

Handling the GUVI Data Products

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Change History:

September 9, 2002

- The GUVI URL has been changed to <http://guvi.jhuapl.edu> from <http://www.timed.jhuapl.edu>. You will get redirected if the old URL is used
- A new machine (Linux) has been added and is called “guvi”. This machine is our web server and all external users log into here. Icarus is still our dedicated GUVI Data Processing Payload Operations Center.
- Added FTP instructions
- Updated disk drives for where the GUVI data products are located. /disks/d0096 has been changed to /disks/dr002 and /disks/dr003
- Updated links per web page modifications
- Added a section on GUVI planning tools

October 28, 2002

- Moved table headers in Appendix A to the beginning of the table as opposed to at the end of the table

January 16, 2003

- The GUVI web pages have been rearranged. Updated instructions to reflect changes
- Updated locations of all data products; use symbolic link /project/timed/guvi instead of specific disk
- Added Data Product Statistics paragraph
- Added GUVI Support Products section
- Added access to Summary Images from new link on home page
- Added access to Data from new link on home page
- Added a note explaining data product file naming conventions for orbits that span the day boundary
- Updated the Planning Tool section

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1.0 GUVI System Requirements

In order to properly display the GUVI web site and/or run the GUVI Java User Interface, there are certain system requirements that you must have. These are outlined in “Accessing the GUVI Web Page”. The other system requirements that you must have are as follows:

- To log in to APL, you must have a copy of SSH running on your platform. This enables you to get into APLs firewall
- To use any of the IDL tools provided, you need to have IDL installed on your platform
- To use any of the C++ tools provided, you need to have C++ installed on your platform
- To use the GUVI Java User Interface as an application, you need to have the Java Run Time Environment version 1.3.0-02 installed on your platform
- The GUVI data files are quite large. A typical Level 1B imaging disk file consisting of a single orbit can be up to ~45 Mbytes. Therefore, to do any of the above, your system must have adequate RAM and CPU.
- There is no requirement on platform type, i.e. PC vs. Mac vs. Sun but only PC or Mac Internet Explore v6+ or Netscape Communicator v4.7+ will be supported for viewing the GUVI web page.

2.0 Understanding the GUVI Data Products

The GUVI data products are written out into a binary format using NetCDF. NetCDF enables the data files to be documented within the data file itself.

- Overall definitions of the GUVI data products are available from the GUVI web site as follows:
 1. Go to
 2. Select “Data”
 3. Select “Data Definition”
 4. Select “Understanding” to get a brief explanation of the data products
- Definitions of exactly what is in the data product files are available from the GUVI web site as follows:
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Data”
 3. Select “Data Definition”
 4. Select “Understanding”

5. Select the link for “GUVI Data File Definitions Document” or select “Download Word Document”

2.1 GUVI Data Product Files

The GUVI data product files are generated every orbit and are broken out as follows:

- Per data product level
 - Per year
 - Per day of year
 - Per orbit

Within a given data product level, the GUVI data files are broken out as follows:

Data Product Level	Data Product Files	
Level 1A	Imaging Mode	
	Spectrograph Mode	
	Static Imaging Mode	
Level 1B	Imaging Mode	Disk
		Limb
	Static Imaging Mode	
Level 1C	Imaging Mode	Disk
		Limb
	Spectrograph Mode	
Level 2B	Imaging Mode	Disk Day
		Disk Night
		Disk Aurora
		Limb Day
		Limb Night
Supporting Data Files		

2.2 GUVI Data Product File Names

The GUVI data product file names are always unique and contain all the pertinent information of what was utilized to generate the data file as follows:

- GUVI_mm_vaaarbb_yyyyddd_REVooooo.filetype: for Level 1A in imaging mode that encompass a single orbit

- GUVI_mm_scan_vaaarbb_yyyyddd_REVooooo.filetype: for Level 1B and Level 1C files in imaging mode that encompass a single orbit
- GUVI_mm_vaaarbb_yyyyddd_REVooooo.name: for Level 1A, Level 1B and Level 1C files in static imaging or spectrograph mode that encompass a single orbit
- GUVI_mm_scan_rrr_vaaarbb_yyyyddd_REVooooo.name: for Level 2B files that encompass a single orbit
- GUVI_mm_scan_vaaarbb_yyyyddd_REVooooo_yyyyddd_REVooooo.name for files that encompass multiple but consecutive orbits
- GUVI_mm_scan_rrr_vaaarbb_yyyyddd_REVooooo_yyyyddd_REVooooo.name for files that encompass multiple but consecutive orbits for a specific data region

Where:

- mm is the instrument mode. Allowable modes are as follows and are case sensitive:
 - im - for imaging mode
 - si - for static imaging mode
 - sp - for spectrograph mode
- scan is the scan type. Allowable choices are as follows and are case sensitive:
 - disk
 - limb
- rrr is the data region that the data in this file covers. Allowable regions are as follows and are case sensitive:
 - day - for day
 - nit - for night
 - aur - for aurora
 - twi - for twilight
 - unk - for unknown
- aaa is the 3 digit data product version number (this number combined with the revision number makes the data product file unique). "v" always precedes this indicating that this is a version number.
- bb is the 2 digit data product revision number (this number combined with the version number makes the data product file unique). "r" always precedes this indicating that this is a revision number.
- yyyy is the year. For multiple orbits, the first is start and the second is stop
- ddd is the day of the year. For multiple orbits, the first is start and the second is stop
- ooooo is the orbit number. For multiple orbits, the first is start and the second is stop. "REV" always precedes this indicating that this is a revolution or orbit number.
- Filetype is the type of data product type. These are the file types for the GUVI routine data product files. Allowable names are as follows and are case sensitive:
 - L1A: level 1A data product files
 - L1B: level 1B data product files
 - L1C: level 1C data product files
 - L2B: level 2B data product files

Note:

- GUVI Level 1A and Level 1B Version 8 and higher data product files that start on one day and end on the next day are named for the day the start of the orbit occurs on
- GUVI Level 1A and Level 1B Version 7 and lower data product files that start on one day and end on the next day are named for the day the end of the orbit occurs on

2.3 GUVI Data Product Version and Revision Information

All of the GUVI data product file names are tagged with version and revision information. Information about what a particular version or revision of a data product file consist of will be located on the GUVI web site as follows:

1. Go to <http://guvi.jhuapl.edu>
2. Select “Data”
3. Select “Versions”
4. Select “Data File Versions”
5. Select the data product type of interest
6. The various components that go into a data product file are displayed. For detailed information on each component, select on that and all changes made will be displayed

2.4 GUVI Data Product Statistics

Statistics have been generated for all GUVI data products produced by version ad the day the data product encompasses. These statistics are located on the GUVI web site as follows:

7. Go to <http://guvi.jhuapl.edu>
8. Select “Data”
9. Select “Versions”
10. Select “Data Product Statistics”
11. Select the desired data product version or desired day of interest

3.0 Accessing the GUVI Web Page

The GUVI web site is located at <http://guvi.jhuapl.edu>. In order to adequately display everything you need to have the following on your system:

1. Either Internet Explorer version 6 or higher
2. Or Netscape Communicator version 4.7 or higher

3. Flash version 6, but if you don't have this already loaded on your platform, you will be prompted and sent to download it
4. JavaScript should be enabled
5. To run the GUVI Java User Interface as an application, you will need to have Java Run Time Environment version 1.3.0_02 installed, you can download that from the same place you launch the GUVI Java User Interface applet.

4.0 GUVI Shared Tools

Tools to read and display the GUVI data products are available from either the GUVI web site or by logging in directly into APL. If you would like to add tools of your own, please contact Michele Weiss at APL and we will add them to the list and make them available. Access to them is as follows:

- Obtaining by logging into APL
 1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command "telnet guvi".
 2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
 3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
 4. Tools resides at /project/timed/guvi/tools. To get there, type "cd /project/timed/guvi/tools".
- Obtaining tools from the GUVI web page
 1. Go to <http://guvi.jhuapl.edu>
 2. Select "Data"
 3. Select "Software"
 4. Select "Shared Tools"
- GUVI Data Readers are also available from the GUVI web page
 1. Go to <http://guvi.jhuapl.edu>
 2. Select "Data"
 3. Select "Software"
 4. Select "Data Readers"

Note: ncdump is only available from the Unidata web site which can be accessed from the GUVI Shared Tools web page.

5.0 GUVI Survey/Summary Products

Survey/Summary browse products are being produced for all of GUVI's routine Level 1 and 2 data products. These are essentially snapshot images from different projections

and/or locations to aid you in determining data products that might be of interest to you. These survey/summary products are only available from the GUVI web site as follows:

1. Go to <http://guvi.jhuapl.edu>
2. From the GUVI home page, Select “Summary Images” or else
3. Select “Data”
4. Select “Summary Images”
5. Select level of data product desired or rather the “Level X Survey Product Gallery” and parse through to get to the data products of interest. You can select the following values depending on the summary product type:
 - Day of year
 - Orbit number within a given day
 - View which consists of either a different map projection or else centered on a different latitude/longitude
 - Wavelength and/or data region depending on the level of the data product being displayed

6.0 GUVI Level 0 Data

6.1 Obtaining Level 0 Raw GUVI Telemetry

GUVI Level 0 data is only available from the TIMED Mission Data Center (MDC). To obtain the data from the MDC, perform the following steps:

1. Go the TIMED Mission Data Center MDC web site located at <http://www.timed.jhuapl.edu/register/index.html>. If this brings you to the TIMED Web Site instead of the TIMED Mission Data Center Registration, select “Science and Data Management” and then select “Mission Data Center”
2. Log in or create a TIMED MDC user account if you don’t already have one. A user account will instantly be created for you.
3. Select “Click Here to Launch Interface”
4. In the green bar at the top of the web page, select “Browse”
5. Select “Telemetry Download Utility”
6. Fill in the table as follows and select “Submit Query”

MDC Archive Map Field	Value to Input	Definition
Include APID(s)	0x480 or blank	To obtain GUVI Housekeeping Data
	0x481 or blank	To obtain GUVI Imaging Mode Data
	0x482 or blank	To obtain GUVI Spectrograph Mode Data
	0x483 or blank	To obtain GUVI Test Mode data
	0x485 or blank	To obtain GUVI Static Imaging Mode Data

Exclude APID(s)	Blank or 0x480, 0x481, 0x482, 0x483, 0x485	If specifying 9 for all subsystems, this field enables you to exclude certain GUVI ApID(s)
Subsystem(s)	Blank or 9	If specifying an ApID, then leave this blank, otherwise can put a 9 for Subsystem to return all of the GUVI ApIDs
Source(s)	All	For all ground stations
Front End(s)	All	Use all of the front ends
Virtual Channel(s)	All	Get all of the frame sources
Dirty Data Wanted	No	Only want Clean and merged data
Start Time	yyyy doy hh:mm:ss	Input the starting time of the data that you want
End Time	yyyy doy hh:mm:ss	Input the ending time of the data that you want
Message Type	TP	Telemetry Packets. Contains minimal amount of overhead header information which is not needed
Data Time Ordering	Space Craft Time	Sort by spacecraft time

6.2 Reading Level 0 Raw GUVI Telemetry

All of the following tools are available from GUVI Shared Tools web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL
- Use ReadL1ANetCDF.cpp to read the file into C++

7.0 GUVI Level 1A Data

7.1 Obtaining GUVI Level 1A Data Product Files

GUVI Level 1A data products are only available by logging into APL and can be obtained by performing the following steps. They are not available on the GUVI web page:

1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command “telnet guvi”.
2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
4. Data generated w/in the last 24 hours resides at /project/timed/guvi/dataproducts and are denoted with an “.L1A” file type. To get there, type “cd /project/timed/guvi/dataproducts”.

5. Older data resides at /disks/dr003/guvi/level1a and are sorted by instrument mode, year and day of year. To get there, type “cd /disks/dr003/guvi/level1a”.

7.2 Reading GUVI Level 1A Data Product Files

All of the following tools are available from GUVI Shared Tools web page and the GUVI Data Readers web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL
- Use ReadL1ANetCDF.cpp to read the file into C++

7.3 Displaying GUVI Level 1A Data Product Files

All of the following tools are available from GUVI Shared Tools web page as described in GUVI Shared Tools.

1. Use Aerospace SIS Browser which obtains the data directly from the TIMED MDC and graphically displays the GUVI Level 1A data
2. Use L1A_qlook to graphically display GUVI Level 1A data in IDL

8.0 GUVI Level 1B Data

8.1 Obtaining GUVI Level 1B Data Product Files

GUVI Level 1B data products are currently available by either logging into APL or else obtaining the data from the GUVI web sites. This can be obtained by performing the following steps:

- Obtaining data by logging into APL
 1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command “telnet guvi”.
 2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
 3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
 4. Data generated w/in the last 24 hours resides at /project/timed/guvi/dataproducts and are denoted with an “.L1B” file type. To get there, type “cd /project/timed/guvi/dataproducts”.
 5. Older data resides at /disks/da002/guvi/level1b and are sorted by instrument mode, year and day of year. To get there, type “cd /disks/da002/guvi/level1b”.

- Obtaining data from the GUVI web page. GUVI Level 1B data products are currently available from the GUVI web site but later they will only be available by logging directly into APL.
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Access Data” or else
 3. Select “Data”
 4. Select “Access Data”
 5. Select “Latest Data” to get data generated within the last 24 hours
 6. Select the level of data product desired and parse through the directories to get to the data products of interest for data products generated later than the last 24 hours.

8.2 Reading GUVI Level 1B Data Product Files

All of the following tools are available from GUVI Shared Tools web page and the GUVI Data Readers web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL
- Use ReadL1BNetCDF.cpp to read the file into C++

8.3 Displaying GUVI Level 1B Data Product Files

All of the following tools are available from GUVI Shared Tools web page as described in GUVI Shared Tools.

3. Use Aerospace SIS Browser which obtains the data directly from the TIMED MDC, produces a GUVI Level 1B data file and graphically displays the GUVI Level 1B data
4. Use L1B_qlook to graphically display GUVI Level 1B data in IDL
5. Survey/Summary products for the GUVI Level 1B data products are available from the GUVI web site. See GUVI Survey/Summary products.

9.0 GUVI Level 1C Data

9.1 Obtaining GUVI Level 1C Data Product Files

GUVI Level 1C data products are available by either logging into APL or else obtaining the data from the GUVI web sites. This can be obtained by performing the following steps:

- Obtaining data by logging into APL

1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command “telnet guvi”.
 2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
 3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
 4. Data generated w/in the last 24 hours resides at /project/timed/guvi/dataproducts and are denoted with an “.L1C” file type. To get there, type “cd /project/timed/guvi/dataproducts”.
 5. Older data resides at /disks/dr003/guvi/level1c and are sorted by instrument mode, year and day of year. To get there, type “cd /disks/dr003/guvi/level1c”.
- Obtaining data from the GUVI web page
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Access Data” or else
 3. Select “Data”
 4. Select “Access Data”
 5. Select “Latest Data” to get data generated within the last 24 hours
 6. Select the level of data product desired and parse through the directories to get to the data products of interest for data products generated later than the last 24 hours.

9.2 Reading GUVI Level 1C Data Product Files

All of the following tools are available from GUVI Shared Tools web page and the GUVI Data Readers web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL
- Use ReadL1CNetCDF.cpp to read the file into C++

9.3 Displaying GUVI Level 1C Data Product Files

All of the following tools are available from GUVI Shared Tools web page as described in GUVI Shared Tools.

6. Survey/Summary products for the GUVI Level 1C data products are available from the GUVI web site. See GUVI Survey/Summary products.
7. Use the GUVI Java User Interface which will be available to run both as an applet (on the GUVI web site) or as an application (as a local application that runs on your PC/Mac/Unix box). This is available from the GUVI web site as follows:
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Data”
 3. Select “Display Data”
 4. Select “Launch Interface” to launch the GUVI Java User Interface applet

10.0 GUVI Level 2B Data

10.1 Obtaining GUVI Level 2B Data Product Files

GUVI Level 2B data products will be available by either logging into APL or else obtaining the data from the GUVI web sites. This can be obtained by performing the following steps:

- Obtaining data by logging into APL
 1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command “telnet guvi”
 2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
 3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
 4. Data generated w/in the last 24 hours resides at /project/timed/guvi/dataproducts and are denoted with an “.L2B” file type. To get there, type “cd /project/timed/guvi/dataproducts”.
 5. Older data resides at /disks/dr002/guvi/level2b and are sorted by data region, year and day of year. To get there, type “cd /disks/dr002/guvi/level2b”.
- Obtaining data from the GUVI web page.
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Access Data” or else
 3. Select “Data”
 4. Select “Access Data”
 5. Select “Latest Data” to get data generated w/in the last 24 hours
 6. Select level of data product desired and parse through to get to the data products of interest for older data products

10.2 Reading GUVI Level 2B Data Product Files

All of the following tools are available from GUVI Shared Tools web page and the GUVI Data Readers web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL
- Use ReadL2BNetCDF.cpp to read the file into C++

10.3 Displaying GUVI Level 2B Data Product Files

All of the following tools are available from GUVI Shared Tools web page as described in GUVI Shared Tools.

- Survey/Summary products for the GUVI Level 2B data products are available from the GUVI web site.
- Use the GUVI Java User Interface which will be available to run both as an applet (on the GUVI web site) or as an application (as a local application that runs on your PC/Mac/Unix box). This is available from the GUVI web site as follows:
 1. Go to <http://guvi.jhuapl.edu>
 2. Select “Data”
 3. Select “Display Data”
 4. Select “Launch Interface” to launch the GUVI Java User Interface applet

11.0 GUVI Supporting Data Files

11.1 Obtaining GUVI Support Data Product Files

GUVI Supporting data products are available by either logging into APL or else obtaining the data from the GUVI web sites. This can be obtained by performing the following steps:

- Obtaining data by logging into APL
 1. From outside APL: log in to APL using Secure Shell, with the host name set to sd-ssh.jhuapl.edu and then once in, log in to guvi which is the GUVI Data Processing Payload Operations Center using the command “telnet guvi”
 2. Using FTP, from outside APL: ftp into guvi.jhuapl.edu
 3. From inside APL: log directly in to guvi which is the GUVI Data Processing Payload Operations Center.
 4. Data generated w/in the last 24 hours resides at /project/timed/guvi/dataproducts. To get there, type “cd /project/timed/guvi/dataproducts”.
 5. Older data resides at /disks/dr002/guvi/support and are sorted by supporting data product type, year and day of year. To get there, type “cd /disks/dr002/guvi/support”.
- Obtaining data from the GUVI web page.
 7. Go to <http://guvi.jhuapl.edu>
 8. Select “Access Data” or else
 9. Select “Data”
 10. Select “Access Data”
 11. Select “Latest Data” to get data generated w/in the last 24 hours
 12. Select “Support Data Files” desired and parse through to get to the data products of interest for older data products

11.2 Reading GUVI Support Data Product Files

All of the following tools are available from GUVI Shared Tools web page and the GUVI Data Readers web page as described in GUVI Shared Tools.

- Use ncdump to display an ASCII text version of the file
- Use read_ncdf.pro to read the file into IDL

12.0 TIMED Data Catalog

The TIMED MDC is providing a data catalog that enables a user to search through the database of all data products submitted to TIMED based on many different parameters and with 5 different means of performing your searches. Access to the TIMED data catalog is as follows:

1. Go the TIMED Mission Data Center MDC web site located at <http://www.timed.jhuapl.edu/register/index.html>. If this brings you to the TIMED Web Site instead of the TIMED Mission Data Center Registration, select “Science and Data Management” and then select “Mission Data Center”
2. Log in or create a TIMED MDC user account if you don’t already have one. A user account will instantly be created for you.
3. Select “Click Here to Launch Interface”
4. In the green bar at the top of the web page, select “Search”
5. This brings you to “TIMED MDC Streamlined Data Product Queries”.

13.0 GUVI Planning Tools

A new area on the GUVI web site has been created which provides access to various GUVI planning tools. These include the following:

- A monthly calendar containing planned and as-flown activities for GUVI
 - An orbit calculator which provides conversions between day of year, date, time and orbit number
 - A day of year lookup to convert to and from julian day
 - A link to the TIMED Coincidence Calculator
1. Go to <http://guvi.jhuapl.edu>
 2. Select “Science”
 3. Select “Planning Tools”

Appendix 1. GUVI Data Product Files

A-1.0 GUVI Level 1A Data Product File

The following tables show the structure, the data fields, the variable names and the “typical” values for a GUVI Level 1A Data Product files. Tables 1 and 3 contain all of the data fields with their corresponding attributes. An attribute is ancillary information about a data field such as units, title, and valid range. Tables 1 and 3 are all of the data fields with their corresponding attributes, this can be performed in IDL by setting the “/attrib” flag. The GUVI Data Product Files also contain header information which are defined in the GUVI Data File Definition Document. IDL considers header information as attributes. Tables 2 and 4 are all of the data fields without their attributes.

```

** Structure <142f638>, 61 tags, length=31822580, refs=1:
  TIME                LONG          Array[389]
  TIME_TITLE          STRING        'Time since start of day'
  TIME_UNITS          STRING        'Milliseconds'
  DETECTOR            BYTE          Array[389]
  DETECTOR_TITLE      STRING        'Detector Number'
  DETECTOR_VALID_RANGE STRING        Array[2]
  SLIT                BYTE          Array[389]
  SLIT_TITLE          STRING        'Slit Position'
  SLIT_VALID_RANGE    STRING        Array[2]
  DARKCOUNTPIXELS     INT           Array[4, 389]
  DARKCOUNTPIXELS_TITLE STRING      'Dark Count Pixels'
  BACKGROUNDPIXELS    INT           Array[21, 389]
  BACKGROUNDPIXELS_TITLE STRING      'Background Count Pixels'
  DATAQUALITYINDICATOR BYTE        Array[389]
  DATAQUALITYINDICATOR_TITLE STRING    'Data Quality Indicator'
  PIXELDATA           FLOAT         Array[14, 5, 191, 389]
  PIXELDATA_TITLE     STRING        'Imaging Mode Pixel Data'
  PIXELDATA_UNITS     STRING        'Counts'
  ERROR               INT           Array[14, 5, 191, 389]
  ERROR_TITLE         STRING        'Decompression Error'
  ERROR_UNITS         STRING        'Percent'
  ERROR_SCALE_FACTOR  STRING        '      10'
  INPUTRATE           LONG          Array[191, 389]
  INPUTRATE_TITLE     STRING        'Input Rate Data'
  OUTPUTRATE          LONG          Array[191, 389]
  OUTPUTRATE_TITLE    STRING        'Output Rate Data'
  TITLE              STRING        'Level1A Imaging Data'
  DATA_PRODUCT_TYPE  STRING        'Level1A Imaging Data'
  SOURCE              STRING        'GUVI DP POC'
  MISSION             STRING        'TIMED'
  DATA_PRODUCT_VERSION STRING      '001'
  PRODUCT_FORMAT_VERSION STRING      '00'
  DATA_PRODUCT_REVISION STRING      '00'
  SOFTWARE_VERSION    STRING        '1.2'
  SOFTWARE_NAME       STRING        'reformatter'
  CALIBRATION_VERSION STRING        '004.0'
  DESCRIPTION         STRING        'Level1A Imaging Data'

```

COMMENT	STRING	'□'
HISTORY	STRING	'□'
FILENAME	STRING	
'GUVI_im_v001r00_2002052_REV01115.L1A'		
DATE_GENERATED	STRING	'2002073150922'
STARTING_TIME	STRING	'2002051223455'
STOPPING_TIME	STRING	'2002052001211'
STARTING_ORBIT_NUMBER	STRING	' 1115'
STOPPING_ORBIT_NUMBER	STRING	' 0'
INSTRUMENT_MODE	STRING	'IMAGING'
SCAN_TYPE	STRING	'N/A'
DATA_REGION	STRING	'N/A'
GRID_SIZE	STRING	' 0'
USED_DATA_PRODUCT_VERSION_NUMBER	STRING	' '
USED_DATA_PRODUCT_REVISION_NUMBER	STRING	'!'
PURPOSE	STRING	'Uncompressed Pixel Data'
INTENDED_RECIPIENT	STRING	= '□'
FILE_TYPE	STRING	'NetCdf'
_81_DAY_F10	STRING	' 0.000000'
DAILY_F10	STRING	' 0.000000'
F10_7_SOURCE	STRING	' '
_3_HOUR_KP	STRING	' 2.00000'
DAILY_KP	STRING	' 2.00000'
KP_AP_SOURCE	STRING	'Estimated'
DAILY_AP	STRING	' 2.00000'

Table 1. GUVI L1A Imaging Data File with Attributes

** Structure <3cf9010>, 10 tags, length=31822148, refs=1:

TIME	LONG	Array[389]
DETECTOR	BYTE	Array[389]
SLIT	BYTE	Array[389]
DARKCOUNTPIXELS	INT	Array[4, 389]
BACKGROUNDPIXELS	INT	Array[21, 389]
DATAQUALITYINDICATOR	BYTE	Array[389]
PIXELDATA	FLOAT	Array[14, 5, 191, 389]
ERROR	INT	Array[14, 5, 191, 389]
INPUTRATE	LONG	Array[191, 389]
OUTPUTRATE	LONG	Array[191, 389]

Table 2. GUVI L1A Imaging Data File without Attributes

** Structure <1437dd8>, 63 tags, length=28900492, refs=1:

TIME	LONG	Array[1946]
TIME_TITLE	STRING	'Time since start of day'
TIME_UNITS	STRING	'Milliseconds'
DETECTOR	BYTE	Array[1946]

DETECTOR_TITLE	STRING	'Detector Number
Utilitized'		
DETECTOR_VALID_RANGE	STRING	Array[2]
SLIT	BYTE	Array[1946]
SLIT_TITLE	STRING	'Slit Position'
SLIT_VALID_RANGE	STRING	Array[2]
MIRROR	INT	Array[1946]
MIRROR_TITLE	STRING	'Mirror Position'
MIRROR_VALID_RANGE	STRING	Array[2]
INPUTRATE	LONG	Array[1946]
INPUTRATE_TITLE	STRING	'Input Rate'
OUTPUTRATE	LONG	Array[1946]
OUTPUTRATE_TITLE	STRING	'Output Rate'
DARKCOUNTPIXELS	INT	Array[4, 1946]
DARKCOUNTPIXELS_TITLE	STRING	'Dark Count Pixels'
BACKGROUNDPIXELS	INT	Array[21, 1946]
BACKGROUNDPIXELS_TITLE	STRING	'Background Count Pixels'
DATAQUALITYINDICATOR	BYTE	Array[1946]
PIXELDATA	FLOAT	Array[176, 14, 1946]
PIXELDATA_TITLE	STRING	'Spectrograph Pixel Data'
PIXELDATA_UNITS	STRING	'Counts'
ERROR	INT	Array[176, 14, 1946]
ERROR_TITLE	STRING	'Decompression Error'
ERROR_UNITS	STRING	'Percentage'
ERROR_SCALE_FACTOR	STRING	' 10'
TITLE	STRING	'Level1A Spectrograph
Data'		
DATA_PRODUCT_TYPE	STRING	'Level1A Spectrograph
Data'		
SOURCE	STRING	'GUVI DP POC'
MISSION	STRING	'TIMED'
DATA_PRODUCT_VERSION	STRING	'001'
PRODUCT_FORMAT_VERSION	STRING	'00'
DATA_PRODUCT_REVISION	STRING	'00'
SOFTWARE_VERSION	STRING	'1.2'
SOFTWARE_NAME	STRING	'reformatter'
CALIBRATION_VERSION	STRING	'004.0'
DESCRIPTION	STRING	'Level1A Spectrograph
Data'		
COMMENT	STRING	'□'
HISTORY	STRING	'□'
FILENAME	STRING	
'GUVI_sp_v001r00_2002067_REV01338.L1A'		
DATE_GENERATED	STRING	'2002074102505'
STARTING_TIME	STRING	'2002067000414'
STOPPING_TIME	STRING	'2002067014130'
STARTING_ORBIT_NUMBER	STRING	' 1338'
STOPPING_ORBIT_NUMBER	STRING	' 0'
INSTRUMENT_MODE	STRING	'SPECTROGRAPH'
SCAN_TYPE	STRING	'N/A'
DATA_REGION	STRING	'N/A'
GRID_SIZE	STRING	' 0'
USED_DATA_PRODUCT_VERSION_NUMBER	STRING	' '
USED_DATA_PRODUCT_REVISION_NUMBER	STRING	'!'
PURPOSE	STRING	'Uncompressed Pixel Data'
INTENDED_RECIPIENT	STRING	'□'
FILE_TYPE	STRING	'NetCdf'

_81_DAY_F10	STRING	' 0.000000'
DAILY_F10	STRING	' 0.000000'
F10_7_SOURCE	STRING	' '
_3_HOUR_KP	STRING	' 2.00000'
DAILY_KP	STRING	' 2.00000'
KP_AP_SOURCE	STRING	'Estimated'
DAILY_AP	STRING	' 2.00000'

Table 3. GUVI L1A Spectrograph Data File with Attributes

```

** Structure <142c438>, 11 tags, length=28900048, refs=1:
  TIME                LONG          Array[1946]
  DETECTOR            BYTE          Array[1946]
  SLIT                BYTE          Array[1946]
  MIRROR              INT           Array[1946]
  INPUTRATE           LONG          Array[1946]
  OUTPUTRATE          LONG          Array[1946]
  DARKCOUNTPIXELS  INT           Array[4, 1946]
  BACKGROUNDPIXELS  INT           Array[21, 1946]
  DATAQUALITYINDICATOR BYTE        Array[1946]
  PIXELDATA           FLOAT         Array[176, 14, 1946]
  ERROR              INT           Array[176, 14, 1946]
    
```

Table 4. GUVI L1A Spectrograph Data File without Attributes

A-2.0 GUVI Level 1B Data Product File

The following tables show the structure, the data fields, the variable names and the “typical” values for a GUVI Level 1B Data Product files. Tables 5 and 6 contain all of the data fields with their corresponding attributes. An attribute is ancilliary information about a data field such as units, title, and valid range. Tables 5 and 6 are all of the data fields with their corresponding attributes, this can be performed in IDL by setting the “/attrib” flag. The GUVI Data Product Files also contain header information which are defined in the GUVI Data File Definition Document. IDL considers header information as attributes. Table 6 are all of the data fields without their attributes.

Table 5. GUVI L1B Imaging Disk Data File with Attributes

```

** Structure <1444bc0>, 67 tags, length=45915700, refs=1:
  TIME                LONG          Array[389]
    
```

TIME_TITLE	STRING	'Time since start of day'
TIME_UNITS	STRING	'Milliseconds'
DETECTOR	BYTE	Array[389]
DETECTOR_TITLE	STRING	'Detector Number'
DETECTOR_VALID_RANGE	STRING	Array[2]
SLIT	BYTE	Array[389]
SLIT_TITLE	STRING	'Slit Position'
SLIT_VALID_RANGE	STRING	Array[2]
DARKCOUNTPIXELS	INT	Array[4, 389]
DARKCOUNTPIXELS_TITLE	STRING	'Dark Count Pixels'
BACKGROUNDPIXELS	INT	Array[21, 389]
BACKGROUNDPIXELS_TITLE	STRING	'Background Count Pixels'
RADIANCEDATA	FLOAT	Array[5, 14, 159, 389]
RADIANCEDATA_TITLE	STRING	'Imaging Mode Disk Radiance
Data'		
RADIANCEDATA_UNITS	STRING	'Rayleighs'
DQI	BYTE	Array[5, 14, 159, 389]
DQI_TITLE	STRING	'Data Quality Indicator'
CALIBRATIONERROR	INT	Array[5, 14, 159, 389]
CALIBRATIONERROR_TITLE	STRING	'Calibration Error'
CALIBRATIONERROR_UNITS	STRING	'Percent'
CALIBRATIONERROR_SCALE_FACTOR	STRING	' 10'
COUNTERROR	INT	Array[5, 14, 159, 389]
COUNTERROR_TITLE	STRING	'Counting Statistical Error'
COUNTERROR_UNITS	STRING	'Percent'
COUNTERROR_SCALE_FACTOR	STRING	' 10'
PIERCEPOINTLATITUDE	FLOAT	Array[14, 159, 389]
PIERCEPOINTLATITUDE_TITLE	STRING	'Latitude of Pierce Point'
PIERCEPOINTLATITUDE_UNITS	STRING	'Geographic coordinates'
PIERCEPOINTLONGITUDE	FLOAT	Array[14, 159, 389]
PIERCEPOINTLONGITUDE_TITLE	STRING	'Longitude of Pierce Point'
PIERCEPOINTLONGITUDE_UNITS	STRING	'Geographic coordinates'
TITLE	STRING	'Level1B Imaging Disk Data'
DATA_PRODUCT_TYPE	STRING	'Level1B Imaging Disk Data'
SOURCE	STRING	'GUVI DP POC'
MISSION	STRING	'TIMED'
DATA_PRODUCT_VERSION	STRING	'001'
PRODUCT_FORMAT_VERSION	STRING	'00'
DATA_PRODUCT_REVISION	STRING	'00'
SOFTWARE_VERSION	STRING	'1.2'
SOFTWARE_NAME	STRING	'reformatter'
CALIBRATION_VERSION	STRING	'004.0'
DESCRIPTION	STRING	'Level1B Imaging Disk Data'
COMMENT	STRING	'□'
HISTORY	STRING	'□'
FILENAME	STRING	
'GUVI_im_disk_v001r00_2002052_REV01115.L1B'		
DATE_GENERATED	STRING	'2002073150923'
STARTING_TIME	STRING	'2002051223455'
STOPPING_TIME	STRING	'2002052001211'
STARTING_ORBIT_NUMBER	STRING	' 1115'
STOPPING_ORBIT_NUMBER	STRING	' 0'
INSTRUMENT_MODE	STRING	'IMAGING'
SCAN_TYPE	STRING	'DISK'
DATA_REGION	STRING	'N/A'
GRID_SIZE	STRING	' 0'

```

USED_DATA_PRODUCT_VERSION_NUMBER  STRING      'cal 2.0 color 2.0
background 3.0 dark 4.0'
USED_DATA_PRODUCT_REVISION_NUMBER STRING      '!'
PURPOSE                            STRING      'Calibrated Imaging Disk Pixel
Data'
INTENDED_RECIPIENT                 STRING      '□'
FILE_TYPE                           STRING      'NetCdf'
_81_DAY_F10                         STRING      '      0.000000'
DAILY_F10                           STRING      '      0.000000'
F10_7_SOURCE                        STRING      ' '
_3_HOUR_KP                          STRING      '      2.00000'
DAILY_KP                            STRING      '      2.00000'
KP_AP_SOURCE                        STRING      'Estimated'
DAILY_AP                            STRING      '      2.00000'

```

Table 6. GUVI L1B Imaging Limb Data File with Attributes

```

** Structure <143b000>, 79 tags, length=12221360, refs=1:
  TIME                               LONG      Array[389]
  TIME_TITLE                         STRING    'Time since start
of day'
  TIME_UNITS                         STRING    'Milliseconds'
  DETECTOR                           BYTE     Array[389]
  DETECTOR_TITLE                     STRING    'Detector Number'
  DETECTOR_VALID_RANGE              STRING    Array[2]
  SLIT                               BYTE     Array[389]
  SLIT_TITLE                         STRING    'Slit Position'
  SLIT_VALID_RANGE                  STRING    Array[2]
  DARKCOUNTPIXELS                 INT      Array[4, 389]
  DARKCOUNTPIXELS_TITLE            STRING    'Dark Count Pixels'
  BACKGROUNDPIXELS                 INT      Array[21, 389]
  BACKGROUNDPIXELS_TITLE            STRING    'Background Count
Pixels'
  BACKGROUNDSTARATPIXEL             BYTE     Array[14, 32, 389]
  BACKGROUNDSTARATPIXEL_TITLE        STRING    'Background Star at
Pixel Indicator'
  BACKGROUNDSTARATPIXEL_VALID_RANGE  STRING    Array[2]
  TANGENTPOINTLATITUDE              FLOAT    Array[14, 32, 389]
  TANGENTPOINTLATITUDE_TITLE         STRING    'Altitude of
Tangent Point'
  TANGENTPOINTLATITUDE_UNITS         STRING    'Geographic
coordinates'
  TANGENTPOINTLONGITUDE             FLOAT    Array[14, 32, 389]
  TANGENTPOINTLONGITUDE_TITLE        STRING    'Longitude of
Tangent Point'
  TANGENTPOINTLONGITUDE_UNITS        STRING    'Geographic
coordinates'
  TANGENTPOINTALTITUDE              FLOAT    Array[14, 32, 389]
  TANGENTPOINTALTITUDE_UNITS         STRING    'Kilometers'
  ZENITHANGLE                       FLOAT    Array[14, 32, 389]
  ZENITHANGLE_TITLE                 STRING    'Zenith Angle'
  ZENITHANGLE_UNITS                 STRING    'Degrees'
  RA                                 FLOAT    Array[14, 32, 389]
  RA_TITLE                           STRING    'Right Ascension'

```

DEC	FLOAT	Array[14, 32, 389]
DEC_TITLE	STRING	'Declination'
RADIANCEDATA	FLOAT	Array[5, 14, 32,
389]		
RADIANCEDATA_TITLE	STRING	'Imaging Mode Limb
Radiance Data'		
RADIANCEDATA_UNITS	STRING	'Rayleighs'
DQI	BYTE	Array[5, 14, 32,
389]		
DQI_TITLE	STRING	'Data Quality
Indicator'		
CALIBRATIONERROR	INT	Array[5, 14, 32,
389]		
CALIBRATIONERROR_TITLE	STRING	'Calibration Error'
CALIBRATIONERROR_UNITS	STRING	'Percent'
CALIBRATIONERROR_SCALE_FACTOR	STRING	' 10'
COUNTERROR	INT	Array[5, 14, 32,
389]		
COUNTERROR_TITLE	STRING	'Counting
Statistical Error'		
COUNTERROR_UNITS	STRING	'Percent'
COUNTERROR_SCALE_FACTOR	STRING	' 10'
TITLE	STRING	'Level1B Imaging
Limb Data'		
DATA_PRODUCT_TYPE	STRING	'Level1B Imaging
Limb Data'		
SOURCE	STRING	'GUVI DP POC'
MISSION	STRING	'TIMED'
DATA_PRODUCT_VERSION	STRING	'001'
PRODUCT_FORMAT_VERSION	STRING	'00'
DATA_PRODUCT_REVISION	STRING	'00'
SOFTWARE_VERSION	STRING	'1.2'
SOFTWARE_NAME	STRING	'reformatter'
CALIBRATION_VERSION	STRING	'004.0'
DESCRIPTION	STRING	'Level1B Imaging
Limb Data'		
COMMENT	STRING	'□'
HISTORY	STRING	'□'
FILENAME	STRING	
'GUVI_im_limb_v001r00_2002052_REV01115.L1B'		
DATE_GENERATED	STRING	'2002074093605'
STARTING_TIME	STRING	'2002051223455'
STOPPING_TIME	STRING	'2002052001211'
STARTING_ORBIT_NUMBER	STRING	= ' 1115'
STOPPING_ORBIT_NUMBER	STRING	= ' 0'
INSTRUMENT_MODE	STRING	'IMAGING'
SCAN_TYPE	STRING	'LIMB'
DATA_REGION	STRING	'N/A'
GRID_SIZE	STRING	' 0'
USED_DATA_PRODUCT_VERSION_NUMBER	STRING	'cal 2.0 color 2.0
background 3.0 dark 4.0'		
USED_DATA_PRODUCT_REVISION_NUMBER	STRING	'!'
PURPOSE	STRING	'Calibrated Imaging
Limb Pixel Data'		
INTENDED_RECIPIENT	STRING	= '□'
FILE_TYPE	STRING	'NetCdf'
_81_DAY_F10	STRING	' 0.000000'

DAILY_F10	STRING	' 0.000000'
F10_7_SOURCE	STRING	' '
_3_HOUR_KP	STRING	' 2.00000'
DAILY_KP	STRING	' 2.00000'
KP_AP_SOURCE	STRING	'Estimated'
DAILY_AP	STRING	' 2.00000'

Table 7. GUVI L1B Imaging Limb Data File without Attributes

** Structure <1438128>, 16 tags, length=12220824, refs=1:

TIME	LONG	Array[389]
DETECTOR	BYTE	Array[389]
SLIT	BYTE	Array[389]
DARKCOUNTPIXELS	INT	Array[4, 389]
BACKGROUNDPIXELS	INT	Array[21, 389]
BACKGROUNDSTARATPIXEL	BYTE	Array[14, 32, 389]
TANGENTPOINTLATITUDE	FLOAT	Array[14, 32, 389]
TANGENTPOINTLONGITUDE	FLOAT	Array[14, 32, 389]
TANGENTPOINTALTITUDE	FLOAT	Array[14, 32, 389]
ZENITHANGLE	FLOAT	Array[14, 32, 389]
RA	FLOAT	Array[14, 32, 389]
DEC	FLOAT	Array[14, 32, 389]
RADIANCEDATA	FLOAT	Array[5, 14, 32, 389]
DQI	BYTE	Array[5, 14, 32, 389]
CALIBRATIONERROR	INT	Array[5, 14, 32, 389]
COUNTERROR	INT	Array[5, 14, 32, 389]