

Standards Change Request

Increase length of START_TIME & STOP_TIME keywords

SCR3-1104.v3

Provenance:

Date: 2007-02-07

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Revised: 2007-03-16, A.C.Raugh – Modified to expand the TIME data type

Revised: 2007-04-03, A.C.Raugh – Modified to reduce proposed maximum length

Working Group: R.Joyner (lead)

Problem:

The current PDS Standards restrict values (both element values in labels and data values in tables) of time TYPE to millisecond accuracy. Data providers are now requesting more accuracy for values of type TIME.

Current Urgency:

Priority is high. This change is needed for the next set of MRO HIRISE data. (It was medium priority when this SCR was first submitted, but now that the time is shorter, it has been raised to high.)

Proposed Solution:

Expand the accuracy of values of type TIME to nanoseconds. Expand the MAXIMUM_LENGTH of PDSDD data dictionary elements from 24 to 30 characters to accommodate the increased precision.

Impact Assessment:

Overall impact is low to moderate.

Documentation

The definition of the TIME data type must be modified in the "Planetary Science Data Dictionary". Several trivial changes to examples and generic formats in the "PDS Standards Reference" should also be made. No changes required to the "Proposer's Archiving Guide" or the "Archive Preparation Guide".

Interface

Maximum lengths for PDS elements with GENERAL_DATA_TYPE = TIME should be expanded in the keyword database and propagated to the next revisions of the pdsdd.full file to avoid individual processing of requests for greater precision in each new case. Approximately 40 keywords are potentially affected.

Legacy Data and Software

Legacy data should not be affected, since all existing valid times will remain valid. Validation tools that read maximum field sizes from the pdsdd.full file should require no modification apart from the update to pdsdd.full. Legacy node and user software may require modification to either specifically handle the longer fields or ignore the extra precision. The immediate impact is likely to be low, since the missions requiring the additional precision are in active development themselves, and the high-precision data are not generally available as yet.

Interagency

Working groups concerned with interoperability between PDS labels and other archive/search systems should be informed that the maximum potential precision for the START_TIME and STOP_TIME keywords is being increased.

Additional Information:

N/A

Requested Changes:

Planetary Science Data Dictionary

In the current section 2.3.5 "TIME Data Type", replace the following:

Event times shall be represented in the ISO/CCSDS/JPL Standard form as follows (brackets [...] enclose optional fields):

YYYY-MM-DDThh:mm:ss[.fff] -or- YYYY-DDDThh:mm:ss[.fff]

With:

Event times shall be represented in the ISO/CCSDS/JPL Standard form as follows:

YYYY-MM-DDThh:mm:ss.f... -or- YYYY-DDDThh:mm:ss.f...

And replace the line:

fff Represents fractional seconds, from one to three decimal places

with:

f... Represents fractional seconds, up to nanosecond accuracy (one to nine decimal places)

In addition, add the following statement following the definition of the time fields:

Note that times may be specified to various degrees of precision, depending on circumstances. See the "PDS Standards Reference" for details of how and when values of type TIME may be truncated to the appropriate precision.

PDS Standards Reference

In Section 5.4 "Syntax for Element Values", replace this statement (under "Date and Times"):

Date and time values must be in the PDS standard date/time format: *YYYY-MM-DDThh:mm:ss.sss*.

With this:

Date and time values must be in the PDS standard date/time format: *YYYY-MM-DDThh:mm:ss.f...* The maximum precision supported is nanoseconds (i.e., up to nine decimal places in fractional seconds).

In Section 7.1, replace the examples:

CCYY-MM-DDTHH:MM:SS.sss (preferred format)
CCYY-DDDTHH:MM:SS.sss

With:

CCYY-MM-DDTHH:MM:SS.f... (preferred format)
CCYY-DDDTHH:MM:SS.f...

And in the subsequent field descriptions, replace:

sss - fractions of second (000-999)

with

f... - fractions of a second (from one to nine decimal places)

PDS Element Data Base and PDSDD.FULL file

Following is a list of keywords culled from release 65 of pdsdd.full which have a GENERAL_DATA_TYPE of TIME. Their current MAXIMUM_LENGTH is in the third column:

APPLICABLE_START_TIME	TIME	24	
APPLICABLE_STOP_TIME	TIME	24	
EARTH_RECEIVED_START_TIME	TIME	24	
EARTH_RECEIVED_STOP_TIME	TIME	24	
EARTH_RECEIVED_TIME	TIME	24	
EFFECTIVE_TIME	TIME	24	
FIRST_IMAGE_TIME	TIME	18	
IMAGE_TIME	TIME	24	
LAST_IMAGE_TIME	TIME	18	
MAPPING_START_TIME	TIME	24	
MAPPING_STOP_TIME	TIME	24	
MISSION_PHASE_START_TIME	TIME	24	
MISSION_PHASE_STOP_TIME	TIME	24	
MPF_LOCAL_TIME	TIME	8	Deprecated element - no change
NOTEBOOK_ENTRY_TIME	TIME	24	
OBSERVATION_TIME	TIME	24	
ORBIT_START_TIME	TIME	24	
ORBIT_STOP_TIME	TIME	24	
ORDER_STATUS_TIME	TIME	24	
PERIAPSIS_TIME	TIME	24	
POSITION_TIME	TIME	24	
PROCESS_TIME	TIME	24	
PROCESSING_START_TIME	TIME	24	
PROCESSING_STOP_TIME	TIME	24	
PRODUCT_CREATION_TIME	TIME	24	
REFERENCE_TIME	TIME	24	
REQUEST_TIME	TIME	24	
RESOLUTION_TIME	TIME	24	
RING_EVENT_START_TIME	TIME	24	
RING_EVENT_STOP_TIME	TIME	24	
RING_EVENT_TIME	TIME	24	
SCET_START_TIME	TIME	24	
SCET_STOP_TIME	TIME	24	
SEF_CREATION_TIME	TIME	24	
START_TIME	TIME	24	
STOP_TIME	TIME	24	
TARGET_PARAMETER_EPOCH	TIME	24	

TIME_RANGE_NUMBER	TIME	24
UNCORRECTED_START_TIME	TIME	24

We recommend increasing the MAXIMUM_LENGTH of all of the above elements to 30 with a single exception, as noted above to accommodate the potential for nanosecond accuracy of the data type.

The exception is MPF_LOCAL_TIME, a deprecated keyword that already has compliance issues noted in its definition.