

Memorandum of Understanding
between the
Jet Propulsion Laboratory, California
Institute of Technology
and the
NASA Space Science Data Coordinated
Archive

2025 January

Approved by:

David R. Williams

David Williams
Head, NSSDCA

Sami Asmar

Sami Asmar
Deep Space Network
Commitments and Interfaces Management Office

CC: Bo Trieu, Program Executive, NASA HQ

Introduction

This is a Memorandum of Understanding (MOU) between the NASA Space Science Data Coordinated Archive (NSSDCA) and the Jet Propulsion Laboratory (JPL), California Institute of Technology. It documents the roles of those organizations in the management and short-term tape backup preservation (~5-10 years) of pre-archive planetary radar data from the Goldstone Solar System Radar (GSSR), within NASA's Deep Space Network (DSN). This MOU may be amended as a result of further agreements between the NSSDCA and JPL.

As described in a variety of documents from the National Academies of Science, Engineering, and Medicine and in NASA policy, the scientific data generated by NASA are intended to advance knowledge of the Solar System and the Universe and represent a significant public investment. Further, having prior scientific data available can motivate the development of new algorithms or reinterpretation and advancement of knowledge as new data become available.

The GSSR has been conducting planetary radar observations of various objects in the Solar System since the mid-1980s. Over this interval, after an observation, data have been stored in a variety of media and formats, but the majority of the data from the past approximately 20 years are stored on a set of hard drives in a single room in a building at JPL. These data are not generally accessible to other researchers, and there is a risk that they could be lost because only a single copy of them exists.

The pre-archive planetary radar data consist mostly of asteroid observations from the early-1990s onward and include other planetary targets, e.g., Mercury, Venus, or Galilean satellites. GSSR data are stored in binary .rdf files, a radar format, and are organized by target designation. The pre-archive radar data also include ancillary files associated with various stages of data collection. The estimated upper limit for the volume of these data is 500 TB.

The NSSDCA was created in 1966 as NASA's only archive for space and Earth science data. It is presently responsible for top-level data management functions that span all space science programs in the SMD scientific disciplines, and for selected discipline-specific responsibilities as defined by mutual agreements between the NSSDCA and the relevant SMD program division.

Responsibilities

JPL

- JPL shall organize the GSSR data by target designation.
- For each delivery of GSSR data, JPL shall
 - Generate an XML-formatted manifest by executing the following actions:
 - Internally stage a directory tree, containing one or more target designations, and
 - Execute the NSSDCA-provided `xman` software in generic mode on the directory tree;
 - Compute the checksum of the resulting XML-formatted manifest; and
 - Transfer the directory tree, the XML-formatted manifest, and the file containing its checksum to NSSDCA using `rsync`.
- JPL shall make intermittent deliveries instead of all at once and alert NSSDCA accordingly. Each delivery should be limited to approximately 10 TB or less.
- JPL shall provide samples for the NSSDCA to test its `xman` software.
- JPL should prepare a detailed description document for these data and provide or cite documentation on the `.rdf` format.
- JPL may assign a DOI to these data.
- JPL may request the NSSDCA return one or more deliveries, *e.g.*, if JPL needs to restore data to an identical directory structure in the case of a device/machine failure.

NSSDCA

- NSSDCA shall open a data collection in the NSSDCA [Master Catalog](#) and provide the ID to JPL.
- NSSDCA shall provide JPL with any `ssh` keys required for the data transfer using `rsync`.
- For each delivery, NSSDCA shall
 - Confirm the checksum against the manifest;
 - Write one copy of delivered data to archival tape; and
 - Notify JPL that NSSDCA has archived the delivery to tape.
 - NSSDCA shall ship tapes to Iron Mountain, Inc., for storage.
- NSSDCA shall test its `xman` software on samples provided by JPL before production deliveries begin.
- NSSDCA shall provide any special qualifiers or other guidance to JPL personnel as to how to execute the `xman` software.
- If JPL requests a delivery be returned, NSSDCA shall retrieve the associated tape(s) from Iron Mountain; electronically stage the data in the format and directory structure it was provided; and notify JPL.
- NSSDCA shall negotiate with the JPL any amendments to this MOU, as needed.