists on earth and the relative few living and working in the high-risk environment of space. The Space Shuttle Mission Control Room, or the White Flight Control Room, was the last in a series of control rooms in

NASA's Mission Control Center used for monitoring, supporting, and controlling activities during the duration of the Space Shuttle Program. In use from 1995 until the retirement of the shuttle fleet in 2011, the White Control Room directed the on-orbit activities of the shuttle fleet through numerous satellite deployments, retrievals and repairs, and the construction of the International Space Station. The progression through ever-increasingly sophisticated flight control systems is a testament to the flexibility and adaptability of the Mission Control Center as a whole. Upon the shuttle fleet retirement and the end of the Space Shuttle program, the White Flight Control Room has undergone a refurbishment and upgrade process that incorporates the most advanced systems available in preparation to continue to support the International Space Station well into the future.

- Unprocessed Field note material exists for this structure: N1697
- Survey number: HAER TX-109-E

Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA http://hdl.loc.gov/loc.pnp/pp.print

NASA JOHNSON SPACE CENTER, BUILDING NO. 32, SPACE ENVIRONMENT SIMULATION LABORATOPY, CHAMBERS A & B, 2101 NASA PARKWAY, HOUSTON, HARRIS COUNTY, TX



Reference Link: http://www.loc.gov/item/tx1124/

Contributor Names: Historic American Engineering Record, creator
National Aeronautics and Space Center
Bechtel Corporation
Chicago and Bridge Iron
Ets-Hokin and Galvan, Inc.
Industrial, Fisher, and Diversified
Paul Hardeman, Inc.
Radio Corporation of America
Brown & Root Construction Company
Space Task Group
Eisenhower, Dwight D
Kennedy, John F
Wilson, W K, Jr
Gilruth, Robert
Charles Luckman and Associates
General Electric
Army Corps of Engineers
Rucker Company
Bausch and Lomb
McDonnell
North American Aviation
Rockwell International
Johnson Space Center, sponsor

Behrens, Thomas, project manager
Created / Published: Documentation compiled after 1968
Subject Headings: - man in space
- national space program
- space exploration
- laboratories
- simulators
- Texas -- Harris County -- Houston
Notes: - Significance: Chambers A and B of the Space Environment Simulation Laboratory were critical to the success of Project Apollo and to the manned spacecraft program. Chamber A could achieve conditions similar to those at 87 miles above the earth's surface and was used in testing of the Apollo vehicle. When completed, it was the largest man-rated vacuum chamber built. Chamber B was used for testing the Apollo command module, as well as providing a simulated space environment for training astronauts.
- Survey number: HAER TX-109-B
- Building/structure dates: 1963-1964 Initial Construction
- Building/structure dates: 1965 Subsequent Work
- Building/structure dates: 1966 Subsequent Work
- Building/structure dates: 2008 Subsequent Work
Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA
http://hdl.loc.gov/loc.pnp/pp.print

ROCKET ENGINE TESTING FACILITY, NASA GLENN RESEARCH CENTER, CLEVELAND,

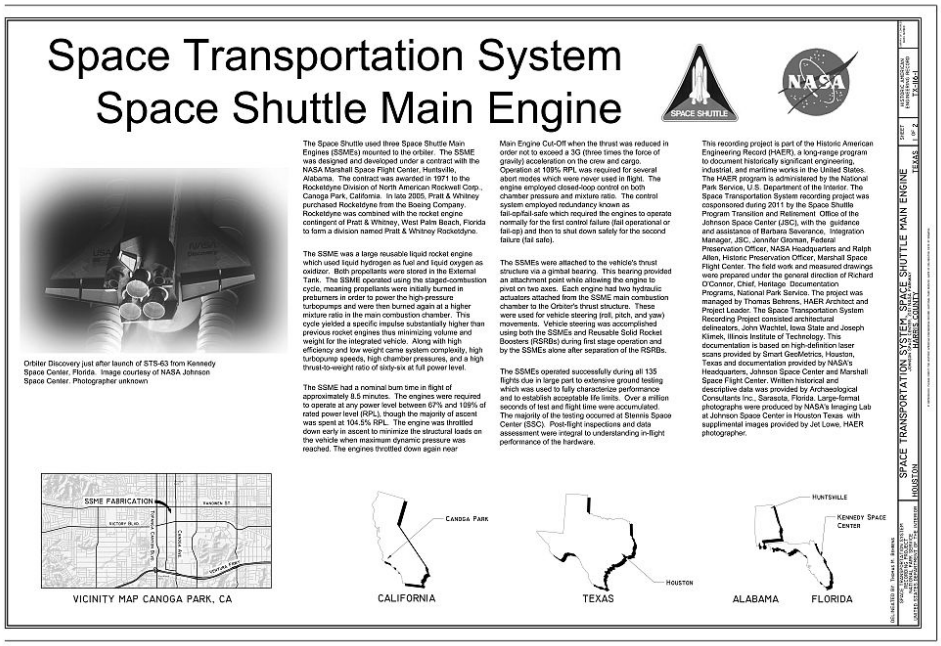
Reference Link: http://www.loc.gov/item/oh1920/

Contributor Names: Historic American Engineering Record, creator
National Aeronautics & Space Administration (NASA)
H. K. Ferguson Company
Cleveland Municpal Airport
National Advisory Committee on Aeronautics
Kumar, Rebecca, transmitter
Bates, Jeff, photographer
NASA Information Technology Center (ITC), photographer
Stewart, Robert C, historian
Dawson, Virginia P, historian
Hampton, Roy A, historian
Created / Published: Documentation compiled after 1968
Notes: - Significance: NASA began construction of the Rocket Engine Test Facility (RETF) in 1955 on land that was formerly part of the Cleveland Municipal Airport. In 1940, the National Advisory Committee on Aeronautics selected 200 acres of the airport site for the construction of an Aircraft Engine Research Laboratory. The site of this original lab and the RETF is the present NASA John H. Glenn Research Center at Lewis Field. The construction of RETF was related to post-war missile development, which required the construction of facilities dedicated to the research and testing of rocket engines and auxiliary equipment...

- Building/structure dates: 1955-1957 Initial Construction
- Building/structure dates: 1995 Subsequent Work
- Building/structure dates: 2003 Demolished

Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA
http://hdl.loc.gov/loc.pnp/pp.print

SPACE TRANSPORTATION SYSTEM, SPACE SHUTTLE MAIN ENGINE, LYNDON B. JOHNSON SPACE CENTER, 2101 NASA PARKWAY, HOUSTON, HARRIS COUNTY, TX



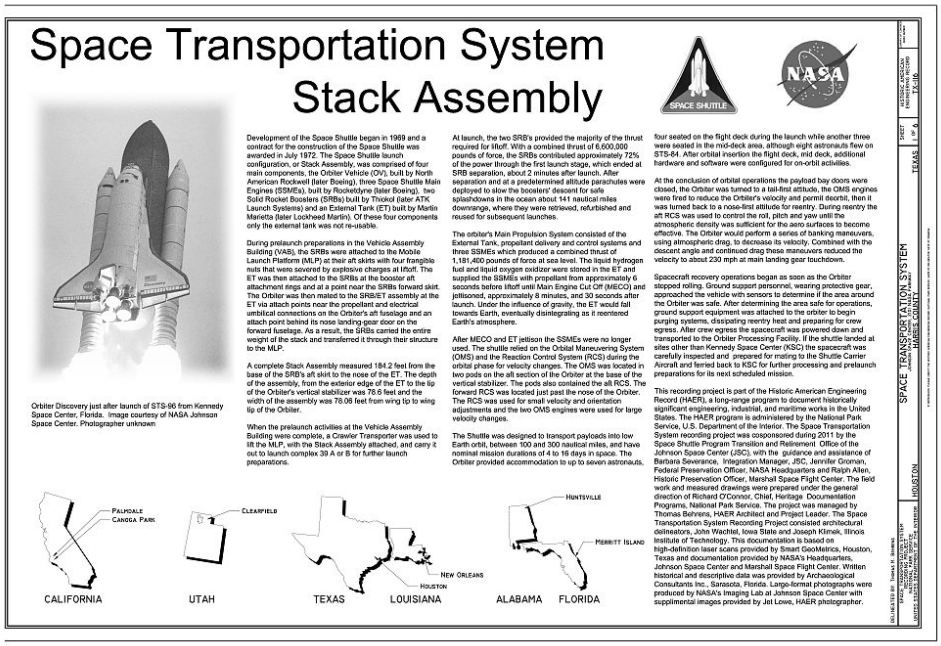
Reference Link: http://www.loc.gov/item/tx1115/

Contributor Names: Historic American Engineering Record, creator
National Aeronautics and Space Administration, Owner
Groman, Jennifer, Historic Preservation Officer
Severance, Barbara
Allen, Ralph, Historic Preservation Officer
Smart GeoMetrics, contractor
Created / Published: Documentation compiled after 1968
Subject Headings: - Shuttle Program
- national space program
- space exploration
- space flight
- man in space
- rocket engines
- liquid propellant
- Texas -- Harris County -- Houston

Notes: - Significance: The Space Shuttle used three Space Shuttle Main Engines (SSMEs) mounted to the orbiter. The SSME was designed and developed under a contract with the NASA Marshall Space Flight Center, Huntsville, Alabama. The contract was awarded in 1971 to the Rocketdyne Division of North American Rockwell Corp., Canoga Park, California. In late 2005, Pratt & Whitney purchased Rocketdyne from the Boeing Company. Rocketdyne was combined with the rocket engine contingent of Pratt & Whitney, West Palm Beach, Florida to form a division named Pratt & Whitney Rocketdyne. The SSME was a large reusable liquid rocket engine which used liquid hydrogen as fuel and liquid oxygen as oxidizer. Both propellants were stored in the External Tank. The SSME operated using the staged-combustion cycle

meaning propellants were initially burned in preburners in order to power the high-pressure turbopumps and were then burned again at a higher mixture ratio in the main combustion chamber. This cycle yielded a specific impulse substantially higher than previous rocket engines thus minimizing volume and weight for the integrated vehicle. Along with high efficiency and low weight came system complexity, high turbopump speeds, high chamber pressures, and a high thrust-to-weight ratio of sixty-six at full power level. ...
- Survey number: HAER TX-116-I
Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA
http://hdl.loc.gov/loc.pnp/pp.print

SPACE TRANSPORTATION SYSTEM, LYNDON B. JOHNSON SPACE CENTER, 2101 NASA PARKWAY, HOUSTON, HARRIS COUNTY, TX

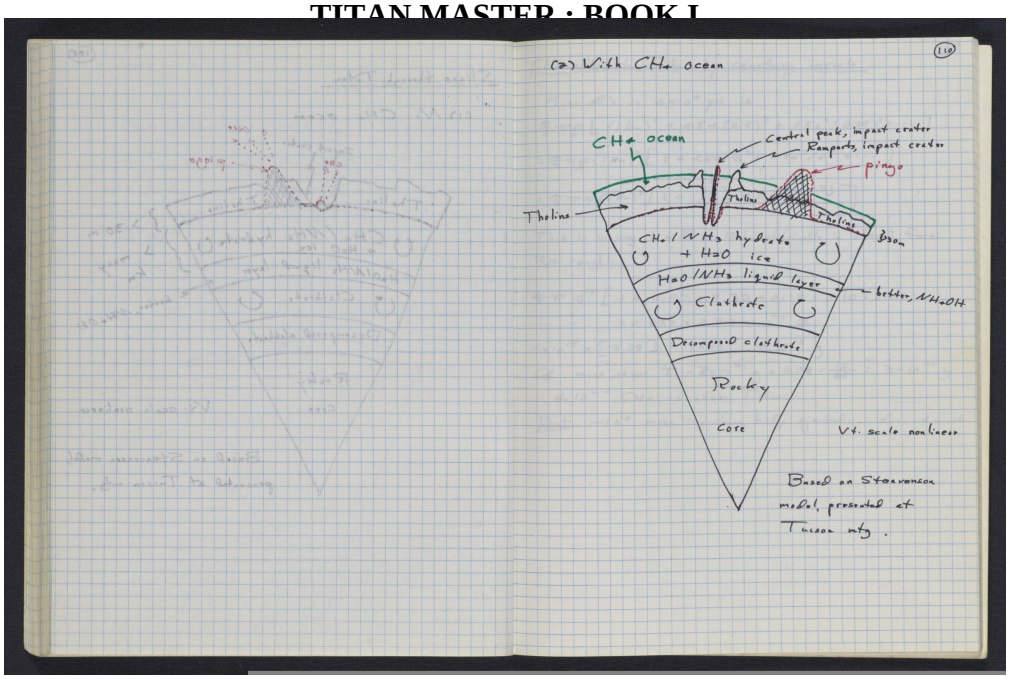


Reference Link: http://www.loc.gov/item/tx1106/

Contributor Names: Historic American Engineering Record, creator
National Aeronautics and Space Administration, Owner
Smithsonian Institution, Owner
Deming, Joan, historian
Slovinac, Patricia, historian
Archaeological Consultants, Inc., contractor
Wolfe, Jeffrey, field team
Nehr, Adam, field team
Farrar, Tom, field team
Behrens, Thomas M, project manager
Wachtel, John, delineator
Klimek, Joseph, delineator
Pierce, Ryan, delineator
Smart GeoMetrics, field team
Lowe, Jet, photographer
Created / Published: Documentation compiled after 1968
Subject Headings: - national space program
- space exploration
- space flight
- man in space
- Shuttle Program
- rocket propulsion
- fuel tanks

- Texas -- Harris County -- Houston
Notes: - Significance: The Orbiter Discovery, OV-103, is considered eligible for listing in the National Register of Historic Places (NRHP) in the context of the U.S. Space Shuttle Program (1969-2011) under Criterion A in the areas of Space Exploration and Transportation and under Criterion C in the area of Engineering. Because it has achieved significance within the past fifty years, Criteria Consideration G applies. Under Criterion A, Discovery is significant as the oldest of the three extant orbiter vehicles constructed for the Space Shuttle Program (SSP), the longest running American space program to date; she was the third of five orbiters built by NASA. Unlike the Mercury, Gemini, and Apollo programs, the SSP's emphasis was on cost effectiveness and reusability, and eventually the construction of a space station. Including her maiden voyage (launched August 30, 1984), Discovery flew to space thirty-nine times, more than any of the other four orbiters; she was also the first orbiter to fly twenty missions. She had the honor of being chosen as the Return to Flight vehicle after both the Challenger and Columbia accidents. Discovery was the first shuttle to fly with the redesigned SRBs, a result of the Challenger accident, and the first shuttle to fly with the Phase II and Block I SSME. Discovery also carried the Hubble Space Telescope to orbit and performed two of the five servicing missions to the observatory. She flew the first and last dedicated Department of Defense (DoD) missions, as well as the first unclassified defense-related mission. In addition, Discovery was vital to the construction of the International Space Station (ISS); she flew thirteen of the thirty-seven total missions flown to the station by a U.S. Space Shuttle. She was the first orbiter to dock to the ISS, and the first to perform an exchange of a resident crew. Under Criterion C, Discovery is significant as a feat of engineering. According to Wayne Hale, a flight director from Johnson Space Center, the Space Shuttle orbiter represents a "huge technological leap from expendable rockets and capsules to a reusable, winged, hypersonic, cargo-carrying spacecraft." Although her base structure followed a conventional aircraft design, she used advanced materials that both minimized her weight for cargo-carrying purposes and featured low thermal expansion ratios, which provided a stable base for her Thermal Protection System (TPS) materials. The Space Shuttle orbiter also featured the first reusable TPS; all previous spaceflight vehicles had a single-use, ablative heat shield. Other notable engineering achievements of the orbiter included the first reusable orbital propulsion system, and the first two-fault-tolerant Integrated Avionics System. As Hale stated, the Space Shuttle remains "the largest, fastest, winged hypersonic aircraft in history," having regularly flown at twenty-five times the speed of sound.
- Survey number: HAER TX-116
Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA
http://hdl.loc.gov/loc.pnp/pp.print

TITAN MASTER : BOOK I

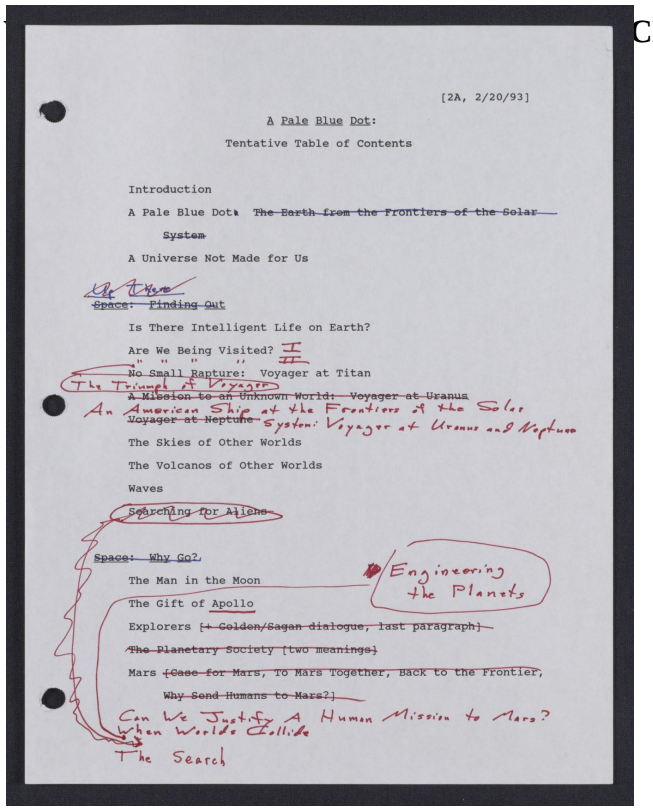


Reference Link: http://www.loc.gov/resource/mss85590.032/?sp=57&r=-0.121,0.07,1.056,0.455,0

Contributor Names: Sagan, Carl (Author)
Created / Published: 1981
Subject Headings: - Astronomy
- Sagan, Carl
- Saturn (Planet)
- Outer space--Exploration
- Titan (Satellite)
- Atmosphere
- Clouds
- Organics
- Manuscripts

Genre: Manuscripts
Notes: - A set of notes on Titan, Saturn's largest moon. The notes include discussion of the Titan's clouds, tides, and the possibilities of floating organics on Titan.
Repository: Manuscript Division

PALE BLUE DOT : A CE : SECOND DRAFT



[2A, 2/20/93]

A Pale Blue Dot:

Tentative Table of Contents

Introduction

A Pale Blue Dot: ~~The Earth from the Frontiers of the Solar System~~

A Universe Not Made for Us

~~Space: Finding Out~~

Is There Intelligent Life on Earth?

Are We Being Visited? I

" " " II

~~No Small Rapture: Voyager at Titan~~

~~A Mission to an Unknown World: Voyager at Uranus~~

~~Voyager at Neptune~~

The Triumph of Voyager

An American Ship at the Frontiers of the Solar System: Voyager at Uranus and Neptune

The Skies of Other Worlds

The Volcanos of Other Worlds

Waves

~~Searching for Aliens~~

~~Space: Why Go?~~

The Man in the Moon

The Gift of Apollo

Explorers ~~[+ Golden/Sagan dialogue, last paragraph]~~

~~The Planetary Society [two meanings]~~

Mars ~~[Case for Mars, To Mars Together, Back to the Frontier, Why Send Humans to Mars?]~~

Engineering the Planets

Can We Justify A Human Mission to Mars?

When Worlds Collide

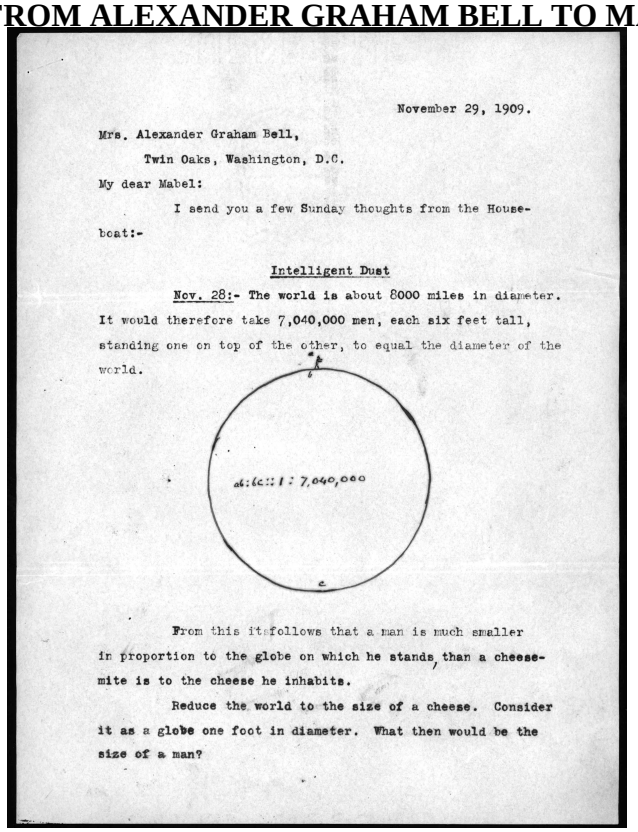
The Search

Reference Link: http://www.loc.gov/resource/mss85590.042/?sp=3

Contributor Names: Sagan, Carl (Author)
Subject Headings: - Sagan, Carl
- Outer space--Exploration
- Planets
- Space colonies
- Astronautics--Human factors
- Asteroids
- Manuscripts

Genre: Manuscripts
Notes: - The second of twenty full drafts of Pale blue dot : a vision of the human future in space, published in 1994. Sagan discusses the history of astronomy and considers the future of humanity in space, arguing that it is necessary for humanity's survival to explore and ultimately terraform and create human settlements on planets and asteroids. The draft is made up of interleaved notes. These notes were transcribed from audio recordings dictated by Carl Sagan. The resulting assembled document was then extensively marked up and revised by Sagan. In cases where Sagan wrote notes on the back of printed pages those pages were digitized.
Repository: Manuscript Division

IMAGE 1 OF LETTER FROM ALEXANDER GRAHAM BELL TO MABEL HUBBARD BELL,



November 29, 1909.

Mrs. Alexander Graham Bell,
Twin Oaks, Washington, D.C.

My dear Mabel:

I send you a few Sunday thoughts from the House-boat:-

Intelligent Dust

Nov. 28:- The world is about 8000 miles in diameter. It would therefore take 7,040,000 men, each six feet tall, standing one on top of the other, to equal the diameter of the world.

From this it follows that a man is much smaller in proportion to the globe on which he stands, than a cheese-mite is to the cheese he inhabits.

Reduce the world to the size of a cheese. Consider it as a globe one foot in diameter. What then would be the size of a man?

Reference Link: http://www.loc.gov/resource/magbell.04300515/?sp=1

Contributor Names: Bell, Alexander Graham
Bell, Mabel Hubbard
Created / Published: November 29, 1909
Subject Headings: - Astronomy
- Correspondence
Genre: Correspondence
Repository: Manuscript Division
Digital Id: http://hdl.loc.gov/loc.mss/magbell.04300515