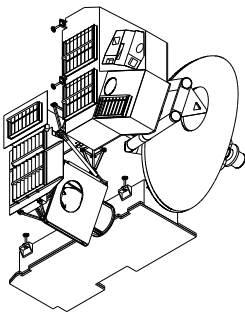


JPL D-29569

## Earth Observing System (EOS)

### Microwave Limb Sounder (MLS)

# EOS MLS Level 1 File Description with Data Dictionary



LIBOA  
LIBRADD  
LIBRADG  
LIBRADT

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### Version 2.0

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# 1. Introduction

## 1.1. Scope

This document describes the content, meaning and format of the output data files under the jurisdiction of the Level 1 data processing software for the EOS Microwave Limb Sounder (MLS) instrument. This data is available from the NASA Goddard Space Flight Center Earth Sciences (GES) Data and Information Services Center (DISC).

The release of this document describes the outputs of the latest version of the MLS data processing.

## 1.2. Controlling Documents

The main source of requirements for file content and format is the document *Science Requirements on the EOS MLS Instrument and Data Processing Software* (Waters and Jarnot, 2002). Detailed requirements for the Level 1 data processing can be found in the Level 1 ATBD (Jarnot, 2004).

## 1.3. Applicable Documents

The main inputs to the Level 1 program are the Level 0 data files and the spacecraft attitude and ephemeris files. The instrument Level 0 data is described in the *Instrument Flight Software Command and Telemetry Handbook*, Mike Girard, JPL D-16761. The Level 0 data is transmitted from EDOS in 2 hour chunks. Each chunk consists of a constructor record file and a data file. These are described in the *Interface Control Document Between EOS Data and Operations System (EDOS) and EOS Ground System (EGS) Elements* (GSFC 423-ICD-EDOS/EGS, January 20, 2004). The instrument Level 0 data along with the spacecraft attitude and ephemeris data are accessed using the SDP Toolkit which is described in *Release 7 SDP Toolkit Users Guide for the ECS Project* (May 2004).

## 1.4. Overview

The next two chapters describe the output data files followed by a comprehensive data dictionary for all the quantities described in those files.

### 1.4.1. Input data files

The main datasets input to the Level 1 software are the Level 0 instrument data and spacecraft attitude and ephemeris data. As explained above, these data are described elsewhere. Other inputs are used for job control and configuration. These files are available with the software.

### 1.4.2. Output data files

The files output by the Level 1 software fall into the following categories:

**Orbit/attitude and tangent point (L1BOA)** HDF5 file containing orbit/attitude and tangent point geolocation data.

**DACS Radiances (L1BRADD)** HDF5 file containing the calibrated radiances and precisions from data produced by the Digital Autocorrelator Spectrometers.

**GHz band Radiances (L1BRADG)** HDF5 file containing the calibrated radiances and precisions from data produced by the GHz filter bands. These include the 25, 12 and 4 channel filter banks.

**THz band Radiances (L1BRADT)** HDF5 file containing the calibrated radiances and precisions from data produced by the THz filter bands.

In standard production mode, these files are produced on a daily basis describing 24 hours from midnight universal time.

Each HDF5 Level 1 output file contains common header information consisting of Process Control File (PCF) contents and Configuration file (L1CF) contents which are both written as HDF5 annotations. Also included in the header is metadata from the Metadata Configuration File (MCF).

Table 1.1 gives a full list of the data files normally produced by the software:

Table 1.1.: Output file names

The Level 1 daily output files produced in operational mode. *<version>* is a brief string describing the version of the files. *<cycle>* is a brief string describing the production cycle number. *YYYYdDOY* describes the calendar date for the data within the files, e.g. 2001d074 describes day number 74 in the year 2001, i.e. March 15. This is consistent with the CCSDS Timecode B format.

Filename	Content
MLS-Aura_L1BOA_V<version>-C<cycle>_YYYYdDOY.h5	L1BOA
MLS-Aura_L1BRADD_V<version>-C<cycle>_YYYYdDOY.h5	L1BRADD
MLS-Aura_L1BRADG_V<version>-C<cycle>_YYYYdDOY.h5	L1BRADG
MLS-Aura_L1BRADT_V<version>-C<cycle>_YYYYdDOY.h5	L1BRADT



### **1.4.3. HDF5**

The output data described in this document are stored in Hierarchical Data Format version 5 (HDF5). HDF5 is a platform-independent binary file format devised by the National Center for Super-computing Applications (NCSA). Data is stored in the files in the form of a linked list. Access to the data is provided through a set of high level Application Programmer Interfaces (API's) which provide mechanisms for easily storing standard scientific quantities such as multi-dimensional array, annotations and data tables.

For detailed documentation of the HDF5 file formats, refer to the URL:

<http://hdf.ncsa.uiuc.edu/>



## 2. Output Files

The files described in this section are outputs produced by the current version of the Level 1 data processing programs.

Each HDF5 Level 1 output file contains common header information. The Level 1 header contents:

Table 2.1.: L1HDR

Name	Description
PCF	PCF (Process Control File) file contents
LCF	Configuration file contents
coremetadata	Core metadata descriptors
InstrumentName	Instrument Name (MLS Aura)
HostName	Computer processor name (L2 only!)
ProcessLevel	Program processing level (L1)
PGEVersion	PGE Version of software
StartUTC	Start UTC time
EndUTC	End UTC time
GranuleMonth	Month number of data granule
GranuleDay	Day number of month of data granule
GranuleDayOfYear	Day number of Year of data granule
GranuleYear	Year number of data granule
TAI93At0zOfGranule	Start time in TAI unit
MiscNotes	Miscellaneous Notes (L2 only!)
counterMAF	Major frame counter since mission start

### 2.1. L1BOA

This file contains the definitive set of EOS Aura orbit/attitude data and tangent point geolocation information. This file is in the HDF5 format. The contents are described in table 2.2.

Table 2.2.: L1BOA

Name	Description
L1HDR	Level 1 header (see Table 2.1)
OrbitNumber	Orbit Number array
OrbitPeriod	Orbital period of each orbit
BO_name	Bright Object names
BO_Angle_GHz	Bright Object angles to GHz limb port
BO_Angle_THz	Bright Object angles to THz limb port
MAFStartTimeTAI	Start time of MAF in TAI format
MAFStartTimeUTC	Start time of MAF in UTC format
leapsec	Contents of leapsec file
noMIFs	Number of Minor frames in record
utcpole	Contents of UTC pole file
SpcRec	Spacecraft record (see Table 2.3)
tpRecGHz	Tangent point record for GHz module (see Table 2.4)
tpRecTHz	Tangent point record for THz module (see Table 2.4)

## 2.2. L1BRADD

This file contains the calibrated MLS radiance observations for the DACS. This file is in the HDF5 format. The contents are describe in table 2.5.

## 2.3. L1BRADG

This file contains the calibrated MLS radiance observations for the GHz filter bands not including data from the DACS bands. This file is in the HDF5 format. The contents are described in table 2.6.

## 2.4. L1BRADT

This file contains the calibrated MLS radiance observations for the THz filter bands. This file is in the HDF5 format. The contents are described in table 2.7.

Table 2.3.: Spacecraft Record

Name	Description
scECI	Spacecraft location in ECI coordinates
scECR	Spacecraft location in ECR coordinates
scGeocAlt	Spacecraft geocentric altitude
scGeocLat	Spacecraft geocentric latitude
scGeodAlt	Spacecraft geodetic altitude
scGeodLat	Spacecraft geodetic latitude
scGeodAngle	MLS master coordinate $\phi$
scLon	Spacecraft longitude
scMIF_TAI	MIF time in TAI units
scOrbIncl	Orbital inclination
scVelECI	Spacecraft velocity in ECI coordinates
scVelECR	Spacecraft velocity in ECR coordinates
ypr	Yaw, pitch and roll
yprRate	Rate of change of ypr

Table 2.4.: Tangent Point Record

Name	Description
azimAngle	Azimuth Angle of FOV
encoderAngle	Boresight inclination wrt. instrument
scAngle	Boresight inclination wrt. spacecraft +x vector
scanAngle	Boresight inclination wrt. orbit +x vector
scanRate	Rate of change of scanAngle
tpBO_stat	Bright Object status for tangent point
tpECI	Tangent point location in ECI coordinates
tpECR	Tangent point location in ECR coordinates
tpECRtoFOV	ECR to FOV array
tpGeocAlt	Geocentric altitude of tangent point
tpGeocAltRate	Rate of change of TpGeocAlt
tpGeocLat	Geocentric latitude of tangent point
tpGoedAlt	Geodetic altitude of tangent point
tpGeodAltRate	Rate of change of TpGeodAlt
tpGeodAltX	Extended Geodetic altitude of tangent point (THz)
tpGeodAngle	MLS master coordinate $\phi$ , for tangent point
tpGeodLat	Geodetic latitude of tangent point
tpLon	Longitude of tangent point
tpLosAngle	Line-of-sight angle of tangent point
tpLosVel	Line-of-sight velocity
tpOrbY	Out of plane distance of tangent point
tpPos_Prime	Antenna Positions prime
tpSolarTime	Solar time of tangent point
tpSolarZenith	Solar zenith angle of tangent point

Table 2.5.: L1BRADD

Name	Description
L1HDR	Level 1 header (see Table 2.1)
MAFStartTimeGIRD	MAF start time in GIRD format
Radiance	Calibrated limb radiance for each DACS band
RadPrecision	Radiance precision for each DACS band
Baseline	Total Baseline Radiance
BaselinePrecision	Total Baseline Radiance Precision
BaselineAC	Baseline AC Radiance
BaselineACprecision	Baseline AC Radiance Precision
BaselineDC	Baseline DC Radiance
BaselineDCprecision	Baseline DC Radiance Precision
BandChans	Number of Channels per Band
BandChi2	Band Chi square
Pri_Reflec	Primary reflector average temperature
Sec_Reflec	Secondary reflector average temperature
Ter_Reflec	Tertiary reflector average temperature

Table 2.6.: L1BRADG

Name	Description
L1HDR	Level 1 header (see Table 2.1)
AscDescIndx	Ascending/Descending index
BaselineAlt	Baseline altitude per GHz band channel
BaselineLatBin	Baseline latitude bin values
LatBinChanAvg	Latitude bin channel averages
LatBinIndx	Latitude bin index per MIF
MAFStartTimeGIRD	MAF start time in GIRD format
Radiance	Calibrated limb radiance for each GHz band
RadPrecision	Radiance precision for each GHz band
Baseline	Total Baseline Radiance
BaselinePrecision	Total Baseline Radiance Precision
BaselineAC	Baseline AC Radiance
BaselineACprecision	Baseline AC Radiance Precision
BaselineDC	Baseline DC Radiance
BaselineDCprecision	Baseline DC Radiance Precision
BandChans	Number of Channels per Band
BandChi2	Band Chi square
Pri_Reflec	Primary reflector average temperature
Sec_Reflec	Secondary reflector average temperature
Ter_Reflec	Tertiary reflector average temperature

Table 2.7.: L1BRADT

Name	Description
L1HDR	Level 1 header (see Table 2.1)
MAFStartTimeGIRD	MAF start time in GIRD format
Radiance	Calibrated limb radiance for each THz band
RadPrecision	Radiance precision for each THz band
Baseline	Total Baseline Radiance
BaselinePrecision	Total Baseline Radiance Precision
BaselineAC	Baseline AC Radiance
BaselineACprecision	Baseline AC Radiance Precision
BaselineDC	Baseline DC Radiance
BaselineDCprecision	Baseline DC Radiance Precision
BandChans	Number of Channels per Band
BandChi2	Band Chi square



## 3. Data Dictionary

---

**Name:** AscDescIndx

**Meaning:** Ascending/Descending index array per GHz MIF per MAF

**Nominal occurrence:** L1BRADG

**Format:** integer(125)

**Unit:** 1 = ascending, 2 = descending

**Nominal division:** MAF

---

**Name:** azimAngle

**Meaning:** Azimuth angle for FOV

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Unit:** degrees

**Nominal division:** MIF, MAF

---

**Name:** BandChans

**Meaning:** Number of channels per band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** integer

**Nominal division:** BandNo

---

---

**Name:** BandChi2

**Meaning:** Chi square value per band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** BandNo, ChanNo

---

**Name:** BandNo

**Meaning:** Total number of bands

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 34

---

**Name:** Baseline

**Meaning:** Calibrated baseline limb radiance for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

**Name:** BaselineAC

**Meaning:** Calibrated AC baseline limb radiance for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

---

**Name:** BaselineACprecision

**Meaning:** Calibrated AC baseline limb radiance precision for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

**Name:** BaselineAlt

**Meaning:** Baseline altitude per channel per GHz band

**Nominal occurrence:** L1BRADG

**Format:** real

**Unit:** meters

**Nominal division:** FBchan, GHzBand

---

**Name:** BaselineDC

**Meaning:** Calibrated DC baseline limb radiance for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

**Name:** BaselineDCprecision

**Meaning:** Calibrated DC baseline limb radiance precision for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

---

**Name:** BaselineLatBin

**Meaning:** Baseline Latitude Bin min/max values per bin number per ascend/descend

**Nominal occurrence:** L1BRADG

**Format:** real(2,4,2)

---

**Name:** BaselinePrecision

**Meaning:** Calibrated baseline limb radiance precision for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, MAF and chanMB, MAF and chanWF, MAF and chanDACS, MAF

**Unit:** brightness temperature (K)

---

**Name:** chanDACS

**Meaning:** Number of DACS Filter Bank channels

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 129

---

**Name:** chanFB

**Meaning:** Number of Filter Bank channels

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 25

---

---

**Name:** chanMB

**Meaning:** Number of Mid-Band Bank channels

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 11

---

**Name:** ChanNo

**Meaning:** Maximum number of channels

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 129

---

**Name:** chanWF

**Meaning:** Number of Wide Filter bank channels

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** 4

---

**Name:** coremetadata

**Meaning:** Metadata descriptors

**Nominal occurrence:** L1BOA, L1BRADD, L1BRADG, L1BRADT

**Format:** ODL string

---

**Name:** counterMAF

**Meaning:** Major frame count since instrument reset

**Nominal occurrence:** L1HDR

**Format:** integer

**Unit:** MAF

---

---

**Name:** encoderAngle  
**Meaning:** Boresight inclination wrt. instrument  
**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA  
**Format:** real  
**Unit:** degrees  
**Nominal division:** GHz.MIF, MAF, THz.MIF, MAF

---

**Name:** EndUTC  
**Meaning:** End time in UTC format  
**Nominal occurrence:** L1HDR annotation  
**Format:** string  
**Value:** “yyyy-doyThh:mm:ss”

---

**Name:** GHz.MIF  
**Meaning:** Number of GHz module Limb scan minor frames  
**Nominal occurrence:** L1BOA HDF5 SD dimension  
**Format:** integer  
**Value:** 125

---

**Name:** GranuleDay  
**Meaning:** Day number of month of the data granule  
**Nominal occurrence:** L1HDR annotation  
**Format:** integer  
**Value:** 1..31

---

---

**Name:** GranuleDayOfYear

**Meaning:** Day number of year of the data granule

**Nominal occurrence:** L1HDR annotation

**Format:** integer

**Value:** 1..366

---

**Name:** GranuleMonth

**Meaning:** Month number of the data granule

**Nominal occurrence:** L1HDR annotation

**Format:** integer

**Value:** 1..12

---

**Name:** GranuleYear

**Meaning:** Year number of the data granule

**Nominal occurrence:** L1HDR annotation

**Format:** integer

**Value:** 2004..20nn

---

**Name:** HostName

**Meaning:** Computer Host name

**Nominal occurrence:** L1HDR annotation

**Format:** string

**Value:** ""

**Note:** This entry is used only for Level 2 processing

---

---

**Name:** InstrumentName  
**Meaning:** Instrument name  
**Nominal occurrence:** L1HDR annotation  
**Format:** string  
**Value:** “MLS Aura”

---

**Name:** L1HDR  
**Meaning:** Level 1 Header Record  
**Nominal occurrence:** L1BOA , L1BRADD, L1BRADG, L1BRADT  
**Format:** HDF5 datasets and annotations

---

**Name:** LatBin  
**Meaning:** Latitude Bin dimension  
**Nominal occurrence:** HDF5 SD dimension  
**Format:** integer  
**Value:** 8

---

**Name:** LatBinChanAvg  
**Meaning:** Channel Average per Latitude Bin  
**Nominal occurrence:** L1BRADG  
**Format:** real  
**Nominal division:** chanFB, BandNo, LatBin

---

**Name:** LatBinIndx  
**Meaning:** Latitude Bin index  
**Nominal occurrence:** L1BRADG  
**Format:** integer  
**Nominal division:** GHz.MIF, MAF

---



---

**Name:** LCF

**Meaning:** LCF (Level 1 Configuration File) file contents

**Nominal occurrence:** L1HDR

**Format:** PCF string

**Nominal division:** unspecified lines

---

**Name:** leapsec

**Meaning:** Leapsec file contents

**Nominal occurrence:** L1BOA

**Format:** string

**Nominal division:** unspecified lines

---

**Name:** MAF

**Meaning:** Major frame dimension

**Nominal occurrence:** HDF5 SD dimension

**Format:** integer

**Value:** unlimited

---

**Name:** MAFStartTimeGIRD

**Meaning:** Start time of MAF in GIRD standard time

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** double real

**Nominal division:** MAF

**Unit:** seconds since January 1, 1958

---

---

**Name:** MAFStartTimeTAI  
**Meaning:** Start time of MAF in TAI time  
**Nominal occurrence:** L1BOA  
**Format:** double real  
**Nominal division:** MAF  
**Unit:** TAI toolkit internal time

---

**Name:** MAFStartTimeUTC  
**Meaning:** Start time of MAF in UTC time  
**Nominal occurrence:** L1BOA  
**Format:** string  
**Nominal division:** MAF  
**Unit:** UTC toolkit internal time

---

**Name:** MIF  
**Meaning:** Minor frame dimension  
**Nominal occurrence:** HDF5 SD dimension  
**Format:** integer  
**Value:** 148

---

**Name:** MiscNotes  
**Meaning:** Miscellaneous notes  
**Nominal occurrence:** L1HDR annotation  
**Format:** string  
**Value:** ""  
**Note:** This entry is used only for Level 2 processing

---

---

**Name:** noMIFs

**Meaning:** Number of Minor frames in current MAF

**Nominal occurrence:** L1BOA

**Format:** integer

**Nominal division:** MAF

**Value:** 146..149

---

**Name:** OrbitNumber

**Meaning:** Array containing orbit number since beginning of mission

**Nominal occurrence:** L1BOA

**Format:** integer(16)

**Value:** 1..unlimited

---

**Name:** OrbitPeriod

**Meaning:** Array containing orbital period

**Nominal occurrence:** L1BOA

**Format:** real(16)

**Value:** approximately 5933.0

**Unit:** seconds

---

**Name:** PCF

**Meaning:** PCF (Process Control File) file contents

**Nominal occurrence:** L1HDR

**Format:** PCF string

**Nominal division:** unspecified lines

---

---

**Name:** PGEVersion  
**Meaning:** PGE version of software  
**Nominal occurrence:** L1HDR annotation  
**Format:** string  
**Value:** “V01-40”..”V0n-mm”

---

**Name:** Pri\_Reflec  
**Meaning:** Primary reflector average temperature  
**Nominal occurrence:** L1BRADD, L1BRADG  
**Format:** real  
**Nominal division:** MAF  
**Unit:** Kelvins

---

**Name:** ProcessLevel  
**Meaning:** Program processing Level  
**Nominal occurrence:** L1HDR annotation  
**Format:** string  
**Value:** “L1”

---

**Name:** Radiance  
**Meaning:** Calibrated limb radiance for each spectral band  
**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT  
**Format:** real  
**Nominal division:** chanFB, GHz.MIF, MAF and chanFB, THz.MIF, MAF and  
chanMB, GHz.MIF, MAF and chanWF, GHz.MIF, MAF and chanDACS,  
GHz.MIF, MAF  
**Unit:** brightness temperature (K)

---

---

**Name:** RadPrecision

**Meaning:** Radiance precision for each spectral band

**Nominal occurrence:** L1BRADD, L1BRADG, L1BRADT

**Format:** real

**Nominal division:** chanFB, GHz.MIF, MAF and chanFB, THz.MIF, MAF and chanMB, GHz.MIF, MAF and chanWF, GHz.MIF, MAF and chanDACS, GHz.MIF, MAF

**Unit:** brightness temperature (K)

---

**Name:** scanAngle

**Meaning:** Boresight inclination wrt. orbit +x vector

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** scAngle

**Meaning:** Boresight inclination wrt. orbit +x vector

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** scanRate

**Meaning:** Rate of change of **scanAngle**

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees/second

---

---

**Name:** scECI

**Meaning:** Spacecraft location in ECI coordinates

**Nominal occurrence:** L1BOA

**Format:** real(3)

**Nominal division:** MIF, MAF

**Unit:** meters

---

**Name:** scECR

**Meaning:** Spacecraft location in ECR coordinates

**Nominal occurrence:** L1BOA

**Format:** real(3)

**Nominal division:** MIF, MAF

**Unit:** meters

---

**Name:** scGeocAlt

**Meaning:** Spacecraft geocentric altitude

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** meters

---

**Name:** scGeocLat

**Meaning:** Spacecraft geocentric latitude

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** degrees

---

---

**Name:** scGeodAlt

**Meaning:** Spacecraft geodetic altitude

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** meters

---

**Name:** scGeodAngle

**Meaning:** Spacecraft MLS master coordinate  $\phi$

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** cumulative degrees

---

**Name:** scGeodLat

**Meaning:** Spacecraft geodetic latitude

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** degrees

---

**Name:** scLon

**Meaning:** Spacecraft longitude

**Nominal occurrence:** L1BOA

**Format:** real

**Nominal division:** MIF, MAF

**Unit:** degrees

---

---

**Name:** scMIF\_TAI  
**Meaning:** Spacecraft TAI time per MIF  
**Nominal occurrence:** L1BOA  
**Format:** double real  
**Nominal division:** MIF, MAF  
**Unit:** seconds

---

**Name:** scOrbIncl  
**Meaning:** Spacecraft orbit inclination  
**Nominal occurrence:** L1BOA  
**Format:** real  
**Nominal division:** MIF, MAF  
**Unit:** degrees

---

**Name:** scVelECI  
**Meaning:** Spacecraft velocity in ECI coordinates  
**Nominal occurrence:** L1BOA  
**Format:** real(3)  
**Nominal division:** MIF, MAF  
**Unit:** meters/second

---

**Name:** scVelECR  
**Meaning:** Spacecraft velocity in ECR coordinates  
**Nominal occurrence:** L1BOA  
**Format:** real(3)  
**Nominal division:** MIF, MAF  
**Unit:** meters/second

---



---

**Name:** Sec\_Reflec

**Meaning:** Secondary reflector average temperature

**Nominal occurrence:** L1BRADD, L1BRADG

**Format:** real

**Nominal division:** MAF

**Unit:** Kelvins

---

**Name:** StartUTC

**Meaning:** Start time in UTC format

**Nominal occurrence:** L1HDR annotation

**Format:** string

**Value:** “yyyy-doyThh:mm:ss”

---

**Name:** TAI93At0zOfGranule

**Meaning:** Start time in TAI93 units

**Nominal occurrence:** L1HDR annotation

**Format:** double real

**Unit:** seconds

---

**Name:** Ter\_Reflec

**Meaning:** Tertiary reflector average temperature

**Nominal occurrence:** L1BRADD, L1BRADG

**Format:** real

**Nominal division:** MAF

**Unit:** Kelvins

---

---

**Name:** THz.MIF

**Meaning:** Number of THz module Limb scan Minor frames

**Nominal occurrence:** L1BOA HDF5 SD dimension

**Format:** integer

**Value:** 125

---

**Name:** THz.MIFx

**Meaning:** Number of extended THz module Limb scan Minor frames

**Nominal occurrence:** L1BOA HDF5 SD dimension

**Format:** integer

**Value:** 23

---

**Name:** tpBO\_stat

**Meaning:** Tangent point bright object status

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** integer

**Nominal division:** MIF, MAF

**Unit:** 0 = no bright object in limb view; else bit number of bright object as indexed in BO\_name

---

**Name:** tpECI

**Meaning:** Tangent point location in ECI coordinates

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real(3)

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters

---

---

**Name:** tpECR

**Meaning:** Tangent point location in ECR coordinates

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real(3)

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters

---

**Name:** tpECRtoFOV

**Meaning:** Tangent point in ECR coordinates with respect to FOV (Field of View) coordinates

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real(9)

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** radians

---

**Name:** tpGeocAlt

**Meaning:** Geocentric altitude of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters

---

**Name:** tpGeocAltRate

**Meaning:** Rate of change of **tpGeocAlt**

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters/second

---

---

**Name:** tpGeocLat

**Meaning:** Geocentric latitude of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** tpGeodAlt

**Meaning:** Geodetic altitude of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters

---

**Name:** tpGeodAltRate

**Meaning:** Rate of change of **tpGeodAlt**

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters/second

---

**Name:** tpGeodAltX

**Meaning:** Geodetic altitude of tangent point extended for THz scan

**Nominal occurrence:** tpRecTHz in L1BOA

**Format:** real

**Nominal division:** THz.MIFx, MAF

**Unit:** meters

---

---

**Name:** tpGeodAngle

**Meaning:** MLS master coordinate  $\phi$ , for tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** cumulative degrees

---

**Name:** tpGeodLat

**Meaning:** Geodetic latitude of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF,

**MAF**

**Unit:** degrees

---

**Name:** tpLon

**Meaning:** Longitude of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** tpLosAngle

**Meaning:** Line-of-sight angle of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

---

**Name:** tpLosVel

**Meaning:** Line-of-sight velocity of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters/second

---

**Name:** tpOrbY

**Meaning:** Out of plane distance of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** meters

---

**Name:** tpPos\_Prime

**Meaning:** Antenna Positions prime

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real(2)

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** tpRecGHz

**Meaning:** Tangent point record for GHz module

**Nominal occurrence:** L1BOA

**Format:** record structure

**Nominal division:** MAF

---

---

**Name:** tpRecTHz

**Meaning:** Tangent point record for THz module

**Nominal occurrence:** L1BOA

**Format:** record structure

**Nominal division:** MAF

---

**Name:** tpSolarTime

**Meaning:** Solar time of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** hours

---

**Name:** tpSolarZenith

**Meaning:** Solar zenith angle of tangent point

**Nominal occurrence:** tpRecGHz, tpRecTHz in L1BOA

**Format:** real

**Nominal division:** GHz.MIF, MAF and THz.MIF, MAF

**Unit:** degrees

---

**Name:** utcpole

**Meaning:** UTC pole file contents

**Nominal occurrence:** L1BOA

**Format:** string

**Nominal division:** unspecified lines

---

---

**Name:** ypr

**Meaning:** Yaw, pitch and roll of the spacecraft

**Nominal occurrence:** L1BOA

**Format:** real(3)

**Nominal division:** MIF, MAF

**Unit:** degrees

---

**Name:** yprRate

**Meaning:** Rate of change of **ypr**

**Nominal occurrence:** L1BOA

**Format:** real(3)

**Nominal division:** MIF, MAF

**Unit:** degrees/second

---



## A. HDF5 listings

This section lists examples of the HDF5 files produced by Level 1. These listings are produced using the “h5ls -l” command on the .h5 files. For a more detailed listing, do the “h5dump -H” on the .h5 files.

## A.1. L1BOA

```
/GHz Group
/GHz/BO_stat Dataset {3508/Inf, 148}
/GHz/ECI Dataset {3508/Inf, 125, 3}
/GHz/ECR Dataset {3508/Inf, 125, 3}
/GHz/ECRtoFOV Dataset {3508/Inf, 125, 9}
/GHz/GeocAlt Dataset {3508/Inf, 125}
/GHz/GeocAltRate Dataset {3508/Inf, 125}
/GHz/GeocLat Dataset {3508/Inf, 125}
/GHz/GeodAlt Dataset {3508/Inf, 125}
/GHz/GeodAltRate Dataset {3508/Inf, 125}
/GHz/GeodAngle Dataset {3508/Inf, 125}
/GHz/GeodLat Dataset {3508/Inf, 125}
/GHz/Lon Dataset {3508/Inf, 125}
/GHz/LosAngle Dataset {3508/Inf, 125}
/GHz/LosVel Dataset {3508/Inf, 125}
/GHz/OrbY Dataset {3508/Inf, 125}
/GHz/Pos_Prime Dataset {3508/Inf, 125, 2}
/GHz/SolarTime Dataset {3508/Inf, 125}
/GHz/SolarZenith Dataset {3508/Inf, 125}
/GHz/azimAngle Dataset {3508/Inf, 148}
/GHz/encoderAngle Dataset {3508/Inf, 148}
/GHz/scAngle Dataset {3508/Inf, 148}
/GHz/scanAngle Dataset {3508/Inf, 148}
/GHz/scanRate Dataset {3508/Inf, 148}
/HDFEOS\ INFORMATION Group
/HDFEOS\ INFORMATION/coremetadata.0 Dataset {SCALAR}
/LCF Dataset {1}
/MAFStartTimeTAI Dataset {3508/Inf}
/MAFStartTimeUTC Dataset {3508/Inf}
/PCF Dataset {1}
/THz Group
/THz/BO_stat Dataset {3508/Inf, 148}
/THz/ECI Dataset {3508/Inf, 125, 3}
/THz/ECR Dataset {3508/Inf, 125, 3}
/THz/ECRtoFOV Dataset {3508/Inf, 125, 9}
/THz/GeocAlt Dataset {3508/Inf, 125}
/THz/GeocAltRate Dataset {3508/Inf, 125}
/THz/GeocLat Dataset {3508/Inf, 125}
/THz/GeodAlt Dataset {3508/Inf, 125}
/THz/GeodAltRate Dataset {3508/Inf, 125}
/THz/GeodAltX Dataset {3508/Inf, 23}
/THz/GeodAngle Dataset {3508/Inf, 125}
/THz/GeodLat Dataset {3508/Inf, 125}
/THz/Lon Dataset {3508/Inf, 125}
/THz/LosAngle Dataset {3508/Inf, 125}
/THz/LosVel Dataset {3508/Inf, 125}
/THz/OrbY Dataset {3508/Inf, 125}
/THz/Pos_Prime Dataset {3508/Inf, 125, 2}
/THz/SolarTime Dataset {3508/Inf, 125}
/THz/SolarZenith Dataset {3508/Inf, 125}
/THz/azimAngle Dataset {3508/Inf, 148}
/THz/encoderAngle Dataset {3508/Inf, 148}
/THz/scAngle Dataset {3508/Inf, 148}
/THz/scanAngle Dataset {3508/Inf, 148}
/THz/scanRate Dataset {3508/Inf, 148}
/counterMAF Dataset {3508/Inf}
/leapsec Dataset {1}
/noMIFs Dataset {3508/Inf}
/sc Group
/sc/ECI Dataset {3508/Inf, 148, 3}
/sc/ECR Dataset {3508/Inf, 148, 3}
```

```

/sc/GeocAlt Dataset {3508/Inf, 148}
/sc/GeocLat Dataset {3508/Inf, 148}
/sc/GeodAlt Dataset {3508/Inf, 148}
/sc/GeodAngle Dataset {3508/Inf, 148}
/sc/GeodLat Dataset {3508/Inf, 148}
/sc/Lon Dataset {3508/Inf, 148}
/sc/MIF_TAI Dataset {3508/Inf, 148}
/sc/OrbIncl Dataset {3508/Inf, 148}
/sc/VelECI Dataset {3508/Inf, 148, 3}
/sc/VelECR Dataset {3508/Inf, 148, 3}
/sc/ypr Dataset {3508/Inf, 148, 3}
/sc/yprRate Dataset {3508/Inf, 148, 3}
/utcpole Dataset {1}

```

## A.2. L1BRADD

```

/BandChans Dataset {34}
/BandChi2 Dataset {129, 34}
/HDFEOS\ INFORMATION Group
/HDFEOS\ INFORMATION\coremetadata.0 Dataset {SCALAR}
/LCF Dataset {1}
/MAFStartTimeGIRD Dataset {3508/Inf}
/PCF Dataset {1}
/Pri_Reflec Dataset {3508/Inf}
/R1A:118.B22D:PT.S0.DACS-4 Dataset {3508/Inf, 125, 129}
/R1A:118.B22D:PT.S0.DACS-4\ Baseline Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ Baseline\ precision Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ BaselineAC Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ BaselineAC\ precision Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ BaselineDC Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ BaselineDC\ precision Dataset {3508/Inf, 129}
/R1A:118.B22D:PT.S0.DACS-4\ precision Dataset {3508/Inf, 125, 129}
/R2:190.B23D:H20.S0.DACS-2 Dataset {3508/Inf, 125, 129}
/R2:190.B23D:H20.S0.DACS-2\ Baseline Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ Baseline\ precision Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ BaselineAC Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ BaselineAC\ precision Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ BaselineDC Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ BaselineDC\ precision Dataset {3508/Inf, 129}
/R2:190.B23D:H20.S0.DACS-2\ precision Dataset {3508/Inf, 125, 129}
/R3:240.B24D:O3.S0.DACS-3 Dataset {3508/Inf, 125, 129}
/R3:240.B24D:O3.S0.DACS-3\ Baseline Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ Baseline\ precision Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ BaselineAC Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ BaselineAC\ precision Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ BaselineDC Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ BaselineDC\ precision Dataset {3508/Inf, 129}
/R3:240.B24D:O3.S0.DACS-3\ precision Dataset {3508/Inf, 125, 129}
/R3:240.B25D:CO.S1.DACS-1 Dataset {3508/Inf, 125, 129}
/R3:240.B25D:CO.S1.DACS-1\ Baseline Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ Baseline\ precision Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ BaselineAC Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ BaselineAC\ precision Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ BaselineDC Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ BaselineDC\ precision Dataset {3508/Inf, 129}
/R3:240.B25D:CO.S1.DACS-1\ precision Dataset {3508/Inf, 125, 129}
/Sec_Reflec Dataset {3508/Inf}
/Ter_Reflec Dataset {3508/Inf}
/counterMAF Dataset {3508/Inf}

```

## A.3. L1BRADG

```
/AscDescIndx Dataset {3508/Inf, 125}
/BandChans Dataset {34}
/BandChi2 Dataset {129, 34}
/BaselineAlt Dataset {34, 25}
/BaselineLatBin Dataset {8, 2}
/HDFEOS\ INFORMATION Group
/HDFEOS\ INFORMATION/coremetadata.0 Dataset {SCALAR}
/LCF Dataset {1}
/LatBinChanAvg Dataset {8, 34, 25}
/LatBinIndx Dataset {3508/Inf, 125}
/MAFStartTimeGIRD Dataset {3508/Inf}
/PCF Dataset {1}
/Pri_Reflec Dataset {3508/Inf}
/R1A:118.B1F:PT.S0.FB25-1 Dataset {3508/Inf, 125, 25}
/R1A:118.B1F:PT.S0.FB25-1\ Baseline Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ Baseline\ precision Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ BaselineAC Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ BaselineAC\ precision Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ BaselineDC Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ BaselineDC\ precision Dataset {3508/Inf, 25}
/R1A:118.B1F:PT.S0.FB25-1\ precision Dataset {3508/Inf, 125, 25}
/R1A:118.B32W:PT.S0.WF4-1 Dataset {3508/Inf, 125, 4}
/R1A:118.B32W:PT.S0.WF4-1\ Baseline Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ Baseline\ precision Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ BaselineAC Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ BaselineAC\ precision Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ BaselineDC Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ BaselineDC\ precision Dataset {3508/Inf, 4}
/R1A:118.B32W:PT.S0.WF4-1\ precision Dataset {3508/Inf, 125, 4}
/R1B:118.B34W:PT.S0.WF4-3 Dataset {3508/Inf, 125, 4}
/R1B:118.B34W:PT.S0.WF4-3\ Baseline Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ Baseline\ precision Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ BaselineAC Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ BaselineAC\ precision Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ BaselineDC Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ BaselineDC\ precision Dataset {3508/Inf, 4}
/R1B:118.B34W:PT.S0.WF4-3\ precision Dataset {3508/Inf, 125, 4}
/R2:190.B27M:HCN.S0.MB11-1 Dataset {3508/Inf, 125, 11}
/R2:190.B27M:HCN.S0.MB11-1\ Baseline Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ Baseline\ precision Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ BaselineAC Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ BaselineAC\ precision Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ BaselineDC Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ BaselineDC\ precision Dataset {3508/Inf, 11}
/R2:190.B27M:HCN.S0.MB11-1\ precision Dataset {3508/Inf, 125, 11}
/R2:190.B2F:H2O.S0.FB25-2 Dataset {3508/Inf, 125, 25}
/R2:190.B2F:H2O.S0.FB25-2\ Baseline Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ Baseline\ precision Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ BaselineAC Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ BaselineAC\ precision Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ BaselineDC Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ BaselineDC\ precision Dataset {3508/Inf, 25}
/R2:190.B2F:H2O.S0.FB25-2\ precision Dataset {3508/Inf, 125, 25}
/R2:190.B3F:N2O.S2.FB25-3 Dataset {3508/Inf, 125, 25}
/R2:190.B3F:N2O.S2.FB25-3\ Baseline Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ Baseline\ precision Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ BaselineAC Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ BaselineAC\ precision Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ BaselineDC Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ BaselineDC\ precision Dataset {3508/Inf, 25}
/R2:190.B3F:N2O.S2.FB25-3\ precision Dataset {3508/Inf, 125, 25}
```

/R2:190.B4F:HNO3.S0.FB25-4 Dataset {3508/Inf, 125, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ Baseline Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ Baseline\ precision Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ BaselineAC Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ BaselineAC\ precision Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ BaselineDC Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ BaselineDC\ precision Dataset {3508/Inf, 25}  
/R2:190.B4F:HNO3.S0.FB25-4\ precision Dataset {3508/Inf, 125, 25}  
/R2:190.B5F:CLO.S0.FB25-5 Dataset {3508/Inf, 125, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ Baseline Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ Baseline\ precision Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ BaselineAC Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ BaselineAC\ precision Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ BaselineDC Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ BaselineDC\ precision Dataset {3508/Inf, 25}  
/R2:190.B5F:CLO.S0.FB25-5\ precision Dataset {3508/Inf, 125, 25}  
/R2:190.B6F:O3.S0.FB25-6 Dataset {3508/Inf, 125, 25}  
/R2:190.B6F:O3.S0.FB25-6\ Baseline Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ Baseline\ precision Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ BaselineAC Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ BaselineAC\ precision Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ BaselineDC Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ BaselineDC\ precision Dataset {3508/Inf, 25}  
/R2:190.B6F:O3.S0.FB25-6\ precision Dataset {3508/Inf, 125, 25}  
/R3:240.B33W:O3.S0.WF4-2 Dataset {3508/Inf, 125, 4}  
/R3:240.B33W:O3.S0.WF4-2\ Baseline Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ Baseline\ precision Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ BaselineAC Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ BaselineAC\ precision Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ BaselineDC Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ BaselineDC\ precision Dataset {3508/Inf, 4}  
/R3:240.B33W:O3.S0.WF4-2\ precision Dataset {3508/Inf, 125, 4}  
/R3:240.B7F:O3.S0.FB25-7 Dataset {3508/Inf, 125, 25}  
/R3:240.B7F:O3.S0.FB25-7\ Baseline Dataset {3508/Inf, 25}  
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/Sec_Reflec Dataset {3508/Inf}  
/Ter_Reflec Dataset {3508/Inf}  
/counterMAF Dataset {3508/Inf}
```

## A.4. L1BRADT

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/BandChans Dataset {34}  
/BandChi2 Dataset {129, 34}  
/HDFEOS\ INFORMATION Group  
/HDFEOS\ INFORMATION/coremetadata.0 Dataset {SCALAR}  
/LCF Dataset {1}  
/MAFStartTimeGIRD Dataset {3507/Inf}  
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## B. Acronyms

CCSDS	Consultative Committee for Space Data Systems
DISC	Data and Information Services Center
ECI	Earth Centered Inertial
EDOS	EOS Data and Operations System
ECR	Earth Centered Rotating
EOS	Earth Observing System
GES	Goddard Space Flight Center Earth Sciences
GIRD	General Interface Requirements Document
HDF5	Hierarchical Data Format version 5
MAF	MAjor Frame
MIF	MInor Frame
MLS	Microwave Limb Sounder
PCF	Process Control File
PGS	Product Generation System
TAI	International Atomic Time
TBD	To Be Determined
UTC	Universal Time Code



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