National Facilities Study

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Unclas

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Facilities Inventory

Volume 1

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NASA
Washington, D.C.
Volume 1 – Facilities Inventory

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SUMMARY

It was clear early in the effort that an inventory of existing aerospace facilities had to be developed to perform the study. The scope had to include Aeronautics R&D, Space R&D, and Space Operations facilities. Significant facilities in both Government and private industry needed to be identified and categorized.

The Facilities/Engineering and Costing Task Group and the other Task Groups jointly developed a three-page format for the inventory. It includes a brief description of the facility, key operating parameters capabilities, cost data, degree of utilization, and point of contact for additional information.

Data was solicited from all NASA centers, DoE, NOAA, and from the Army, Navy, Air Force, Advanced Projects Research Agency, and the Ballistic Missile Defense Organization. Industry participation was assisted by the Aerospace Industries Association and the American Institute of Aeronautics and Astronautics, leading to direct interaction with the key companies. Each site (private industry or government) was provided a standardized data input package to report the characteristics of its facilities.

Guidelines were issued to limit the data inputs to the more significant key facilities. This still resulted in more facilities than could be evaluated in the time available and approaches were developed by the task groups to focus on the areas most likely to pay off.

The information returned from the responding sites was merged into a single comprehensive inventory, resident in a computer database for ease of access to the information. The database provided a number of analytical tools and capabilities to assist the task groups in performing their study efforts.

Data loading was, and still is, a dynamic process. Data was received at various times throughout the course of the study, and the database was appended as each new data set was received.

The NFS facility inventory is now the most comprehensive source of information concerning aeronautics and aerospace facilities available. The inventory contains detailed information on 2,823 facilities from 78 sites. This represents nearly 8,000 pages of information. The following table summarizes the number of facilities contained in the database to date by agency and industry:
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<table>
<thead>
<tr>
<th>Sites</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA</td>
<td>11</td>
</tr>
<tr>
<td>DoD</td>
<td>30</td>
</tr>
<tr>
<td>NOAA</td>
<td>3</td>
</tr>
<tr>
<td>DoE</td>
<td>10</td>
</tr>
<tr>
<td>Industry</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>2,823</td>
</tr>
</tbody>
</table>

PURPOSE

The inventory activity was initiated to solve the critical need for a single source of site specific descriptive and parametric data on major public and privately held aeronautics and aerospace related facilities. This was a challenging undertaking due to the scope of the effort and the short lead time in which to assemble the inventory and have it available to support the task group study needs. The inventory remains dynamic as sites are being added and the data is accessed and refined as the study progresses.

The inventory activity also included the design and implementation of a computer database and analytical tools to simplify access to the data.

This volume describes the steps which were taken to define the data requirements, select sites, solicit and acquire data from them. A discussion of the inventory structure and analytical tools is also provided.

DATA DEFINITION

The Facility Engineering and Costing Task Group in cooperation with the other Task Groups defined a standard set of data that would be applicable for Space Research and Development, Space Operations, and Aeronautics Research and Development facilities. The data format was carefully constructed to allow NASA, DoD, and private industry facilities to be accurately described. The input from the task groups was critical since they had the technical knowledge of what were the important features of a facility that must be available to support their analysis. The resultant data and parametric analysis requirements are reflected in the inventory structure.

ACTIVITY SELECTION

The task groups, with the assistance of the Facilities Engineering and Costing task group developed a preliminary listing of locations to be included in the inventory. This was done to a great extent based on personal knowledge and experience. The task
groups also identified the federal agencies which were considered major participants in aeronautics and aerospace activities.

The industry sites were primarily member firms of the Aerospace Industries Association (AIA), or the American Institute of Aeronautics and Astronautics (AIAA). The AIA and AIAA were informed of the NFS and assisted the team in contacting and soliciting inputs from their member companies. Industry participation was voluntary. Figure I - 1 lists the type of facilities that were targeted for inclusion in the inventory.

DATA ACQUISITION

A questionnaire was sent to each of the selected sites. Samples of three completed questionnaires are shown in Figures I - 2, I - 3, and I - 4, and provide details on the following buildings:

- Figure I - 2 The Vertical Processing Facility at the Kennedy Space Center
- Figure I - 3 J-6 Rocket Propulsion Test Facility at Arnold Engineering Center
- Figure I - 4 National Transonic Facility at Langley Research Center

Due to the volume of information to be collected an electronic media was developed to simplify the data acquisition process and to minimize data entry errors. The electronic input form was structured to have "picklists" for the majority of the data elements. These picklists afforded users the opportunity to quickly choose from a range of predefined responses to most data fields. This greatly reduced the time required to fill out the questionnaire and was designed to provide a level of data consistency. The person filling out the questionnaire could enter a different response if the predefined selections were not sufficient. The result of allowing the user to add data is reflected in the growth in facility categories, programs and keywords discussed previously. The electronic input form provided the additional advantage of allowing the site specific input data to be electronically loaded into the NFS database, as opposed to having to manually transfer the data.

When site data was received a number of validation and verification activities took place. This was designed to insure that all data available to the task groups was accurate and consistent.

When necessary, error reports were returned to the respondents for clarification of information. If the concerns or questions were minor in scope the respondents were contacted by telephone and data ambiguities resolved.
VOLUME 1 - INVENTORY

No attempt was made to force the use of the predefined data categories, or to judge the accuracy of the parametric data. This would be the responsibility of the task groups if they felt it necessary to their analysis efforts.

INVENTORY STRUCTURE

The inventory data was structured to be hierarchial as shown in this simplified outline:

A. Owner
B. Location
C. Building
D. Building parameters
   D1. size
   D2. Operations & maintenance cost
E. Facility Type
   E1. Program Supported
   E2. Keyword
F. Performance parameter

This approach allowed individual sites to have one or more buildings, as well as individual buildings to contain one or more facilities. This was done to allow the inventory to be very specific and not be limited to only listing what might be considered the primary function of any particular building or structure. Figures 1 - 5 and 1 - 6 provide examples of programs supported and keywords as were developed by the specific sites.

DATA ANALYSIS TOOLS

The database into which the site specific inventory data was loaded was selected to provide easy access to the data, with analytical tools to perform manipulations of the data to support the task group analysis requirements. Analytical tools included sophisticated query and edit capabilities and custom report generators.

Analysis can be performed at any level of the hierarchy structure previously defined (see "Inventory Structure" on pg. I - 2). For example, a query can be constructed to select only those facilities which match a particular keyword. Similarly, a higher level query can be constructed to select only those buildings of a selected size.

INVENTORY RESULTS

A comprehensive inventory, describing an estimated 80 to 85 percent of the aeronautics and aerospace facilities throughout the nation was compiled. This
VOLUME 1 - INVENTORY

inventory was available to support the NFS analytical requirements. Over 2800 facilities at 78 different sites are included. The following table summarizes the facilities contained in the inventory.

<table>
<thead>
<tr>
<th>Agency</th>
<th># Sites</th>
<th># Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA</td>
<td>11</td>
<td>1,044</td>
</tr>
<tr>
<td>DoD</td>
<td>30</td>
<td>694</td>
</tr>
<tr>
<td>NOAA</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>DoE</td>
<td>10</td>
<td>130</td>
</tr>
<tr>
<td>Industry</td>
<td>24</td>
<td>904</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>2,823</td>
</tr>
</tbody>
</table>

Figure I - 7 contains a listing of the sites included in the inventory by agency/industry. Figure I - 8 identifies the type facilities at each of these sites that were available for analytical review.

Over 1230 supported programs are identified, and facilities are categorized by one or more of over 1500 keywords. In total over 8000 pages of detailed narrative and parametric data is included in the inventory and used by the NFS Task Groups.

CONCLUSION

The NFS Facilities Inventory affords us analysis opportunities which clearly offer potential cost savings and technological benefits. The facilities inventory provides a comprehensive and accessible source of information on major government and industry facilities. The inventory is a building block on which both industry and government can develop their long term technology and facilities investment strategies.

To permit the inventory to be of the greatest future benefit, it should be expanded to included a greater percentage of the total nationwide facilities. Data definitions should be refined, validation and data verification procedures strengthened, and user access improved.

RECOMMENDATIONS FOR FUTURE ACTIVITIES

The inventory of United States aeronautics and aerospace facilities should be completed by adding additional site data required to contain all major, U. S. facilities,
refined to enhance analytical capabilities, and maintained to ensure data is current and accurate. In order to permit the long term utility of the inventory the following should be considered:

A process for ensuring the inventory is up-to-date and accurate should be developed and implemented.

As the number of users and represented sites increase a strategy to protect sensitive or proprietary data, control data access, and monitor system usage should be developed.

The sites and data currently contained in the inventory should be reviewed to determine additional sites/facilities to be included, as well as facilities currently included which may be superfluous. Criteria for determining facilities to be included in the inventory should be developed to permit orderly future growth.

A comprehensive review of the existing data should be performed, and a more concise data set should be established in order to provide greater data discipline, and enhance analysis capabilities.

Inventory customers should be determined, and a strategy developed to make the data available to them at the lowest life cycle cost.
Volume 1 - Facilities Inventory

Assembly
Command Destruct
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Flight Experiment Ground Support (E.G. Clean Room)
Human Factors/Biomedical
Landing Ops
Launch
Launch Processing Ops
Launch Processing/Booster
Launch Processing/Ordnance
Manufacturing
Materials
Mission Operations
On-Orbit Mission Control Centers
Operational Simulation/Demonstration
Operations
Payload Operations
Processing
Propulsion Testing
Range
Recovery Ops
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Training
Wind Tunnels

Figure I - 1
Types of Facilities in the NFS Inventory
C.1 KENNEDY SPACE CENTER

B.1 Vehicle Assembly Building /K6-0848

F.1 High Bay 1 Cell ......................................................... 2
F.2 High Bay 2 Cell .......................................................... 3
F.3 High Bay 3 Cell .......................................................... 4
F.4 High Bay 4 Cell .......................................................... 5
F.5 High Bay Towers (6) ...................................................... 6
F.6 High Bay Transfer Aisle ................................................ 7
F.7 LB Cells (8) Low Bay Area/East .................................... 8
F.8 LB Cells (8) Low Bay Area/West .................................... 9
F.9 Low Bay Transfer Aisle ................................................ 10
F.10 Utility Annex/K6-947 .................................................. 11

Figure I - 2
Sample Completed Questionnaire - KSC VAB
1. Agency: National Aeronautics and Space Administration
   Center/Base: KENNEDY SPACE CENTER
   Address: CODE DF
             JOHN F. KENNEDY SPACE CENTER
             KENNEDY SPACE CENTER, FL 32899

2. Contact Name: DON PAGE
   Organization: ENGINEERING DEVELOPMENT
   Phone Number: 407-867-4553
   Fax Number: 407-867-4812
   Mail Stop: DF

3. Date Submitted: Jul 14, 1993
   Updated: Dec 14, 1993
   Date Printed: Jan 27, 1994
1. Building Name: Vehicle Assembly Building / K6-0848
   Center/Base Name: KENNEDY SPACE CENTER

2. Geographical Location
   City: Kennedy Space Center
   State: FL
   Country: UNITED STATES
   Zip Code: 32899

3. Owner (If Privately Owned): N/A

4. Occupancy Year: 1966

5. Status:
   - Under Construction
   - Active
   - Inactive

6. Condition:
   - New
   - Good
   - Fair
   - Poor

7. Building Description:
   The launch Vehicle Assembly Building (VAB) is capable of supporting the
   receiving, assembly, integration, test and checkout of the Space Shuttle
   elements. It is an integral part of the LC-39 integrate, transport and launch
   (ITL) concept for Shuttle processing and launch. The VAB also provides
   external tank and orbiter main engine storage, test and checkout capabilities.
   Each VAB integration cell is capable of supporting 7 Shuttle launches per year.
   The VAB covers an area of about 8 acres and has a volume of 129,482,000 cubic
   feet. It is 525 feet tall, 715 feet long and 518 feet wide. The structures
   can withstand winds up to 125 miles per hour. The foundation rests on more
   than 4200 steel pipe pilings, each 16 inches in diameter and driven down to
   bedrock at a depth of 160 feet. The Low Bay is 210 feet tall and contains the
   Shuttle main engine maintenance shop and serves as a holding area for SRB
   forward assemblies and aft skirts. Facing east are High Bays 1 and 3 where SRB
   stacking. ET/SRB Mate and Orbiter/ET Mate occurs in a vertical position on the
   Mobile Launcher Platform. Facing west is High Bays 2 and 4 where ET Checkout
   and storage takes place. Each open VAB high bay is situated between an office
   tower. There are three towers on the east side and three towers on the west
   side. Since the VAB is a hazardous facility due to the presence of solid
   rocket motor segments, these office towers are unoccupied. The VAB has more
   than 70 lifting devices including two 250-ton bridge cranes. Two new 325-ton
   bridge cranes are in the process of being installed to replace the 250-ton
   cranes. The Low Bay has a 175-ton bridge crane that traverses the length of
   the transfer aisle thru the Low Bay and High Bay. NOTE: Each High Bay door is
   465 sq. ft. from ground to top. The lower door is 192 ft. wide and 114 ft.
   high; the upper door is 342 ft. high, 76 ft. wide. The north VAB door is 55 x
   55 and the south VAB door is 55 x 95. Located immediately west of the VAB is
   the 29,000 sq. ft. Utility Annex/K6-947 which provides utility support to the
   VAB.

8. Square Feet of Building: 1702551

9. Availability for Non-Owner Utilization:
   - Yes
   - No

   If Yes, Sector:
   - Military
   - Civil Gov't
   - Commercial
# National Facilities Study
## Building Data

1. **Building Name:** Vehicle Assembly Building /K6-0848  
   **Center/Base Name:** KENNEDY SPACE CENTER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$0M - $1M</td>
<td>$0M - $50M</td>
<td>$0K - $25K</td>
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<tr>
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<td>$50M - $100M</td>
<td>$25K - $100K</td>
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<td>$100M - $200M</td>
<td>$100K - $200K</td>
</tr>
<tr>
<td>$10M - $50M</td>
<td>$200M - $350M</td>
<td>$200K - $350K</td>
</tr>
<tr>
<td>$50M - $100M</td>
<td>$350M - $500M</td>
<td>$350K - $500K</td>
</tr>
<tr>
<td>$100M+</td>
<td>$500M+</td>
<td>$500K+</td>
</tr>
</tbody>
</table>

13. **Support Category (See attachment for selections):**
   - a. 
   - b. 
   - c. 
   - d. 
   - e. 
   - f. 

**Updated:** Nov 05, 1993  
**Date Printed:** Jan 27, 1994
**National Facilities Study**  
**Facility Data**

1. **Facility Name:** High Bay 1 Cell  
   **Building Name:** Vehicle Assembly Building /K6-0848  
   **Updated Date:** Nov 05, 1999  
   **Date Printed:** Jan 27, 1999

2. **Percent Utilized:** 80  
   **Basis (Shifts/Days):**  
   - [X] 3 Shifts / 5 Days  
   - [ ] 1 Shift / 5 Days  
   - [ ] 1 Shift / 7 Days  
   - [ ] 2 Shifts / 5 Days  
   - [ ] 2 Shifts / 7 Days

3. **Security Level:**  
   - [X] Unclassified
   - [ ] Confidential
   - [ ] Secret
   - [ ] Top Secret

4. **Facility Types (see attachment for selections):**  
   a. Launch  
   b. WG Manufacturing  
   c. WG Payload Processing, Launch & Recovery  
   d. Other:

5. **Performance Parameters (see attachment for selections):**  
   **Parameter Name**  
   **Unit of Measure**  
   **Value(s)**  
   **Type**  
   - crane #1 capacity: 250.0 tons  
   - crane #1 hook height: 462.0 feet  
   - crane #2 capacity: 325.0 tons  
   - crane #2 hook height: 462.0 feet  
   - door #1 height: 342.0 feet  
   - door #1 width: 76.0 feet  
   - door #2 height: 114.0 feet  
   - door #2 width: 192.0 feet  
   - facility height: 475.0 feet  
   - facility length: 200.0 feet  
   - facility width: 150.0 feet

   *Types:*  
   - D - Discrete Value  
   - R - Range  
   - M - Minimum Value  
   - X - Maximum Value  
   - B - Yes/No

6. **Support Category (see attachment for selections):**  
   a.  
   b.  
   c.  
   d.  
   e.  

   **Square Feet**

7. **Programs (see attachment for selections):**  
   **Programs Supported**  
   **(Past/Present/Future) Status**  
   **Customer**  
   **Years Supported**
   - Space Shuttle  
     - Present  
     - NASA  
     - 1975 - 1999

---

**Page 3**
National Facilities Study
Facility Data

1. Facility Name: High Bay 2 Cell
   Building Name: Vehicle Assembly Building /K6-0848

2. Percent Utilized
   Basis(Shifts/Days): □ 1 Shift/5 Days □ 1 Shifts / 7 Days □ 2 Shifts / 5 Days □ 2 Shifts / 7 Days
   □ 3 Shifts / 5 Days □ 3 Shifts / 7 Days □ Other: ________

3. Security Level:
   □ Unclassified □ Confidential □ Secret □ Top Secret

4. Facility Types (see attachment for selections):
   a. Launch
   b. WG Payload Processing, Launch & Recovery
   c. ________
   d. ________

5. Performance Parameters (see attachment for selections):
   Parameter Name
   Unit of Measure | Value(s) | Type*
   ----------------|---------|---
   crane #1 capacity | tons | 250.0 | D
   crane #1 hook height | feet | 462.0 | D
   crane #2 capacity | tons | 325.0 | D
   crane #2 hook height | feet | 462.0 | D
   door #1 height | feet | 342.0 | D
   door #1 width | feet | 76.0 | D
   door #2 height | feet | 114.0 | D
   door #2 width | feet | 192.0 | D
   facility height | feet | 475.0 | D
   facility length | feet | 200.0 | D
   facility width | feet | 150.0 | D

6. Support Category (see attachment for selections):
   Support Category
   a. ________
   b. ________
   c. ________
   d. ________
   e. ________

7. Programs (see attachment for selections):
   Programs Supported
   Space Shuttle
   (Past/Present/Future) Status
   PRESENT
   Customer NASA
   Years Supported
   Start: 1975 End: 9999

Page 4
Updated Nov 05, 1993
Date Printed: Jan 27, 1994
Page 4
National Facilities Study
Facility Data

1. Facility Name: High Bay 3 Cell
   Building Name: Vehicle Assembly Building/K6-0848
   Updated Date: Nov 05, 1999
   Date Printed: Jan 27, 1999

2. Percent Utilized: 80%
   Basis(Shifts/Days): [X] 3 Shifts / 5 Days  [ ] 3 Shifts / 7 Days  [ ] 2 Shifts / 5 Days  [ ] 2 Shifts / 7 Days
   Other:

   Other:

4. Facility Types (see attachment for selections):
   a. Launch
   b. WG Payload Processing, Launch & Recovery
   c. 
   d. 

5. Performance Parameters (see attachment for selections):
   Parameter Name
   - crane #1 capacity
   - crane #1 hook height
   - crane #2 capacity
   - crane #2 hook height
   - door #1 height
   - door #1 width
   - door #2 height
   - door #2 width
   - facility height
   - facility length
   - facility width
   Unit of Measure: tons, feet, square feet
   Value(s): 250.0, 462.0, 325.0, 462.0, 342.0, 76.0, 114.0, 192.0, 475.0, 200.0, 150.0
   Type*: D - Discrete Value  R - Range  M - Minimum Value  X - Maximum Value  B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   a. 
   b. 
   c. 
   d. 
   e. 
   Square Feet

7. Programs (see attachment for selections):
   Programs Supported
   Space Shuttle
   (Past/Present/Future) Status
   (Present)
   Customer: NASA
   Years Supported
   Start: 1975  End: 9999
1. Facility Name: High Bay 4 Cell
   Building Name: Vehicle Assembly Building / K6-0848

2. Percent Utilized
   Basis (Shifts/Days): 40
   - 1 Shift / 5 Days
   - 1 Shift / 7 Days
   - 2 Shifts / 5 Days
   - 2 Shifts / 7 Days

3. Security Level:
   - Unclassified
   - Confidential
   - Secret
   - Top Secret

4. Facility Types (see attachment for selections):
   a. Launch
   b. Vehicle Processing, Launch & Recovery
   c. (Blank)
   d. (Blank)

5. Performance Parameters
   Parameter Name: crane #1 capacity
   Unit of Measure: tons
   Value(s): 250.0
   Type: D

6. Support Category (see attachment for selections):
   Support Category
   a. (Blank)
   b. (Blank)
   c. (Blank)
   d. (Blank)
   e. (Blank)

7. Programs
   Programs Supported: Space Shuttle
   (Past/Present/Future) Status: PRESENT
   Customer: NASA
   Years Supported: 1975 - 19999

Page 6
National Facilities Study  
Facility Data

1. Facility Name: High Bay Towers (6)  
   Building Name: Vehicle Assembly Building /K6-0848

2. Percent Utilized  
   Basis(Shifts/Days): ☒ 1 Shift/5 Days ☐ 1 Shifts / 7 Days ☐ 2 Shifts / 5 Days ☐ 2 Shifts / 7 Days
   ☐ 3 Shifts / 5 Days ☐ 3 Shifts / 7 Days ☐ Other: ________________________________


4. Facility Types (see attachment for selections):  
   a. Launch  
   b. W/ Payload Processing, Launch & Recovery  
   c. ________________________________  
   d. ________________________________

5. Performance Parameters (see attachment for selections):  
   Parameter Name
   > facility height
   > facility length
   > facility width
   Parameter Unit of Measure Value(s) Type*  
   feet 525.0 D  
   feet 200.0 D  
   feet 35.0 D

   Types: D - Discrete Value  R - Range  M - Minimum Value  X - Maximum Value  B - Yes/No

6. Support Category (see attachment for selections):  
   Support Category  
   a. Administrative
   b. Logistics
   c. Maintenance
   d. Precision Measurement Equipment Lab
   e. ________________________________

   Square Feet  
   12983
   208175
   20484
   155618

7. Programs (see attachment for selections):  
   Programs Supported  
   (Past/Present/Future) Status  
   Customer  
   Years Supported Start  
   Years Supported End

   ________________________________
   ________________________________
   ________________________________
   ________________________________
   ________________________________

I - 16
National Facilities Study
Facility Data

1. Facility Name:
   High Bay Transfer Aisle
   Vehicle Assembly Building / K6-0848

2. Percent Utilized
   Basis (Shifts/Days):
   - [ ] 1 Shift/5 Days
   - [ ] 1 Shifts / 7 Days
   - [X] 2 Shifts / 5 Days
   - [ ] 2 Shifts / 7 Days
   - [ ] 3 Shifts / 5 Days
   - [ ] 3 Shifts / 7 Days
   - [ ] Other:

3. Security Level:
   - [X] Unclassified
   - [ ] Confidential
   - [ ] Secret
   - [ ] Top Secret

4. Facility Types (see attachment for selections):
   a. Launch
   b. WG Payload Processing, Launch & Recovery
   c.
   d.

5. Performance Parameters (see attachment for selections):
   Parameter Name
   - crane #1 capacity
   - crane #1 hook height
   - door #1 height
   - door #1 width
   - facility height
   - facility length
   - facility width
   Unit of Measure
   - tons
   - feet
   - feet
   - feet
   - feet
   - feet
   Value(s)
   - 175.0
   - 165.0
   - 53.0
   - 56.0
   - 475.0
   - 418.0
   - 94.0
   Type*
   - D
   - D
   - D
   - D
   - D
   - D

Types:
- D - Discrete Value
- R - Range
- M - Minimum Value
- X - Maximum Value
- B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   a.
   b.
   c.
   d.
   e.

7. Programs (see attachment for selections):
   Programs Supported
   - Space Shuttle
   (Past/Present/Future) Status
   - PRESENT
   Customer
   - NASA
   Years Supported
   - Start 1975
   - End 9999

Page 8
Updated: Nov 05, 1993
Date Printed: Jan 27, 1994
National Facilities Study
Facility Data

1. Facility Name: LB Cells (8) Low Bay Area/East
   Building Name: Vehicle Assembly Building /K6-0848

2. Percent Utilized Basis(Shifts/Days): 60%
   - 1 Shift/5 Days
   - 1 Shifts / 7 Days X
   - 2 Shifts / 5 Days
   - 2 Shifts / 7 Days
   - 3 Shifts / 5 Days
   - 3 Shifts / 7 Days
   - Other:

3. Security Level: X Unclassified

4. Facility Types (see attachment for selections):
   Type
   - a. Launch
   - Keywords: launch control/processing/integration
   - b. WG Payload Processing, Launch & Recovery
   - c.
   - d.

5. Performance Parameters (see attachment for selections):
   Parameter Name
<table>
<thead>
<tr>
<th>Unit of Measure</th>
<th>Value(s)</th>
<th>Type*</th>
</tr>
</thead>
<tbody>
<tr>
<td>crane #1 capacity</td>
<td>tons</td>
<td>175.0</td>
</tr>
<tr>
<td>crane #1 hook height</td>
<td>feet</td>
<td>166.0</td>
</tr>
<tr>
<td>facility height (each)</td>
<td>feet</td>
<td>210.0</td>
</tr>
<tr>
<td>facility length (each)</td>
<td>feet</td>
<td>260.0</td>
</tr>
<tr>
<td>facility width (each)</td>
<td>feet</td>
<td>190.0</td>
</tr>
</tbody>
</table>

   Types: D - Discrete Value, R - Range, M - Minimum Value, X - Maximum Value, B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   - a. Administrative
   - b. Logistics
   - c. Maintenance
   - d. Precision Measurement Equipment Lab
   - e.

   Square Feet
   - Administrative: 58426
   - Logistics: 69392
   - Maintenance: 6828
   - Precision Measurement Equipment Lab: 51873

7. Programs (see attachment for selections):
   Programs Supported
<table>
<thead>
<tr>
<th>Space Shuttle</th>
<th>(Past/Present/Future) Status</th>
<th>Customer</th>
<th>Years Supported Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRESENT</td>
<td>NASA</td>
<td>1975</td>
<td>1999</td>
</tr>
</tbody>
</table>

Page 9
### National Facilities Study

#### Facility Data

1. **Facility Name:**
   - Building Name: **LB Cells (8) Low Bay Area/West**
   - Vehicle Assembly Building / K6-0848

2. **Percent Utilized**
   - Basis (Shifts/Days): 60
   - 
   - 1 Shift/5 Days
   - 1 Shift/7 Days
   - 2 Shifts/5 Days
   - 2 Shifts/7 Days
   - 3 Shifts/5 Days
   - 3 Shifts/7 Days
   - Other:

3. **Security Level:**
   - Unclassified
   - Confidential
   - Secret
   - Top Secret

4. **Facility Types (see attachment for selections):**
   - a. Launch
     - Keywords: launch control/processing/integration
   - b. WG Payload Processing, Launch & Recovery
   - c. 
   - d. 

5. **Performance Parameters (see attachment for selections):**
   - Parameter Name
     - crane #1 capacity
     - crane #1 hook height
     - facility height
     - facility length
     - facility width
   - Unit of Measure
     - tons
     - feet
   - Value(s)
     - 175.0
     - 166.0
     - 210.0
     - 260.0
     - 190.0
   - Type*
     - D

6. **Support Category (see attachment for selections):**
   - Support Category
     - Administrative
     - Logistics
     - Maintenance
     - Precision Measurement Equipment Lab
   - Square Feet
     - 58426
     - 69392
     - 6828
     - 51873

7. **Programs (see attachment for selections):**
   - Programs Supported
     - Space Shuttle
     - (Past/Present/Future) Status
       - PRESENT
     - Customer
       - NASA
     - Years Supported
       - Start
       - End
       - 1975
       - 9999

---

I - 19
National Facilities Study
Facility Data

1. Facility Name: Low Bay Transfer Aisle
   Building Name: Vehicle Assembly Building/K6-0848

2. Percent Utilized
   Basis(Shifts/Days): [X] 2 Shifts / 5 Days

3. Security Level:
   [X] Unclassified
   [ ] Confidential
   [ ] Secret
   [ ] Top Secret

4. Facility Types (see attachment for selections):
   a. Launch
   b. WG Payload Processing, Launch & Recovery
   c. ____________
   d. ____________

5. Performance Parameters (see attachment for selections):
   Parameter Name | Unit of Measure | Value(s) | Type*
   ____________ | ____________ | ____________ | ____________
   > crane #1 capacity | tons | 175.0 | D
   > crane #1 hook height | feet | 166.0 | D
   > door #1 height | feet | 94.0 | D
   > door #1 width | feet | 55.0 | D
   > facility height | feet | 75.0 | D
   > facility length | feet | 260.0 | D
   > facility width | feet | 92.0 | D

   Types: D - Discrete Value  R - Range  M - Minimum Value  X - Maximum Value  B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   a. ____________
   b. ____________
   c. ____________
   d. ____________
   e. ____________

   Square Feet
   ____________
   ____________
   ____________
   ____________
   ____________

7. Programs (see attachment for selections):
   Programs Supported | (Past/Present/Future) Status | Customer | Years Supported Start | End
   ____________ | ____________ | ____________ | ____________ | ____________
   Space Shuttle | PRESENT | NASA | 1975 | 1993
National Facilities Study
Facility Data

1. Facility Name: Utility Annex/K6-947
   Building Name: Vehicle Assembly Building /K6-0848

2. Percent Utilized
   Basis(Shifts/Days): [ ] 1 Shift/5 Days  [ ] 1 Shifts/7 Days  [ ] 2 Shifts/5 Days  [ ] 2 Shifts/7 Days
   [ ] 3 Shifts/5 Days  [x] 3 Shifts/7 Days
   Other:______________________________________

   Other:______________________________________

4. Facility Types (see attachment for selections):
   a. Launch
   b. W.G. Payload Processing, Launch & Recovery
   c.______________________________________
   d.______________________________________

5. Performance Parameters (see attachment for selections):
   Parameter Name: facility height, facility length, facility width
   Unit of Measure: feet
   Value(s): facility height 20.0 feet, facility length 250.0 feet, facility width 100.0 feet
   Type*: D - Discrete Value  R - Range  M - Minimum Value  X - Maximum Value  B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   a.______________________________________
   b.______________________________________
   c.______________________________________
   d.______________________________________
   e.______________________________________

7. Programs (see attachment for selections):
   Programs Supported: Space Shuttle
   (Past/Present/Future) Status: Present
   Customer: NASA
   Years Supported: Start 1975  End 9999
## TABLE OF CONTENTS

C.1 ARNOLD ENGINEERING DEVELOPMENT CENTER

- B.1 J-6 Rocket Propulsion Test Facility Bldg. 2124. ........................................... 1

- F.1 J-6 Rocket Propulsion Test Facility ................................................................. 2

- F.2 Propulsion Development Test Cell T-6 .............................................................. 3

- F.3 Ultra-High Altitude Research Test Cell R2H .................................................... 4

---

**Figure 1 - 3**

Sample Completed Questionnaire - AEDC J6
### 1. Agency:
Department of Defense

### Center/Base:
ARNOLD ENGINEERING DEVELOPMENT CENTER

### Address:

<table>
<thead>
<tr>
<th>Street Address</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2. Contact Name:
John Rampy

### Organization:
Deputy for Operations (DO)

### Contact Information:
- **Phone Number:** 615-454-7621
- **Fax Number:** 615-454-3559
- **Mail Stop:** 9010

### 3. Date Submitted:
Jul 23, 1993

### Date Updated:
Dec 14, 1993

### Date Printed:
Jan 27, 1994
National Facilities Study
Building Data

I. Building Name: J-6 Rocket Propulsion Test Facility Bldg. 2124.
   Center/Base Name: ARNOLD ENGINEERING DEVELOPMENT CENTER

2. Geographical Location
   City: Tullahoma
   State: TN
   Country: UNITED STATES
   ZipCode: 37389 - 9010

3. Owner (If Privately Owned): N/A

4. Occupancy Year: 1994

5. Status:
   X Under Construction
   □ Active
   □ Inactive

6. Condition:
   X New
   □ Good
   □ Fair
   □ Poor

7. Building Description:
   J-6 is a remotely located facility built for testing of detonable solid-propellant rocket motors with up to 80,000 lbs of propellant without introducing risk to other AEDC facilities. J-6 is a horizontally arranged test cell designed for static testing of large solid-propellant rocket motors with up to 500,000 lb thrust at simulated pressure altitudes of 100,000 ft. An annular steam ejector with flow rates up to 3,000 lb/sec and a water-cooled diffuser system are used in conjunction with a 4.5 million-cu ft dehumidification chamber to provide pre- and post-test altitude simulation and to minimize recirculation during motor tailoff. Test objectives that can be accomplished in Test Cell J-6 are rocket performance, altitude ignition, development of high ratios nozzles, and spin testing.

8. Square Feet of Building: 16000

9. Availability for Non-Owner Utilization:
   X Yes □ No

   If Yes, Sector: X Military X Civil Gov't X Commercial

10. Current Replacement Value
    Building (Brick & Mortar)
        □ $0M - $1M
        □ $1M - $5M
        □ $5M - $10M
        □ $10M - $50M
        □ $50M - $100M
        X $100M+

11. Current Replacement Value Outfitting
        □ $0M - $50M
        X $50M - $100M
        □ $100M - $200M
        □ $200M - $350M
        □ $350M - $500M
        □ $500M+

12. Current Annual Ops & Maintenance
    □ $0K - $25K
    X $25K - $100K
    □ $100K - $200K
    □ $200K - $350K
    □ $350K - $500K
    □ $500K +

13. Support Category (See attachment for selections):
   a. Administrative
   □ Logistics
   □ Precision Measurement Equipment Lab
   □ Safety

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National Facilities Study
Building Data

1. Building Name: J-6 Rocket Propulsion Test Facility Bldg. 2124.
Center/Base Name: ARNOLD ENGINEERING DEVELOPMENT CENTER

Updated: Nov 16, 1993
Date Printed: Jan 27, 1994

13. Support Category (See attachment for selections):
   e. Security
   f. ________________________________
### National Facilities Study

**Facility Data**

1. **Facility Name:** J-6 Rocket Propulsion Test Facility
   **Building Name:** J-6 Rocket Propulsion Test Facility Bldg. 2124.

2. **Percent Utilized Basis:**
   - [ ] 1 Shift/5 Days
   - [ ] 1 Shifts/7 Days
   - [x] 2 Shifts/5 Days
   - [ ] 2 Shifts/7 Days
   - [x] 3 Shifts/5 Days
   - [ ] 3 Shifts/7 Days
   - [ ] Other: Under Construction

3. **Security Level:**
   - [ ] Unclassified
   - [ ] Confidential
   - [ ] Secret
   - [x] Top Secret

4. **Facility Types (see attachment for selections):**
   - **Type:**
     - a. Propulsion Testing
     - b. Rocket Propulsion Ground Test Facility
     - c. WG Power & Propulsion
     - d.

5. **Performance Parameters (see attachment for selections):**
   **Parameter Name**
   | Parameter Name                        | Unit of Measure | Value(s) | Type*
   |---------------------------------------|-----------------|----------|------
   | access door length                    | feet            | 20.0     | D    |
   | access door width                     | feet            | 40.0     | D    |
   | air temperature                       | degrees-fahrenheit | 15.0 - 110.0 | R    |
   | axial force                           | pounds-force    | 500000.0 | D    |
   | crane capacity                        | tons            | 75.0     | X    |
   | dehumidification access               | square feet     | 10.0     | D    |
   | dehumidification chamber diameter     | feet            | 250.0    | D    |
   | dehumidification chamber height       | feet            | 100.0    | D    |
   | pitch force                           | pounds-force    | 300000.0 | D    |
   | spin rate                             | revolutions/minute | 0.0 - 250.0 | R    |
   | test section diameter                 | feet            | 26.0     | D    |
   | test section length                   | feet            | 62.0     | X    |
   | yaw force                             | pounds-force    | 150000.0 | D    |

   **Types:**
   - D - Discrete Value
   - R - Range
   - M - Minimum Value
   - X - Maximum Value
   - B - Yes/No

6. **Support Category (see attachment for selections):**
   **Support Category**
   - a. Administrative
   - b. Logistics
   - c. Safety
   - d. Security
   - e.

7. **Programs (see attachment for selections):**
   **Programs Supported**
<table>
<thead>
<tr>
<th>Programs Supported</th>
<th>(Past/Present/Future) Status</th>
<th>Customer</th>
<th>Years Supported</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castor 120</td>
<td>FUTURE</td>
<td></td>
<td></td>
<td>1994</td>
<td>1994</td>
</tr>
</tbody>
</table>
National Facilities Study
Facility Data

1. Facility Name: J-6 Rocket Propulsion Test Facility
Building Name: J-6 Rocket Propulsion Test Facility Bldg. 2124.

Updated: Nov 16, 1993
Date Printed: Jan 27, 1994

7. Programs (see attachment for selections):

<table>
<thead>
<tr>
<th>Programs Supported</th>
<th>(Past/Present/Future) Status</th>
<th>Customer</th>
<th>Years Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castor IV-XL</td>
<td>FUTURE</td>
<td>Air Force</td>
<td>1994 1994</td>
</tr>
<tr>
<td>PK Program - Stages II and III</td>
<td>FUTURE</td>
<td>Air Force</td>
<td>1994 1999</td>
</tr>
</tbody>
</table>
1. Facility Name: Propulsion Development Test Cell T-6
   Building Name: J-6 Rocket Propulsion Test Facility Bldg. 2124.

2. Percent Utilized
   Basis(Shifts/Days): □ 1 Shift/5 Days □ 1 Shifts/7 Days □ 2 Shifts/5 Days □ 2 Shifts/7 Days
   Other: as required


4. Facility Types (see attachment for selections):
   a. Propulsion Testing
   b. Rocket Propulsion Ground Test Facility
   c. WG Power & Propulsion
   d. 

5. Performance Parameters (see attachment for selections):
   Parameter Name
   - simulated flight environment @ mach 3.
   - test cell diameter
   - test cell length
   - wavelength range

   Unit of Measure: feet
   Value(s): 90000.0
   Type*: D

   Types: D - Discrete Value R - Range M - Minimum Value X - Maximum Value B - Yes/No

6. Support Category (see attachment for selections):
   Support Category
   a. 
   b. 
   c. 
   d. 
   e. 

   Square Feet

7. Programs (see attachment for selections):
   Programs Supported
   (Past/Present/Future) Status
   Customer
   Years Supported
   Start
   End
1. Facility Name: Ultra-High Altitude Research Test Cell R2H
   Building Name: 1-6 Rocket Propulsion Test Facility Bldg. 2124.

2. Percent Utilized
   Basis (Shifts/Days): 30
   - 1 Shift/5 Days
   - 1 Shifts/7 Days
   - 2 Shifts/5 Days
   - 2 Shifts/7 Days
   - 3 Shifts/5 Days
   - 3 Shifts/7 Days
   - 4 Shifts/5 Days
   - 4 Shifts/7 Days
   - Other: as required

3. Security Level:
   - Unclassified
   - Confidential
   - Secret
   - Top Secret

4. Facility Types (see attachment for selections):
   a. Propulsion Testing
   b. Research Laboratory
   c. Test Chambers
   d. WG Power & Propulsion
   e. 

5. Performance Parameters (see attachment for selections):

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Unit of Measure</th>
<th>Value(s)</th>
<th>Type*</th>
</tr>
</thead>
<tbody>
<tr>
<td>mass flow = 30 grams/sec</td>
<td>feet</td>
<td>200000.0</td>
<td>D</td>
</tr>
<tr>
<td>mass flow = 5 grams/sec</td>
<td>feet</td>
<td>225000.0</td>
<td>D</td>
</tr>
<tr>
<td>test chamber diameter</td>
<td>feet</td>
<td>3.0</td>
<td>D</td>
</tr>
<tr>
<td>test chamber length</td>
<td>feet</td>
<td>5.0</td>
<td>D</td>
</tr>
</tbody>
</table>

   Types: D - Discrete Value, R - Range, M - Minimum Value, X - Maximum Value, B - Yes/No

6. Support Category (see attachment for selections):

   Support Category
   a. 
   b. 
   c. 
   d. 
   e. 

7. Programs (see attachment for selections):

   Programs Supported
   UV Mechanism Research Program

   (Past/Present/Future) Status
   PRESENT

   Customer
   Air Force

   Years Supported

Page 5
Updated Nov 16, 1993
Date Printed Jan 27, 1994
TABLE OF CONTENTS

C.1 LANDLEY RESEARCH CENTER

B.1 National Transonic Facility/1236

F.1 National Transonic Facility

Figure 1 - 4
Sample Completed Questionnaire - LaRC NTF

1 - 30
1. Agency: National Aeronautics and Space Administration
Center/Base: LANGLEY RESEARCH CENTER
Address: CODE 446

LANGLEY RESEARCH CENTER
HAMPTON, VA 23665 - 5225

2. Contact Name: ALAN FARROW
Organization: FACILITIES PROGRAM DEVELOPMENT OFFICE
Phone Number: 446
Fax Number: 48096
Mail Stop: 446

3. Date Submitted: Jul 16, 1993
Updated: Dec 16, 1993
Date Printed: Jan 27, 1994
National Facilities Study
Building Data

1. Building Name: National Transonic Facility/1236
   Center/Base Name: Langley Research Center

2. Geographical Location
   City: Hampton
   State: VA
   Country: United States
   Zip Code: 23681

3. Owner (If Privately Owned): US Government

4. Occupancy Year: 1982

5. Status:
   - Under Construction
   - Active
   - Inactive

6. Condition:
   - New
   - Good
   - Fair
   - Poor

7. Building Description:
   The National Transonic Facility is used to perform high-Reynolds number aerodynamic and fluid dynamic experimental research on a wide range of flight and aerospace vehicles at Mach number of 0.2 to 1.2 and Reynolds number per foot up to 120x10 to the 6 power. The facility is a continuous flow, closed circuit, pressurized, test medium. Full-scale flight Reynolds number test conditions are achieved when the facility operates with the gaseous nitrogen test medium. As a result of this unique capability, the facility is rated as "World Class." A $60 million facility upgrade for productivity improvement is scheduled for fiscal year 1994.

8. Square Feet of Building: 40616

9. Availability for Non-Owner Utilization:
   - Yes
   - No

   If Yes, Sector:
   - Military
   - Civil Government
   - Commercial

10. Current Replacement Value
    Building (Brick & Mortar)
    - $0M - $1M
    - $1M - $5M
    - $5M - $10M
    - $10M - $50M
    - $50M - $100M
    - $100M+

11. Current Replacement Value Outfitting
    - $0M - $50M
    - $50M - $100M
    - $100M - $200M
    - $200M - $350M
    - $350M - $500M
    - $500M+

12. Current Annual Ops & Maintenance
    - $0K - $25K
    - $25K - $100K
    - $100K - $200K
    - $200K - $350K
    - $350K - $500K
    - $500K+

13. Support Category (See attachment for selections):
   a. Administrative
   b. Maintenance
   c. Power
   d. Precision Measurement Equipment Lab
   e. Safety
### National Facilities Study
### Building Data

1. **Building Name:** National Transonic Facility/1236  
   **Center/Base Name:** LANGLEY RESEARCH CENTER

13. **Support Category (See attachment for selections):**  
   - Transportation

---

Updated: Nov 05, 1993  
Date Printed: Jan 27, 1994
1. Facility Name: National Transonic Facility
   Building Name: National Transonic Facility/1236

2. Percent Utilized
   Basis(Shifts/Days): 
   - 67% 1 Shift/5 Days
   - Other: 2 Shifts / 5 Days

3. Security Level: 
   - Unclassified
   - Confidential
   - Secret
   - Top Secret

4. Facility Types (see attachment for selections):
   a. WG Aero & Acoustics
   b. Wind Tunnels
   c. 
   d. 

5. Performance Parameters (see attachment for selections):
<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Unit of Measure</th>
<th>Value(s)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>angle-of-attack</td>
<td>degrees</td>
<td>-11.0 - 45.0</td>
<td>R</td>
</tr>
<tr>
<td>angle-of-yaw</td>
<td>degrees</td>
<td>-180.0 - 180.0</td>
<td>R</td>
</tr>
<tr>
<td>mach #</td>
<td>unitless</td>
<td>0.2 - 1.2</td>
<td>R</td>
</tr>
<tr>
<td>pressure capability</td>
<td>psia</td>
<td>14.7 - 133.7</td>
<td>R</td>
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<td>reynolds #</td>
<td>millions per foot</td>
<td>120.0</td>
<td>X</td>
</tr>
<tr>
<td>roll angle</td>
<td>degrees</td>
<td>-15.0 - 15.0</td>
<td>R</td>
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<td>temperature range - fahrenheit</td>
<td></td>
<td>-320.0 - 150.0</td>
<td>R</td>
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<tr>
<td>test section height</td>
<td>feet</td>
<td>8.2</td>
<td>D</td>
</tr>
<tr>
<td>test section length</td>
<td>feet</td>
<td>25.0</td>
<td>D</td>
</tr>
<tr>
<td>test section width</td>
<td>feet</td>
<td>8.2</td>
<td>D</td>
</tr>
</tbody>
</table>

6. Support Category (see attachment for selections):
   a. Precision Measurement Equipment Lab
   b. Transportation
   c. 
   d. 
   e. 

7. Programs (see attachment for selections):
<table>
<thead>
<tr>
<th>Programs Supported</th>
<th>(Past/Present/Future) Status</th>
<th>Customer</th>
<th>Years Supported Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Subsonic Transportation</td>
<td>PRESENT</td>
<td>Boeing, McDo</td>
<td>1993</td>
<td>2000</td>
</tr>
<tr>
<td>Boeing 767</td>
<td>PRESENT</td>
<td>BOEING</td>
<td>1990</td>
<td>1996</td>
</tr>
<tr>
<td>C-17</td>
<td>PRESENT</td>
<td>Douglas Airc</td>
<td>1989</td>
<td>1995</td>
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<td>High Speed Research</td>
<td>PRESENT</td>
<td>Boeing, McDo</td>
<td>1993</td>
<td>2000</td>
</tr>
</tbody>
</table>
Volume 1 - Facilities Inventory

Access to Space
Advanced Solid Rocket Motor
Air Force Ballistic Missile Launches
Assured Crew Return Vehicle (ACRV)
Atlas/Centaur
AXAF
Clementine
Comet
Commercial Titan III
Crystal Growth Furnace
Defense Meterological Satellite Program
Defense Satellite Communications System
Dod Satellites
Earth Observing System
FEWS Program
Galileo
Gamma Ray Observatory
High Speed Research
Hybrid Booster Development
LOX/Hydrocarbon Engine
Mars Return Vehicles
MICOM (Next Generation Missile)
Mission to Planet Earth
NASP
New Generation Launch Vehicle
P&W RL-10 Upgrade
Pegasus
Pluto Fly By
Propulsion Technology
Robotic Technology Test Vehicle
SCRAMJET Test Facility
Solid Propellant R/D
Solidification Furnace
Space Based Laser
Space Shuttle
Space Shuttle Solid Rocket Motor
STME
TDRSS
Telerobotics
Transport Aircraft

Figure 1 - 5
Examples of Programs Supported
Volume 1 - Facilities Inventory

Figure I - 6
Examples of Keywords Used in NFS Inventory

aerodynamics research
aeropropulsion heat transfer research
aerodynamic test stand
altitude chambers
anechoic test chamber
anechoic test range
arc jet
balloon/sounding rocket tracking data
acquisition
communications control center
drop tower
drop tower
engine test stand
hybrid propulsion test facility
launch control, processing, and integration
launch facilities, structures, and support
liquid rocket engine test stands
low-speed aerodynamic research
neutral buoyancy
payload operations and control centers
propellant tank - mfg
propulsion component test
pyrotechnics test
radio frequency anechoic test chamber
rocket propulsion test
simulator testing
simulators
solar array simulators
solid motor build-up
solid rocket motor test stands
space vehicle assembly
spacecraft control centers
spacecraft test
spin and attitude control systems test
spin test
simulators
tanks and assembly manufacturing
tanks and assembly manufacturing
temperature & altitude control chambers
test/acoustic model
test/anechoic
test cell - rocket propulsion test
test cell - sub-scale engine components
test/structural - thermal
thermal-vacuum solar simulation
thermal-vacuum test chamber
thermal-vacuum test chamber
tribology
vacuum chambers/thermal
vtol hover test stand
wind tunnel/hypersonic
wind tunnel/subsonic
wind tunnel/supersonic
wind tunnel/transonic
Volume 1 - Facilities Inventory

<table>
<thead>
<tr>
<th>Agency:</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoD</td>
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<td>Indian Ocean Tracking Station, Seychelles, IO</td>
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<td>Kennedy Space Center (Patrick AFB)</td>
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<td>Patrick AFB, FL</td>
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<td>U. S. Army Research Institute of Environmental Medicine</td>
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<td>Vandenberg AFB</td>
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| Industry | Aerojet Electronics Systems Division |
|          | Aerospace Corporation  |
|          | Boeing  |
|          | COMSAT Corporation  |

Figure I - 7
Sites By Agency/Industry

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### Volume 1 - Facilities Inventory

<table>
<thead>
<tr>
<th>Agency: Industry (cont'd)</th>
<th>Site</th>
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<tbody>
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<tr>
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<tr>
<td>Loral (Infrared and Imaging Systems)</td>
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<tr>
<td>Martin Marietta (Astronautics Division)</td>
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<td>Rockwell (Space)</td>
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<td>Thiokol</td>
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<tr>
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<td>Johnson Space Center/White Sands</td>
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<td>Downey/Palmdale</td>
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<td>Kennedy Space Center</td>
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<tr>
<td>Langley Research Center</td>
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<tr>
<td>Lewis Research Center/Plumbrook Station</td>
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**Figure 1 - 7**

Sites By Agency/Industry

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1 Data received in hard-copy form on 4/6/94, but not interpreted & loaded to NFS database as of printing.
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<td>DoE</td>
<td>Ames National Lab</td>
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<td>Sandia/Los Alamos National Lab</td>
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<td>Stanford Linear Accelerator Center</td>
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</table>

Figure I - 7
Sites By Agency/Industry

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Figure I-8
Types of Facilities at Selected Sites

Aerojet Electronic Systems Division
- Communications
- Computational Support/Computer Ops
- Environmental Simulation/Experimentation
- Manufacturing
- Mission Operations
- Processing
- Support
- Test Chambers
- Testbeds
- Tracking & Data Acquisition

Wind Tunnels
- Antigua AS, West Indies
- Range

Armstrong Laboratory/Human System Center
- Human Factors/Biomedical
- Operational Simulation/Demonstration
- Research Laboratory
- Test Chambers

Aerospace Corporation
- Environmental Simulation/Experimentation
- Operational Simulation/Demonstration
- Processing
- Propulsion Testing
- Research Laboratory
- Operational Simulation/Demonstration
- Test Chambers
- Test Stands
- Testbeds

Arnold Engineering Development Center
- Assembly
- Computational Support/Computer Ops
- Data Archive/Storage
- Environmental Simulation/Experimentation
- Flight Experiment Ground Support (clean room)
- Launch
- Materials
- Mission Operations
- Operational Simulation/Demonstration
- Operations
- Propulsion Testing
- Range
- Research Laboratory
- Rocket Propulsion Ground Test Facility
- Support
- Test Chambers
- Test Stands
- Wind Tunnels

Ames Research Center
- Assembly
- Communications
- Computational Support/Computer Ops
- Data Archive/Storage
- Environmental Simulation/Experimentation
- Flight Experiment Ground Support (clean room)
- Human Factors/Biomedical
- Manufacturing
- Mission Operations
- Operational Simulation/Demonstration
- Operations
- Payload Operations
- Processing
- Propulsion Testing
- Range
- Research Laboratory
- Support
- Test Chambers
- Test Stands
- Testbeds
- Tracking & Data Acquisition
- Training

Ascension AAF, South Atlantic
- Range

BMDO
- Computational Support/Computer Ops
- Data Archive/Storage
- Environmental Simulation/Experimentation
- Flight Experiment Ground Support (clean room)
- Mission Operations
- On-Orbit Mission Control Centers
- Operational Simulation/Demonstration
- Operations
- Payload Operations
- Processing
Volume 1 - Facilities Inventory

Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Wind Tunnels

Boeing
Assembly
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Manufacturing
Payload Operations
Processing
Propulsion Testing
Research Laboratory
Test Chambers
Test Stands
Testbeds
Training
Wind Tunnels

Cape Canaveral Air Force Station
Launch
Launch Processing/Ordnance
Mission Operations
Payload Operations
Range

Cape Canaveral ELS PCT Station
Tracking & Data Acquisition

COMSAT Corporation
Assembly
Communications
Research Laboratory
Test Chambers

Diego Garcia, IO
Tracking & Data Acquisition

Dryden Flight Research Center/ARC
Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Landing Ops
Launch
Launch Processing Ops

Fairbanks Command and Data Acquisition Station
Communications
Operations
Tracking & Data Acquisition

Fairchild AFB, CO
Communications
On-Orbit Mission Control Centers
Tracking & Data Acquisition

Falcon AFB, CO
Communications
Mission Operations
On-Orbit Mission Control Centers
Payload Operations
Testbeds
Tracking & Data Acquisition

Fairchild Space and Defense Corporation
Assembly
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Human Factors/Biomedical
Manufacturing
Materials
Operational Simulation/Demonstration
Operations
Payload Operations
Processing
Research Laboratory
Support
Volume 1 - Facilities Inventory

Test Chambers
Test Stands
Testbeds
Training

General Dynamics Corp. - Space Systems Division
Assembly
Environmental Simulation/Experimentation
Launch
Launch Processing Ops
Launch Processing/Booster
Manufacturing
Materials
Mission Operations
Operational Simulation/Demonstration
Operations
Payload Operations
Processing
Propulsion Testing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds

Goddard Space Flight Center
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Mission Operations
On-Orbit Mission Control Centers
Operations
Test Chambers
Testbeds
Tracking & Data Acquisition

Guam Tracking Station
Tracking & Data Acquisition

Hawaii Tracking Station, Oahu, HI
Communications
Range
Tracking & Data Acquisition

Hercules Incorporated
Assembly

Manufacturing
Processing

Honeywell, Inc. - Space Systems Division
Assembly
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Launch Processing Ops
Manufacturing
Materials
Operational Simulation/Demonstration
Operations
Processing
Research Laboratory
Support
Test Chambers
Test Stands
Testbeds

Hughes
Test Chambers
Test Stands
Testbeds

Indian Ocean Station, Seychelles, IO
Communications
Support
Tracking & Data Acquisition

Jet Propulsion Lab
Assembly
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Manufacturing
Materials
Mission Operations
Operations
Processing
Range
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition

Johnson Space Center
Volume 1 - Facilities Inventory

Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Human Factors/Biomedical
Landing Ops
Launch
Manufacturing
Materials
Mission Operations
On-orbit mission Control Centers
Operational Simulation/Demonstration
Operations
Payload Operations
Processing
Propulsion Testing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Training

Kennedy Space Center
Launch
Payload Operations
Range
Recovery Ops

Kennedy Space Center (PAFB/DOD)
Range

Kwajalein Ground Antenna/Monitor Station
(GPS)
Communications
Tracking & Data Acquisition

Langley Research Center
Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Landing Ops

Manufacturing
Materials
Operational Simulation/Demonstration
Operations
Processing
Propulsion Testing
Research Laboratory
Support
Test Chambers
Test Stands
Testbeds
Wind Tunnels

Lewis Research Center
Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Manufacturing
Materials
Operational Simulation/Demonstration
Payload Operations
Propulsion Testing
Research Laboratory
Rocket Propulsion Ground Test Facility
Test Chambers
Test Stands
Testbeds
Wind Tunnels

Lockheed
Assembly
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Launch Processing Ops
Manufacturing
Materials
Mission Operations
Operational Simulation/Demonstration
Operations
Processing
Range
Research Laboratory
Support
Test Chambers
Volume 1 - Facilities Inventory

Test Stands
Testbeds
Tracking & Data Acquisition
Training
Wind Tunnels

Loral Infrared and Imaging Systems
Assembly
Manufacturing
Materials
Research Laboratory
Test Chambers

Marshall Space Flight Center
Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Human Factors/Biomedical
Launch Processing/Booster
Manufacturing
Materials
Mission Operations
On-orbit mission Control Centers
Operational Simulation/Demonstration
Operations
Payload Operations
Processing
Propulsion Testing
Range
Recovery ops
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Training
Wind Tunnels

Motorola, Inc.
Assembly
Environmental Simulation/Experimentation
Manufacturing
Research Laboratory

National Technical Systems
Assembly
Test Chambers
Testbeds
Wind Tunnels

New Hampshire Tracking Station, NH
Communications
Tracking & Data Acquisition

Oakhangar, Borden Hauta, UK
Communications
Tracking & Data Acquisition

Offutt AFB, NE
Communications
Mission Operations
On-orbit mission Control Centers
Payload Operations

Onizuka AFS, CA
Assembly
Communications
Data Archive/Storage
On-orbit mission Control Centers
Operational Simulation/Demonstration
Operations
Processing
Tracking & Data Acquisition

Patrick AFB, FL
Range

Phillips Lab/Edwards AFB
Assembly
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Materials
Processing
Propulsion Testing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition

Rockwell
Volume 1 - Facilities Inventory

Assembly
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Launch
Manufacturing
Materials
Mission Operations
Operational Simulation/Demonstration
Operations
Processing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Wind Tunnels

Rome Laboratory
Computational Support/Computer Ops
Processing
Range
Research Laboratory
Testbeds
Tracking & Data Acquisition

Stennis Space Center
Assembly
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Manufacturing
Materials
Operations
Processing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Tracking & Data Acquisition
Wind Tunnels

Suxtland Federal Center, Building #4
Assembly
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Launch
Manufacturing
Materials
Mission Operations
Operational Simulation/Demonstration
Operations
Processing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Tracking & Data Acquisition
Wind Tunnels

Texas Instruments, Inc. - Defense Systems & Electronics
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Environmental Simulation/Experimentation
Manufacturing
Materials
Mission Operations
Operational Simulation/Demonstration
Operations
Processing
Propulsion Testing
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Training

Thiokol
Assembly
Communications
Computational Support/Computer Ops
Data Archive/Storage
Environmental Simulation/Experimentation
Manufacturing
Materials
Operational Simulation/Demonstration
Operations
Processing
Propulsion Testing
Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Wind Tunnels

Thule Tracking Station
Communications
Tracking & Data Acquisition

TRW Space and Electronics Group
Assembly
Communications
Computational Support/Computer Ops
Environmental Simulation/Experimentation
Flight Experiment Ground Support (clean room)
Human Factors/Biomedical
Manufacturing
On-orbit mission Control Centers
Payload Operations
Processing
Propulsion Testing
Volume 1 - Facilities Inventory

Research Laboratory
Rocket Propulsion Ground Test Facility
Support
Test Chambers
Test Stands
Testbeds
Tracking & Data Acquisition
Wind Tunnels

United Technologies, Inc.
Manufacturing
Operational Simulation/Demonstration
Processing
Propulsion Testing
Rocket Propulsion Ground Test Facility
Test Stands

US Army Research Institute of
Environmental Medicine
Environmental Simulation/Experimentation
Research Laboratory
Test Chambers

Vandenberg AFB
Communications
Launch
Payload Operations
Range
Testbeds
Tracking & Data Acquisition

Wallops Command and Data Acquisition Station
Communications
Mission Operations
Processing
Support
Tracking & Data Acquisition

Wallops Flight Facility/GSFC
Launch
Payload Operations
Range
Recovery Ops

Westinghouse Electric
Assembly
Computational Support/Computer Ops
Volume 1 - Appendix 1
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MSgt. Ed Fuller  Office of the Deputy Assistant Secretary of the Air Force for Space Plans and Policy - member, Space Operations Task Group

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LCol. Stan Mushaw  Office of the Deputy Assistant Secretary of the Air Force for Space Plans and Policy - member, Space Operations Task Group

Mr. Ralph Spillinger  Facilities Planning and Projects Office, NASA HQ - member, Space Operations Task Group

Ms. Judy Simonds  Chief, Program Evaluation Branch, Office of Space Flight, NASA HQ - member, Space Operations and Space Research and Development Task Groups

Special Recognition:

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