



Cosmic Dust Sample Investigator's Guidebook

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Cosmic Dust Sample Summary

Cosmic dust, otherwise known as interplanetary dust particles (IDPs), has been collected by NASA U-2, ER2, WB57F aircraft in the stratosphere on oil-coated Lexan surfaces since 1981, and is curated at the Johnson Space Center. Many thousands of 2 – 100 μm particles have been collected, and it is believed that both comet and asteroid samples are present. Several cosmic dust collections have been flown during periods that coincided with prominent meteor streams and low velocity fresh cometary dust trails. These samples therefore have great scientific value. This material is curated at Johnson Space Center and made available for allocation to the international scientific community through sample requests following guidelines outlined within this document.

State of the Cosmic Dust Samples

The cosmic dust particles are observed as fine particles dispersed on the silicone oil ($n(\text{CH}_3)_2\text{SiO}$) coated surfaces of the cosmic dust sample collectors. Particles removed from these collectors are rinsed with the organic solvent hexane to remove silicone oil, but some residual oil may remain on the particles. Cosmic dust has also recently been successfully collected using oil-free polyurethane foam substrates, and other alternative oil-free substrates may be flown in the future.

Due to the presence of terrestrial contaminants, the curation staff is rarely certain of the origin of any particular extraterrestrial particle. A subset of the collected particles are examined by optical and scanning electron microscopy and energy dispersive X-ray spectrometry (EDS) to determine the structure and chemical composition of individual dust grains. Extraterrestrial particles are often identifiable by their characteristic chemical compositions and are termed “Cosmic”. Cosmic type particles are provisionally identified as those having one of the three following sets of attributes: a) Irregular to spherical, opaque, dark-colored particles composed mostly of Fe with minor S and/or Ni. b) Irregular to spherical, translucent to opaque, dark-colored particles containing various proportions of Mg, Si, and Fe with traces of S and/or Ni. c) Irregular to faceted or blocky, transparent to translucent particles containing mostly Mg, Si, and Fe but with traces of S and/or Ni. Some extraterrestrial particles may have chemical compositions that differ from these classes. Other particle types include artificial terrestrial contamination (TCA), natural terrestrial contamination (TCN), and aluminum oxide spheres (AOS). Common contaminants include reentering spacecraft debris, volcanic ash and desert dust. We emphasize that, for catalog purposes, types are defined for their descriptive and curatorial utility, not as scientific classifications. The provisional identifications made in the cosmic dust catalogs are indeed only tentative.

Some cosmic dust particles fragment into dozens to thousands of grains upon impact into the cosmic dust collector. Individual pieces of these ‘cluster particles’ may be allocated to different investigators, enabling multiple independent investigations of the same sample. Cosmic Dust Catalog #16 compiles a listing of available cluster particles as of July 2004.

Cosmic Dust Sample Preparation

The Curatorial Facility at JSC is responsible for the preparation of cosmic dust samples, within the capabilities of the curatorial operation. Although a few particles may reach one hundred μm in diameter, most available particles are on the order of 10 μm or smaller. JSC curation has extensive experience in the handling and preparation of small particles, including Hayabusa Mission and Stardust Mission samples. However, each laboratory/instrument may have unique sample preparation requirements that go beyond the capabilities or experience of the JSC curation facility. Investigators are strongly encouraged to consult closely with the JSC curatorial staff regarding their sample preparation requirements before submitting a sample request. The curator may in turn refer the Investigator to others in the community having expertise in specific areas of sample preparation.

The types of samples made available by JSC curation are individual whole particles, and very rarely, entire small collection surfaces. Particles are named for the number and type of stratospheric collector they are collected onto, and the final sample mount they ended up residing on in the curation lab. Thus particle L2005 E12 would have been collected onto the 5th (005) large area collector (L), flown on an ER-2 (2) aircraft, and would presently be the 12th particle on curation mount E. Particle W7016 A31 would have been collected from a WB57F aircraft (W7), the 16th small collection surface (016), and presently be the 31st particle on curation mount A. In addition, particles that break up during collection are called “cluster particles” and are given additional names - in the past they were denoted by adding a “*” to the name, and for the past 28 years by explicitly adding the word “cluster” to their name.

Cosmic Dust Sample Allocation

Cosmic dust samples collected by NASA are made available to the investigators only under a carefully controlled and monitored program.

The cosmic dust sample curator is responsible for the preservation of the cosmic dust sample collection and for providing appropriate samples to Investigators. Entire small cosmic dust collectors are available to qualified investigators. In general we have curated $\frac{1}{2}$ of all collection surfaces to permit future scientists access to samples collected in the past.

The curator will allocate cosmic dust samples to Investigators on the advice of the Cosmic Dust Committee (CDC) of the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM). Allocation plans will be approved by the Associate Administrator of the Science Mission Directorate or designee.

Requests for cosmic dust samples will be accepted at any time, in accordance with the information posted on the JSC curation website <http://curator.jsc.nasa.gov>. Requests will be considered at periodic meetings of the CDC.

Cosmic Dust Sample Requests

The cosmic dust samples are a unique and valuable collection. Typical samples allocated to Investigators will be on the order of 10 μm in size. Larger particles, reaching up to 100 μm in diameter, are very rare. Cosmic Dust Catalogs are available for inspection at this site: <http://curator.jsc.nasa.gov/dust/index.cfm>. Preference will be given to Investigators who have demonstrated capability of handling and analyzing small particles, consortium studies, and analyses that do not completely consume samples.

Investigators are strongly encouraged to form consortia in order to maximize the scientific return from each sample. Coordinated analyses are considered to be especially important for studies that will result in damage to or destruction of the samples. The largest particles in the collection and those particles exhibiting unusual or rare properties will be reserved for well qualified consortia.

JSC curation will perform preliminary examination of a subset of the samples, including obtaining secondary electron images and energy dispersive X-ray spectra. However, owing to limited curation resources, the samples will not, in general, be extensively characterized prior to allocation. Investigators who receive completely uncharacterized samples should thus be prepared to do pre-analysis characterization of samples allocated to them, and should be prepared for the possibility that allocated samples may not match their expectations.

Investigators are also encouraged to make the minimum request that meets the requirements of the proposed measurements. Please ensure that all items called for in Appendix A “Sample Request Guidelines” are included in the sample request. All samples are photographed before shipment, to prove that samples were indeed shipped, so samples lost during handling by investigators must be re-requested and undergo peer review as a new request.

Prior to receiving samples, investigators must complete a Cosmic Dust Sample Loan Agreement. Appendix B is an example of the loan agreement format for domestic investigators. International investigators must contact the cosmic dust curator to execute an International Loan Agreement.

Loan Agreements and sample loans are limited to five years. Investigators wishing to extend their sample loan agreement must submit a properly justified request to the curator. Investigators who have samples beyond the approved return date and who have not requested an extension may be considered delinquent and ineligible for additional sample allocations until their existing samples have been returned.

Sample Request Submission

Guidelines and requirements for cosmic dust allocation requests are described in Appendix A of this document. Sample requests should be submitted electronically in pdf format to the cosmic dust sample curator, michael.e.zolensky@nasa.gov.

Sample Request Review

Sample requests are reviewed by a subcommittee of CAPTEM, the Cosmic Dust Committee (CDC). In considering allocation requests, the CDC will assess the scientific merit of the proposal, the capability of the proposers, the availability of requested samples, and the realism of the investigation. The CDC will also weigh the overall merit of the request with the required amount of sample and any possible damage that the sample may incur. The subcommittee will consist of approximately five scientists from diverse fields, and will be appointed by the Chair of CAPTEM. Service on the CDC is subject to the procedures established by CAPTEM.

Sample Preparation Priority

Some types of sample preparation are time-consuming and risky, while others are relatively straightforward. Allocations may not, therefore, be made in the order in which proposals are received. While the CDC may make recommendations for ordering of sample requests, the decisions for prioritization of sample preparation in order to maximize the number of allocations will be made solely by the Curator. All sample requests supported by the CDC will be regarded to have equal scientific merit for the purpose of prioritization of allocations.

Alteration of Samples

Any procedure that is likely to result in a major change in the final state of allocated samples (e.g., subdivision, complete destruction, substantial radiation damage, substantial heating) as compared with that described in the initial sample request must be reviewed by the CDC. Such requests should be made in writing to the cosmic dust sample curator.

Other Use of Samples

Samples are generally provided to Investigators for research purposes only. Requests for samples for display or educational purposes are rarely approved.

Cosmic Dust Sample Security and Accountability

The cosmic dust samples are the property of the United States government. It is NASA's policy that samples are used only for authorized purposes. Sample security requirements are detailed in the Cosmic Dust Sample Loan Agreement (Appendix B).

Cosmic Dust Investigators

Investigators who wish to analyze cosmic dust samples must become cosmic dust investigators before receipt of any cosmic dust samples, either from the curator or from any already-approved Investigator as part of collaborative/consortium studies. Potential cosmic dust investigators must make a written commitment to abide by a set of rules, procedures, and restrictions, as outlined below. Investigators make this commitment by signing and returning to the curator the Cosmic Dust Sample Loan Agreement. A sample loan agreement is shown in Appendix B, and can be downloaded from the web at <http://curator.jsc.nasa.gov/dust/forms>. The form must be signed and returned by mail to the cosmic dust curator (Mailing Address: Cosmic Dust Sample Curator, Mail Code KT, Johnson Space Center, 2101 NASA Parkway, Houston, TX 77058).

Sample Receipt

A Sample Assignment form will accompany each sample distributed by the curator. ***The Sample Assignment form must be signed and returned by mail upon receipt of the samples.*** A blank copy of this form is included in Appendix C.

Sample Transfer between Investigators

Sample transfers between investigators are permitted only under the following circumstances: (1) Samples may be transferred between the cosmic dust investigator and his collaborators if the collaborative work was part of the original sample allocation request reviewed by CDC and approved by the curator. In this case, the PI remains responsible for the security and prompt return of samples (to the PI) after the collaborator is done with the measurements and samples. (2) If the PI wishes to transfer samples to collaborators other than those who were approved in the original sample request, permission must be requested from the curator, who may request review by the CDC. Once permission is granted, the PI may transfer the samples as in case 1, above. (3) If a loan is terminated, either at the request of the cosmic dust investigator or the curator, and the sample is assigned to a new PI, the curator may direct the original investigator to transfer the sample directly to the new investigator. Policies governing sample transfer are included in the Cosmic Dust Loan Agreement (Appendix B). In any sample transfer both the transmitting and receiving Investigators must complete and return Cosmic Dust Sample Transfer Forms by e-mail or fax to the curator. These transfer forms may be downloaded from the web at: <http://curator.jsc.nasa.gov/dust/forms>.

Sample Security

Cosmic dust investigators are responsible for the security of the samples allocated to them, and will be held accountable in the event that samples are lost, stolen or misused. When analyses require facilities outside of the laboratory of the Investigator, the samples remain under the supervision by the Investigator or the Investigator's research team. The investigator should prevent unsupervised access to the samples by anyone not on the research team. However, the Investigator should exercise reasonable judgment in the handling and security of these samples in order to maximize the scientific yield of sample analysis.

Sample Storage

The full requirements for the storage of cosmic dust samples are given in the Cosmic Dust Sample Loan Agreement, and are summarized here. Samples should be stored in clean and secure conditions, commensurate with the preciousness of these samples. The sample must be stored in a locked safe or a locked laboratory. They should be stored and handled in such a manner as to prevent cross-contamination with terrestrial and other extraterrestrial samples.

Lost Samples

In the event that a sample cannot be accounted for, the investigator must report the loss to the cosmic dust curator immediately, by completing and emailing, faxing or mailing a Sample Loss or Consumption form. This form can be downloaded from the web at: <http://curator.jsc.nasa.gov/dust/forms>.

Sample Accountability

Each cosmic dust investigator is required to maintain records of the use of allocated samples. Samples become the investigator's responsibility when the investigator accepts delivery of the samples from NASA. That responsibility ends only when loaned samples have been returned to NASA, or completely consumed by analysis as per the approved sample request.

A dedicated laboratory notebook should be used to maintain records of the receipt, transmittal, and treatment of samples, including any intentional or accidental damage, contamination or destruction.

Investigators are required to maintain a complete inventory of loaned samples. Investigators are required to complete, sign and return an inventory of loaned samples to the curator annually. Investigators are reminded that their records and inventory may be audited by the US Government at any time. The inventory must be witnessed by a security representative or a representative of the Institution.

Destruction During Analysis

If, in the course of analysis or handling, loaned samples are consumed or destroyed, whether intentionally or unintentionally, a Sample Loss or Consumption Form indicating this fact should be completed and returned by email, fax or mail to the curator. Blank forms may be downloaded from the web at: <http://curator.jsc.nasa.gov/dust/forms> .

Sample Transfer Methods

These guidelines apply to transfers from the curator to cosmic dust investigators, from cosmic dust investigators to the curator, and to transfers between cosmic dust investigators.

Samples can be sent by an overnight package delivery service that allows packages to be tracked online (e.g., FedEx, DHL), or by registered mail. Before shipment, the sender and the recipient must agree on a date on which the recipient or the recipient's designee can receive the allocation. Only persons authorized by the Investigator may receive and open the package. The authorized official shall record the receipt of the samples promptly.

The value of the shipment must be recorded on the shipping form as "zero". To preclude inadvertent opening by mailroom employees, place inside the box a prominent message "MAIL ROOM EMPLOYEES: THIS PACKAGE CONTAINS MATERIALS TO BE OPENED ONLY IN A CLEAN ENVIRONMENT". Samples should be sealed in at least two layers of packaging so that exterior packaging can be removed prior to clean environment entry.

Samples may also be carried by hand from and to JSC. If samples are hand-carried by air, an accompanying letter from NASA should be carried with the samples indicating the scientific value of the samples and cautioning airport security personnel against opening or touching the samples. The samples should not be put in checked luggage.

Appendix A: Sample Request Guidelines

Requests for research samples from the NASA cosmic dust sample collection are carefully reviewed by the Cosmic Dust Sample Allocation Committee (CDC), a subcommittee of the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM). Sample requests are considered independently of the status of research proposals that have been submitted or funded for the analysis of cosmic dust samples. Therefore, each cosmic dust sample request must be as informative and well justified as possible.

The sample request consists of a letter or e-mail from the Principal Investigator (PI) who will be responsible for the loan of any cosmic dust samples. The request letter will contain the following:

1. A clear description of the **scientific goals** and objectives of the proposed work and how the new analyses or tests will improve upon or complement previous work.
2. A clear description of the **measurements to be made**. For example, specify whether 'probe' analyses are electron-, ion-, proton-, or other microbeam method. Identify which Co-I and facility will perform each analysis. The request must demonstrate that the proposed measurements can be made with the requisite sensitivity and accuracy to achieve the scientific objectives, ideally by previous analyses of similarly prepared samples or analogs. The request must state whether the proposed analyses will completely consume the samples.
3. **For new investigators or new techniques**, the following should be provided:
 - a. PI/Co-I team's previous relevant experience and publications on cosmic dust samples or a closely related subject.
 - b. Demonstrate the feasibility of the analysis (sensitivity, precision, and accuracy) by similar measurements of appropriate analog samples
4. Explanation of **time constraints** (such as schedules for instrument time).
5. **Sample requirements**
 - a. Composition and size of sample necessary for the proposed investigation. If samples matching these requirements are not available, the request may be denied.
 - b. Form of samples: individual grains, or complete collection surfaces. Special sample preparation procedures may be requested, but may not be possible owing to time or resource constraints.
 - c. Mounting requirements (type of TEM grid or substrate). Special sample substrates and special sample containers must be provided by the requestor.

- d. Specific sample numbers (if known). Samples may be given unofficial designations by individual PIs that differ from the official designations assigned by the cosmic dust sample curator. The curator must be able to unambiguously identify the sample.
- e. Specify whether returned (previously studied) cosmic dust samples are acceptable.

6. List of cosmic dust samples already in the possession of the PI.

Please refer any questions about cosmic dust sample requests as follows:

Michael Zolensky (michael.e.zolensky@nasa.gov)
Cosmic Dust Sample Curator, Mail Code KT
NASA Lyndon B. Johnson Space Center, 2101 NASA Parkway Houston, TX 77058-3696

Appendix B: Nonreimbursable Agreement between the National Aeronautics and Space Administration Johnson Space Center and [Principal Investigator Name] and [Institution Name] for the Loan of Cosmic Dust Samples

Authority and Parties

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113), this Loan Agreement is entered into by the National Aeronautics and Space Administration Johnson Space Center, located at Houston, Texas (hereinafter referred to as “NASA” or “JSC”) and the Principal Investigator (hereafter referred to as “PI”) located at [Institution Name, Institution Location] and [Institution Name] (herein referred to as “the Institution”). NASA, the PI and the Institution may be individually referred to as a “Party” and collectively referred to as the “Parties.”

PURPOSE

Cosmic Dust samples distributed by Johnson Space Center of the National Aeronautics and Space Administration, hereinafter referred to as JSC, are property of the US Government and are under the custody and curatorial control of JSC.

The Johnson Space Center of the National Aeronautics and Space Administration, a Federal Agency, desires to enter into a Loan Agreement and to make certain Cosmic Dust samples available to the PI. The PI proposes to use the said Cosmic Dust samples to undertake, at his / her own direction, scientific investigations. These investigations are described in a sample request submitted by the PI to the Cosmic Dust Curator. Approval of a sample request is a prerequisite to this Loan Agreement and subsequent loan of the Cosmic Dust samples.

The use of the Cosmic Dust samples will permit beneficial contact among representatives of JSC, the PI and the Institution; will provide opportunities for discovery and dissemination of information to the scientific community and to the general public; will promote the maximum utilization of Cosmic Dust

samples by JSC; and will provide opportunities for dissemination of information concerning the activities of NASA.

RESPONSIBILITIES:

The Parties Agree to the Following:

1. The Cosmic Dust samples made subject to this Loan Agreement shall be assigned to the PI on sample assignment forms signed by the JSC Cosmic Dust Curator and the PI.

2. The Cosmic Dust samples are the property of the United States Government, and are therefore made available to investigators 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 Cosmic Dust samples. The PI and the Institution shall be responsible for the receipt, use (including security during use), and accountability of the Cosmic Dust samples, as follows:
 - a. As determined by NASA, the Cosmic Dust samples shall be either hand-carried, at the expense of the Institution, by an authorized official of the Institution, or mailed at JSC's expense, to the PI via registered mail or by a shipping service approved by JSC. JSC reserves the right, at the expense of the Institution, to direct the mode of transportation for the return of the Cosmic Dust samples.
 - b. Only the PI or the PI's Designee may receive and open the package. The PI or Designee shall record all of the Cosmic Dust samples promptly upon receipt, and a record of receipt shall be maintained while the Cosmic Dust samples are in the custody, possession or control of the PI.
 - c. During the use for research purposes, the Cosmic Dust samples must be under the constant control of the PI or Designee. At the end of each use of the Cosmic Dust samples, an inventory of the investigated samples shall be made.
 - d. When not being actively investigated, the Cosmic Dust samples must be locked in a safe or secure storage cabinet equipped with a combination padlock or equivalent. The combination to the storage safe or cabinet shall be under the exclusive control of the PI and, if appropriate, the Institution security organization. If a controlled environment is

required for scientific purposes, samples not being actively investigated must be stored in a locked laboratory.

- e. In no case may astromaterials on loan from NASA be stored with money, precious stones or minerals, classified material or any other item that is considered to be of high theft value.
- f. To insure that appropriate security arrangements are followed, the storage space holding the Cosmic Dust samples shall be subject to inspection by NASA representatives upon request.
- g. The PI shall report immediately the loss or damage of the Cosmic Dust samples to the JSC Cosmic Dust Curator.

3. The PI shall be responsible for accurate accounting of all Cosmic Dust samples by sample name / number and location. The PI shall perform an inventory of the Cosmic Dust samples on an annual basis using the sample inventory form provided by the JSC Cosmic Dust Curator, and submit this form to the JSC Cosmic Dust Curator in a timely manner. This inventory includes any samples consumed or destroyed in the course of the research. This inventory shall be signed by the PI and certified by an official or security representative of the Institution. At the termination of this Loan Agreement, unless an extension of the loan has been granted, the Cosmic Dust samples shall be returned to JSC with a full accounting of such Cosmic Dust samples, using the sample return form provided by the JSC Cosmic Dust Curator.

4. The PI may use the Cosmic Dust samples at his/her own Institution, or may carry the samples to use them at other locations consistent with the approved sample request. If the approved sample request entails collaborative work at another institution, the Cosmic Dust samples shall be either hand-carried, at the expense of the Institution, by an authorized official of the Institution, or mailed at the Institution's expense, via registered mail or by a shipping service approved by JSC. The PI shall keep a record of all such transfers, inform the JSC Cosmic Dust Curator when such transfers occur, and note them in the annual inventory. When the samples are in use by a collaborator, the original PI is responsible for extending the security requirements set forth in this agreement and shall retain responsibility for the Cosmic Dust samples. When the collaborator has finished planned work on the samples, they must be immediately returned to the PI.

5. This Loan Agreement is not transferable to another institution or investigator. If the PI relocates to another institution and wishes to continue research on the Cosmic Dust samples, a new Loan

Agreement must be completed among the PI, the new Institution and NASA before Cosmic Dust samples can be transferred. If the PI is finished with a sample, but another investigator is interested in studying this sample, a new sample request must be submitted to the Cosmic Dust Curator, and if approved a new Loan Agreement must be completed by the new Investigator.

6. Return of samples to JSC may arise from several circumstances. If the PI completes or terminates research on Cosmic Dust samples, the samples must be returned to the JSC Cosmic Dust Curator. If the PI relocates to a new institution without executing a new loan agreement, the samples must be returned. Upon the circumstances of death or incapacitation of the PI, the Institution will be responsible for returning the Cosmic Dust samples. Finally, if this agreement expires without renewal or is terminated by any of the Parties, the Cosmic Dust samples must be returned.

7. The use of Cosmic Dust samples shall be solely for the purposes set forth in the approved sample request. This Loan Agreement does / or does not allow the PI to use destructive analytical procedures, as specified in the approved sample request. The PI may request from the Cosmic Dust Curator an amendment to the sample request in order to perform additional research on the samples.

8. When requested to do so during the period of the use, the PI or the Institution shall provide to representatives of JSC a copy of any publication(s) resulting from the research and confer any scientific knowledge acquired as a result of such use, provided that no proprietary knowledge shall be disclosed involuntarily in the discharge of this obligation.

9. Title to the Cosmic Dust samples shall remain with the US Government and shall not be affected by the incorporation, attachment, or mixture thereof to or with property not owned by NASA.

10. NASA, the PI or the Institution may, consistent with Federal law and this Loan Agreement, release general information regarding their own participation in this Loan Agreement as desired.

LIABILITY AND RISK OF LOSS

1. Notwithstanding any other provision of this Agreement, the PI and / or the Institution shall not be liable for loss of or damage to the Cosmic Dust samples, except that the PI and / or the Institution shall be responsible for any such loss or damage:

a. which results from willful misconduct, lack of good faith, or negligence on the part of the PI and / or the Institution's directors or officers, or on the part of any of the Institution's 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 PI and / or the Institution due to the willful misconduct, lack of good faith, or negligence on the part of any of the Institution's directors, officers, or other representatives mentioned in (a) above (i) to maintain and administer, in accordance with the provisions of this Loan 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.

2. NASA, its officers, and employees shall not be liable for any loss, damage, expense, or liability of whatsoever nature or kind arising out of, or as a result of, or in connection with the possession or use of the samples during the term of the loan or any extension thereof.

3. The PI and the Institution hereby waive any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors and subcontractors, at any tier) and employees of NASA's related entities for any injury to, or death of, Institution employees or the employees of the Institution's related entities, or for damage to, or loss of, the Institution's property or the property of its related entities arising from or related to activities conducted under this Loan Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct. The Institution further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA and employees of NASA's related entities for injury, death, damage, or loss arising from or related to activities conducted under this Loan Agreement.

FINANCIAL OBLIGATIONS

There shall be no transfer of funds between the Parties under this Agreement and each Party shall fund its own participation. All activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA goods, services, facilities, or equipment. In the event that NASA's projected availability changes, the PI shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's use of the goods, services, facilities, or equipment shall have priority over the use planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two or more non-NASA Parties, NASA, in its sole discretion, shall determine the priority as between those Parties. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

nonexclusivity

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other private or public entities.

USE OF NASA NAME, INITIALS, AND EMBLEM

The PI or the Institutions shall not use "National Aeronautics and Space Administration" or "NASA" in a way that creates the impression that a product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. The PI or the Institution must submit any proposed public use of the NASA name or initials (including press releases and all promotional and advertising use) to the NASA Assistant Administrator for the Office of Communication or designee ("NASA

Communications”) for review and approval. A approval by NASA Communications shall be based on applicable law and policy governing the use of the NASA name and initials.

Use of NASA emblems (*i.e.*, NASA Seal, NASA Insignia, NASA logo type, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. The PI or the Institution must submit any proposed use of the emblems to NASA Communications for review and approval.

TERMS OF AGREEMENT -- DURATION, TERMINATION, AND MODIFICATION

This Loan Agreement becomes effective upon the date of the last signature below (“effective date”) and shall remain in effect until the completion of all obligations of the Parties hereto, or five years from the effective date. If the PI still holds Cosmic Dust samples, a new or renewal Loan Agreement must be agreed upon by NASA and the PI or the samples must be returned to the JSC Cosmic Dust Curator. If the Cosmic Dust samples are required for additional research the PI may request, in writing, a loan extension from the JSC Cosmic Dust Curator. If the request is approved, the loan period shall be extended by the amount of time agreed to by the JSC Cosmic Dust Curator.

The Parties may unilaterally terminate this Loan Agreement by providing thirty (30) calendar days written notice to the other Parties. Upon termination the PI or the Institution must return the Cosmic Dust samples held to the JSC Cosmic Dust Curator within thirty (30) days. However, if any provision of this Loan Agreement is violated, NASA may request the return of all the Cosmic Dust samples and the PI or the Institution shall return the Cosmic Dust samples immediately. Any modification to this Agreement shall be executed, in writing, and signed by the PI and an authorized representative of the Institution and of NASA.

POINTS OF CONTACT

The following personnel are designated as the Points of Contact among the Parties in the performance of this Agreement:

<u>NASA JSC Curator</u>	Institution	<u>Official</u>
Name		Name
Title	Title	
Email		Email
Telephone	Telephone	
Fax		Fax
Address		Address

Principal Investigator

Name
Email
Telephone
Fax
Address

DISPUTE RESOLUTION

All disputes concerning questions of fact or law arising under this Loan Agreement shall be referred by the claimant in writing to the appropriate persons identified in this Agreement as the “Points of Contact.” The persons identified as the “Point of Contact” for NASA, the PI and the Institution shall consult and attempt to resolve all issues arising from the implementation of this Loan Agreement. If the Parties are unable to resolve the dispute, then the NASA signatory or that person’s Designee, as applicable, shall issue a written decision that shall be the final agency decision for the purpose of judicial review. Nothing in this article limits or prevents any of the Parties from pursuing any other right or remedy available by law upon the issuance of the final NASA decision.

APPLICABLE LAW

U.S. Federal law governs this Loan Agreement for all purposes, including, but not limited to, determining the validity of the Loan Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

SIGNATORY AUTHORITY

The signatories to this Loan Agreement covenant and warrant that they have authority to execute this Loan Agreement. By signing below, the undersigned agrees to the above terms and conditions.

NASA JSC Curator

Institution

Official

Name

Name

Date

Date

Principal Investigator

Name

Date

Appendix C: Cosmic Dust Sample Assignment Form

COSMIC DUST SAMPLE ASSIGNMENT

<<PI>> has been assigned the following sample(s):

<<Sample Number>>

Cosmic Dust Sample Curator

Issue Date: <<Date>>

Return Date: None/Date

I acknowledge receipt of the above samples(s):

Signature & Date

Recipient's name, printed

By accepting custody of the above sample(s), the recipient understands that it is furnished pursuant to, and is fully subject to, the terms and conditions of the agreement under which the related Cosmic Dust Samples analysis is to be performed.

**Upon receipt of the samples, please sign this form and return it to the
Cosmic Dust Sample Curator
Mail Code: KT
Johnson Space Center,
Houston, Texas 77058**

Appendix D: Cosmic Dust Sample Documentation Form

Date:

CO:

Event: __Transmittal __Receipt __Loss or Destruction __Subdivision

JSC Tracking Number:	Cosmic Dust Sample Description
Transfer from: <hr/>	Processor:
Date:	
Transfer to:	Receipt signature:

PLEASE RETURN THIS FORM TO:

COSMIC DUST SAMPLE CURATOR
MAIL CODE KT
NASA JOHNSON SPACE CENTER
2101 NASA PARKWAY
HOUSTON, TX 77058