Appendix B. GUVI Data File Definitions

Data Product Filenames

- 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
  - 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

Header

- data product file headers. Note: On December 26, 2007 the TIMED orbit number no longer would fit into a signed short variable, so the start and stop orbit number fields in the header were changed from a 2 byte “Short” to a 4 byte “Integer” in revision 3.1 of the software. This changed the size of the header

from 2026 bytes to 2030 bytes. These Integer orbit numbers will be found in product version 9 and greater of the L1A, L1B and version 4 and greater of the L1C.

Data Item	Needed when….	Description	Data Type	Field Size (Bytes)	Range or Nominal Value	Requirement
Title	Always	Succinct description of what is in the data set	Character	256	Up to 255 characters	TIMED standard header
Data product type	Always	Type of data product	Character	256	Up to 255 characters	TIMED standard header
Source	Always	Person or facility that created this facility.	Character	33	Up to 32 characters	TIMED standard header
Mission	Always	Mission - always TIMED	Character	6	“TIMED”	TIMED standard header
Data product version number	Routine data products	Indicates how many times the content or format for the product type has changed.	Integer	2	0 .. 999	TIMED standard header
Data product revision number	Routine data products	Indicates how many times this version of the data product has been updated	Integer	2	0 .. 99	GUVI standard header
Product format version number	Routine data products	Indicates how many times the format of the product type has changed.	Integer	2	0 .. 999	TIMED standard header
Software version number – major and minor	Routine data products	Major and minor software version number. This is 2 sets of 2 numbers. Indicates number of major and minor changes in processing algorithms.	Character	6	i.e. "01.02"	TIMED standard header
Software name	Always	Name of the software that created this product	Character	65	Up to 64 characters	TIMED standard header
Input/Cal version number – major and minor	Routine data products	Major and minor software version number. This is 2 sets of 2 numbers. Indicates number of major and minor changes in input/calibration processing algorithms.	Character	6	i.e. "02.03"	TIMED standard header

Description	Always	Description of this data product	Character	256	Up to 255 characters	TIMED standard header
Comment	Optional	Comment lines	Character	256	Up to 255 characters	TIMED standard header
History	Non-routine data products	Optional global attribute for an audit trail, i.e. date, time of day, user name, program name and command arguments	Character	256	Up to 255 characters	TIMED standard header
File name	Always	Name of this file	Character	81	Up to 80 characters	TIMED standard header
Date and time generated	Always	Data and time that this data product was generated	Character	14	yyyydoyhhmmss	TIMED standard header
Starting time	Always	Starting time/date of data used in this data product	Character	14	yyyydoyhhmmss	GUVI standard header
Stopping time	Always	Stopping time/date of data used in this data product	Character	14	yyyydoyhhmmss	GUVI standard header
Starting orbit number	Always	Starting orbit number of data used in this data product	Integer	4	0 .. 87,600	GUVI standard header
Stopping orbit number	Data product encompasses multiple orbits. 0 otherwise.	Stopping orbit number of data used in this data product, if this product encompasses multiple orbits	Integer	4	0 .. 87,600	GUVI standard header
Instrument mode	Always	Instrument mode for this data product	Character	15	"Imaging", "Static Imaging" or "Spectrograph"	GUVI standard header
Instrument scan type	Imaging mode data products.	Instrument scan type when in imaging mode	Character	5	"Disk", "Limb" or "None"	GUVI standard header
Data region	Level 2B Imaging mode data products. Level 3 or higher data products if files encompasses only a single data	Data region when in imaging mode.	Character	9	"Day", "Night", "Aurora", "Twilight", "Unknown" or "N/A"	GUVI standard header

	region					
Grid size	Level 1C and Level 2B data products. 0 otherwise	Size of the grid utilized when binning the data products	Integer	2		GUVI standard header
Data product version(s)	Non-routine data products. 0 otherwise	Data product version number for data products utilized to derive this data product. If multiple files are used, then multiple version numbers are to be included here.	Integer	2	0 .. 999	GUVI standard header
Data product revision number(s)	Non-routine data products. 0 otherwise	Data product revision number for data products utilized to derive this data product. If multiple files are used, then multiple version numbers are to be included here.	Integer	2	0 .. 999	GUVI standard header
Purpose of data product	Non-routine data products. Blank otherwise.	Describe the purpose of this data product	Character	256	Up to 255 characters	GUVI standard header
Intended recipient	Non-routine data products. Blank otherwise.	Document the intended recipient/viewer of this data product	Character	133	Up to 132 characters	GUVI standard header
File type	Non-routine data products not utilizing NetCDF. "NetCDF" otherwise.	Type of file	Character	33	Up to 32 characters	GUVI standard header
81 day F10.7	Routine data products	81 day solar EUV flux value used to generate this routine data product	Float	4		GUVI standard header
Daily F10.7	Routine data products	Current day solar EUV flux value used to generate this routine data product	Float	4		GUVI standard header

F10.7 source	Routine data products	Qualify source of F10.7	Character	10	"Estimated" or "Final"	GUVI standard header
3 hour Kp	Routine data products	3 hour Kp value used to generate this routine data product	Float	4		GUVI standard header
daily Kp	Routine data products	daily Kp value used to generate this routine data product	Float	4		GUVI standard header
Kp/Ap source	Routine data products	Qualify source of Kp and Ap	Character	10	"Estimated" or "Final"	GUVI standard header
daily Ap	Routine data products	daily Ap value used to generate this routine data product	Float	4		GUVI standard header
Total size of header				2030		

Level 1A Data File (only output upon selection from the DP POC)

The data in this file contains uncompressed pixel data. It is unprocessed instrument data at full resolution, time-tagged, s/c location specified and tagged with a preliminary data quality flag

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A

- data per scan for imaging mode

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day for the start of the current scan
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror start position		Integer	2		
Mirror nadir position		Integer	2		
Dark count pixels (4)		Integer	4 * 2		N/A
Background count pixels (7 * 3)		Integer	21 * 2		N/A
Total per scan			62		

- data per scan for static imaging modes

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day for the start of the current scan
Detector # of detector being used		Integer	1	1 .. 2	N/A

Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4= unknown	N/A
Mirror step position		Integer	1		N/A
Dark count pixels (4)		Integer	4 * 2		N/A
Background count pixels (7 * 3)		Integer	21 * 2		N/A
Total per scan			59		

- data per scan for spectrograph modes

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day for the start of the current scan
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror step position		Integer	1		N/A
Input rate for detector being used		Integer	4		N/A
Output rate		Integer	4		N/A
Dark count pixels (4)		Integer	4 * 2		N/A
Background count pixels (7 * 3)		Integer	21 * 2		N/A
Total per scan			67		

- Uncompressed imaging data per cross track (191) - only when instrument is in imaging mode.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Pixel data (for each of the five colors and for each along track index). Along track index will vary first and color last.		Float	4 * 14 * 5		Counts
Decompression error (for each of the five colors and for each along track index). Along track		Scaled integer (by a	2 * 14 * 5		Percent scaled by 10

index will vary first and color last.		factor of 10)			
Input rate data for detector being used		Integer	4		N/A
Output rate data for detector being used		Integer	4		N/A
Total			428		
Total (191)			81,748		

- Compressed static imaging data per along track index (191) - only when instrument is in static imaging mode.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Fine time		Float	4		Milliseconds since start of scan
Pixel data (for each of the five colors and for each along track index). Along track index will vary first and color last.		Float	4 * 14* 5		Counts
Decompression error (for each of the five colors and for each along track index). Along track index will vary first and color last.		Scaled integer (by a factor of 10)	2 * 14 * 5		Percent scaled by 10
Input rate data for detector being used		Integer	4		N/A
Output rate data for detector being used		Integer	4		N/A
Total			432		
Total (191)			82,512		

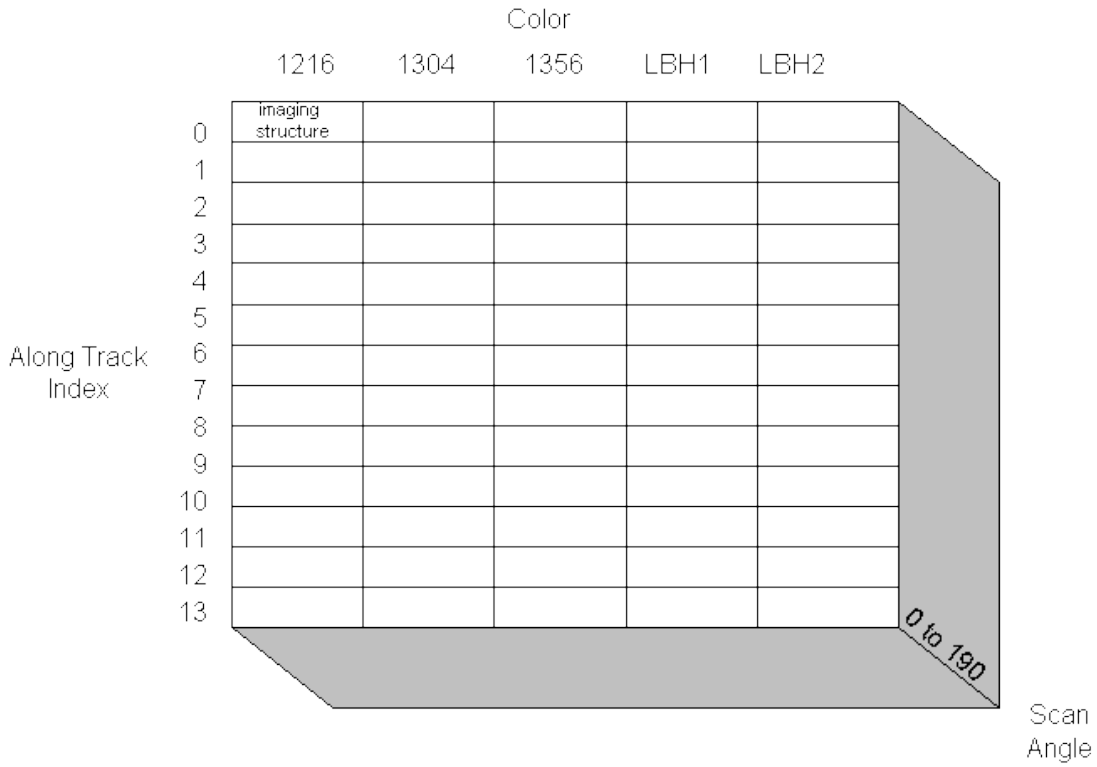
- Compressed spectrograph data per along track index (14) - only when instrument is in spectrograph mode.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Pixel data (for each of the 176 colors)		Float	4 * 176		Counts
Decompression error (for each of the 176 colors)		Scaled integer (by a factor of 10)	2 * 176		Percent scaled by 10
Total			1,056		
Total (14)			14,784		

Total Level 1A Imaging data file:

Header:	2026 bytes
Data per scan:	57 bytes * (100 min. orbit / 15 sec. Scan) = 22,800 bytes
Imaging data per scan:	81,748 bytes * (100 min. orbit / 15 sec. Scan) = 32,699,200 bytes
Total:	32,724,026 bytes = ~33 Mbytes per orbit

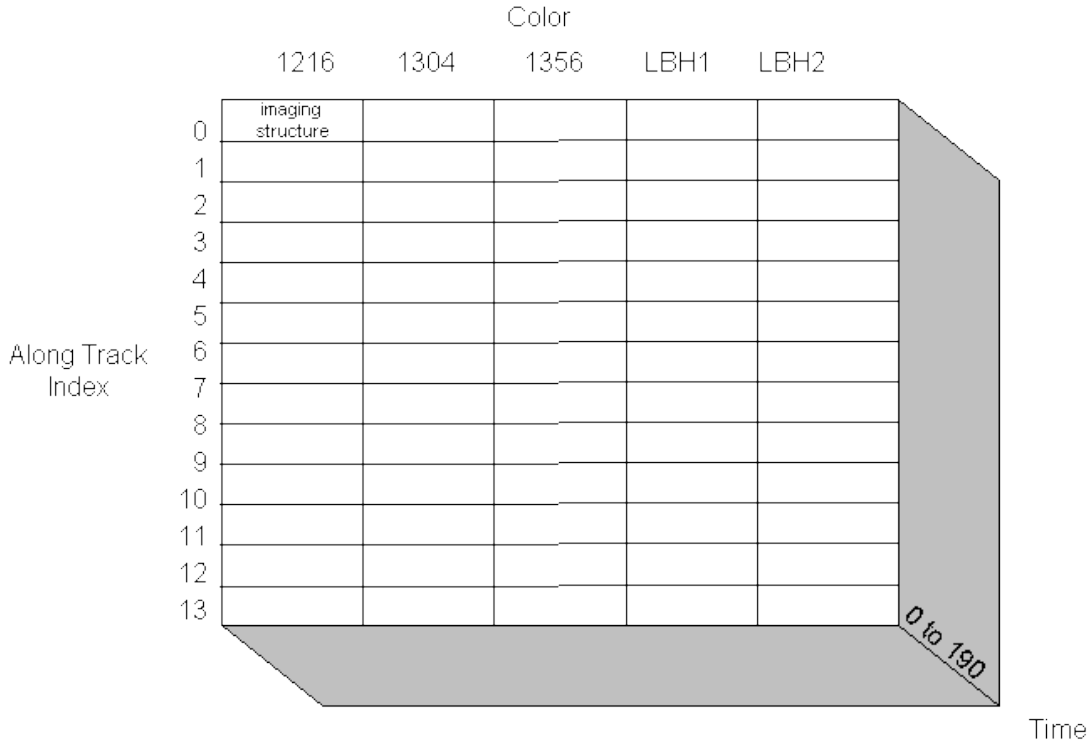
GUVI Imaging Mode Level 1A Data Logical Representation



Total Level 1A Static Imaging data file:

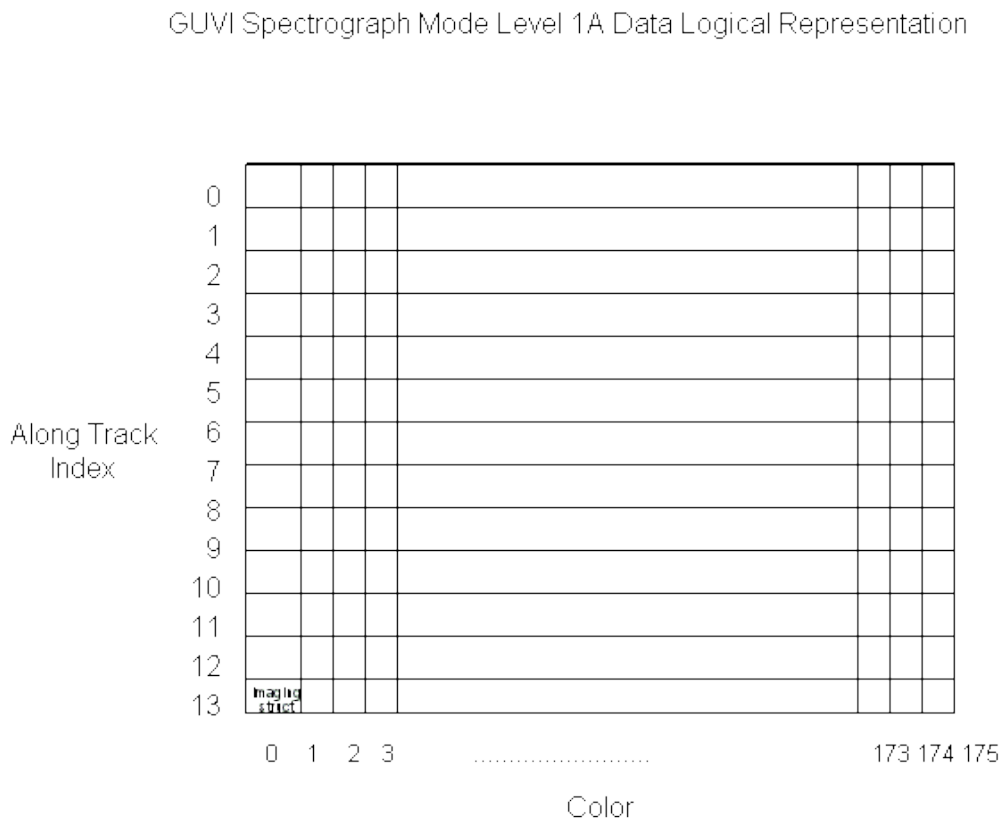
Header:	2026 bytes
Data per scan:	58 bytes * (100 min. orbit / 15 sec. Scan) = 23,200 bytes
Imaging data per scan:	82,512 bytes * (100 min. orbit / 15 sec. Scan) = 33,004,800 bytes
Total:	33,030,026 bytes = ~34 Mbytes per orbit

GUVI Static Imaging Mode Level 1A Data Logical Representation



Total Level 1A Spectrograph data file:

Header:	2026 bytes
Data per scan:	66 bytes * (100 min. orbit/ 3 sec. Scan) = 132,000 bytes
Spectrograph data per scan:	14,784 bytes * (100 min. orbit / 3 sec. Scan) = 29,568,000 bytes
Total:	29,702,026 bytes = ~30 Mbytes per orbit



Imaging Disk Level 1B (BDR) Data File (only outputed upon selection from the DP POC)

The data in this file has been calibrated.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A
Total size		2026		

- data per scan

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day
Detector # of detector being used		Integer	1	1 .. 2	N/A

Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror start position		Integer	2		
Mirror nadir position		Integer	2		
Dark count pixels (4)		Integer	4 * 2		
Background count pixels (7 * 3)		Integer	21 * 2		
Total			62		

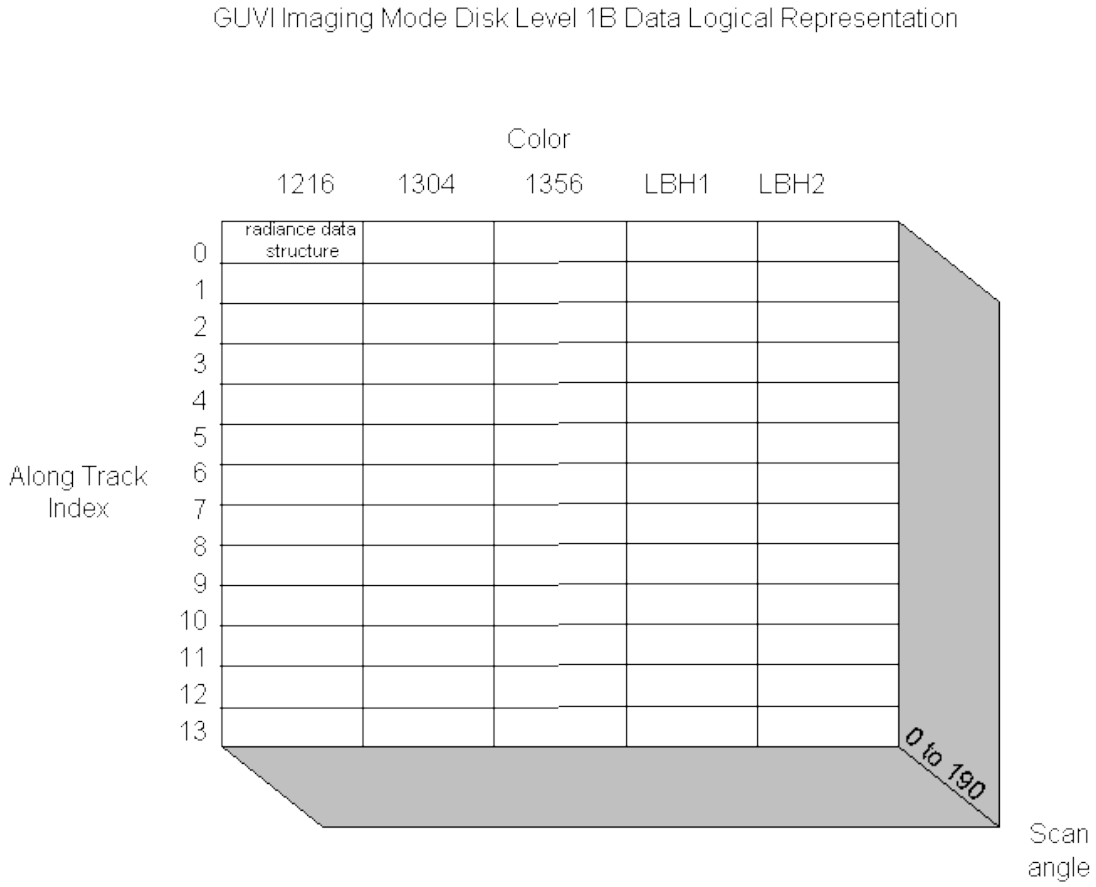
- data per scan angle and per along track index (159 x 14)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Data quality indicator		Integer	1	Bit 0-3 Unused Bit 7: 1 = Negative Radiance; 0 = positive Bit 6: 1 = Zero Radiance; 0 = non-zero Bit 5: 1 = Geolocation error (disk pixel on limb or limb pixel on disk); 0 = correct geolocation Bit 4: 1 = Calibration failure; 0 = No calibration failure	N/A
Pierce point latitude - geographic coordinates		Float	4	-90 .. 90	Degrees
Pierce point longitude - geographic coordinates		Float	4	-180 .. 180	Degrees
Radiance of each of 5 colors		Float	4 * 5		Rayleighs
Calibration error for each of the 5 colors		Scaled integer (by a factor of 10)	2 * 5		Percent scaled by 10
Counting statistical error for each of the 5 colors		Scaled integer (by a factor of 10) If Bit 6 of	2 * 5		Percent scaled by 10 If Bit 6 of DQI set then value

		DQI set then integer is not scaled!			returned is Rayleighs / count (unscaled)
Total			48		
Total (159 * 14)			106,848		

Total Imaging Disk Level 1B data file:

Header:	2026 bytes
Data per scan:	57 bytes * (100 min. orbit / 15 sec. Scan) = 22,800 bytes
Imaging data per scan:	106,848 bytes * (100 min. orbit / 15 sec. Scan) = 42,739,200 bytes
Total:	42,764,026 bytes = ~43 Mbytes per orbit



<u>Imaging Limb Level 1B (BDR) Data File</u> (only outputed upon selection from the DP POC)

The data in this file has been calibrated.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A

- data per scan

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror start position		Integer	2		
Mirror nadir position		Integer	2		
Dark count pixels (4)		Float	4 * 2		
Background count pixels (7 * 3)		Float	21 * 2		
Total			62		

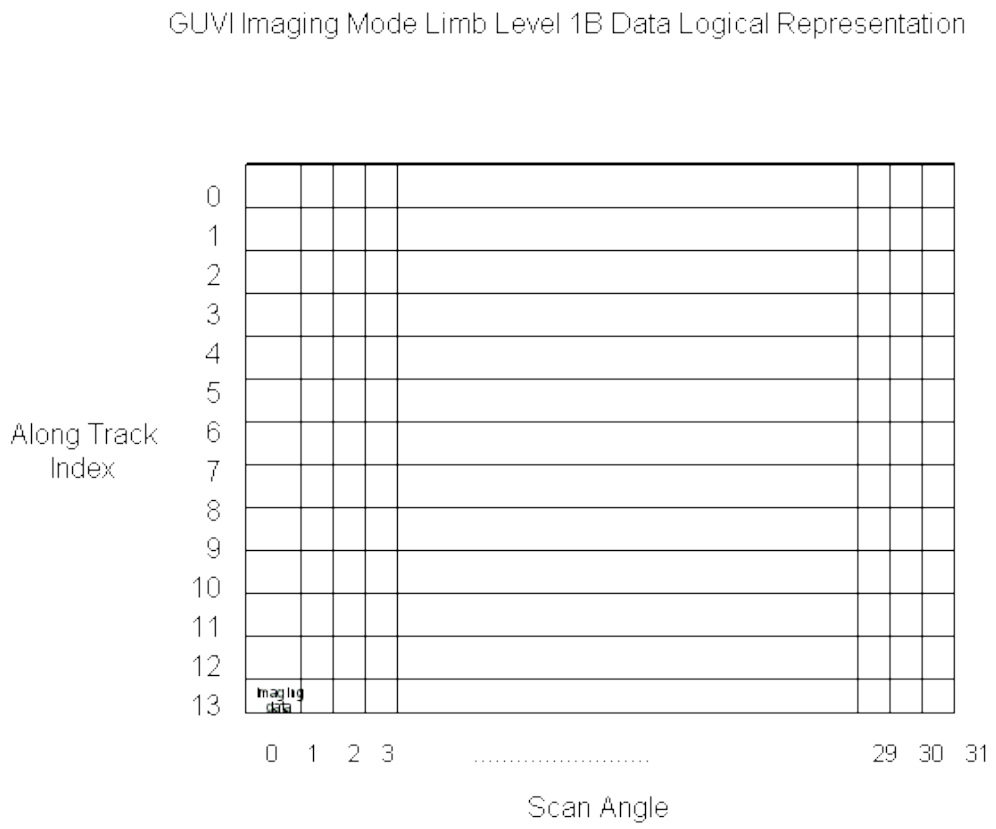
- data per scan angle and per along track index (32 x 14)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Data quality indicator		Integer	1	Bit 0-3 Unused Bit 7: 1 = Negative Radiance; 0 = positive Bit 6: 1 = Zero Radiance; 0 = non-zero Bit 5: 1 = Geolocation error (disk pixel on limb or limb pixel on disk); 0 = correct geolocation Bit 4: 1 =	N/A

				Calibration failure; 0 = No calibration failure	
Background star at pixel		Integer	1	0 = false, 1 = true	N/A
Tangent point latitude - geographic coordinates		Float	4	-90 .. 90	Degrees
Tangent point longitude - geographic coordinates		Float	4	-180 .. 180	Degrees
Tangent point altitude		Float	4		kilometers
Zenith angle		Float	4		Degrees
RA		Float	4		
DEC		Float	4		
Radiance of each of 5 colors		Float	4 * 5		Rayleighs
Calibration error for each of 5 the colors		Scaled integer (by a factor of 10)	2 * 5		Percent scaled by 10
Counting statistic error for each of the 5 colors		Scaled integer (by a factor of 10) If Bit 6 of DQI set then integer is not scaled!	2 * 5		Percent scaled by 10 If Bit 6 of DQI set then value returned is Rayleighs / count (unscaled)
Total			65		
Total (32 * 14)			29,120		

Total Imaging Limb Level 1B Imaging data file:

Header:	2026 bytes
Data per scan:	57 bytes * (100 min. orbit / 15 sec. Scan) = 22,800 bytes
Imaging data per scan:	29,120 bytes * (100 min. orbit / 15 sec. Scan) = 11,648,000 bytes
Total:	11,672,826 bytes = ~12 Mbytes per orbit



<u>Static Imaging Level 1B (BDR) Data File</u> (only outputed upon selection from the DP POC)

The data in this file has been calibrated.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A

- data per scan

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1.366	
Time		Integer	4		Milliseconds since 00:00:00 of current day
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed, 1 = wide,	N/A

				2 = medium, 3 = narrow, 4 = unknown	
Dark count pixels (4)		Float	4 * 2		
Background count pixels (7 * 3)		Float	21 * 2		
Total			58		

- data per scan angle (191)

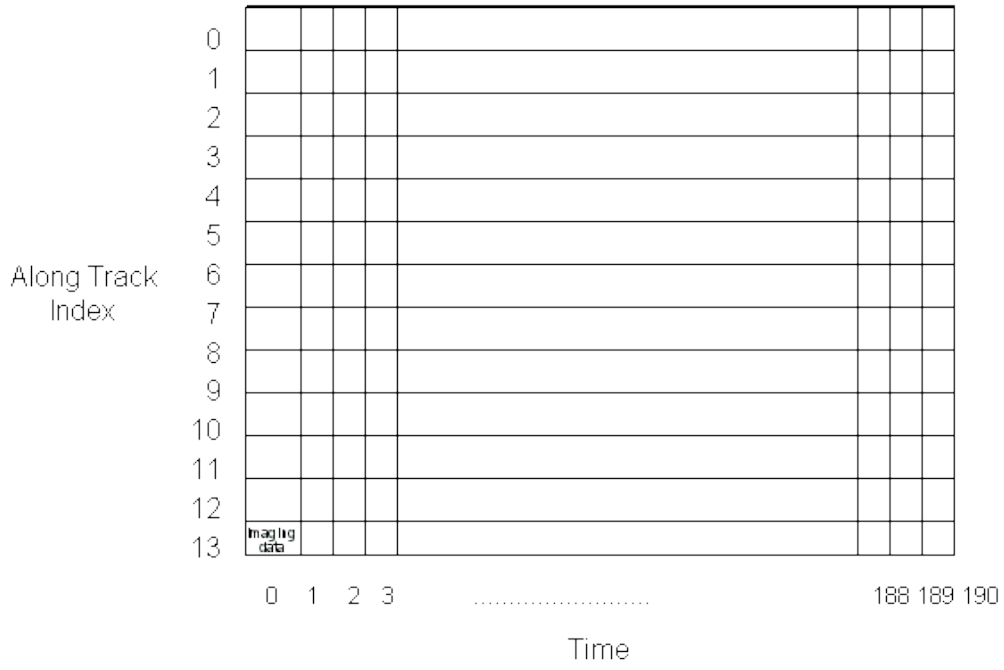
Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Fine time		Float	4		Milliseconds since start of scan
Data quality indicator		Integer	14 * 1	Bit 0-3 Unused Bit 7: 1 = Negative Radiance; 0 = positive Bit 6: 1 = Zero Radiance; 0 = non-zero Bit 5: 1 = Geolocation error (disk pixel on limb or limb pixel on disk); 0 = correct geolocation Bit 4: 1 = Calibration failure; 0 = No calibration failure	N/A
Background star at pixel		Integer	14 * 1	0 = false, 1 = true	N/A
RA		Float	14 * 4		
DEC		Float	14 * 4		
Tangent point latitude - geographic coordinates		Float	14 * 4	-90 .. 90	Degrees
Tangent point longitude - geographic coordinates		Float	14 * 4	-180 .. 180	Degrees
Tangent point altitude		Float	14 * 4		kilometers
Radiance of each of 5 colors		Float	14 * 4 * 5		Rayleighs
Calibration error for each of 5 the colors		Scaled integer (by a factor of 10)	14 * 2 * 5		Percent scaled by 10
Counting statistic error for		Scaled	14 * 2 * 5		Percent

each of the 5 colors		integer (by a factor of 10) If Bit 6 of DQI set then integer is not scaled!			scaled by 10 If Bit 6 of DQI set then value returned is Rayleighs / count (unscaled)
Total			858		
Total (191)			163,878		

Total Level 1B Static Imaging data file:

Header:	2026 bytes
Data per scan:	57 bytes * (100 min. orbit / 15 sec. Scan) = 22,800 bytes
Imaging data per scan:	27,456 bytes * (100 min. orbit / 15 sec. Scan) = 65,551,200 bytes
Total:	65,576,026 bytes = ~66 Mbytes per orbit

GUVI Static Imaging Mode Level 1B Data Logical Representation



Imaging Disk Level 1C (SDR) Data File

This data in this file has been geolocated at a 150 km altitude, gridded and binned to a 25 km X 25 km resolution.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A
Total size		2026		

- data per along track grid point (1647 max NetCDF unlimited dimension)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year	DOY	Integer	2	1..366	
Time	TIME	Integer	4		Milliseconds since 00:00:00 of current day when satellite crosses along track grid point
Detector # of detector being used	DETECTOR	Integer	1	1 .. 2	N/A
Slit position being used	SLIT	Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Total			8		

- data per across track grid point and per along track grid point (119 x 1647)

Data Item	NetCDF Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Average intensity 5 colors 2 types (types are rectified, unrectified,	RadianceData	float	4*2*5	10^3 .. 5*10^4	Rayleighs (values are NaNs if no pixel data)
Systematic uncertainty 5 colors	SystematicError	float	4*2*5		Rayleighs (values are NaNs if no pixel data)
Statistical uncertainty 5 colors	StatisticalError	float	4*2*5		Rayleighs (values are NaNs if no pixel data)
Data region	DataRegion	Byte	1	Bit 0: Dayside 0°<SZA<90°	1 = daylight 2 = night 4 = twilight

				Bit 1: Nightside 110°<SZA<180° Bit 2: Twilight 90°<SZA<110° Bit 3: Polar Region 50° <|Geomaglat| < 90° Bit 4: Equatorial Region 0°<|Geomaglat|<50° Bit 5,6: Unused Bit 7: Unknown region	8 = Polar 9 = Daylight Polar 10 = Night Polar 12 = Twilight polar 16 = Equatorial 17 = Daylight equatorial 18 = night equatorial 20 = twilight equatorial 128=Geolocation error
Pixel center latitude – geomagnetic		Float	4	-90.0 .. 90.0	degrees
Pixel center longitude – geomagnetic		float	4	-180.0 .. 180.0	degrees
Pixel center latitude – geographic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude – geographic		float	4	-180.0 .. 180.0	degrees
Pierce point altitude		Float	4		kilometers
Solar Zenith Angle	SZA	Float	4	-90 .. 90	degrees
Data quality indicator	DQI	Integer	1	Bit 0-6 Unused Bit 7: 1 = No Data; 0 = Valid Pixel Data	N/A
Total per pixel			146		
Total (195993 disk pixels) (25 25 km)			28614978		

Total Disk Level 1C Imaging data file:
Data per pixel: 146 bytes
Data per scan 8 bytes
(along track grid point)
Data per file 2026 bytes
Total: 28614978 + 1647*8 + 2026 = 28630180 bytes = ~28 Mbytes per orbit

Imaging Limb Level 1C (SDR) Data File

The data in this file has been calibrated but unlike the Level 1C disk data this data is not gridded and is at the full instrument resolution.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A

- data per scan

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year		Integer	2	1..366	
Time		Integer	4		Milliseconds since 00:00:00 of current day
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror start position		Integer	2		
Mirror nadir position		Integer	2		
Pixel FOV (14)		Float	14 * 4		Degrees
Dark count pixels (4)		Float	4 * 2		
Background count pixels (7 * 3)		Float	21 * 2		
Total			118		

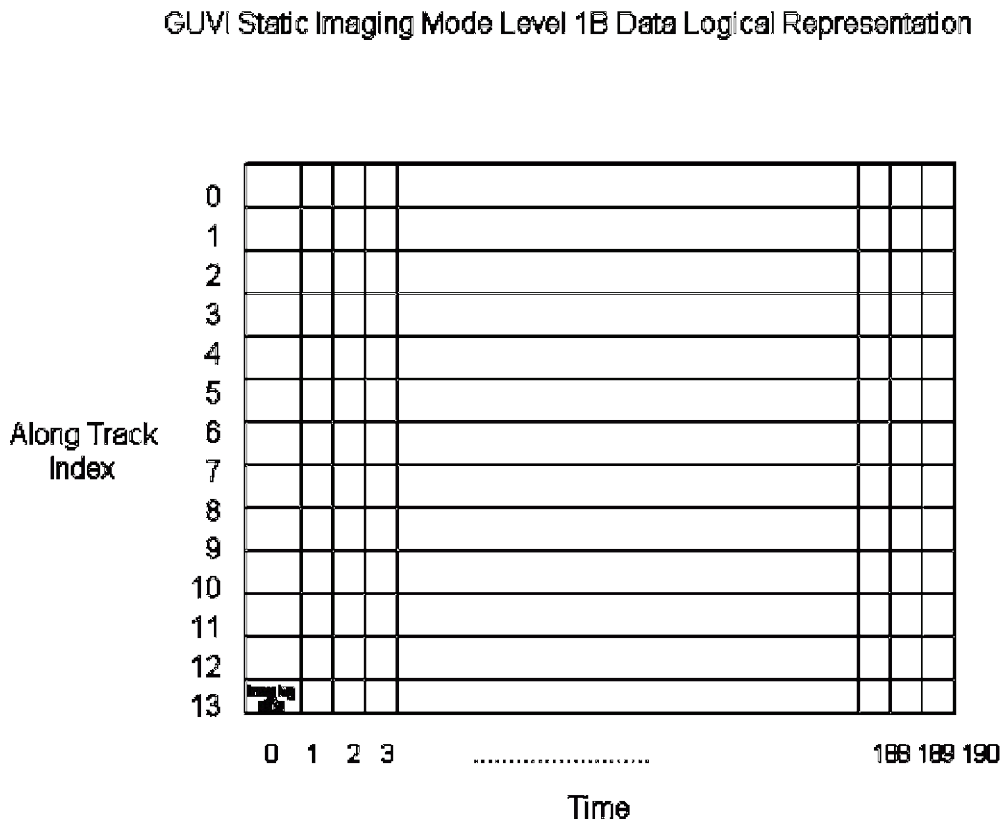
- data per scan angle and per along track index (32 x 14)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Data quality indicator		Integer	1	Bit 0-3 Unused Bit 7: 1 = Negative Radiance; 0 = positive Bit 6: 1 = Zero Radiance; 0 =	N/A

				non-zero Bit 5: 1 = Geolocation error (disk pixel on limb or limb pixel on disk); 0 = correct geolocation Bit 4: 1 = Calibration failure; 0 = No calibration failure	
Background star at pixel		Integer	1	0 = false, 1 = true	N/A
Tangent point latitude - geographic coordinates		Float	4	-90 .. 90	Degrees
Tangent point longitude - geographic coordinates		Float	4	-180 .. 180	Degrees
Tangent point altitude		Float	4		kilometers
Zenith angle		Float	4		Degrees
RA		Float	4		
DEC		Float	4		
Radiance of each of 5 colors		Float	4 * 5		Rayleighs
Calibration error for each of 5 the colors		Scaled integer (by a factor of 10)	2 * 5		Percent scaled by 10
Counting statistic error for each of the 5 colors		Scaled integer (by a factor of 10) If Bit 6 of DQI set then integer is not scaled!	2 * 5		Percent scaled by 10 If Bit 6 of DQI set then value returned is Rayleighs / count (unscaled)
Total			65		
Total (32 * 14)			29,120		

Total Imaging Limb Level 1C Imaging data file:

Header:	2026 bytes
Data per scan:	118 bytes * (100 min. orbit / 15 sec. Scan) = 47,200 bytes
Imaging data per scan:	29,120 bytes * (100 min. orbit / 15 sec. Scan) = 11,648,000 bytes
Total:	11,697,226 bytes = ~12 Mbytes per orbit



Spectrograph Level 1C (SDR) Data File

The data in this file is geolocated but not gridded or binned.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026		N/A

- per scan

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Scan mirror position/along track index		Float	4		N/A
Detector # of detector being used		Integer	1	1 .. 2	N/A
Slit position being used		Integer	1	0 = closed,	N/A

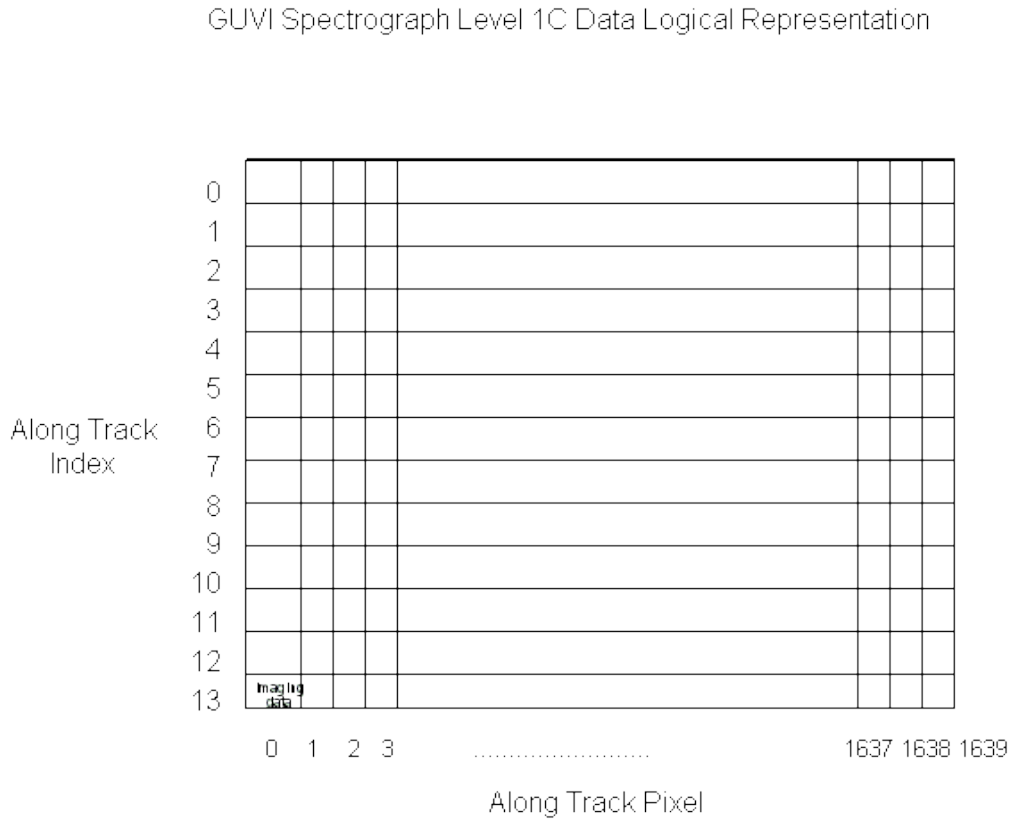
				1 = wide, 2 = medium, 3 = narrow, 4 = unknown	
Input rate for detector being used		Integer	4		N/A
Output rate		Integer	4		N/A
Wavelengths observed		array of float	4 * 14 * 176	100 .. 200	Nanometers
Total			9870		

- for every along track pixel (1640) and across track pixel (14)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time		Integer	4		Milliseconds since 00:00:00 of current day
Raw uncompressed counts		Array of float	4 * 176		N/A
Counting statistical error		Array of scaled integers (scaled by a factor of 10)	2 * 176		Percent scaled by 10
Data quality indicator		Integer	1	Bit 0: 1 = invalid input/output rate data; 0 = valid Bit 1-7: TBD	N/A
Pixel center latitude - geographic		Float	4	-90 .. 90	degrees
Pixel center longitude - geographic		Float	4	-180 .. 180	degrees
Pixel center latitude - geomagnetic		Float	4	-90 .. 90	degrees
Pixel center longitude - geomagnetic		Float	4	-180 .. 180	degrees
Tangent altitude		Float	4		kilometers
RA		Float	4		
DEC		Float	4		
Along track angle		float	4	1 .. 102	degrees
Total			1,090		
Total (1640 * 14)			25,026,400		

Total Level 1C Spectrograph data file:

Header:	2026 bytes
Housekeeping data per scan:	9870 * (100 min. / 3 sec per scan) = 19,740,000 bytes
Spectrograph data per scan:	25,026,400 bytes
Total:	44,768,426 bytes = ~45 Mbytes per orbit



Imaging Day Disk Level 2B (EDR) Data File

Data in this file is geolocated, gridded and binned. Day pixels are gridded to a 100 km X 100 km resolution at nadir and increasing in size as the scan angle increases.

- per EDR file

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header		N/A	2026	N/A	N/A
Qeuv, Solar EUV Energy Flux		float	4	1 ..6	ergs cm
Qeuv uncertainty		float	4	0 .. 100	Percent scaled by 10
Qeuv present		bit	1	0 .. 1	N/A

Along track pixel size for day pixels		Float	4		N/A
Across track pixel size for day pixels		Array of Floats	4 * 26		N/A
Scaling pixel size referenced to height for day pixels		Float	4		N/A
Total			2047		

- per file. The array sizes indicated for the auroral boundary coordinates are an approximation and are not meant to imply an exact number of points.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic		array of floats	4 * 122	-180 .. 180	degrees

longitudes - model					
Total			19,904		

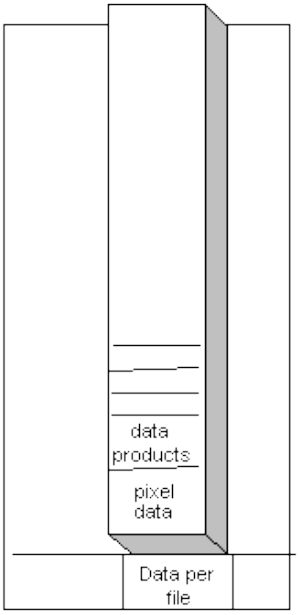
- EDR data per day pixel (3,519 day pixels)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time		Integer	4		Milliseconds since 00:00:00 of current day
Pixel center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Pixel center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Pierce point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
O/N_2		Float	4	0.2 .. 2.0	N/A
O/N_2 uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Total			39		
Total (3,519 pixels)			137,241		

Total Level 2B Day Disk Imaging data file:

Header:	2,047 bytes
Data per file:	19,904 bytes
Imaging data per day pixels:	137,241 bytes
Total:	159,192 bytes = ~1 Mbytes per orbit

GUVI Imaging Mode Level 2B
Data Logical Representation



Imaging Night Disk Level 2B (EDR) Data File

Data in this file is geolocated, gridded and binned. Night pixels are gridded to a 100 km X 100 km resolution at nadir and increasing in size as the scan angle increases.

- per EDR file

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header		N/A	2026	N/A	N/A
Along track pixel size - for night pixels		Float	4		N/A
Across track pixel size – for night pixels		Array of Floats	4 * 26		N/A
Scaling pixel size referenced to height – for night pixels		Float	4		N/A
Total			2,038		

- per file. The array sizes indicated for the auroral boundary coordinates are an approximation and are not meant to imply an exact number of points.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Total			19,904		

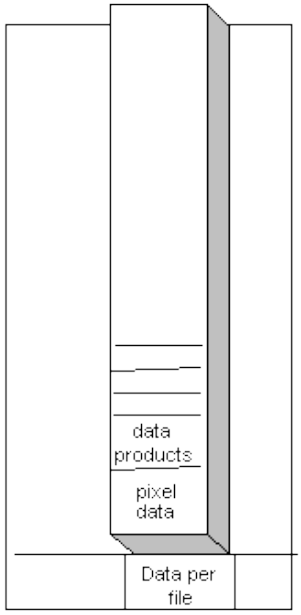
- EDR data per night pixel (1,760 night pixels)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time		Integer	4		Milliseconds since 00:00:00 of current day
Pixel center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Pixel center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Pierce point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
TEC		N/A	4	N/A	N/A
TEC uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Total			39		
Total (1,760 pixels)			68,640		

Total Level 2B Night Disk Imaging data file:

Header:	2,038 bytes
Data per file:	19,904 bytes
Imaging data per night pixels:	68,640 bytes
Total:	90,582 bytes = ~1 Mbytes per orbit

GUVI Imaging Mode Level 2B
Data Logical Representation



Imaging Aurora Disk Level 2B (EDR) Key Parameters Data File

Data in this file is geolocated, gridded and binned and contains all aurora key parameters. Auroral pixels are gridded to a 25 km X 25 km resolution at nadir and increasing in size as the scan angle increases.

- per EDR file

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header		N/A	2026	N/A	N/A
Along track pixel size – for auroral pixels		Float	4		N/A
Across track pixel size – for auroral pixels		Array of Floats	4 * 26		N/A
Scaling pixel size referenced to height – for auroral pixels		Float	4		N/A
Total			2,034		

- per file. The array sizes indicated for the auroral boundary coordinates are an approximation and are not meant to imply an exact number of points.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Proton auroral boundary geomagnetic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – actual		array of floats	4 * 500	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic longitudes - actual		array of floats	4 * 500	-180 .. 180	degrees
Mixed electron/proton auroral boundary geographic latitudes - model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geographic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Mixed electron/proton auroral boundary geomagnetic latitudes – model		array of floats	4 * 122	-90 .. 90	degrees
Mixed electron/proton auroral boundary geomagnetic longitudes - model		array of floats	4 * 122	-180 .. 180	degrees
Total			19,904		

- EDR data per aurora pixel for the northern hemisphere (28,145 auroral pixels). The data for this will actually be merged in with the northern hemisphere auroral pixels and will not appear separately.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time		Integer	4		Milliseconds since 00:00:00 of current day
Pixel center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Pixel center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Pierce point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
Q		Float	4		
Q uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
<E>		Float	4		
<E> uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Height of peak in ionization rate		Float	4		
Height of peak in ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Column ionization rate		Float	4		
Column ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Total vertical column density at the peak of the ionization rate		Float	4		
Total vertical column density at the peak of the ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Total			63		

Total (28,145 northern hemisphere pixels)			1,773,135		

- EDR data per aurora pixel for the southern hemisphere (28,145 auroral pixels). The data for this will actually be merged in with the northern hemisphere auroral pixels and will not appear separately.

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time		Integer	4		Milliseconds since 00:00:00 of current day
Pixel center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Pixel center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Pixel center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Pierce point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
Q		Float	4		
Q uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
<E>		Float	4		
<E> uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Height of peak in ionization rate		Float	4		
Height of peak in ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Column ionization rate		Float	4		
Column ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10
Total vertical column density at the peak of the ionization rate		Float	4		
Total vertical column density at the peak of the ionization rate uncertainty		Scaled integer (by a factor of 10)	2		Percent scaled by 10

Total			63		
Total (28,145 southern hemisphere pixels)			1,773,135		

Total Level 2B Aurora Disk Imaging data file:

Header: 2,034 bytes
Data per file: 19,904 bytes
Imaging data per northern hemisphere auroral pixels: 1,773,135 bytes
Imaging data per southern hemisphere auroral pixels: 1,773,175 bytes
Total: 3,568,208 bytes = ~4 Mbytes per orbit

Imaging Limb Day Level 2B (EDR) Data File

The data in this file is geolocated, gridded and binned. Day pixels are gridded to a 100 km X 100 km resolution at nadir and increasing in size as the scan angle increases.

- per file

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header		N/A	2026		N/A
Qeuv, Solar EUV Energy Flux		float	4	1 ..6	ergs cm
Qeuv uncertainty		float	4	0 .. 100	Percent scaled by 10
Qeuv present		bit	1	0 .. 1	N/A
Along track pixel size – for day pixels		Float	4		N/A
Across track pixel size – for day pixels		Array of Floats	4 * 26		N/A
Scaling pixel size referenced to height – for day pixels		Float	4		N/A
Altitude grid		Array of floats	4 * 100		kilometers
Total per pixel			2,447		

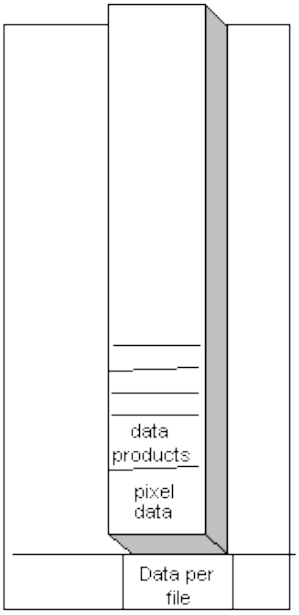
- limb EDR data per day pixel (35 day pixels)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year Time		Integer Integer	2 4	1..366	 Milliseconds since 00:00:00 of current day
Profile center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Profile center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Profile center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Profile center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Profile center altitude		Float	4		kilometers
Tangent point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
O density		Float	100 * 4	0 .. 10^{21}	cm^{-3}
O density uncertainty		Scaled integer (by a factor of 10)	100 * 2		Percent scaled by 10
N_2 density		Float	100 * 4	0 .. 10^{21}	cm^{-3}
N_2 density uncertainty		Scaled integer (by a factor of 10)	100 * 2		Percent scaled by 10
O_2 density		Float	100 * 4	0 .. 10^{21}	cm^{-3}
O_2 density uncertainty		Scaled integer (by a factor of 10)	100 * 2		Percent scaled by 10
Total			1837		
Total (35)			64,295		

Total Level 2B Day Limb Imaging data file:

Header:	2,447 bytes
Imaging data per day pixels:	64,295 bytes
Total:	66,742 bytes = ~.5 Mbytes per orbit

GUVI Imaging Mode Level 2B
Data Logical Representation



Imaging Limb Night Level 2B (EDR) Data File

The data in this file is geolocated, gridded and binned. Night pixels are gridded to a 100 km X 100 km resolution at nadir and increasing in size as the scan angle increases.

- per file

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header		N/A	2026		N/A
Along track pixel size – for night pixels		Float	4		N/A
Across track pixel size – for night pixels		Array of Floats	4 * 26		N/A
Scaling pixel size referenced to height – for night pixels		Float	4		N/A
Altitude grid		Array of floats	4 * 100		kilometers
Total per pixel			2,438		

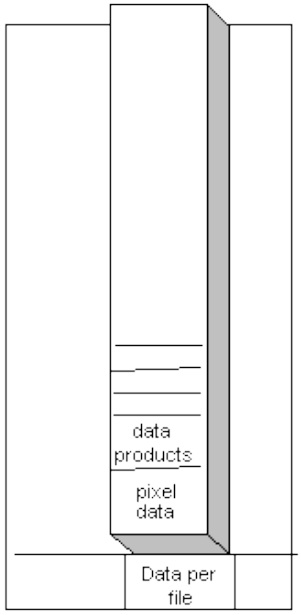
- limb EDR data per night pixel (36 night pixels)

Data Item	Netcdf Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Day of Year Time		Integer Integer	2 4	1..366	 Milliseconds since 00:00:00 of current day
Profile center latitude - geomagnetic		float	4	-90.0 .. 90.0	degrees
Profile center longitude - geomagnetic		float	4	-180.0 .. 180.0	degrees
Profile center latitude - geographic		float	4	-90.0 .. 90.0	degrees
Profile center longitude - geographic		float	4	-180.0 .. 180.0	degrees
Profile center altitude		Float	4		kilometers
Tangent point altitude		Float	4		kilometers
Along track angle		Float	4		degrees
Across track index		Integer	2		N/A
Data quality indicator - a set of 8 data quality indicators masked together to form a single short integer value. Individual indicators will be defined later		Integer	1		N/A
EDP		Float	4 * 100		
EDP uncertainty		Scaled integer (by a factor of 10)	2 * 100		Percent scaled by 10
Total			637		
Total (36)			22,932		

Total Level 2B Night Limb Imaging data file:

Header:	2,438 bytes
Imaging data per night pixels:	22,932 bytes
Total:	25,370 bytes = ~.5 Mbytes per orbit

GUVI Imaging Mode Level 2B
Data Logical Representation



Dynamic Overlay Files – one file per orbit

Filename: GUVI_dddyyyy_REVooooo_aaaabbbb.dyn_overlay
Where:

- ddd is the day of year
- yyyy is the 4 digit year
- ooooo is the orbit number
- aaaa is the data product version number
- bbbb is the data product revision number

- per entry

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time of measurement	Integer	4		Seconds since start of day?

- for each along track index

Data Item	Data Product	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Latitudes for satellite ground track – geographic	Level 2B	Array of float	4 * x	-90 .. 90	degrees

Longitudes for satellite ground track – geographic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Latitudes for satellite ground track – geomagnetic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Longitudes for satellite ground track – geomagnetic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Sunward disk scan boundary latitudes – geographic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Sunward disk scan boundary longitudes – geographic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Sunward disk scan boundary latitudes – geomagnetic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Sunward disk scan boundary longitudes - geomagnetic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Anti-sunward disk scan boundary latitudes – geographic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Anti-sunward disk scan boundary longitudes – geographic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Anti-sunward disk scan boundary latitudes – geomagnetic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Anti-sunward disk scan boundary longitudes – geomagnetic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Terminator crossing latitudes – geographic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Terminator crossing longitudes – geographic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Terminator crossing latitudes – geomagnetic	Level 2B	Array of float	4 * x	-90 .. 90	degrees
Terminator crossing longitudes – geomagnetic	Level 2B	Array of float	4 * x	-180 .. 180	degrees
Universal time of along track position	Level 1C, Level 2A, Level 2B	Array of float	4 * x	0 .. 86399.9	seconds
Total					

Supporting Data Files – Spacecraft Housekeeping File

Filename: GUVI_yyyyddd_REVooooo_aaaabbbb.sc_housekeep
Where:

- yyyy is the 4 digit year
- ddd is the day of year
- ooooo is the orbit number
- aaaa is the data product version number
- bbbb is the data product revision number

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A
Total size		2026		

- data per scan

Data Item	Data Product used for	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Spacecraft time (UTC)	Level 1A, Level 1C, Level 2A, Level 2B	Integer	4	N/A	Seconds since 00:00:00 Jan. 6, 1980
Select fields within spacecraft low priority housekeeping packet 1 data	Level 1A, Level 1C, Level 2A, Level 2B				
Select fields within spacecraft low priority housekeeping packet 2 data	Level 1A, Level 1C, Level 2A, Level 2B				
Select fields within spacecraft high priority housekeeping packet data	Level 1A, Level 1C, Level 2A, Level 2B				

Supporting Data Files – TIMED Spacecraft PVAT File

This file will be archived versions of the TIMED actual Position, Velocity, Attitude and Time file and will utilize the TIMED actual PVAT filenaming convention of: MDC_yyyydoy##.pos. The format is defined in the TIMED GIIS, section 8.

Supporting Data Files – TIMED Current Good Telemetry Status File

This file will be archived versions of the TIMED Current Good Telemetry Status file and will utilize the TIMED Current Good Telemetry Status File filenaming convention of: MDC_yyyydoy##.gst. The format is defined in the TIMED GIIS, section 8.

Supporting Data Files - TIMED Solar & Geomagnetic Indices File

This file will be archived versions of the TIMED short-term and long-term Solar & Geomagnetic Indices file and will utilize the TIMED filenaming convention of MDC_starttime_stoptime_##.ind. The format is defined in the TIMED GIIS, section 8.

Supporting Data Files – GUVI Housekeeping File

Filename: GUVI_vaaarbb_yyyyddd_REVooooo.ghskp
Where:

- aaa is the 3 digit data product version number and will be preceded by "v"
- bb is the 2 digit data product revision number and will be preceded by "r"

- yyyy is the 4 digit year
- ddd is the day of year
- ooooo is the orbit number

There will be one of these files for each full orbit. This file will contain the following data from the GUVI housekeeping packet converted from engineering units.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A
Total size		2026		

- data per scan

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time (UTC)	Integer	4	N/A	Milliseconds since 00:00:00 of the current day
Significant event flags	Binary	2	Byte 1: Bit 7 - TBD Bit 6 - TBD Bit 5 - TBD Bit 4 - TBD Bit 3 - TBD Bit 2 - TBD Bit 1 - TBD Bit 0 - TBD Byte 2: Bit 7 - Day/Night Indicator Bit 6 - SAA region Bit 5 - Polar region Bit 4 - Attitude - sun safe mode Bit 3 - Attitude - nadir pointing mode Bit 2 - Solar panel rotation Bit 1 - Yaw maneuver Bit 0 - Sun senor trip, 0=normal, 1=tripped	
System status word	Binary	2	Byte 1: Bit 7 - TBD Bit 6 - TBD Bit 5 - TBD Bit 4 - TBD Bit 3 - TBD Bit 2 - TBD Bit 1 - TBD Bit 0 - TBD	

			Byte 2: Bit 7 - High voltage Error, 0=no error, 1=error Bit 6 - Scan motor position error 0=no error, 1=error Bit 5 - Scan motor power, 0=off, 1=on Bit 4 - SIS detector selected, 0=detector1, 1=detector2 Bits 3-0 Instrument mode, 0=maintenance, 1=test, 2=spectrograph, 3=imaging, 4=safe, 5=static imaging, 6=test/forced convert	
Error counter	Integer	1		
SIS status	Binary	2	Byte 1: Bit 7 - TBD Bit 6 - TBD Bit 5 - TBD Bit 4 - Scan motor heater power, 0=off, 1=on Bit 3 - Detector #1 power, 0=off, 1=on Bit 2 - Detector #2 power, 0=off, 1=on Bit 1 - Narrow slit in telltale, 0=in/closed, 1=not in/open Bit 0 - Narrow slit out telltale, 0=out/closed, 1=not out/open Byte 2: Bit 7 - Medium slit in telltale, 0=in/closed, 1=not in/open Bit 6 - Medium slit out telltale, 0=out/closed, 1=not out/open Bit 5 - Pop-up mirror out telltale, 0=out/closed, 1=not out/open Bit 4 - Scan motor drive select, 0=primary, 1=secondary Bit 3 - Start position telltale, 0=not start, 1=start position Bit 2 - Nadir position telltale, 0=not nadir, 1=nadir position Bit 1 - Cover closed telltale, 0=closed, 1=open Bit 0 - Cover full open telltale, 0=full open, 1=not open	
Start position or fixed mirror position	Integer	2		
Nadir position	Integer	2		
Detector #1 HV set	Integer	1		
Detector #2 HV set	Integer	1		
HK converter reference voltage (nom = 2.5v)	Float	4		
ECU +5 voltage	Float	4		

SIS housing temperature	Float	4		
SIS electronics temperature	Float	4		
SIS scan mirror temperature	Float	4		
FPE #1 temperature	Float	4		
FPE #2 temperature	Float	4		
HVPS #1 temperature	Float	4		
HVPS #2 temperature	Float	4		
ECU power board temperature	Float	4		
ECU chassis temperature	Float	4		
Scan motor current	Float	4		
Detector #1 HV monitor	Float	4		
Detector #2 HV monitor	Float	4		
Detector #1 current	Float	4		
Detector #2 current	Float	4		
Input rate detector #1	Integer	4		
Input rate detector #2	Integer	4		
Output rate	Integer	4		
Integration count (minimum)	Integer	4		
Integration count (maximum)	Integer	4		
Dark count pixels (4 pixels)	Integer	2 * 4		
Total size in bytes		109		

Total GUVI Housekeeping Supporting Data file:

Total imaging support data file: 2026 + (109 * (100 min. / 15 sec)) = 45,626 bytes per orbit

Total static imaging support data file: 2026 + (109 * (100 min. / 15 sec)) = 45,626 bytes per orbit

Total spectrograph support data file: 2026 + (109 * (100 min. / 3 sec)) = 220,026 bytes per orbit

Total all other modes support data file: 2026 + (109 * 100 min / 1 sec)) = 656,026 bytes per orbit

Supporting Data Files – GUVI Pointing Information

Filename: GUVI_mm_scan_rrr_vaaarbb_yyyyddd_REVooooo.xxxx_supportdata

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
  - nht - for night
  - aur - for aurora
  - twi - for twilight
  - unk - for unknown
- aaa is the three digit data product version number and will be preceded by "v"

- bb is the 2 digit data product revision number and will be preceded by "r"
- yyyy is the 4 digit year
- ddd is the day of year
- ooooo is the orbit number
- xxxx is the level of the data:
  - pL1C: pointing information for level 1C data products
  - pL2B: pointing information for level 2B data products

There will be one of these files for each orbit and for each of the following data product file types:

- Level 1C disk - imaging mode
- Level 1C limb - imaging mode
- Level 1C spectrograph mode
- Level 2B day disk - imaging mode
- Level 2B night disk - imaging mode
- Level 2B aurora disk - imaging mode
- Level 2B day limb - imaging mode
- Level 2B night limb - imaging mode

This file will provide pointing information for each pixel provided in the above data files with time being used as the key. Tangent point information is only valid on the limb and pierce point information is only valid on the disk.

- per file

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Header	N/A	2026	N/A	N/A
Total size		2026		

- data per scan

Data Item	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Time (UTC)	Integer	4	N/A	Milliseconds since 00:00:00 of the current day
Earth radius at the satellite	Float	4		kilometers
Solar zenith angle at the satellite	Float	4	0 .. 359	Degrees
Solar azimuth angle at the satellite	Float	4	0 .. 359	Degrees
Lunar zenith angle at the satellite	Float	4	0 .. 359	Degrees
Lunar azimuth angle at the satellite	Float	4	0 .. 359	Degrees
Tangent/pierce point latitude	Float	4	-90.0 .. 90.0	Degrees
Tangent/pierce point longitude	Float	4	-180.0 .. 180.0	Degrees
Tangent/pierce point altitude	Float	4		kilometers
Local solar time at the tangent/pierce point	Float	4	0 .. 11	Hours

Earth radius at the tangent/pierce point	Float	4		kilometers
Solar zenith angle at tangent/pierce point	Float	4	0 .. 359	Degrees
Solar azimuth angle at tangent/pierce point	Float	4	0 .. 359	Degrees
Lunar zenith angle at tangent/pierce point	Float	4	0 .. 359	Degrees
Lunar azimuth angle at tangent/pierce point	Float	4	0 .. 359	Degrees
Total size in bytes		60		

Total GUVI Pointing Supporting Data file:

Total Level 1C disk data file:	(140,730 * 60) + 2026 = 8,445,826 bytes
Total Level 1C limb data file:	(1093 + 563) * 60 + 2026 = 101,386 bytes
Total Level 1C spectrograph file:	(1640 * 5) * 60 + 2026 = 494,026 bytes
Total Level 2B day disk data file:	(3519) * 60 + 2026 = 213,166 bytes
Total Level 2B night disk data file:	(1760) * 60 + 2026 = 107,626 bytes
Total Level 2B aurora disk data file:	(56,290) * 60 + 2026 = 3,379,426 bytes
Total Level 2B day limb data file:	(35) * 60 + 2026 = 4,126 bytes
Total Level 2B night limb data file:	(36) * 60 + 2026 = 4,186 bytes