

## The Lunar Reconnaissance Orbiter SPICE Data Archive

### Introduction

This document provides an overview of the Lunar Reconnaissance Orbiter (LRO) SPICE data set, including a description of the directory structure. Additional documents included on this data set provide more details, especially the ``spicedb.cat'' dataset description and the various kernel-specific ``/data/\*/\*info.txt'' files.

This data set contains navigation and related observation geometry and other ancillary data in the form of SPICE System kernel files for the LRO spacecraft. See the file ``mission.cat'' in the ``/catalog'' directory for a description of the mission and the file ``insthost.cat'' in the same directory for a description of the spacecraft.

The SPICE kernel files contain geometric and other ancillary information needed to recover the full value of science instrument data. Data in the SPICE kernel files must be accessed using the NAIF (Navigation and Ancillary Information Facility) software called the SPICE Toolkit. See the file ``softinfo.txt'' in the ``/software'' directory for instructions on how to obtain this software.

This data set is contained on a single virtual volume, LROSP\_1000, including data from all mission phases and covering from launch, TBD, through the end time of the latest spacecraft trajectory file supplied in the data set. Until the end of the spacecraft lifespan this data set will be accumulating with new data added every three months.

### File Formats

All text documents and other meta information files such as descriptions, PDS object definitions and detached PDS labels are stream format files, with a carriage return (ASCII 13) and a line feed character (ASCII 10) at the end of the record. This allows the files to be read by MS-DOS/Windows, Unix and MacOS operating systems.

The data files in this data set were prepared to be used under a UNIX environment. Therefore all SPICE text kernel files are UNIX text files, with a line feed character (ASCII 10) at the end of the line, and all SPICE binary kernels files are UNIX binary files in which bit pattern structures for double precision and integer numbers follow the IEEE standard. While some of the data files on this volume can be used 'as is', converting the files to binary or

text format native to the user's computer may be required. Refer to the documentation provided with the SPICE Toolkit to find out whether conversion is needed in each specific case.

NAIF provides a tool (BINGO) that can convert either binary or text kernels from one format to another. This means that text files can have their line terminator changed and binary files can be converted to the native format of the platform of interest. For access to this tool, see the reference to the NAIF utilities website in the file ``/software/softinfo.txt``.

## Volume Contents

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Files on this volume are organized into a set of subdirectories below the top-level directory. The following table shows the structure and content of these directories. In this table, directory names are enclosed in square brackets ([ ]). See the ``\*info.txt`` files in each directory for specific information on the files in the directory, including naming schemes.

### [top-level-directory]

-- <a href="#">aareadme.txt</a>	Text version of the aareadme file.
-- <a href="#">aareadme.htm</a>	HTML version of the aareadme file.
-- <a href="#">aareadme.lbl</a>	PDS label for both aareadme files.
-- <a href="#">errata.txt</a>	Comments and errata on this volume.
-- <a href="#">voldesc.cat</a>	Description of the contents of this volume.
-- <a href="#">[catalog]</a>	Directory containing PDS catalog objects.
-- <a href="#">catinfo.txt</a>	Description of files in the catalog directory.
-- <a href="#">insthost.cat</a>	Description of the spacecraft.
-- <a href="#">mission.cat</a>	Description of the mission.
-- <a href="#">person.cat</a>	References for personnel who created this volume.
-- <a href="#">ref.cat</a>	List of publications mentioned in *.cat files.
-- <a href="#">release.cat</a>	Description of the data set releases.
-- <a href="#">spicedscat</a>	Description of the SPICE data set.
-- <a href="#">spice hsk.cat</a>	Description of housekeeping (browser) information.
+-- <a href="#">spice inst.cat</a>	Description of SPICE kernels.
-- <a href="#">[data]</a>	Directory containing SPICE data files (kernels.)
-- <a href="#">[ck]</a>	Directory containing CK files.
-- <a href="#">ckinfo.txt</a>	Description of files in the data/ck directory.
-- *.bc	CK files.
+-- *.lbl	PDS labels for CK files.
-- <a href="#">[ek]</a>	Directory containing EK files.
-- <a href="#">ekininfo.txt</a>	Description of files in the data/ek directory.

		-- *.bes	Binary EK files.
		+-- *.lbl	PDS labels for EK files.
		-- <a href="#">[fk]</a>	Directory containing FK file(s).
		-- <a href="#">fkinfo.txt</a>	Description of files in the data/fk directory.
		-- *.tf	FK file(s).
		+-- *.lbl	PDS labels for FK files.
		-- <a href="#">[ik]</a>	Directory containing IK files.
		-- <a href="#">ikinfo.txt</a>	Description of files in the data/ik directory.
		-- *.ti	IK files.
		+-- *.lbl	PDS labels for IK files.
		-- <a href="#">[lsk]</a>	Directory containing LSK files.
		-- <a href="#">lskinfo.txt</a>	Description of files in the data/lsk directory.
		-- *.tls	LSK file(s).
		+-- *.lbl	PDS labels for LSK files.
		-- <a href="#">[pck]</a>	Directory containing PCK file(s).
		-- <a href="#">pckinfo.txt</a>	Description of files in the data/pck directory.
		-- *.bpc	Binary PCK file(s).
		-- *.tpc	Text PCK file(s).
		+-- *.lbl	PDS labels for PCK files.
		-- <a href="#">[sclk]</a>	Directory containing SCLK file(s).
		-- <a href="#">sclkinfo.txt</a>	Description of files in the data/sclk directory.
		-- *.tsc	SCLK file(s).
		+-- *.lbl	PDS labels for SCLK files.
		+-- <a href="#">[spk]</a>	Directory containing SPK files.
		-- <a href="#">spkinfo.txt</a>	Description of files in the data/spk directory.
		-- *.bsp	SPK files.
		+-- *.lbl	PDS labels for SPK files.
		-- <a href="#">[document]</a>	Directory containing volume related documents.
		-- <a href="#">docinfo.txt</a>	Description of files in the document directory.
		-- <a href="#">onlabels.txt</a>	Description of PDS labels for SPICE kernels.
		+-- <a href="#">lblinfo.txt</a>	Description of PDS label location in this volume.
		-- <a href="#">[extras]</a>	Directory containing extra data elements.
		-- <a href="#">extrinfo.txt</a>	Description of files and directories in extras.
		-- <a href="#">[mk]</a>	Directory containing meta-kernels.
		-- <a href="#">mkinfo.txt</a>	Description of meta-kernel files.
		+-- *.tm	Meta-kernel files.

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| +-- \[orbnum\]          Directory containing orbit number files.
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| |-- orbinfo.txt      Description of orbit number files.
| +-- *.nrb            ``node-to-node'' orbit number files.
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|-- \[index\]            Directory containing index files.
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| |-- indxinfo.txt      Description of files in the index directory.
| |-- checksum.tab      Table of MD5 checksums for files in this data set.
| |-- checksum.lbl      PDS label for checksum.tab file.
| |-- index.tab         Index table of SPICE kernels on this volume.
| +-- index.lbl         PDS label for index.tab file.
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+-- \[software\]
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| +-- softinfo.txt      instructions on how to obtain SPICE software.
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#### Whom to Contact for Information

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PDS Navigation and Ancillary Information Facility (NAIF),  
MAIL STOP 301-121  
Jet Propulsion Laboratory  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, CA, 91109-8099  
818-354-3869  
WWW Site: <http://naif.jpl.nasa.gov>  
Electronic mail address: [pds\\_operator@naif.jpl.nasa.gov](mailto:pds_operator@naif.jpl.nasa.gov)

#### Cognizant Persons

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