

**WARNING: THIS PROCEDURE CONTAINS
HAZARDOUS OPERATIONS**



HESSI SPACECRAFT LOADING AND UNLOADING

HSI_MIT_035E.DOC

2001-JAN-09

PETER HARVEY

30 SW Safety Approval: _____ Date _____

As Run on: _____ (Date/Time)

By _____ (Test Conductor)

DOCUMENT REVISION RECORD

Rev.	Date	Description of Change
B	2000-12-30	<p>When starting haz ops, add words to change lights to amber, make facility announcement and set up control area.</p> <p>For ending haz ops, add words to change lights to green, make facility announcement.</p> <p>Added forklift as a backup support to the lift gate.</p>
C	2001-01-02	<p>Removed forklift backup support</p>
D	2001-01-07	<p>Comments from 30SW Doyle on 035C resulting in Rev D</p> <p>General Comments</p> <ol style="list-style-type: none"> 1. HSI_MIT_012 General Comments 1, 2, 3, and 6 apply. <ol style="list-style-type: none"> 1. Add 30 SW Safety approval signature block on cover page(EWR 127-1, Appendix 6B, para. 6B.2.a.)=>Cover sheet 2. List/Identify any tools/equipment that may be required to run this procedure (EWR 127-1, Appendix 6B, para. 6B.2.8). See 4.2 3. List/Identify required personnel protective equipment(PPE) (EWR 127-1, Appendix 6B, para. 6B.2.7). See 4.3. 6. Add the appropriate emergency and backout steps per EWR 127-1, Appendix 6B, para., 6B.2.15. See 7.3 2. Prior to and after performance of the hazardous operations, add steps to make the appropriate PA announcement, specify the safety clear area and change the area warning lights (EWR 127-1, Appendix 6B, para 6B.2.14). See 7.0.2,7.4.2. <p>Specific Comments</p> <ol style="list-style-type: none"> 1. Page 3, sec 1.1 - Add EWR 127-1 to the list of reference documents (EWR 127-1 Appendix 6B, para. 6B.2.10.c). See 1.1 2. Page 4, sec 6.0 - Since the Spectrometer is purged with liquid nitrogen, add a step to check the oxygen level prior to personnel entering the truck. See 6.0 step 1. 3. Page 4, sec 6.0, item 3 - Specify the safety control area. see 7.0.1. 4. Page 5, sec 7.1, items 8 and 9 - The total weight of the spacecraft and the dolly is 972 lbs. Clarify whether two technicians can hold the spacecraft and pull it into the truck. Clarify if a winching device is used to move the spacecraft or if some sort of template is used to fill the void between the lift gate and the truck bed. Clarify how two technicians inside the truck can effectively hold the spacecraft. See 6.0.2 lift gate leveling precaution.
E	2001-01-09	<p>NASA Safety Review Comments Incorporation</p> <p>Page 5 Item 7. Insert: A crew briefing shall be made prior to start of hazardous ops. See 7.0.3</p> <p>Add: Task leader verify all equipment needed to perform task is on hand. All personnel are trained and ready to proceed. See 7.0.3</p> <p>Page 15 item 7. Add: Establish a Safety Control area. See 7.0.1</p> <p>Insert: Turn on flashing amber light. See 7.0.2</p> <p>Page 5 item 7. Insert: In Bldg 836, Obtain NASA Safety concurrence to proceed with HAZARDOUS Operations. See 7.0.4</p> <p>Page 5. Add a step, In Bldg 836 obtain NASA Safety concurrence to return area to normal operations, turn amber light off. See 7.4.1</p> <p>Add: EMERGENCY Instructions See Appendix A.</p>

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Western Range/NASA Safety: _____
Date

Project Manager: _____
Peter Harvey Date

System Engineer: _____
David Curtis Date

QA: _____
Ron Jackson Date

1.0 INTRODUCTION

This procedure provides the necessary instructions for unloading the High Energy Solar Spectrographic Imager (HESSI) payload from a truck equipped with a lift gate, and similarly, load the spacecraft into a truck via the same gate. The document describes the equipment, personnel, and procedures necessary for handling the HESSI Payload during these operations.

1.1 Reference Documents

1. NSS/GO-1740.9 NASA Safety Standard for Lifting Devices and Equipment
2. NHB5300.4(3L) Requirements for Electrostatic Discharge Control
3. FED-STD-209 Airborne Particulate Cleanliness Classes in Clean Rooms and Clean Zones.
4. EWR 127-1

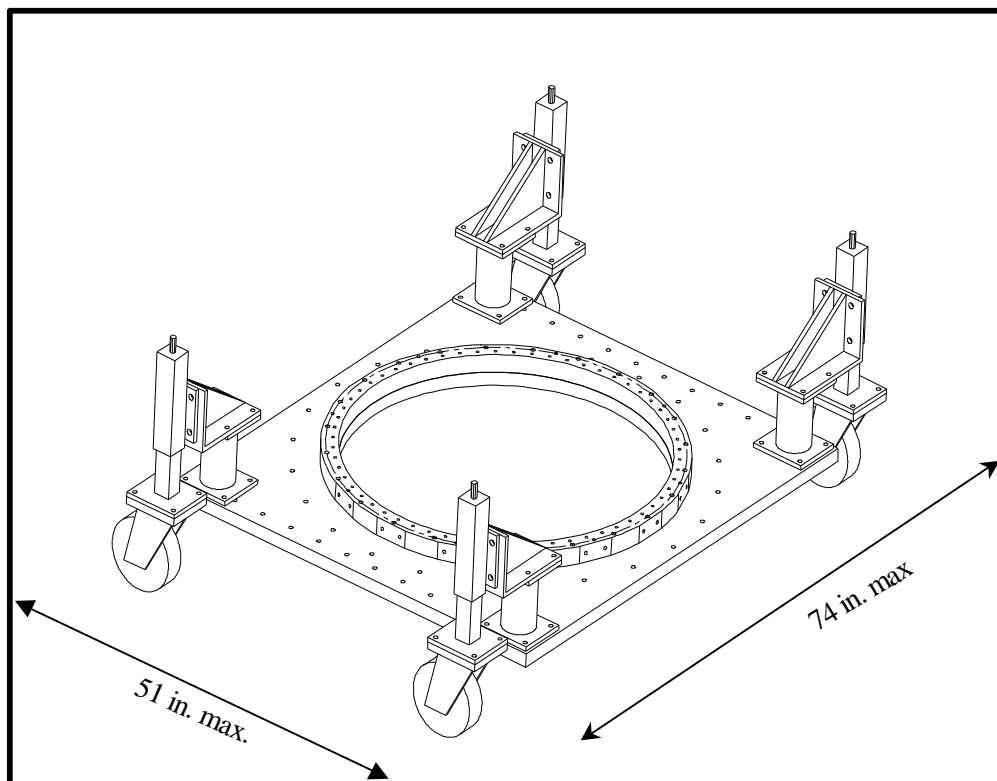
1.2 Description of Hazards Contained in this Procedure

Offloading from or loading the spacecraft into a truck is potentially hazardous to the spacecraft or nearby personnel. The truck lift gate could fail or the spacecraft could roll off the lift gate while the lift gate is raised.

2.0 APPLICATION

The HESSI payload will be transported from JPL to VAFB Building 836 and from there to building 1555 as required to support payload processing. The payload weighs 291 kg and its dolly weighs approximately 150 kg. Figure 1 contain a sketch of the dolly used for transport.

Figure 1. Spacecraft Dolly



3.0 CLEANLINESS AND ENVIRONMENT

The HESSI payload should be treated as ESD sensitive, and handled per MIL-STD-1686 Class 1, and NHB5300.4(3L) Requirements for Electrostatic Discharge Control.

The HESSI payload is contamination sensitive, and must be handled with appropriate care. At all times, the payload will be handled per FED-STD-209 Airborne Particulate Cleanliness Classes in Clean Rooms and Clean Zones.

All moving operations outside of a clean room will take place with the payload covered with anti-static bagging.

The payload will be handled only by personnel wearing attire appropriate for a FED-STD-209 Class 100,000 cleanroom, including gloves. If the payload is double bagged, personnel will not need full cleanroom suits. However, gloves and wrist straps will be required.

4.0 REQUIRED PERSONNEL and Equipment

Only the Project Manager, Project Engineer or Quality Assurance have the authority to make changes in this procedure if the need arises. At least one of these individuals will be present during the full duration of payload operations defined below.

4.1 Essential Personnel

Whenever the spacecraft and dolly are lifted or lowered by the truck lift gate, the following personnel are required to be involved:

1. Lift Coordinator
2. Lift Gate Operator
3. Four technicians, one for each corner of the dolly
4. Quality Assurance

4.2 Tools Required

Equipment Item	Used for
Truck with Lift Gate	Raising/Lowering
Spacecraft Dolly	Transportation
Ground Straps	Grounding
ForkLift	Backup to Lift Gate
Oxygen level sensor	Post Ship O2 check

4.3 Protective Equipment

None required.

5.0 SAFETY

The area where the lift is to occur shall be accessible to only those personnel directly involved in the lift, and only those who have been briefed on this procedure. QA shall determine if there are unnecessary personnel in the area who should be cleared.

6.0 PRECAUTIONS

The following precautions shall be taken before lifting or lowering the payload :

1. If the spacecraft has been transported with LN2 in the truck, check the Oxygen level of the truck before entering.

2. The truck should be positioned such that the lift gate will be level to within 3-4 degrees. This provides a limit of approximately 50 lbs in any direction for 2 technicians to overcome in the manipulation of the spacecraft on the lift gate.
3. The payload dolly shall be grounded and verified by QA.
4. The payload shall be bagged with ESD material, as appropriate.
5. QA shall set up signs, and/or barricades, to specify a 2m area to keep unauthorized personnel away.
6. QA shall inspect lift gate and dolly for damage before approving the lift.
7. Using a test load of at least twice the actual load, the lift gate operator shall demonstrate lift gate proper functioning.

7.0 GENERAL LIFTING or LOWERING PROCEDURE USING LIFT GATE

- 7.0.1 Install the 2m clear area markers around the lift gate.
- 7.0.2 Change warning light to amber and announce over the Public Address system that the spacecraft will be performing loading or unloading procedures.
- 7.0.3 Perform Crew Briefing. The lift coordinator will hold a Pre-Task Briefing which includes the following subjects: Walkthru of the task to be completed; Potential Hazards Involved; Use of Protective Equipment; Verification that all needed equipment is on hand, and all personnel have appropriate training.
- 7.0.4 In Building 836, obtain NASA Safety concurrence to proceed with HAZARDOUS Operations.

BEGINNING OF HAZARDOUS OPERATIONS

WARNING : Performing the procedure below may result in severe personnel injury, loss of life, or major equipment damage if not followed exactly.

7.1 LIFTING PROCEDURE

1. The lift gate operator should position the lift gate at the lower position.
2. The lift gate operator should confirm that the gate is ready for the spacecraft.
3. Technicians positioned at all four corners around the dolly will push the dolly onto the lift gate, such that one wheel at a time transits the void onto the lift gate.
4. After the dolly is centered on the gate, all four wheels shall be locked by pushing down on the level arms.
5. Personnel will exit the lift gate. Two technicians will enter the truck.
6. If the gate is supplied with a safety stop, it should be deployed now.
7. The lift operator will raise the lift gate and spacecraft. (If gate gets stuck, use procedure 7.3)
8. While technicians inside the truck steady the dolly, all four wheels are unlocked.
9. Technicians then roll the dolly into the truck, such that one wheel at a time transits the void of the lift gate.

7.2 LOWERING PROCEDURE

1. The lift gate operator should position the lift gate at the raised position.
2. If the gate is supplied with a safety stop, it should be deployed now.
3. The lift gate operator should confirm that the gate is ready for the spacecraft.
4. Technicians positioned at all four corners around the dolly will push the dolly onto the lift gate, such that one wheel at a time transits the void onto the lift gate.
5. After the dolly is centered on the gate, all four wheels shall be locked by pushing down on the level arms.
6. Personnel will exit the lift gate.
7. The lift gate will be lowered to the ground. (If the gate gets stuck, use procedure 7.3)
8. While technicians inside the truck hold the dolly, all four wheels are unlocked.

9. Technicians positioned at all four corners around the dolly will push the dolly off the lift gate, such that one wheel at a time transits the void of the lift gate.

7.3 BACKUP LIFT/LOWERING STEP (in the event of lift gate failure)

1. Position forklift such that each fork touches only the spacecraft dolly and has as much clearance to the spacecraft radiator as possible.
2. Lift spacecraft, back up and lower spacecraft to the ground to safe the spacecraft.

END OF HAZARDOUS OPERATION

7.4 CLEANUP

7.4.1 In Bldg 836, obtain NASA Safety concurrence to return area to normal operations, turn amber light off.

7.4.2 Remove the area markers around the lift gate.

7.4.3 Change warning light to green and announce over the Public Address system that the spacecraft loading or unloading procedure is complete.

A. EMERGENCY OPERATIONS

FIRE :

- [1] Stop the operation;
- [2] Evacuate the area;
- [3] Call 911.

EARTHQUAKE :

- [1] Stop the operation;
- [2] Engage brakes on the spacecraft dolly;
- [3] Evacuate the area.