

National Aeronautics and Space Administration



Genesis / Stardust Hardware
INVESTIGATOR'S GUIDEBOOK

Astromaterials Acquisition and Curation Office/KT
Astromaterials Research and Exploration Science Directorate/KA

NASA

Lyndon B. Johnson Space Center
Houston, Texas

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AUTHORIZATION (SIGNATURE) PAGE

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Space-Exposed Hardware Curator

Date

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Astromaterials Curator

Date

1. PURPOSE OF THIS GUIDEBOOK

The Genesis / Stardust Hardware Investigator's Guidebook is a reference source with descriptions of specific procedures for requesting samples and requirements for care of any samples allocated. Further information concerning these and other collections of space-exposed hardware and extraterrestrial samples is online at <http://curator.jsc.nasa.gov/>

2. OVERVIEW OF GENESIS AND STARDUST HARDWARE AND DOCUMENTATION

2.1 GENESIS The Genesis spacecraft returned to Earth on September 8, 2004 following a three-year mission to collect solar wind atoms and ions. During recovery the parafoil failed to deploy and the Sample Return Capsule (SRC) impacted the surface of the Utah Test and Training Range (UTTR). The SRC and the included Science Canister containing the solar wind collectors were damaged, but the majority of the hardware was recovered. The SRC and the Science Canister were initially documented and partially disassembled in a clean room at UTTR, and the Science Canister was removed from the SRC. In October 2004 the Science Canister and solar wind collectors were transported to the Genesis Curation Facility at the Johnson Space Center (JSC). The damaged SRC was transported to the Lockheed Martin Astronautics plant in Littleton, CO for analysis in support of the Genesis Mishap Investigation Board. The SRC was released by the Board and, in December 2005, was transferred to the JSC Space-Exposed Hardware Laboratory for curation and allocation.

Because the Genesis science canister was precision cleaned and sealed in a Class 10 cleanroom prior to flight, the canister and all of its internal mechanisms are considered science samples and may not be allocated through the Space-Exposed Hardware Program. Requests for these materials are handled by the Genesis Science Allocation Committee. Guidelines for such request are online at <http://curator.jsc.nasa.gov/genesis/Requests.htm>

2.2 STARDUST The Stardust spacecraft returned to Earth on January 15, 2006 following a seven-year mission to collect comet and interstellar dust particles. The SRC landed at UTTR, and was initially documented and partially disassembled in a local clean room. The SRC was then transported to JSC. The comet and interstellar sample trays were removed from the science canister and placed in the Stardust Curation Laboratory. The remaining SRC hardware, including the science canister, was placed in the JSC Space-Exposed Hardware Laboratory for curation and allocation.

2.3 DOCUMENTATION The Space-Exposed Hardware Curator maintains Hardware Databases documenting the spacecraft hardware and its processing. These databases are supplemented by extensive photographic records. This documentation will be consolidated into catalogs of Genesis and Stardust space-exposed hardware. Investigators should contact the Space-Exposed Hardware Curator for copies of these records to support hardware requests and subsequent testing.

3. REQUESTS FOR GENESIS AND STARDUST HARDWARE SAMPLES

Returned spacecraft hardware is a limited national resource and a future heritage. Samples are released only for approved applications in research, engineering development, and public display. To meet that responsibility, NASA carefully screens all sample requests. The review process is delegated to the Genesis / Stardust Hardware Allocation Committee, appointed by and reporting to the Discovery Program Manager at the Marshall Space Flight Center. Allocation Committee approval of a request, followed by concurrence from the Discovery Program Office, authorizes the Space-Exposed Hardware Curator to prepare and allocate samples.

Certain hardware may be designated as proprietary by the manufacturer. Requests for access to hardware so designated shall be assessed on a case-by-case basis by the Allocation Committee.

Requests for tests that do not involve removal of the spacecraft hardware from JSC, nor alteration of the hardware, and that do not involve proprietary hardware, may be assessed solely by the Curator. These requests are still required to include detailed plans and procedures, as described below. In such cases, the Curator shall fully inform the Allocation Committee.

4. SUBMITTING SAMPLE REQUESTS

Sample requests should be submitted directly to the Space-Exposed Hardware Curator at the following address:

Dr. Michael Zolensky
Space-Exposed Hardware Curator
Mail Code KT
Johnson Space Center
2101 NASA Parkway
Houston , TX 77058

281-483-5128 voice
281-483-5347 fax
michael.e.zolensky@nasa.gov

Receipt of requests will be confirmed by the Curator. Requests determined to be sufficiently mature to warrant consideration will be forwarded to the Genesis / Stardust Hardware Allocation Committee. Electronic submissions will expedite the allocation review process. The Allocation Committee will process applications on an ongoing basis, as received. If necessary, the Allocation Committee may set up a teleconference with the applicant to discuss requests. All individuals requesting Genesis or Stardust Hardware samples should follow the requirements and guidelines in sections 4.1 through 4.3 below, to the extent applicable.

- 4.1 Statement of objectives and description of the tests to be conducted** State the test objectives and describe the tests in sufficient detail to permit an in-depth review. State whether the tests will be destructive or non-destructive, and the hardware required. State how the results will be reported, and discuss the nature of the results (public or proprietary).
- 4.2 Sampling Plan** Provide a detailed plan for sampling the hardware, including specific parts or locations, procedures, and tools required. The sampling plan should be discussed with JSC Curatorial personnel prior to submission of the request.
- 4.3 Shipping and return plan** Provide a shipping and return plan, including any requirements for specialized containers. Investigator-supplied shipping containers are encouraged. The design of such containers should be worked out in advance with JSC Curatorial personnel. The Investigator should provide an estimate of the date by which the Hardware will be returned to JSC.

5 LOAN AGREEMENTS AND USER AGREEMENTS

5.1 LOAN AGREEMENTS

Following Allocation Committee endorsement and concurrence by the Discovery Program Office, the Space-Exposed Hardware Curator will prepare a Hardware Loan Agreement for signature by the Investigator. This Agreement delineates the responsibilities of the Investigator, including precautions required to minimize the possibility of theft or unauthorized use of the hardware (example Loan Agreement is shown in Appendix A). Upon receipt of the properly executed Loan Agreement, the Space-Exposed Hardware Curator will prepare the authorized samples and ship them to the Investigator.

5.2 USER AGREEMENTS

Genesis / Stardust Hardware testing may require the analytical capabilities of several institutions applied to an individual piece, requiring transfer among Investigators at different locations. The Investigator signing the Loan Agreement is the Accountable Investigator responsible for the security and tracking of the specimens assigned to him or her. If the Accountable Investigator sends the hardware to a Collaborator at another location, that Collaborator must be made aware of the security and handling protocols that are required. This is accomplished by having each Collaborator sign, and place on file with the Space-Exposed Hardware Curator prior to receipt of hardware, a User Agreement (example User Agreement is shown in Appendix B). A User Agreement details the handling, storage, and transfer protocols required to protect the Genesis / Stardust Hardware from theft or loss. A signed facsimile on file with the Curator is adequate until a paper copy arrives. [Note: the Accountable Investigator remains responsible for the hardware, even if is temporarily transferred to a Collaborator.]

6 CONTINUATION AS A SAMPLE INVESTIGATOR.

An Investigator's privilege for retention and use of Genesis / Stardust Hardware is contingent upon fulfilling the following obligations: (1) maintenance of, and adherence to, the Genesis / Stardust Hardware Loan Agreement; (2) timely cooperation with the annual Genesis / Stardust Hardware inventory; (3) timely cooperation with Hardware recalls, if necessary, and d) continued need for retention of hardware for planned, timely tests.

7 HARDWARE SECURITY AND ACCOUNTABILITY

Genesis / Stardust Hardware is the property of the United States Government, and it is NASA's policy that these materials will be used only for authorized purposes. It is therefore essential that rigorous accountability and security procedures be followed by all persons who have access to Genesis / Stardust Hardware.

7.1 SECURITY

A Genesis / Stardust Hardware Investigator is responsible for the control and safeguarding of all materials allocated to his or her custody. Keeping these materials under supervision or control of the Investigator and/or their Designee during use is required. When not in use, the Hardware must be locked in a safe or secure storage cabinet equipped with a combination padlock, or, if a controlled environment is required, in a locked laboratory. Combinations to the storage safe or cabinet will be under the exclusive control of the Investigator and/or their Designee. At the end of each use an inventory shall be made to insure accountability of the Hardware. Such inventories shall be maintained as a permanent record and shall be made accessible to NASA upon request. In no case may the Genesis / Stardust Hardware be stored with money, precious stones or minerals, classified material, or any other item that is considered to be of high theft potential. In the event a piece of Hardware is missing, lost, or cannot be accounted for, the Investigator must immediately report the loss to the Space-Exposed Hardware Curator.

Genesis / Stardust Hardware Investigators shall maintain complete records of the use of Hardware in their possession. These materials become the Investigator's responsibility when he or she accepts delivery from NASA, and that responsibility ends only when (1) the Hardware has been returned to NASA in the manner authorized, and (2) all material has been accounted for. The following sections specify requirements for Hardware accountability which must be met by a Genesis / Stardust Hardware Investigator.

7.1.1 Use of Electronic Documents

Electronic documents may be used to increase efficiency under these conditions: a) verification of Hardware transfers by electronic media shall be from Investigators using institutional computer accounts secured with password protection under the exclusive control of the Investigator, b) facsimile copies must be signed and be comparable to a signature on record with the Curator (for example, the Loan Agreement). The Curator will print paper copies of transfer documents and other documents for inclusion in the

Curator's permanent record for Investigators. Paper documents for the Loan Agreement and the annual inventory are required.

7.1.2 Documentation of Hardware Transfers Between Curator and Investigator

All Hardware transfers between the Space-Exposed Hardware Curator and each Investigator must be documented. By signing the *Genesis / Stardust Hardware Assignment* form (Appendix C), the Investigator becomes accountable for the Hardware. An Investigator may designate to another person to receive samples in his or her name. Such a designation must be in writing and a copy must be on file with the Space-Exposed Hardware Curator (e-mail to the Curator is acceptable and will be printed for the file copy). A Delegation of Authority does not relieve the Investigator of responsibility for Hardware received by his or her Designee.

7.1.2.1 Hardware transmitted by the Space-Exposed Hardware Curator is accompanied by a Genesis / Stardust Hardware Assignment form. Upon receipt of Hardware, the form must be signed by the Investigator and returned to the Space-Exposed Hardware Curator (signed facsimile is acceptable; however, the Investigator assumes the responsibility of verifying that the form was received by the Curator).

7.1.2.2 Transfers of Hardware *accountability* are not permitted between or among Investigators. If such a transfer of accountability is required, the Hardware must be returned to the Space-Exposed Hardware Curator for re-issue.

7.1.3 Hardware Return Documentation

All Genesis / Stardust Hardware and residues remaining at the completion of testing are to be returned to the Space-Exposed Hardware Curator. Upon the receipt of the Hardware and accountability and history documentation from an investigator, the database will be updated and the Curator will issue a Genesis / Stardust Hardware Return Receipt (Appendix D) to the Investigator.

For each piece of Hardware returned to the Curator, a history of the handling by the Investigator shall be provided. This history shall include analytical or cleaning procedures applied to the Hardware and exposure to any environments or chemicals that may alter the material. If all or parts of the Hardware are consumed during testing, this shall be documented.

8. HARDWARE INVENTORY

Annually, during the first quarter of the calendar year, the Space-Exposed Hardware Curator will provide each Investigator with a complete inventory listing of Hardware for which the Investigator is accountable. The Investigator shall review and verify the listing of current holdings to ensure that all Hardware is appropriately listed. The annual inventory must be supervised by the Investigator and witnessed by a colleague, security official, or other official of the Investigator's institution. The verified inventory listing shall be promptly returned to the Space-Exposed Hardware Curator. Appendix E is an example of an inventory listing.

If pieces of Hardware are in the possession of a collaborator at the time of the annual inventory, the Investigator may authorize (in writing; signed facsimile is adequate) the Collaborator to conduct the inventory and account for those pieces. That properly witnessed verification must be provided to the accountable Investigator who will transmit it to the Space-Exposed Hardware Curator as part of the total inventory verification. In no case will the verification of a Hardware inventory by any person other than an Investigator or Collaborator, having a valid User Agreement, be accepted by the Space-Exposed Hardware Curator.

9. NUMBERING OF HARDWARE PIECES AND SPLITS

Permanent numbers for individual pieces of Hardware are assigned by the Space-Exposed Hardware Curator's staff. Investigators are required to identify all splits they create, as created, to the Space-Exposed Hardware Curator, who will issue new split numbers. The Curator will enter the each description and number into the Hardware Database.

10. HARDWARE SHIPPING

Pieces of Hardware may be transferred by Federal Express or equivalent reliable courier service that provides online, real-time tracking of shipments. The process for shipping has three steps. First, the shipper (usually the Space-Exposed Hardware Curatorial staff) communicates with the recipient to verify that someone will be there to accept delivery on a certain date. Second, the shipper sends an e-mail announcing that the package has been sent for delivery on a certain date. This message includes the tracking number and a reminder that the recipient should promptly acknowledge receipt of package. Third, if no response is received on delivery date from the recipient, the shipper will send an e-mail query asking for confirmation of delivery. A search shall begin immediately, if needed.

Fed Ex forms require a value of package contents. This value shall be recorded as "zero". To preclude inadvertent opening by mail room employees, place inside the box a prominent message "MAIL ROOM EMPLOYEES: THIS PACKAGE CONTAINS MATERIALS TO BE OPENED ONLY IN A CLEANROOM".

Appendix A

GENESIS / STARDUST HARDWARE LOAN AGREEMENT

The Johnson Space Center of the National Aeronautics and Space Administration, a Federal Agency, hereinafter referred to as JSC, desires to enter into a Loan Agreement and to make certain material available to «**institution**», hereinafter referred to as the INSTITUTION. The INSTITUTION proposes to use said material to undertake, at its own direction, tests endorsed by the Genesis / Stardust Allocation Committee.

The use of the material by the INSTITUTION will permit beneficial contact between representatives of JSC and the INSTITUTION to provide opportunities for discovery and dissemination of information concerning the Genesis / Stardust Hardware, promote maximum utilization of material, and provide opportunities for dissemination of information concerning the activities of the National Aeronautics and Space Administration.

It therefore is agreed as follows:

1. The pieces of hardware (hereinafter referred to as the PROPERTY) made subject to this agreement will be assigned to [INSTITUTION] on Genesis / Stardust Hardware Assignment Forms signed by the JSC Space-Exposed Hardware Curator and the Investigator of [INSTITUTION NAME].
2. The PROPERTY is the property of the United States Government, is considered irreplaceable, and is therefore made available to users only under a carefully controlled and monitored program. It is therefore essential that rigorous security and accountability procedures be followed by all persons who have access to the PROPERTY. The Investigator will be responsible for the receipt, use (including security during use), accountability, and return of the PROPERTY at the end of the designated time. The INSTITUTION will agree to strictly adhere to the following procedures for the security of the PROPERTY:
 - a. Only persons authorized by the Investigator may receive and open the package. The authorized official shall record all of the PROPERTY promptly upon receipt, and it shall be so identified so long as it remains in the custody, possession, or control of the INSTITUTION.
 - b. Verification of PROPERTY transfers by electronic media shall be from persons authorized by the Investigator using institutional computer accounts secured with password protection under the exclusive control of the authorized person.
 - c. During use the PROPERTY must be under the control of the Investigator. At the end of each use of the PROPERTY, an inventory shall be made to insure the

accountability of the PROPERTY. Such inventories shall be maintained as a permanent record and shall be made accessible to NASA at all reasonable times.

- d. When not in use, the PROPERTY must be locked in a safe or secure storage cabinet equipped with a combination padlock, or, if a controlled environment is required, in a locked laboratory.
 - e. Combination to the storage safe or cabinet will be under the exclusive control of authorized officials.
 - f. Report immediately the loss or damage of the PROPERTY to the Space-Exposed Hardware Curator, Johnson Space Center, Houston, Texas 77058, telephone (281) 483-5128.
 - g. Transfer of PROPERTY among the Investigator and Collaborators is allowed if the Collaborator has submitted a signed Genesis / Stardust Hardware Sample User Agreement to the Space-Exposed Hardware Curator. The accountability for the PROPERTY remains with the Investigator to whom the PROPERTY is assigned. The Space-Exposed Hardware Curator shall be notified of PROPERTY transferred to Collaborators.
 - h. The PROPERTY shall be either hand-carried by the INSTITUTION's authorized official or mailed via FedEx or equivalent responsible, real-time tracking courier. The Space-Exposed Hardware Curator reserves the right, at the INSTITUTION's expense, to direct the mode of transportation for the PROPERTY. Shipping of PROPERTY among Collaborators shall be carefully tracked and consists of 3 steps: 1) verify recipient is available to receive package on arrival date, 2) recipient immediately acknowledges receipt, and 3) sender inquires about package receipt if recipient does not respond by day after expected arrival.
3. NOTWITHSTANDING any other provision of this agreement, the INSTITUTION shall not be liable for loss of or damage to the PROPERTY, or for the expenses incidental to such loss or damage, except that the INSTITUTION shall be responsible for any such loss or damage (including expenses incidental thereto):
- a. which results from willful misconduct or lack of good faith on the part of the INSTITUTION's directors or officers, or on the part of any of its managers, superintendents or any other equivalent representatives, who have supervision or direction of all or substantially all of the INSTITUTION's business; or
 - b. which results from a failure on the part of the INSTITUTION due to the willful misconduct or lack of good faith on the part of any of its directors, officers, or other representatives mentioned in (a) above (i) to maintain and administer, in accordance with the provisions of this agreement, the program for delivery, protection, and preservation of Government property, or (ii) to take all reasonable steps to comply with any written directions from JSC with respect to the delivery, protection, and preservation of Government property.

HOWEVER, loss or damage to the PROPERTY caused by failure to follow proper safeguarding standards as set forth in this agreement will be considered in selecting participants in future agreements.

4. Title to the PROPERTY shall remain with NASA and shall not be affected by the incorporation, attachment, or mixture thereof to or with property not owned by NASA.
5. To the extent permitted under the law of the State of «**state**», the INSTITUTION shall be liable for all claims, demands, actions, costs, and charges made, asserted, or incurred by reason of any injury to any person or property, or loss of life or property, suffered or sustained during the period of the use and enjoyment when the injury, loss of life, or property damage is caused by any act or omission of any agent or employee of the INSTITUTION.
6. This agreement shall become effective upon the date of the last signature hereto and will remain in effect for four years.

FOR: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Michael Zolensky
Space-Exposed Hardware Curator
Johnson Space Center

Date

FOR: «**institution**»

Investigator Signature

Date

Title

Appendix B

GENESIS / STARDUST HARDWARE USER AGREEMENT

I, _____ (recipient's name, printed) am collaborating with Genesis / Stardust Hardware Investigator _____ (Investigator's name, printed). I have read the sample security protocols below and agree to abide by them.

1. The Hardware (hereinafter referred to as the PROPERTY) made subject to this agreement are assigned to _____ (Investigator's name, printed).
2. The PROPERTY is the property of the United States Government, is considered irreplaceable, and is therefore made available to users only under a carefully controlled and monitored program. It is therefore essential that rigorous security and accountability procedures be followed by all persons who have access to the PROPERTY. The Investigator will be responsible for the receipt, use (including security during use), accountability, and return of the PROPERTY at the end of the designated time.
 - a. Only persons authorized by the Investigator may receive and open the package. The authorized recipient shall record all of the PROPERTY promptly upon receipt, and it shall be so identified so long as it remains in the custody, possession, or control of the recipient.
 - b. Verification of PROPERTY transfers by electronic media shall be from authorized persons using institutional computer accounts secured with password protection under the exclusive control of that person.
 - c. During use, the PROPERTY must be under the control of the recipient, acting for the accountable Investigator.
 - d. When not in use, the PROPERTY must be locked in a safe or secure storage cabinet equipped with a combination padlock, or, if a controlled environment is required, in a locked laboratory.
 - e. Combination to the storage safe or cabinet will be under the exclusive control of authorized persons.
 - f. Report immediately the loss or damage of the PROPERTY to the Space-Exposed Hardware Curator, Johnson Space Center, Houston, Texas 77058, telephone (281) 483-5128.

- g. Transfer of PROPERTY among Investigators and Collaborators is allowed if the Collaborator has submitted a signed Genesis / Stardust Hardware User Agreement to the Space-Exposed Hardware Curator. The accountability for the PROPERTY remains with the Investigator to whom the PROPERTY is assigned. The Space-Exposed Hardware Curator shall be notified of PROPERTY transferred to Collaborators.
- h. The PROPERTY shall be either hand-carried by the Investigator's authorized persons or mailed via FedEx or equivalent responsible, real-time tracking courier. Shipping of PROPERTY among Collaborators shall be carefully tracked and consists of 3 steps: 1) verify recipient is available to receive package on arrival date, 2) recipient immediately acknowledges receipt, and 3) sender inquires about package receipt if recipient does not respond by day after expected arrival.

FOR: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Michael Zolensky
Space-Exposed Hardware Curator
Johnson Space Center

Date

FOR: **Collaborator of** _____ **(Investigator name, printed)**

Collaborator Signature

Date

Title

Appendix C

GENESIS / STARDUST HARDWARE ASSIGNMENT FORM

Date :
Curatorial Order # :

JSC Tracking Number:	Hardware Description
Transfer from: NASA - Johnson Space Center Space-Exposed Hardware Curator _____ Michael Zolensky Date:	Processor:
Transfer to:	
HARDWARE RETURN DATE: (usually one year from date of issue) Notes & Special Handling Instructions:	

I acknowledge receipt of, and responsibility for, the above Hardware:

_____ Signature & Date

_____ Recipient's name (printed)

**UPON RECEIPT OF HARDWARE, PLEASE SIGN THIS FORM AND RETURN TO:
SPACE-EXPOSED HARDWARE CURATOR
MAIL CODE KT, JOHNSON SPACE CENTER, HOUSTON, TX 77058.**

Appendix D

GENESIS / STARDUST HARDWARE RETURN RECEIPT

The Space-Exposed Hardware Curator acknowledges receipt of Hardware identified by the following numbers:

FROM: [Investigator Name]

ON: [Date]

This Hardware is being processed back into the active collection and will be cleared from your inventory.

Michael Zolensky
Space-Exposed Hardware Curator

Appendix E

GENESIS / STARDUST HARDWARE INVENTORY

Hardware Number	Expected Return Date

I acknowledge that I maintain control of the above Hardware.

Signature Date
Name printed

I witnessed and verify the above inventory.

Signature Date
Name printed