Status of Japanese Experiment Module (JEM) Activities

Aug. 6, 1991
Houston, Texas

National Space Development Agency of Japan
(NASDA)
HISTORY

- 1984~ Conceptual Study, Basic Design
- March 1989 MOU Signed.
- Sep. 1989 Acceptance of IGA by the Japanese Diet.
- Jan. 1990 Approval to start JEM Program Preliminary Design received and Development Test for Elements started.
- Feb. 1991 Interim Design Reviews conducted.
JEM CONFIGURATION

Pressurized Module (PM)

Exposed Facility (EF)

Experiment Logistics Module

- Pressurized Section (ELM–PS)
  - Exposed Section (ELM–ES)

Remote Manipulator System (JEM RMS)
Attached to the SS Node 2.

Experiments conducted by crew in shirt-sleeve environment.

- Space Medical Experiments
- Biological Experiments
- Material Production Experiments
- Biotechnological Experiments

- 11m(L) × 4.2m(ID)

- 10 ISPRs, 10 System Racks, 3 Storage Racks

- Airlock at the Aft-end Cone 1.3m(D)
EXPOSED FACILITY (EF)

- Open to Space Environment
- Facility for conducting
  - Scientific Observation
  - Earth Observation
  - Experiments in Communications, Technology Development, and Material Science

- $5.3\text{m}(L) \times 5.0\text{m}(W) \times 3.7\text{m}(H)$
- 10 Attached Payloads (Replaceable)
- Pressurized Section (ELM–PS)
  - Attached to the side port of PS.
  - Provides functions such as storage and Transportation of Experiment Devices and Specimens as well as Mission Logistics
  - 4.1m(L) × 4.2m(D), 8 Racks

- Exposed Section (ELM–ES)
  - Attached to the tip of EF.
  - Provides services such as Transportation of EF Payloads and ORUs.
  - 1.8m(L) × 4.9m(W) × 3.6m(H)
REMOTE MANIPULATOR SYSTEM (JEMRMS)

- Attached to the aft end Cone of PM.
- Operation Console located inside of PM.
- Composed of a Main Arm and a Small Fine Arm which is attached to the SEE of the Main Arm.
- Main Arm is 10m long, with maximum handling capability of 7000 Kg.
- Small Fine Arm is 1.8 m long and performs dextrous tasks.
# Space Station Master Schedule

(as of July 1991)

<table>
<thead>
<tr>
<th>NASA Milestone</th>
<th>JEM Milestone</th>
<th>JEM Development</th>
<th>Operation Operation Plan</th>
<th>Ground System</th>
<th>Crew</th>
<th>Utilization Utilization Policy</th>
<th>Utilization Plan</th>
<th>Space Experiment</th>
<th>SSIP Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDR</td>
<td>PRR#1</td>
<td>Preliminary Design</td>
<td>System Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SEL</td>
</tr>
<tr>
<td></td>
<td>PRR#2</td>
<td>Development Test</td>
<td>Detailed Design &amp; Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PRR#3</td>
<td></td>
<td></td>
<td>1st COP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDR</td>
<td>Detail Design</td>
<td></td>
<td>1st TOP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proto Flight Model Acceptance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sustaining Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PFM Integration and Testing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operation Plan**
- 1st Group Crew Recruiting & Selection
- 1st Group Crew Training

**Ground System**
- Standard

**Crew**
- Crew Selection

**Utilization Plan**
- Pre-AO

**Space Experiment**
- IML-1
- FMPT

**SSIP Facilities**
- SEL
- SST, WET
- SSOF

**Note:** The diagram includes various milestones and events for the Space Station, indicating timelines and phases of development.
JEM DEVELOPMENT TEST

- Structure and Mechanism
- Electrical Power System
- Data Management System
- Thermal Control System
- Environment Control System
- Experiment Support System
- Remote Manipulator System
- **Purpose**
  - To conduct
    - JEM development
    - Operations, Training
    - Planning and management
    - Engineering support

- **Configuration**
  - Located at Tsukuba Space Center
    - Space Experiment Laboratory (SEL)
    - Space Station Test Building (SST)
    - Astronaut Training Facility (ATF)
    - Weightless Environment Test Building (WET)
    - Space Station Operations Facility (SSOF)
EVA DEVELOPMENT TEST

- Evaluate accessibility to and maintainability of PM, EF, JEMRMS and OURs by EVA Crew.

- Scheduled Oct. – Nov. 1991

- Use NBS in MSFC

- Mock-up is being designed.

- Reflect in the current design.
JEM DATA RELAY VIA COMETS

- Provide JEM-to-Ground data link
  50 Mbps data rate through Ka-band.
  Up link not planned to JEM.

- Equipment installation including antenna on JEM-EF as an experiment payload.

- Use COMETS (Communications and Broadcasting Test Satellite)
  - Multifrequency Band integration technology
  - Scheduled to be launched in 1997.
  - Missions: Interorbit communications
    Advanced mobile satellite communications
    Advanced satellite broadcasting
H-II ORBITING PLANE (HOPE)

- To carry cargo to/from Space Station/JEM
- Launched by H-II or H-II derivative Vehicle
- Unmanned, fully automatic and reusable
- Operational in the early 2000's
- Gross weight of 20 tons at launch
- Payload weight of 3 tons (up) and 5 tons (down)
- Cargo bay: 6m (L) × 2.8m (D)
- Phase A study