ATL02 Product Data Dictionary

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Group: /		
Conventions	(Attribute)	CF-1.6
citation	(Attribute)	SET_BY_META
contributor_name	(Attribute)	Thomas E Neumann (thomas.neumann@nasa.gov), Thorsten Markus (thorsten.markus@nasa.gov), Suneel Bhardwaj (suneel.bhardwaj@nasa.gov) David W Hancock III (david.w.hancock@nasa.gov)
contributor_role	(Attribute)	Instrument Engineer, Investigator, Principle Investigator, Data Producer, Data Producer
creator_name	(Attribute)	SET_BY_META
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.
date_created	(Attribute)	SET_BY_PGE
date_type	(Attribute)	UTC
description	(Attribute)	Science unit converted time ordered telemetry calibrated for instrument effects. All photon events per channel per transmit pulse. Includes Atmosphere raw profiles. Contains s/c location data.
featureType	(Attribute)	trajectory
geospatial_lat_max	(Attribute)	0.0
geospatial_lat_min	(Attribute)	0.0
geospatial_lat_units	(Attribute)	degrees_north
geospatial_lon_max	(Attribute)	0.0
geospatial_lon_min	(Attribute)	0.0
geospatial_lon_units	(Attribute)	degrees_east
granule_type	(Attribute)	ATL02
hdfversion	(Attribute)	SET_BY_PGE
history	(Attribute)	SET_BY_PGE
identifier_file_uuid	(Attribute)	SET_BY_PGE
identifier_product_doi	(Attribute)	10.5067/ATLAS/ATL02.001
identifier_product_doi_authority	(Attribute)	http://dx.doi.org
identifier_product_format_version	(Attribute)	SET_BY_PGE
identifier_product_type	(Attribute)	ATL02
institution	(Attribute)	SET_BY_META
instrument	(Attribute)	SET_BY_META
keywords	(Attribute)	SET_BY_META
keywords_vocabulary	(Attribute)	SET_BY_META
level	(Attribute)	L1B
license	(Attribute)	Data may not be reproduced or distributed without including the citation for this product included in this metadata. Data may not be distributed in an altered form without the written permission of the ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	(Attribute)	http://dx.doi.org
platform	(Attribute)	SET_BY_META
processing_level	(Attribute)	L1B
project	(Attribute)	SET_BY_META
publisher_email	(Attribute)	SET_BY_META
publisher_name	(Attribute)	SET_BY_META
publisher_url	(Attribute)	SET_BY_META
references	(Attribute)	SET_BY_META
short_name	(Attribute)	ATL02

source	(Attribute)	SET_BY_META		
spatial_coverage_type	(Attribute)	Horizontal		
standard_name_vocabulary	(Attribute)	CF-1.6		
summary	(Attribute)	SET_BY_META		
time_coverage_duration	(Attribute)	SET_BY_PGE		
time_coverage_end	(Attribute)	SET_BY_PGE		
time_coverage_start	(Attribute)	SET_BY_PGE		
time_type	(Attribute)	CCSDS UTC-A		
title	(Attribute)	SET_BY_META		
Group: /ancillary_data				
Description	(Attribute)	Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atlas_sdp_gps_epoch COMPACT	DOUBLE (1)	ATLAS Epoch Offset	seconds since 1980-01-06T00:00:00.000000Z Operations	Number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch (2018-01-01:T00.00.00.000000 UTC). Add this value to delta time parameters to compute full gps_seconds (relative to the GPS epoch) for each data point.
control CONTIGUOUS	STRING (1)	Control File	1 Operations	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds.
data_end_utc COMPACT	STRING (1)	End UTC Time of Granule (CCSDS-A, Actual)	1 Derived	UTC (in CCSDS-A format) of the last data point within the granule.
data_start_utc COMPACT	STRING (1)	Start UTC Time of Granule (CCSDS-A, Actual)	1 Derived	UTC (in CCSDS-A format) of the first data point within the granule.
end_cycle COMPACT	INTEGER (1)	Ending Cycle	1 Derived	The ending cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
end_delta_time COMPACT	DOUBLE (1)	ATLAS End Time (Actual) time	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the last data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
end_geoseg COMPACT	INTEGER (1)	Ending Geolocation Segment	1 Derived	The ending geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
end_gpssow COMPACT	DOUBLE (1)	Ending GPS SOW of Granule (Actual)	seconds Derived	GPS seconds-of-week of the last data point in the granule.
end_gpsweek COMPACT	INTEGER (1)	Ending GPSWeek of Granule (Actual)	weeks from 1980-01-06 Derived	GPS week number of the last data point in the granule.
end_orbit COMPACT	INTEGER (1)	Ending Orbit Number	1 Derived	The ending orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
end_region COMPACT	INTEGER (1)	Ending Region	1 Derived	The ending product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
end_rgt COMPACT	INTEGER (1)	Ending Reference Groundtrack	1 Derived	The ending reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
granule_end_utc COMPACT	STRING (1)	End UTC Time of Granule (CCSDS-A, Requested)	1 Derived	Requested end time (in UTC CCSDS-A) of this granule.
granule_start_utc COMPACT	STRING (1)	Start UTC Time of Granule (CCSDS-A,	1 Derived	Requested start time (in UTC CCSDS-A) of this granule.

		Requested)		
qa_at_interval COMPACT	DOUBLE (1)	QA Along-Track Interval	1 control	Statistics time interval for along-track QA data.
release COMPACT	STRING (1)	Release Number	1 Operations	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed.
start_cycle COMPACT	INTEGER (1)	Starting Cycle	1 Derived	The starting cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
start_delta_time COMPACT	DOUBLE (1)	ATLAS Start Time (Actual) time	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the first data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
start_geoseg COMPACT	INTEGER (1)	Starting Geolocation Segment	1 Derived	The starting geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
start_gpssow COMPACT	DOUBLE (1)	Start GPS SOW of Granule (Actual)	seconds Derived	GPS seconds-of-week of the first data point in the granule.
start_gpsweek COMPACT	INTEGER (1)	Start GPSWeek of Granule (Actual)	weeks from 1980-01-06 Derived	GPS week number of the first data point in the granule.
start_orbit COMPACT	INTEGER (1)	Starting Orbit Number	1 Derived	The starting orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
start_region COMPACT	INTEGER (1)	Starting Region	1 Derived	The starting product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
start_rgt COMPACT	INTEGER (1)	Starting Reference Groundtrack	1 Derived	The starting reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
version COMPACT	STRING (1)	Version	1 Operations	Version number of this granule within the release. It is a sequential number corresponding to the number of times the granule has been reprocessed for the current release.
Group: /ancillary_data/calibrations				
Description	(Attribute)	This group contains calibrations derived from the ATLAS CAL products.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_channel CONTIGUOUS	INTEGER_1 (20)	Channel	1	Dimension scale for ATLAS PCE channels (1-16=strong, 17-20=weak)
ds_fine_counts CONTIGUOUS	INTEGER_1 (75)	Fine Counts	1	Dimension scale for ATLAS Time-of-flight fine counts.
Group: /ancillary_data/calibrations/dead_time				
Description	(Attribute)	CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/shot, channel-to-channel basis.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal42_product COMPACT	STRING (1)	CAL Product Name	1 CAL42	Name of ATLAS CAL Product containing the calibration data
side COMPACT	INTEGER (1)	Detector Bank Side	1 CAL42	A or B side of the detector bank Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
temperature COMPACT	FLOAT (1)	Temperature	degreesC CAL42	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/dead_time/pcex				
Description	(Attribute)	CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/shot, channel-to-channel basis.		
Label	Datatype	long_name	units	description

(Layout)	(Dimensions)	(standard_name)	source	
dead_time COMPACT	DOUBLE (20)	DeadTime	seconds CAL42	Dead Time (channel)
sigma COMPACT	DOUBLE (20)	Sigma	seconds CAL42	Sigma (channel)
Group: /ancillary_data/calibrations/dead_time_radiometric_signal_loss				
Description	(Attribute)	CAL34 - Dead-time Radiometric Signal Loss. Contains a table of radiometric corrections versus apparent return strength and width for several dead-time values. Correction is to be multiplied by raw return strength to get corrected return strength		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal34_product CHUNKED	STRING (:)	CAL Product Name	1 CAL34	Name of ATLAS CAL Products containing the calibration data
dead_time CHUNKED	FLOAT (:)	Dead Time	ns CAL34	Dead time value
rad_corr CHUNKED	DOUBLE (: x : x :)	Radiometric Correction	1 CAL34	Radiometric Correction (width, strength, deadtime)
strength_strong CHUNKED	DOUBLE (: x :)	Strong Beam Strength	events/shot CAL34	Strong spot strength in events/shot (strength, deadtime)
strength_weak CHUNKED	DOUBLE (: x :)	Weak Beam Strength	events/shot CAL34	Weak spot strength in events/shot (strength, deadtime)
width CHUNKED	DOUBLE (: x :)	Apparent Width	ns CAL34	Apparent width (width, deadtime)
Group: /ancillary_data/calibrations/effective_cell_delay				
Description	(Attribute)	CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, and event edge (rising, falling).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal17_product CHUNKED	STRING (:)	CAL Product Name	1 CAL17	Name of ATLAS CAL Product containing the calibration data
Group: /ancillary_data/calibrations/effective_cell_delay/pcex				
Description	(Attribute)	CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, and event edge (rising, falling).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_fall CHUNKED	FLOAT (:)	Call Falling	1 CAL17	Cal_fall value which calibrations are provided (indexed by raw_cal_fall/256)
cal_rise CHUNKED	FLOAT (:)	Call Rising	1 CAL17	Cal_rise value which calibrations are provided (index to raw_cal_rise/256)
efc_fall CHUNKED	FLOAT (: x 20 x 75)	EFC Falling	counts CAL17	Effective Rx falling fine cell count (cell, channel, temp)
efc_ll CHUNKED	FLOAT (: x 75)	EFC LL	counts CAL17	Effective Tx fine cell count for leading lower (cell, temp)
efc_ot CHUNKED	FLOAT (: x 75)	EFC Other	counts CAL17	Effective Tx fine cell count for other (cell, temp)
efc_rise CHUNKED	FLOAT (: x 20 x 75)	EFC Rising	counts CAL17	Effective rising Rx fine cell count (cell, channel, temp)
temperature CHUNKED	FLOAT (:)	Temperature	degreesC CAL17	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/first_photon_bias				
Description	(Attribute)	CAL19 -First Photon Bias. Provides a correction for first photon bias.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal19_product CHUNKED	STRING (:)	CAL Product Name	1 Derived	Name of ATLAS CAL Products containing the calibration data
dead_time	FLOAT	Dead Time	ns	Dead time value

CHUNKED	(:)		Derived	
ffb_corr CHUNKED	DOUBLE (: x : x :)	FFB Correction	1 Derived	First Photon Bias Correction (width, strength, deadtime)
strength_strong CHUNKED	DOUBLE (: x :)	Strong Beam Strength	events/shot Derived	Strong spot strength in events/shot (strength, deadtime)
strength_weak CHUNKED	DOUBLE (: x :)	Weak Beam Strength	events/shot Derived	Weak spot strength in events/shot (strength, deadtime)
width CHUNKED	DOUBLE (: x :)	Apparent Width	ns Derived	Apparent width (width, deadtime)
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity				
Description	(Attribute)	CAL46 - Relationship describing detector responsivity as the PMT high voltage deviates from nominal high voltage setting (V0).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal46_product COMPACT	STRING (1)	CAL Product Name	1 CAL46	Name of ATLAS CAL Product containing the calibration data
side COMPACT	INTEGER (1)	Detector Bank Side	1 CAL46	A or B side of the detector bank Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity/pcex				
Description	(Attribute)	CAL46 - Per-PCE.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
b_strong COMPACT	FLOAT (1)	b_strong	1/v CAL46	Strong spot coefficient b
b_weak COMPACT	FLOAT (1)	b_weak	1/v CAL46	Weak spot coefficient b
c_strong COMPACT	FLOAT (1)	c_strong	1/v^2 CAL46	Strong spot coefficient c
c_weak COMPACT	FLOAT (1)	c_weak	1/v^2 CAL46	Weak spot coefficient c
npoints_strong COMPACT	FLOAT (1)	npoints_strong	1 CAL46	Strong spot number of points
npoints_weak COMPACT	FLOAT (1)	npoints_weak	1 CAL46	Weak spot number of points
rnom_strong COMPACT	FLOAT (1)	r_nom	1 CAL46	Strong spot Rnom
rnom_weak COMPACT	FLOAT (1)	r_nom	1 CAL46	Weak spot Rnom
sigma_b_strong COMPACT	FLOAT (1)	sigma_b_strong	1/v CAL46	Strong spot sigma of coefficient b
sigma_b_weak COMPACT	FLOAT (1)	sigma_b_weak	1/v CAL46	Weak spot sigma of coefficient b
sigma_c_strong COMPACT	FLOAT (1)	sigma_c_strong	1/v^2 CAL46	Strong spot sigma of coefficient c
sigma_c_weak COMPACT	FLOAT (1)	sigma_c_weak	1/v^2 CAL46	Weak spot sigma of coefficient c
sigma_fit_strong COMPACT	FLOAT (1)	sigma_fit_strong	1 CAL46	Strong spot sigma of fit
sigma_fit_weak COMPACT	FLOAT (1)	sigma_fit_weak	1 CAL46	Weak spot sigma of fit
vnom_strong COMPACT	FLOAT (1)	v_nom	v CAL46	Strong spot nominal voltage
vnom_weak	FLOAT	v_nom	v	Weak spot nominal voltage

COMPACT	(1)		CAL46	
Group: /ancillary_data/calibrations/laser_energy_conversion				
Description	(Attribute)	Contains CAL54 - absolute, energy monitor		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
base_temp COMPACT	FLOAT (1)	Base Temperature	degC CAL54	Base temperature coefficient.
cal54_product COMPACT	STRING (1)	CAL File Name	1 CAL54	Name of source file containing the calibration data
internal COMPACT	DOUBLE (8)	Laser Internal Coeffs	1 CAL54	Internal laser monitor coefficients (a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals)
lrs COMPACT	DOUBLE (8)	LRS Coeffs	1 CAL54	LRS coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals
spd COMPACT	DOUBLE (8)	SPD Coeffs	1 CAL54	SPD laser monitor coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals
Group: /ancillary_data/calibrations/laser_energy_fraction				
Description	(Attribute)	Contains CAL45 data - Transmit Energy Fraction per Beam		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal45_product COMPACT	STRING (1)	CAL File Name	1 CAL45	Name of source file containing the calibration data
energy_fract COMPACT	FLOAT (6)	Energy Fraction	1 CAL45	Energy Fraction, Per Spot
optics_throughput COMPACT	FLOAT (3)	Optics Throughput	1 CAL45	Optics Throughput, Per PCE
Group: /ancillary_data/calibrations/low_link_impulse_response				
Description	(Attribute)	CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bin_width COMPACT	FLOAT (1)	Bin Width	seconds CAL20	Histogram bin width
cal20_product COMPACT	STRING (1)	CAL Product Name	1 CAL20	Name of ATLAS CAL Product containing the calibration data
hist_x CONTIGUOUS	DOUBLE (2000)	Histogram Bin X Values	1 CAL20	Histogram bin x-values
laser COMPACT	INTEGER (1)	Laser	1 CAL20	Laser Number
mode COMPACT	INTEGER (1)	Laser Power Setting	1 CAL20	Laser Power Setting
num_bins COMPACT	INTEGER (1)	Number of Bins	1 CAL20	Number of bins in the histogram
return_source COMPACT	INTEGER (1)	Return Source	1 CAL20	Source of the events from which the data are derived. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['none', 'tep', 'maat', 'echo']
side COMPACT	INTEGER (1)	A_or_B	1 CAL20	A or B Side Component Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
temperature COMPACT	FLOAT (1)	Temperature	degreesC CAL20	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/low_link_impulse_response/pcex				
Description	(Attribute)	CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label	Datatype	long_name	units	description

(Layout)	(Dimensions)	(standard_name)	source	
hist CONTIGUOUS	DOUBLE (20 x 2000)	Histogram	1 CAL20	Per-Channel Histogram
total_events COMPACT	INTEGER_8 (20)	Total Events	1 CAL20	Number of events used in constructing the per-channel histogram
Group: /ancillary_data/calibrations/nominal_rx_sensitivity				
Description	(Attribute)	CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal30_product COMPACT	STRING (1)	CAL Product Name	1 CAL30	Name of ATLAS CAL Product containing the calibration data
side COMPACT	INTEGER (1)	Detector Bank Side	1 CAL30	A or B side of the detector bank Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
Group: /ancillary_data/calibrations/nominal_rx_sensitivity/pcex				
Description	(Attribute)	CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
rms_resid_strong COMPACT	DOUBLE (1)	RMS Residual	1 CAL30	Strong spot RMS Residual fraction
rms_resid_weak COMPACT	DOUBLE (1)	RMS Residual	1 CAL30	Weak spot RMS Residual fraction
sdev_strong COMPACT	DOUBLE (1)	sdev_strong	counts/s/pW CAL30	Strong spot standard deviation
sdev_weak COMPACT	DOUBLE (1)	sdev_weak	counts/s/pW CAL30	Weak spot standard deviation
slope_strong COMPACT	DOUBLE (1)	Slope	counts/s/pW CAL30	Strong spot Slope
slope_weak COMPACT	DOUBLE (1)	Slope	counts/s/pW CAL30	Weak spot Slope
Group: /ancillary_data/calibrations/receiver_channel_skews				
Description	(Attribute)	CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Group: /ancillary_data/calibrations/receiver_channel_skews/pcex				
Description	(Attribute)	CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal49_product COMPACT	STRING (1)	CAL Product Name	1 CAL49	Name of ATLAS CAL Product containing the calibration data
side COMPACT	INTEGER (1)	Primary_Redundant	1 CAL49	Primary or Redundant Component Flag Values: ['1', '2'] Flag Meanings: ['PRIM', 'REDU']
skew_fall COMPACT	FLOAT (20)	Skew_Fall	seconds CAL49	Per-channel skew (Fall)
skew_fall_stderr COMPACT	FLOAT (20)	Skew_Fall StdErr	seconds CAL49	Standard error of the calculated skew (Fall)
skew_rise CONTIGUOUS	FLOAT (20)	Skew_Rise	seconds CAL49	Per-channel skew (Rise)
skew_rise_stderr COMPACT	FLOAT (20)	Skew_Rise StdErr	seconds CAL49	Standard error of the calculated skew (Rise)
temperature COMPACT	FLOAT (1)	Temperature	degreesC CAL49	Temperature for which calibrations are retrieved.
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment				

Description	(Attribute)	CAL47 - Provides a calibration for Receiver Sensitivity as a function of Transmit-to-Receiver Beam Misalignment.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
azimuth CHUNKED	DOUBLE (:)	Azimuth	microradians CAL47_IMG	Azimuth
azimuth_grid_range COMPACT	FLOAT (2)	Azimuth Grid Range	microradians CAL47_IMG	Azimuth Grid Range
cal47_product COMPACT	STRING (6)	CAL Product Name	1 CAL47_IMG	Name of ATLAS CAL Product containing the calibration data
elevation CHUNKED	DOUBLE (:)	Elevation	microradians CAL47_IMG	Elevation
elevation_grid_range COMPACT	FLOAT (2)	Elevation Grid Range	microradians CAL47_IMG	Elevation Grid Range
grid_spacing COMPACT	FLOAT (1)	Grid Spacing	microradians CAL47_IMG	GridSpacing
temperature COMPACT	FLOAT (1)	Temperature	degC CAL47_IMG	Reference temperature within the CAL47 product.
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment/pcex				
Description	(Attribute)	CAL47 - Rx Sensitivity as a function of TX-to-IFOV Misalignments. Correlates the residual misalignment of the total 6 beams (given the single BSM AZ/El mirror) interspersed among AMCS calibrations, to apparent shifts in signal gain.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
rel_intensity_strong CHUNKED	DOUBLE (: x :)	Relative intensity	1 CAL47_IMG	Strong spot relative intensity
rel_intensity_weak CHUNKED	DOUBLE (: x :)	Relative intensity	1 CAL47_IMG	Weak spot relative intensity
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom				
Description	(Attribute)	CAL61 - Rx Sensitivity vs. WTOM Ratio. Provides parameter values, for each spot, for the fit of Relative Sensitivity based on the reported WTEM through a quadratic curve.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal61_product COMPACT	STRING (1)	CAL Product Name	1 CAL61	Name of ATLAS CAL Product containing the calibration data
laser COMPACT	INTEGER (1)	Laser	1 CAL61	Laser Number
mode COMPACT	INTEGER (1)	Laser Power Setting	1 CAL61	Laser Power Setting
side COMPACT	INTEGER (1)	Detector Bank Side	1 CAL61	A or B side of the detector bank Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
temperature COMPACT	FLOAT (1)	Temperature	degreesC CAL61	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom/pcex				
Description	(Attribute)	CAL61 - Rx Sensitivity vs. WTOM Ratio. Calibration of receiver throughput as a function of the WTOM/WTEM diode signals (D1, D2) to indicate quality of the spectral tuning of the OFMs (etalons) for each receiver IFOV.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
h_strong COMPACT	DOUBLE (1)	h_strong	1 CAL61	h_strong; used in Eqn 5-17.
h_weak COMPACT	DOUBLE (1)	h_weak	1 CAL61	h_weak; used in Eqn 5-17.
rms_of_fit_strong COMPACT	DOUBLE (1)	rms_of_fit_strong	1 CAL61	rms_of_fit_strong
rms_of_fit_weak	DOUBLE	rms_of_fit_weak	1	rms_of_fit_weak

COMPACT	(1)		CAL61	
sdev_h_strong COMPACT	DOUBLE (1)	sdev_h_strong	1 CAL61	sdev_h_strong
sdev_h_weak COMPACT	DOUBLE (1)	sdev_h_weak	1 CAL61	sdev_h_weak
sdev_xpeak_strong COMPACT	DOUBLE (1)	sdev_xpeak_strong	1 CAL61	sdev_xpeak_strong
sdev_xpeak_weak COMPACT	DOUBLE (1)	sdev_xpeak_weak	1 CAL61	sdev_xpeak_weak
sdev_ypeak_strong COMPACT	DOUBLE (1)	sdev_ypeak_strong	counts/s CAL61	sdev_ypeak_strong
sdev_ypeak_weak COMPACT	DOUBLE (1)	sdev_ypeak_weak	counts/s CAL61	sdev_ypeak_weak
xpeak_strong COMPACT	DOUBLE (1)	xpeak_strong	1 CAL61	xpeak_strong; used in Eqn 5-17.
xpeak_weak COMPACT	DOUBLE (1)	xpeak_weak	1 CAL61	xpeak_weak; used in Eqn 5-17.
ypeak_strong COMPACT	DOUBLE (1)	ypeak_strong	counts/s CAL61	ypeak_strong
ypeak_weak COMPACT	DOUBLE (1)	ypeak_weak	counts/s CAL61	ypeak_weak
Group: /ancillary_data/calibrations/start_timing_skews				
Description	(Attribute)	CAL44 - Start Timing Skews. Produces START pulse timing skews within & among PCEs to properly align all start pulse timing channels.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal44_product CHUNKED	STRING (:)	CAL Product Name	1 CAL44	Name of ATLAS CAL Product containing the calibration data
ll1 CHUNKED	FLOAT (:)	LL1	seconds CAL44	Leading Lower Skew, PCE1
ll2_ll1 CHUNKED	FLOAT (:)	LL2-LL1	seconds CAL44	LL2-LL1
ll3_ll1 CHUNKED	FLOAT (:)	LL3-LL1	seconds CAL44	LL3-LL1
lu_ll1 CHUNKED	FLOAT (:)	LU-LL1	seconds CAL44	LU-LL1
side COMPACT	INTEGER (1)	SPD Side	1 CAL44	A or B side of the Start Pulse Detector Flag Values: ['1', '2'] Flag Meanings: ['A', 'B']
spd_temp CHUNKED	FLOAT (:)	SPD_Temp	degreesC CAL44	SPD Temperature
tl_ll3 CHUNKED	FLOAT (:)	TL-LL3	seconds CAL44	TL-LL3
tu_ll2 CHUNKED	FLOAT (:)	TU-LL2	seconds CAL44	TU-LL2
Group: /ancillary_data/housekeeping				
Description	(Attribute)	Constants and calibrations related to ATLAS housekeeping data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
det_ab_flag COMPACT	INTEGER (1)	Detector Side, A or B	1 Derived, L1B ATBD	Indicates if the active detector (DET) is side A (1) or side B (2). Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
hvpc_ab_flag COMPACT	INTEGER (1)	HVPC Side, A or B	1 Derived, L1B ATBD	Indicates if the active High Voltage Power Converter (HVPC) is side A (1) or side B (2).

				Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
laser_12_flag COMPACT	INTEGER (1)	Laser 1 or Laser 2	1 Derived, L1B ATBD	Indicates if the active Laser is laser 1 or laser 2. Flag Values: ['1', '2'] Flag Meanings: ['1', '2']
lrs_ab_flag COMPACT	INTEGER (1)	LRS Side A or B	1 Derived, L1B ATBD	Indicates if the active LRS is side A (1) or side B (2). Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
pdu_ab_flag COMPACT	INTEGER (1)	PDU Side A or B	1 Derived, L1B ATBD	Indicates if the active PDU is side a (1) or side b (2). Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
spd_ab_flag COMPACT	INTEGER (1)	SPD A or B	1 Derived, L1B ATBD	Indicates if the active Start Pulse Detector (SPD) is side a (1) or side b (2). Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
tams_ab_flag COMPACT	INTEGER (1)	TAMS Side A or B	1 Derived, L1B ATBD	Indicates if the active TAMS is side a (1) or side b (2). Flag Values: ['1', '2'] Flag Meanings: ['a', 'b']
Group: /ancillary_data/isf				
Description	(Attribute)	Constants and calibrations provided by the ICESat-2 Instrument Support Facility (via ANC27)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bias_offset_x COMPACT	DOUBLE (2)	AMCS Bias Offset X	microradians ANC27 (ATBD Section 5.3.3.1)	Zero is center of BSM range: (x,y)=(8000,8000). Used in Eqn 5-13 to generate coordinates that are used in Eqn 5-11 to interpolate CAL 47, which has 1 R grid spacing.
bias_offset_y COMPACT	DOUBLE (2)	AMCS Bias Offset Y	microradians ANC27 (ATBD Section 5.3.3.1)	Zero is center of BSM range: (x,y)=(8000,8000). Used in Eqn 5-13 to generate coordinates that are used in Eqn 5-11 to interpolate CAL 47, which has 1 R grid spacing.
bias_rate COMPACT	DOUBLE (1)	AMCS bias rate	microradians/undefined_time ANC27 (ATBD Section 5.3.3.1)	Currently a placeholder, not used in calculations.
bias_time COMPACT	DOUBLE (2)	AMCS Bias Time	seconds since 2018-01-01 ANC27 (ATBD Section 5.3.3.1)	Times of surrounding AMCS bias corrections
cal46_aging COMPACT	DOUBLE (1)	CAL46 Aging Factor	1 ANC27 (ATBD Section 5.3.14)	CAL46 Aging correction factor
start_time_coeff COMPACT	DOUBLE (8 x 4)	Start Time Coefficients	ns ANC27 (ATBD Section 3.5.6)	Start time coefficients for TOF center correction (coefficent x scenario)
uso_freq_dev COMPACT	DOUBLE (1)	USO Frequence Deviation	hz ANC27	USO frequency deviation; Used in Eqn 2-4.
wtom_alt_tune_corr COMPACT	DOUBLE (1)	WTOM Alt Tuning Correction	1 ANC27 (ATBD Section 5.3.3.2)	W" in Eqn 5-15. Used only for alternate tuning; method for calculating not defined.
wtom_lambda_off COMPACT	DOUBLE (1)	WTOM Wavelength Offset	1 ANC27 (ATBD Section 5.3.3.2)	WTOM Wavelength Offset. Currently zero. An "off-tuning" value to be used with alternate tuning; method for calculating not defined.
wtom_tune_flag COMPACT	INTEGER (1)	WTOM Tuning Flag	1 ANC27 (ATBD Section 5.3.3.2)	WTOM Tuning Flag (1=standard method, 2=alternate method) Flag Values: ['1', '2'] Flag Meanings: ['std', 'alt']
Group: /ancillary_data/tep				
Description	(Attribute)	Contains ancillary values related to TEP detection.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
tep_check_pce1 COMPACT	INTEGER (1)	TEP flag for PCE1.	1 ATLAS L1B ATBD	Flag indicating that the PCE1 strong channels should be checked for TEP events. Default value is 1 (indicating that TEP is possible on PCE1). A value of 0 indicates that PCE1 data are not examined for TEP. Flag Values: ['0', '1'] Flag Meanings: ['do_not_check', 'check']
tep_check_pce2	INTEGER	TEP flag for PCE2.	1	Flag indicating that the PCE2 strong channels should be checked for TEP events. Default value is 1 (indicating that TEP is

COMPACT	(1)		ATLAS L1B ATBD	possible on PCE2). A value of 0 indicates that PCE2 data are not examined for TEP. Flag Values: ['0', '1'] Flag Meanings: ['do_not_check', 'check']
tep_check_pce3 COMPACT	INTEGER (1)	TEP flag for PCE3.	1 ATLAS L1B ATBD	Flag indicating that the PCE3 strong channels should be checked for TEP events. Default value is 0 (indicating that TEP is not possible on PCE3). A value of 1 indicates that PCE3 data are examined for TEP (even though the hardware does not support this possibility). Flag Values: ['0', '1'] Flag Meanings: ['do_not_check', 'check']
thres_tep_max COMPACT	DOUBLE (1)	TEP Detection Maximum	seconds ATLAS L1B ATBD	Maximum value used to classify TEP photons. Default value per ATBD is 100ns. (100e-9 sec)
thres_tep_min COMPACT	DOUBLE (1)	TEP Detection Minimum	seconds ATLAS L1B ATBD	Minimum value used to classify TEP photons. Default value per ATBD is 0ns. (0e-9 sec)
Group: /ancillary_data/tod_tof				
Description	(Attribute)	Contains ancillary parameters related to Time-of-Flight and/or Time-of-Day calculations.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_risefall_box_int COMPACT	DOUBLE (1)	cal_risefall boxcar interval	counts ATLAS L1B ATBD	Boxcar averaging interval for cal_risefall averaging, in major-frame counts. Boxcar averages are using to generate 1D spline coefficients. The spline coefficients are used to create smoothed, interpolated cal_risefall values at the full data rate.
cal_uso_scale COMPACT	DOUBLE (1)	Calibration value for USO	1 ATLAS L1B ATBD	Calibration value for the Ultra Stable Oscillator (USO). Computed using the number of coarse clock ticks measurement generated by the USO between sequential 1PPS time stamps from the on-orbit GPS to estimate the coarse clock ruler scale factor.
corr_rx_coarse_pce1 COMPACT	INTEGER (20)	Correction value for PCE1 Rx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE1 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1.
corr_rx_coarse_pce2 COMPACT	INTEGER (20)	Correction value for PCE2 Rx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE2 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1.
corr_rx_coarse_pce3 COMPACT	INTEGER (20)	Correction value for PCE3 Rx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE3 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1.
corr_tx_coarse_pce1 COMPACT	INTEGER (1)	Correction value for PCE1 Tx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE1 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1.
corr_tx_coarse_pce2 COMPACT	INTEGER (1)	Correction value for PCE2 Tx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE2 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1.
corr_tx_coarse_pce3 COMPACT	INTEGER (1)	Correction value for PCE3 Tx coarse clock offset	counts ATLAS L1B ATBD	Correction for the PCE3 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1.
dt_imet COMPACT	DOUBLE (1)	IMET Clock Tick	seconds/count ATLAS L1B ATBD, Section 4.2.1	IMET clock tick.
dt_t0 COMPACT	DOUBLE (1)	T0 Clock Tick	seconds/count ATLAS L1B ATBD, Section 4.2.1	T0 clock tick.
dt_uso COMPACT	DOUBLE (1)	USO (AMET) Clock Tick	seconds/count ATLAS L1B ATBD, Section 4.2.1	The AMET clock tick
lrs_clock COMPACT	DOUBLE (1)	LRS Clock Rate	seconds/count ATLAS L1B ATBD	The nominal rate of the LRS internal 27 MHz oscillator (divided by 32).
Group: /atlas				
Description	(Attribute)	Group contains the ATLAS EU-converted data		
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).		
Group: /atlas/housekeeping				
Description	(Attribute)	Group contains the ATLAS EU-converted housekeeping data		
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).		

Group: /atlas/housekeeping/laser_energy_internal				
Description	(Attribute)	Internal laser energy from APID 1032 SLA_HK. Packet Frequency is 1 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 1hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections)
e_tx CHUNKED	FLOAT (:)	total laser energy	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy derived from the internal laser energy monitor (APID 1032).
e_tx_pce1_s CHUNKED	FLOAT (:)	Spot laser energy for PCE1, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 strong spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce1_w CHUNKED	FLOAT (:)	Spot laser energy for PCE1, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce2_s CHUNKED	FLOAT (:)	Spot laser energy for PCE2, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce2_w CHUNKED	FLOAT (:)	Spot laser energy for PCE2, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce3_s CHUNKED	FLOAT (:)	Spot laser energy for PCE3, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce3_w CHUNKED	FLOAT (:)	Spot laser energy for PCE3, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from the internal laser energy monitor and split by calibration.
laser_mode CHUNKED	INTEGER_1 (:)	Laser Mode Setting	1 ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Mode setting reported in A_SLA_HK (APID 1032).
laser_temp CHUNKED	FLOAT (:)	Laser Temperature	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Temperature. From SLA_HK Telemetry packet (APID 1032, Laser Cmd Code 0xFE LAS-14, raw_lem_temp).
Group: /atlas/housekeeping/laser_energy_lrs				
Description	(Attribute)	Laser energy derived from LRS Centroid Magnitudes. Packet Frequency is 50 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 50hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections)
e_tx CHUNKED	FLOAT (:)	total laser energy	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy from derived from LRS laser centroid magnitudes.
e_tx_pce1_s CHUNKED	FLOAT (:)	Spot laser energy for PCE1, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce1_w CHUNKED	FLOAT (:)	Spot laser energy for PCE1, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot, derived from LRS laser centroids and split by calibration.

e_tx_pce2_s CHUNKED	FLOAT (:)	Spot laser energy for PCE2, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce2_w CHUNKED	FLOAT (:)	Spot laser energy for PCE2, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from LRS laser centroids and split by calibration.
e_tx_pce3_s CHUNKED	FLOAT (:)	Spot laser energy for PCE3, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce3_w CHUNKED	FLOAT (:)	Spot laser energy for PCE3, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from LRS laser centroids and split by calibration.
lrs_temp CHUNKED	FLOAT (:)	Laser Temperature	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	LRS Temperature. From A_HKT_C Telemetry packet
Group: /atlas/housekeeping/laser_energy_spd				
Description	(Attribute)	Laser energy from APID 1063 Analog HK Telemetry. Packet Frequency is 1 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 1hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections)
ds_10 CONTIGUOUS	INTEGER_1 (10)	DS for 10 measurements	1	Dimension scale for10 measurements.
e_tx CHUNKED	FLOAT (: x 10)	total laser energy	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy from Analog HK Telemetry packet E (APID 1063).
e_tx_pce1_s CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE1, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce1_w CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE1, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot derived from the analog HK telemetry and split by calibration.
e_tx_pce2_s CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE2, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce2_w CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE2, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce3_s CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE3, strong	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce3_w CHUNKED	FLOAT (: x 10)	Spot laser energy for PCE3, weak	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from the analog HK telemetry and split by calibration.
edge_xmtnc CHUNKED	FLOAT (:)	SPD Edge	mV ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	edge_xmtnc. From Analog HK Telemetry packet E (APID 1063).
laser_temp CHUNKED	FLOAT (:)	Laser Temperature	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Temperature. From A_HKT_C PRIMARY SPD THERMISTOR MED_34 chan[74] or REDUNDANT SPD THERMISTOR MED_35 chan[81]
peak_xmtnc CHUNKED	FLOAT (:)	SPD Peak	mV ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	peak_xmtnc. From Analog HK Telemetry packet E (APID 1063).
thrhi_rdbk	FLOAT	SPD Upper Thres	volts	Start Pulse Detector (SPD) upper threshold readback value. Reported as an analog voltage whose nominal setting puts

CHUNKED	(:)		ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	the threshold at 80% of full laser energy. From Analog HK Telemetry packet E (APID 1063).
thrlo_rdbk CHUNKED	FLOAT (:)	SPD Lower Thres	volts ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Start Pulse Detector (SPD) lower threshold readback value. Reported as an analog voltage whose nominal setting puts the threshold at 20% of full laser energy. From Analog HK Telemetry packet E (APID 1063).
Group: /atlas/housekeeping/mce_position				
Description	(Attribute)	MCE Position A/D Packet. Packet Frequency is 200 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 200HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_50 CONTIGUOUS	INTEGER_1 (50)	DS for 50 measurements	1	Dimension scale for 50 measurements.
mce_az CHUNKED	FLOAT (: x 50)	A MCE AZ	microradians ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE	MCE azimuth values.
mce_el CHUNKED	FLOAT (: x 50)	MCE EL	microradians ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE	MCE elevation values.
mce_total_cycles CHUNKED	UINT_4_LE (:)	A MCE total cycles	counts ATL01/atlas/a_mce_pos_1057	MCE reported total number of cycles
Group: /atlas/housekeeping/meb				
Description	(Attribute)	Data from APID 1062 Analog HK Telemetry. Packet Frequency is 1 in Hertz. Voltage and current data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
hkt_ground_check CHUNKED	FLOAT (:)	Ground check	counts ATL01/atlas/a_hkt_d_1062 converted	Ground check - A_HKT_D.chan[30]
hkt_meb_1p5v_asc_v CHUNKED	FLOAT (:)	1P5VTLM-ASC	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VTLM-ASC - A_HKT_D.chan[22]
hkt_meb_1p5v_mon_v CHUNKED	FLOAT (:)	HKT 1.5V Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	HKT 1.5V Monitor - A_HKT_D.chan[5]
hkt_meb_1p5va_pce1_v CHUNKED	FLOAT (:)	1P5VATLM-PCE1	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE1 - A_HKT_D.chan[23]
hkt_meb_1p5va_pce2_v CHUNKED	FLOAT (:)	1P5VATLM-PCE2	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE2 - A_HKT_D.chan[16]
hkt_meb_1p5va_pce3_v CHUNKED	FLOAT (:)	1P5VATLM-PCE3	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE3 - A_HKT_D.chan[17]
hkt_meb_1p5vb_pce1_v CHUNKED	FLOAT (:)	1P5VBTLM-PCE1	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLM-PCE1 - A_HKT_D.chan[24]
hkt_meb_1p5vb_pce2_v CHUNKED	FLOAT (:)	1P5VBTLM-PCE2	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLM-PCE2 - A_HKT_D.chan[25]
hkt_meb_1p5vb_pce3_v CHUNKED	FLOAT (:)	1P5VBTLM-PCE3	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLM-PCE3 - A_HKT_D.chan[18]
hkt_meb_2p5v_pce1_v CHUNKED	FLOAT (:)	2P5VTLM-PCE1	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE1 - A_HKT_D.chan[19]
hkt_meb_2p5v_pce2_v CHUNKED	FLOAT (:)	2P5VTLM-PCE2	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE2 - A_HKT_D.chan[26]

hkt_meb_2p5v_pce3_v CHUNKED	FLOAT (:)	2P5VTLM-PCE3	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE3 - A_HKT_D.chan[27]
hkt_meb_3p3i_lvpc_i CHUNKED	FLOAT (:)	3P3ITLM-LVPC	amps ATL01/atlas/a_hkt_d_1062 converted	3P3ITLM-LVPC - A_HKT_D.chan[12]
hkt_meb_3p3v_mon_v CHUNKED	FLOAT (:)	3.3V Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	3.3V Monitor - A_HKT_D.chan[6]
hkt_meb_5p0i_lvpc_i CHUNKED	FLOAT (:)	5P0ITLM-LVPC	amps ATL01/atlas/a_hkt_d_1062 converted	5P0ITLM-LVPC - A_HKT_D.chan[13]
hkt_meb_5p0i_sbc_i CHUNKED	FLOAT (:)	5P0I_SBC_TLM	amps ATL01/atlas/a_hkt_d_1062 converted	5P0I_SBC_TLM - A_HKT_D.chan[28]
hkt_meb_5p0v_sbc_v CHUNKED	FLOAT (:)	5P0V_SBC_TLM	volts ATL01/atlas/a_hkt_d_1062 converted	5P0V_SBC_TLM - A_HKT_D.chan[29]
hkt_meb_cal_n35p9_t CHUNKED	FLOAT (:)	CAL -35.9	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -35.9 - A_HKT_D.chan[3]
hkt_meb_cal_n62p5_t CHUNKED	FLOAT (:)	CAL -62.5	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -62.5 - A_HKT_D.chan[4]
hkt_meb_cal_n6p6_t CHUNKED	FLOAT (:)	CAL -6.6	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -6.6 - A_HKT_D.chan[2]
hkt_meb_cal_p25_t CHUNKED	FLOAT (:)	CAL +25	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL +25 - A_HKT_D.chan[1]
hkt_meb_cal_p65p3_t CHUNKED	FLOAT (:)	CAL +65.3	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL +65.3 - A_HKT_D.chan[0]
hkt_meb_i_uso_i CHUNKED	FLOAT (:)	ITLM-USO	amps ATL01/atlas/a_hkt_d_1062 converted	ITLM-USO - A_HKT_D.chan[15]
hkt_meb_n15p0i_lvpc_i CHUNKED	FLOAT (:)	15P0I_NEG_TLM-LVPC	amps ATL01/atlas/a_hkt_d_1062 converted	15P0I_NEG_TLM-LVPC - A_HKT_D.chan[21]
hkt_meb_n15v_mon_v CHUNKED	FLOAT (:)	-15V Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	-15V Monitor - A_HKT_D.chan[10]
hkt_meb_n5a_mon_v CHUNKED	FLOAT (:)	HKT -5A Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	HKT -5A Monitor - A_HKT_D.chan[11]
hkt_meb_p15p0i_lvpc_i CHUNKED	FLOAT (:)	15P0I_POS_TLM-LVPC	amps ATL01/atlas/a_hkt_d_1062 converted	15P0I_POS_TLM-LVPC - A_HKT_D.chan[20]
hkt_meb_p15v_mon_v CHUNKED	FLOAT (:)	+15V Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	+15V Monitor - A_HKT_D.chan[9]
hkt_meb_p5a_mon_v CHUNKED	FLOAT (:)	HKT +5A Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	HKT +5A Monitor - A_HKT_D.chan[8]
hkt_meb_p5d_mon_v CHUNKED	FLOAT (:)	+5D Monitor	volts ATL01/atlas/a_hkt_d_1062 converted	+5D Monitor - A_HKT_D.chan[7]
hkt_meb_v_uso_v CHUNKED	FLOAT (:)	VTLM-USO	volts ATL01/atlas/a_hkt_d_1062 converted	VTLM-USO - A_HKT_D.chan[14]
Group: /atlas/housekeeping/pdu				
Description	(Attribute)	PDU Analog HK Telemetry. The PDU analog telemetry digitized by the HKT card and collected by the SBC Thermal Control Task. Packet Frequency is 1 in Hertz. Data is from the APID 1059 (Primary) or APID 1060 (Redundant) HK packets.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP GPS Epoch. This is computed based on the housekeeping design to sample a measurement every 0.003125 seconds from the internal ASC 1PPS . The time for this packet is set as the time of the lowest software channel number in this telemetry packet. If the specific time is needed add to it the difference of its actual ATLAS hardware channel number from the lowest software channel number times the 0.003125 seconds. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
hvpc_mod_1 CHUNKED	FLOAT (:)	HVPC Module 1	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 1 - A_HKT.chan[70]

hvpc_mod_2 CHUNKED	FLOAT (:)	HVPC Module 2	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 2 - A_HKT.chan[71]
hvpc_mod_3 CHUNKED	FLOAT (:)	HVPC Module 3	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 3 - A_HKT.chan[72]
hvpc_mod_4 CHUNKED	FLOAT (:)	HVPC Module 4	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 4 - A_HKT.chan[73]
hvpc_mod_5 CHUNKED	FLOAT (:)	HVPC Module 5	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 5 - A_HKT.chan[74]
hvpc_mod_6 CHUNKED	FLOAT (:)	HVPC Module 6	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 6 - A_HKT.chan[75]
hvpc_tlm_6 CHUNKED	FLOAT (:)	HVPC TLM 6	volts ATL01/atlas/a_hkt_a_1059 converted	HVPC TLM 6 - A_HKT.chan[76]
hvpc_tlm_7 CHUNKED	FLOAT (:)	HVPC TLM 7	volts ATL01/atlas/a_hkt_a_1059 converted	HVPC TLM 7 - A_HKT.chan[77]
pdu_daa_opts_htr_i CHUNKED	FLOAT (:)	PDU DAA OPTS HTR I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU DAA OPTS HTR I - A_HKT.chan[46]
pdu_det_i CHUNKED	FLOAT (:)	PDU DET I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU DET I - A_HKT.chan[23]
pdu_det_v CHUNKED	FLOAT (:)	PDU DET V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU DET V - A_HKT.chan[17]
pdu_hvpc_i CHUNKED	FLOAT (:)	PDU HVPC I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU HVPC I - A_HKT.chan[24]
pdu_laser_1_i CHUNKED	FLOAT (:)	PDU LASER 1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 1 I - A_HKT.chan[21]
pdu_laser_1_v CHUNKED	FLOAT (:)	PDU LASER 1 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 1 V - A_HKT.chan[14]
pdu_laser_2_i CHUNKED	FLOAT (:)	PDU LASER 2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 2 I - A_HKT.chan[22]
pdu_laser_2_v CHUNKED	FLOAT (:)	PDU LASER 2 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 2 V - A_HKT.chan[15]
pdu_lhp1_i CHUNKED	FLOAT (:)	PDU LHP1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP1 I - A_HKT.chan[43]
pdu_lhp2_i CHUNKED	FLOAT (:)	PDU LHP2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP2 I - A_HKT.chan[44]
pdu_lhp_startup_htr_i CHUNKED	FLOAT (:)	PDU LHP STARTUP HTR I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP STARTUP HTR I - A_HKT.chan[42]
pdu_lrs_i CHUNKED	FLOAT (:)	PDU LRS I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LRS I - A_HKT.chan[25]
pdu_lrs_opts_heater_i CHUNKED	FLOAT (:)	PDU LRS OPTS HEATER I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LRS OPTS HEATER I - A_HKT.chan[45]
pdu_meb_lvpc_i CHUNKED	FLOAT (:)	PDU MEB LVPC I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU MEB LVPC I - A_HKT.chan[26]
pdu_meb_lvpc_v CHUNKED	FLOAT (:)	PDU MEB LVPC V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU MEB LVPC V - A_HKT.chan[16]
pdu_n3v_dem1_i CHUNKED	FLOAT (:)	PDU N3V DEM1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM1 I - A_HKT.chan[52]
pdu_n3v_dem1_v CHUNKED	FLOAT (:)	PDU N3V DEM1 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM1 V - A_HKT.chan[2]
pdu_n3v_dem2_i CHUNKED	FLOAT (:)	PDU N3V DEM2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM2 I - A_HKT.chan[63]
pdu_n3v_dem2_v CHUNKED	FLOAT (:)	PDU N3V DEM2 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM2 V - A_HKT.chan[5]
pdu_n3v_dem3_i CHUNKED	FLOAT (:)	PDU N3V DEM3 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM3 I - A_HKT.chan[55]
pdu_n3v_dem3_v	FLOAT	PDU N3V DEM3 V	volts	PDU N3V DEM3 V - A_HKT.chan[8]

CHUNKED	(:)		ATL01/atlas/a_hkt_a_1059 converted	
pdu_n3v_dem4_i CHUNKED	FLOAT (:)	PDU N3V DEM4 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM4 I - A_HKT.chan[66]
pdu_n3v_dem5_i CHUNKED	FLOAT (:)	PDU N3V DEM5 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM5 I - A_HKT.chan[58]
pdu_n3v_dem5_v CHUNKED	FLOAT (:)	PDU N3V DEM5 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM5 V - A_HKT.chan[11]
pdu_n3v_dem6_i CHUNKED	FLOAT (:)	PDU N3V DEM6 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM6 I - A_HKT.chan[69]
pdu_ofa_n12v_v CHUNKED	FLOAT (:)	PDU OFA N12V V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU OFA N12V V - A_HKT.chan[13]
pdu_ofa_p12v_i CHUNKED	FLOAT (:)	PDU OFA P12V I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU OFA P12V I - A_HKT.chan[59]
pdu_ofa_p12v_v CHUNKED	FLOAT (:)	PDU OFA P12V V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU OFA P12V V - A_HKT.chan[12]
pdu_p3p3v_dem1_i CHUNKED	FLOAT (:)	PDU P3P3V DEM1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM1 I - A_HKT.chan[51]
pdu_p3p3v_dem1_v CHUNKED	FLOAT (:)	PDU P3P3V DEM1 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM1 V - A_HKT.chan[1]
pdu_p3p3v_dem2_i CHUNKED	FLOAT (:)	PDU P3P3V DEM2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM2 I - A_HKT.chan[62]
pdu_p3p3v_dem2_v CHUNKED	FLOAT (:)	PDU P3P3V DEM2 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM2 V - A_HKT.chan[4]
pdu_p3p3v_dem3_i CHUNKED	FLOAT (:)	PDU P3P3V DEM3 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM3 I - A_HKT.chan[54]
pdu_p3p3v_dem3_v CHUNKED	FLOAT (:)	PDU P3P3V DEM3 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM3 V - A_HKT.chan[7]
pdu_p3p3v_dem4_i CHUNKED	FLOAT (:)	PDU P3P3V DEM4 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM4 I - A_HKT.chan[65]
pdu_p3p3v_dem5_i CHUNKED	FLOAT (:)	PDU P3P3V DEM5 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM5 I - A_HKT.chan[57]
pdu_p3p3v_dem5_v CHUNKED	FLOAT (:)	PDU P3P3V DEM5 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM5 V - A_HKT.chan[10]
pdu_p3p3v_dem6_i CHUNKED	FLOAT (:)	PDU P3P3V DEM6 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM6 I - A_HKT.chan[68]
pdu_p5v_dem1_i CHUNKED	FLOAT (:)	PDU P5V DEM1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM1 I - A_HKT.chan[50]
pdu_p5v_dem1_v CHUNKED	FLOAT (:)	PDU P5V DEM1 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM1 V - A_HKT.chan[0]
pdu_p5v_dem2_i CHUNKED	FLOAT (:)	PDU P5V DEM2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM2 I - A_HKT.chan[61]
pdu_p5v_dem2_v CHUNKED	FLOAT (:)	PDU P5V DEM2 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM2 V - A_HKT.chan[3]
pdu_p5v_dem3_i CHUNKED	FLOAT (:)	PDU P5V DEM3 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM3 I - A_HKT.chan[53]
pdu_p5v_dem3_v CHUNKED	FLOAT (:)	PDU P5V DEM3 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM3 V - A_HKT.chan[6]
pdu_p5v_dem4_i CHUNKED	FLOAT (:)	PDU P5V DEM4 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM4 I - A_HKT.chan[64]
pdu_p5v_dem5_i CHUNKED	FLOAT (:)	PDU P5V DEM5 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM5 I - A_HKT.chan[56]
pdu_p5v_dem5_v CHUNKED	FLOAT (:)	PDU P5V DEM5 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM5 V - A_HKT.chan[9]
pdu_p5v_dem6_i CHUNKED	FLOAT (:)	PDU P5V DEM6 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM6 I - A_HKT.chan[67]

pdu_pwm_tlsp_pri_i CHUNKED	FLOAT (:)	PDU PWM TLSP PRI I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP PRI I - A_HKT.chan[39]
pdu_pwm_tlsp_sec_i CHUNKED	FLOAT (:)	PDU PWM TLSP SEC I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP SEC I - A_HKT.chan[40]
pdu_pwm_tlsp_tower_i CHUNKED	FLOAT (:)	PDU PWM TLSP TOWER I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP TOWER I - A_HKT.chan[41]
pdu_spare_1_v CHUNKED	FLOAT (:)	PDU SPARE 1 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 1 V - A_HKT.chan[27]
pdu_spare_2_v CHUNKED	FLOAT (:)	PDU SPARE 2 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 2 V - A_HKT.chan[28]
pdu_spare_3_v CHUNKED	FLOAT (:)	PDU SPARE 3 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 3 V - A_HKT.chan[29]
pdu_spare_4_v CHUNKED	FLOAT (:)	PDU SPARE 4 V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 4 V - A_HKT.chan[30]
pdu_spare_5_v CHUNKED	FLOAT (:)	A PDU SPARE 5V	counts ATL01/atlas/a_hkt_a_1059 converted	A_PDU_SPARE_5_V - HKT.chan[60]
pdu_spd_n5v_i CHUNKED	FLOAT (:)	PDU SPD N5V I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD N5V I - A_HKT.chan[48]
pdu_spd_n5v_v CHUNKED	FLOAT (:)	PDU SPD N5V V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD N5V V - A_HKT.chan[19]
pdu_spd_p3p3v_i CHUNKED	FLOAT (:)	PDU SPD P3P3V I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P3P3V I - A_HKT.chan[49]
pdu_spd_p3p3v_v CHUNKED	FLOAT (:)	PDU SPD P3P3V V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P3P3V V - A_HKT.chan[20]
pdu_spd_p5v_i CHUNKED	FLOAT (:)	PDU SPD P5V I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P5V I - A_HKT.chan[47]
pdu_spd_p5v_v CHUNKED	FLOAT (:)	PDU SPD P5V V	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P5V V - A_HKT.chan[18]
pdu_tams_i CHUNKED	FLOAT (:)	PDU TAMS I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TAMS I - A_HKT.chan[31]
pdu_tcs_ofa_htr1_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR1 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR1 I - A_HKT.chan[32]
pdu_tcs_ofa_htr2_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR2 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR2 I - A_HKT.chan[33]
pdu_tcs_ofa_htr3_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR3 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR3 I - A_HKT.chan[34]
pdu_tcs_ofa_htr4_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR4 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR4 I - A_HKT.chan[35]
pdu_tcs_ofa_htr5_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR5 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR5 I - A_HKT.chan[36]
pdu_tcs_ofa_htr6_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR6 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR6 I - A_HKT.chan[37]
pdu_tcs_ofa_htr7_i CHUNKED	FLOAT (:)	PDU TCS OFA HTR7 I	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR7 I - A_HKT.chan[38]

Group: /atlas/housekeeping/pointing

Description	(Attribute)	APID 1138 ATLAS Pointing Message- Spacecraft Attitude and Rates Packet - Relayed to SSR. Packet Frequency is by command.
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
q_sc_i2b_1 CHUNKED	DOUBLE (:)	q_sc_i2b_1	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 1

q_sc_i2b_2 CHUNKED	DOUBLE (:)	q_sc_i2b_2	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 2
q_sc_i2b_3 CHUNKED	DOUBLE (:)	q_sc_i2b_3	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 3
q_sc_i2b_4 CHUNKED	DOUBLE (:)	q_sc_i2b_4	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 4
sc_solution_sec CHUNKED	UINT_4_LE (:)	sc_solution_sec	seconds ATL01/atlas/a_sc_pon_1138	Recorded time of the pointing solution in seconds from the spacecraft epoch
sc_solution_subsec CHUNKED	UINT_4_LE (:)	sc_solution_subsec	subseconds ATL01/atlas/a_sc_pon_1138	Spacecraft recorded time counts - 24 bits, 100 ns per count
x_sc_body_rate CHUNKED	DOUBLE (:)	x_sc_body_rate	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the X axis in the ATLAS frame
y_sc_body_rate CHUNKED	DOUBLE (:)	y_sc_body_rate	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the Y axis in the ATLAS frame
z_sc_body_rate CHUNKED	DOUBLE (:)	z_sc_body_rate	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the Z axis in the ATLAS frame
Group: /atlas/housekeeping/position_velocity				
Description	(Attribute)	APID 1137 ATLAS Position Message-Spacecraft Position and Velocity Packet - Relayed to SSR. Packet Frequency is in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_solution_sec CHUNKED	UINT_4_LE (:)	sc_solution_sec	seconds ATL01/atlas/a_sc_pos_1137	Recorded time of the position/velocity solution in seconds from the spacecraft epoch
sc_solution_subsec CHUNKED	UINT_4_LE (:)	sc_solution_subsec	seconds ATL01/atlas/a_sc_pos_1137	Spacecraft recorded time counts - 24 bits, 100 ns per count
x_sc_eci_pos CHUNKED	DOUBLE (:)	x_sc_eci_pos	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: X axis
x_sc_eci_vel CHUNKED	DOUBLE (:)	x_sc_eci_vel	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: X axis
y_sc_eci_pos CHUNKED	DOUBLE (:)	y_sc_eci_pos	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: Y axis
y_sc_eci_vel CHUNKED	DOUBLE (:)	y_sc_eci_vel	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: Y axis
z_sc_eci_pos CHUNKED	DOUBLE (:)	z_sc_eci_pos	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: Z axis
z_sc_eci_vel CHUNKED	DOUBLE (:)	z_sc_eci_vel	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: Z axis
Group: /atlas/housekeeping/radiometry				
Description	(Attribute)	The radiometry group contains background and receiver sensitivity		
data_rate	(Attribute)	Data within this group are stored at the data rate of one hertz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bg_sensitivity_pce1_s CHUNKED	FLOAT (:)	PCE1 Strong background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE1, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce1_w CHUNKED	FLOAT (:)	PCE1 Weak background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE1, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce2_s CHUNKED	FLOAT (:)	PCE2 Strong background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE2, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce2_w CHUNKED	FLOAT (:)	PCE2 Weak background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE2, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.

bg_sensitivity_pce3_s CHUNKED	FLOAT (:)	PCE3 Strong background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE3, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce3_w CHUNKED	FLOAT (:)	PCE3 Weak background sensitivity	events/s/Watt ATBD Section 5.5.2	PCE3, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections)
ret_sensitivity_pce1_s CHUNKED	FLOAT (:)	PCE1 Strong return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE1, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
ret_sensitivity_pce1_w CHUNKED	FLOAT (:)	PCE1 Weak return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE1, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
ret_sensitivity_pce2_s CHUNKED	FLOAT (:)	PCE2 Strong return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE2, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
ret_sensitivity_pce2_w CHUNKED	FLOAT (:)	PCE2 Weak return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE2, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
ret_sensitivity_pce3_s CHUNKED	FLOAT (:)	PCE3 Strong return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE3, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
ret_sensitivity_pce3_w CHUNKED	FLOAT (:)	PCE3 Weak return sensitivity	events/s/Watt ATBD Section 5.5.3	PCE3, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
Group: /atlas/housekeeping/status				
Description	(Attribute)	Flags parsed from HKT Status Registers Housekeeping Packet. Packet Frequency is 1 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pdua_daa_opt CHUNKED	INTEGER_1 (:)	PDUA_DAA_OPT status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_DAA_OPT status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_det_ps CHUNKED	INTEGER_1 (:)	PDUA_DET_PS status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_DET_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_hvpc CHUNKED	INTEGER_1 (:)	PDUA_HVPC status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_HVPC status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_laser_1 CHUNKED	INTEGER_1 (:)	PDUA_LASER_1 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LASER_1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_laser_2 CHUNKED	INTEGER_1 (:)	PDUA_LASER_2 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LASER_2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_lhp1 CHUNKED	INTEGER_1 (:)	PDUA_LHP1 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_lhp2 CHUNKED	INTEGER_1 (:)	PDUA_LHP2 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']

pdua_lhp_startup CHUNKED	INTEGER_1 (:)	PDUA_LHP_STARTUP status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP_STARTUP status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_lrs CHUNKED	INTEGER_1 (:)	PDUA_LRS status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LRS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_lrs_opt CHUNKED	INTEGER_1 (:)	PDUA_LRS_OPT status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LRS_OPT status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa1 CHUNKED	INTEGER_1 (:)	PDUA_OFA1 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa2 CHUNKED	INTEGER_1 (:)	PDUA_OFA2 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa3 CHUNKED	INTEGER_1 (:)	PDUA_OFA3 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA3 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa4 CHUNKED	INTEGER_1 (:)	PDUA_OFA4 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA4 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa5 CHUNKED	INTEGER_1 (:)	PDUA_OFA5 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA5 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa6 CHUNKED	INTEGER_1 (:)	PDUA_OFA6 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA6 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa7 CHUNKED	INTEGER_1 (:)	PDUA_OFA7 status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA7 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_ofa_ps CHUNKED	INTEGER_1 (:)	PDUA_OFA_PS status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_pri_mir CHUNKED	INTEGER_1 (:)	PDUA_PRI_MIR status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_PRI_MIR status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_sec_mir CHUNKED	INTEGER_1 (:)	PDUA_SEC_MIR status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SEC_MIR status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_spare_sig CHUNKED	INTEGER_1 (:)	PDUA_SPARE_SIG status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SPARE_SIG status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_spd_ps CHUNKED	INTEGER_1 (:)	PDUA_SPD_PS status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SPD_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_tams_ls CHUNKED	INTEGER_1 (:)	PDUA_TAMS_LS status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_TAMS_LS status flag. 0=ON, 1=OFF

				Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdua_tower CHUNKED	INTEGER_1 (:)	PDUA_TOWER status flag	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_TOWER status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_daa_opt CHUNKED	INTEGER_1 (:)	PDUB_DAA_OPT status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_DAA_OPT status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_det_ps CHUNKED	INTEGER_1 (:)	PDUB_DET_PS status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_DET_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_hvpc CHUNKED	INTEGER_1 (:)	PDUB_HVPC status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_HVPC status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_laser_1 CHUNKED	INTEGER_1 (:)	PDUB_LASER_1 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LASER_1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_laser_2 CHUNKED	INTEGER_1 (:)	PDUB_LASER_2 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LASER_2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_lhp1 CHUNKED	INTEGER_1 (:)	PDUB_LHP1 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_lhp2 CHUNKED	INTEGER_1 (:)	PDUB_LHP2 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_lhp_startup CHUNKED	INTEGER_1 (:)	PDUB_LHP_STARTUP status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP_STARTUP status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_lrs CHUNKED	INTEGER_1 (:)	PDUB_LRS status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LRS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_lrs_opt CHUNKED	INTEGER_1 (:)	PDUB_LRS_OPT status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LRS_OPT status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa1 CHUNKED	INTEGER_1 (:)	PDUB_OFA1 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA1 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa2 CHUNKED	INTEGER_1 (:)	PDUB_OFA2 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA2 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa3 CHUNKED	INTEGER_1 (:)	PDUB_OFA3 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA3 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa4 CHUNKED	INTEGER_1 (:)	PDUB_OFA4 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA4 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']

pdub_ofa5 CHUNKED	INTEGER_1 (:)	PDUB_OFA5 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA5 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa6 CHUNKED	INTEGER_1 (:)	PDUB_OFA6 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA6 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa7 CHUNKED	INTEGER_1 (:)	PDUB_OFA7 status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA7 status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_ofa_ps CHUNKED	INTEGER_1 (:)	PDUB_OFA_PS status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_pri_mir CHUNKED	INTEGER_1 (:)	PDUB_PRI_MIR status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_PRI_MIR status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_sec_mir CHUNKED	INTEGER_1 (:)	PDUB_SEC_MIR status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SEC_MIR status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_spare_sig CHUNKED	INTEGER_1 (:)	PDUB_SPARE_SIG status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SPARE_SIG status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_spd_ps CHUNKED	INTEGER_1 (:)	PDUB_SPD_PS status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SPD_PS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_tams_ls CHUNKED	INTEGER_1 (:)	PDUB_TAMS_LS status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_TAMS_LS status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
pdub_tower CHUNKED	INTEGER_1 (:)	PDUB_TOWER status flag	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_TOWER status flag. 0=ON, 1=OFF Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
Group: /atlas/housekeeping/thermal				
Description	(Attribute)	Thermal data from APID 1061 Analog HK Telemetry. Packet Frequency is 1 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. This is computed based on the housekeeping design to sample a measurement every 0.003125 seconds from the internal ASC 1PPS . The time for this packet is set as the time of the lowest channel number in this telemetry packet.. If the specific time is needed use the channel number from the lowest channel in packet. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
hkt_a_beam_px_t CHUNKED	FLOAT (:)	HKT_BEAMX_PX_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	A_HKT_BEAMX_PX_T A_HKT_C.chan[62]
hkt_beamx_t CHUNKED	FLOAT (:)	HKT BEAMX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Beam Expander I/F mTTCS-21 or 30 A_HKT_C.chan[82]
hkt_bsm_t CHUNKED	FLOAT (:)	HKT BSM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT BSM I/F T TCS-20 - A_HKT_C.chan[33]
hkt_cchp_adiab_t CHUNKED	FLOAT (:)	HKT CCHP ADIAB T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Laser CCHP Adiabatic Section T TCS-12 A_HKT_C.chan[55]

hkt_cchp_las1_t CHUNKED	FLOAT (:)	HKT CCHP LAS1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Laser 1 I/F T TCS-14 A_HKT_C.chan[59]
hkt_dem1_t1_eb_t CHUNKED	FLOAT (:)	HKT_DEM1_T1_EB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 74 - DEM1_TH_B-MEB-37 External Bottom t A_HKT_C.chan[38]
hkt_dem1_t2_it_t CHUNKED	FLOAT (:)	HKT_DEM1_T2_IT_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 76 - DEM1_TH_D-MEB-39 Internal Top T A_HKT_C.chan[40]
hkt_dem1_t3_ib_t CHUNKED	FLOAT (:)	HKT_DEM1_T3_IB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 75 - DEM1_TH_C-MEB-38 Internal Bottom T A_HKT_C.chan[39]
hkt_dem1_t4_et_t CHUNKED	FLOAT (:)	HKT_DEM1_T4_ET_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 73 - DEM1_TH_A-MEB-36 External Top T A_HKT_C.chan[37]
hkt_dem2_t CHUNKED	FLOAT (:)	HKT_DEM2_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 77 - DEM2_TH_A-MEB-40 External Bottom T A_HKT_C.chan[41]
hkt_dem3_t1_eb_t CHUNKED	FLOAT (:)	HKT_DEM3_T1_EB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 79 - DEM3_TH_B-MEB-42 External Bottom T A_HKT_C.chan[43]
hkt_dem3_t2_it_t CHUNKED	FLOAT (:)	HKT_DEM3_T2_IT_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 81 - DEM3_TH_D-MEB-44 Internal Top T A_HKT_C.chan[45]
hkt_dem3_t3_ib_t CHUNKED	FLOAT (:)	HKT_DEM3_T3_IB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 80 - DEM3_TH_C-MEB-43 Internal Bottom T A_HKT_C.chan[44]
hkt_dem3_t4_et_t CHUNKED	FLOAT (:)	HKT_DEM3_T4_ET_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 78 - DEM3_TH_A-MEB-41 External Top T A_HKT_C.chan[42]
hkt_dem4_t CHUNKED	FLOAT (:)	HKT_DEM4_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 82 - DEM4_TH_A-MEB-45 External Bottom T A_HKT_C.chan[46]
hkt_dem5_t1_eb_t CHUNKED	FLOAT (:)	HKT_DEM5_T1_EB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 84 - DEM5_TH_B-MEB-47 External Bottom T A_HKT_C.chan[48]
hkt_dem5_t2_it_t CHUNKED	FLOAT (:)	HKT_DEM5_T2_IT_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 86 - DEM5_TH_D-MEB-49 Internal Top T A_HKT_C.chan[50]
hkt_dem5_t3_ib_t CHUNKED	FLOAT (:)	HKT_DEM5_T3_IB_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 85 - DEM5_TH_C-MEB-48 Internal Bottom T A_HKT_C.chan[49]
hkt_dem5_t4_et_t CHUNKED	FLOAT (:)	HKT_DEM5_T4_ET_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 83 - DEM5_TH_A-MEB-46 External Top T A_HKT_C.chan[47]
hkt_dem6_t CHUNKED	FLOAT (:)	HKT_DEM6_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 87 - DEM6_TH_A-MEB-50 External Bottom T A_HKT_C.chan[51]
hkt_dom_rad1_t CHUNKED	FLOAT (:)	HKT DOM RAD1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT DAA DOM Radiator T (Pri) TCS-47 - A_HKT_C.chan[36]
hkt_dom_rad2_t CHUNKED	FLOAT (:)	HKT DOM RAD2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT DAA DOM Radiator T (Red) TCS-48 - A_HKT_C.chan[34]
hkt_foldm_t CHUNKED	FLOAT (:)	HKT FOLDM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Fold Mirror I/F I TCS-22 A_HKT_C.chan[83]
hkt_imsc_myflex_t CHUNKED	FLOAT (:)	HKT IMSC MYFLEX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	IMSC Flexure 1 T TCS-28 A_HKT_C.chan[88]
hkt_imsc_mzflex_t CHUNKED	FLOAT (:)	HKT IMSC MZFLEX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	IMSC Flexure 2 T TCS-29 A_HKT_C.chan[89]
hkt_lasrad_t CHUNKED	FLOAT (:)	HKT LASRAD T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Laser LHP Radiator T TCS_54 A_HKT_C.chan[61]
hkt_lhp_evap_t CHUNKED	FLOAT (:)	HKT LHP EVAP T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Evaporator T TCS-15 A_HKT_C.chan[54]
hkt_lhp_liqline_t CHUNKED	FLOAT (:)	HKT LHP LIQLINE T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Liquid Line T TCS-16 A_HKT_C.chan[60]
hkt_lhp_res1_t CHUNKED	FLOAT (:)	HKT LHP RES1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Compensation Chamber T (Pri) TCS-10 A_HKT_C.chan[52]
hkt_lhp_res2_t CHUNKED	FLOAT (:)	HKT LHP RES2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Compensation Chamber T (Red) TCS-11 A_HKT_C.chan[53]
hkt_lhp_vapline_t CHUNKED	FLOAT (:)	HKT LHP VAPLINE T	degreesC ATL01/atlas/a_hkt_c_1061 converted	A_HKT_LHP_VAPLINE_T TCS-17 A_HKT_C.chan[90]
hkt_lrs_orad1_t	FLOAT	HKT LRS ORAD1 T	degreesC	LRS Optics RadiatorT (Pri) TCS-08 A_HKT_C.chan[56]

CHUNKED	(:)		ATL01/atlas/a_hkt_c_1061 converted	
hkt_lrs_orad2_t CHUNKED	FLOAT (:)	HKT LRS ORAD2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LRS Optics Radiator T (Red) TCS-09 A_HKT_C.chan[57]
hkt_lrs_ss_t CHUNKED	FLOAT (:)	HKT LRS SS T	degreesC ATL01/atlas/a_hkt_c_1061 converted	LRS Sunshade I/F T TCS-13 A_HKT_C.chan[58]
hkt_ltr_tams_t CHUNKED	FLOAT (:)	HKT LTR TAMS T	degreesC ATL01/atlas/a_hkt_c_1061 converted	TAMS LTR T TCS-18 A_HKT_C.chan[94]
hkt_ltr_trans_t CHUNKED	FLOAT (:)	HKT LTR TRANS T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Transmitter LTR T TCS_19 A_HKT_C.chan[102]
hkt_meb_asc1_t CHUNKED	FLOAT (:)	HKT MEB ASC1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB ASC1 T MEB-01F - A_HKT_C.chan[0]
hkt_meb_asc2_t CHUNKED	FLOAT (:)	HKT MEB ASC2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB ASC2 T MEB-02 - A_HKT_C.chan[1]
hkt_meb_hkt_t CHUNKED	FLOAT (:)	HKT MEB HKT T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB HKT T MEB-21 - A_HKT_C.chan[2]
hkt_meb_lvpc1_t CHUNKED	FLOAT (:)	HKT MEB LVPC1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB LVPC1 T MEB-03 - A_HKT_C.chan[3]
hkt_meb_lvpc2_t CHUNKED	FLOAT (:)	HKT MEB LVPC2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB LVPC2 T MEB-04 - A_HKT_C.chan[4]
hkt_meb_mce1_t CHUNKED	FLOAT (:)	HKT MEB MCE1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE1 T MEB-07 - A_HKT_C.chan[5]
hkt_meb_mce2_t CHUNKED	FLOAT (:)	HKT MEB MCE2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE2 T MEB-08 - A_HKT_C.chan[6]
hkt_meb_mce3_t CHUNKED	FLOAT (:)	HKT MEB MCE3 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE3 T MEB-09 - A_HKT_C.chan[7]
hkt_meb_mce4_t CHUNKED	FLOAT (:)	HKT MEB MCE4 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE4 T MEB-10 - A_HKT_C.chan[8]
hkt_meb_pce1_1_t CHUNKED	FLOAT (:)	HKT MEB PCE1 1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE1 1 T MEB-11 - A_HKT_C.chan[9]
hkt_meb_pce1_2_t CHUNKED	FLOAT (:)	HKT MEB PCE1 2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE1 2 T MEB-12 - A_HKT_C.chan[10]
hkt_meb_pce2_1_t CHUNKED	FLOAT (:)	HKT MEB PCE2 1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE2 1 T MEB-13 - A_HKT_C.chan[11]
hkt_meb_pce2_2_t CHUNKED	FLOAT (:)	HKT MEB PCE2 2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE2 2 T MEB-14 - A_HKT_C.chan[12]
hkt_meb_pce3_1_t CHUNKED	FLOAT (:)	HKT MEB PCE3 1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE3 1 T MEB-15 - A_HKT_C.chan[13]
hkt_meb_pce3_2_t CHUNKED	FLOAT (:)	HKT MEB PCE3 2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE3 2 T MEB-16 - A_HKT_C.chan[14]
hkt_meb_sbc1_t CHUNKED	FLOAT (:)	HKT MEB SBC1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB SBC1 T MEB-17 - A_HKT_C.chan[15]
hkt_meb_sbc2_t CHUNKED	FLOAT (:)	HKT MEB SBC2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB SBC2 T MEB-18 - A_HKT_C.chan[16]
hkt_meb_uso1_t CHUNKED	FLOAT (:)	HKT MEB USO1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB USO1 T MEB-19 - A_HKT_C.chan[17]
hkt_meb_uso2_t CHUNKED	FLOAT (:)	HKT MEB USO2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB USO2 T MEB-20 - A_HKT_C.chan[18]
hkt_ob_mz1_t CHUNKED	FLOAT (:)	HKT OB MZ1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-23 A_HKT_C.chan[65]
hkt_ob_mz2_t CHUNKED	FLOAT (:)	HKT OB MZ2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-24 A_HKT_C.chan[66]
hkt_ob_mz3_t CHUNKED	FLOAT (:)	HKT OB MZ3 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-25 A_HKT_C.chan[67]
hkt_ob_pz1_t CHUNKED	FLOAT (:)	HKT OB PZ1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, +Z Side T TCS-26 A_HKT_C.chan[63]

hkt_ob_pz2_t CHUNKED	FLOAT (:)	HKT OB PZ2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, +Z Side T TCS-27 A_HKT_C.chan[64]
hkt_ob_pz3_t CHUNKED	FLOAT (:)	HKT_OB_PZ3_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench +z3 T TCS_31 A_HKT_C.chan[103]
hkt_ob_pz4_t CHUNKED	FLOAT (:)	HKT_OB_PZ4_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench +z4 T TCS_32 A_HKT_C.chan[105]
hkt_ofa1_et_t CHUNKED	FLOAT (:)	HKT_OFA1_ET_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	OFA1 ETALON T TCS_58 A_HKT_C.chan[104]
hkt_ofa1_pri_t CHUNKED	FLOAT (:)	HKT OFA1 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-33 OFA1 PRI T - A_HKT_C.chan[19]
hkt_ofa1_red_t CHUNKED	FLOAT (:)	HKT OFA1 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-34 OFA1 RED T - A_HKT_C.chan[26]
hkt_ofa2_pri_t CHUNKED	FLOAT (:)	HKT OFA2 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-35 OFA2 PRI T - A_HKT_C.chan[20]
hkt_ofa2_red_t CHUNKED	FLOAT (:)	HKT OFA2 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-36 OFA2 RED T - A_HKT_C.chan[27]
hkt_ofa3_pri_t CHUNKED	FLOAT (:)	HKT OFA3 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-37 OFA3 PRI T - A_HKT_C.chan[21]
hkt_ofa3_red_t CHUNKED	FLOAT (:)	HKT OFA3 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-38 OFA3 RED T - A_HKT_C.chan[28]
hkt_ofa4_pri_t CHUNKED	FLOAT (:)	HKT OFA4 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-39 OFA4 PRI T - A_HKT_C.chan[22]
hkt_ofa4_red_t CHUNKED	FLOAT (:)	HKT OFA4 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-40 OFA4 RED T - A_HKT_C.chan[29]
hkt_ofa5_pri_t CHUNKED	FLOAT (:)	HKT OFA5 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-41 OFA5 PRI T - A_HKT_C.chan[23]
hkt_ofa5_red_t CHUNKED	FLOAT (:)	HKT OFA5 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-42 OFA5 RED T - A_HKT_C.chan[30]
hkt_ofa6_pri_t CHUNKED	FLOAT (:)	HKT OFA6 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-43 OFA6 PRI T - A_HKT_C.chan[24]
hkt_ofa6_red_t CHUNKED	FLOAT (:)	HKT OFA6 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-44 OFA6 RED T - A_HKT_C.chan[31]
hkt_ofa7_et_t CHUNKED	FLOAT (:)	HKT_OFA7_ET_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	OFA7 ETALON T TCS_59 A_HKT_C.chan[106]
hkt_ofa7_pri_t CHUNKED	FLOAT (:)	HKT OFA7 PRI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-45 OFA7 PRI T - A_HKT_C.chan[25]
hkt_ofa7_red_t CHUNKED	FLOAT (:)	HKT OFA7 RED T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-46 OFA7 RED T - A_HKT_C.chan[32]
hkt_scif_myflex_t CHUNKED	FLOAT (:)	HKT SCIF MYFLEX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	-Y S/C Flexure T A_HKT_C.chan[93]
hkt_scif_pxflex_t CHUNKED	FLOAT (:)	HKT SCIF PXFLEX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	+X S/C Flexure T TCS-51 A_HKT_C.chan[87]
hkt_scif_pyflex_t CHUNKED	FLOAT (:)	HKT SCIF PYFLEX T	degreesC ATL01/atlas/a_hkt_c_1061 converted	-+Y S/C Flexure T TCS-53 A_HKT_C.chan[101]
hkt_spd_t CHUNKED	FLOAT (:)	HKT SPD T	degreesC ATL01/atlas/a_hkt_c_1061 converted	SPD I/F T TCS-50 A_HKT_C.chan[85]
hkt_struc_my_t CHUNKED	FLOAT (:)	HKT STRUC MY T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure Y Panel T TCS_55 A_HKT_C.chan[91]
hkt_struc_mz_t CHUNKED	FLOAT (:)	HKT STRUC MZ T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure Z Panel T TCS_57 A_HKT_C.chan[92]
hkt_sunshade_t CHUNKED	FLOAT (:)	HKT_SUNSHADE_T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure +Z Panel T A_HKT_C.chan[86]
hkt_tel_pri1_t CHUNKED	FLOAT (:)	HKT TEL PRI1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Primary Mirror T (Pri) TCS-05 A_HKT_C.chan[95]
hkt_tel_pri2_t	FLOAT	HKT TEL PRI2 T	degreesC	Telescope, Primary Mirror T (Red) TCS-06 A_HKT_C.chan[96]

CHUNKED	(:)		ATL01/atlas/a_hkt_c_1061 converted	
hkt_tel_pri3_t CHUNKED	FLOAT (:)	HKT TEL PRI3 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT Telescope, Primary Mirror T TCS-07 - A_HKT_C.chan[35]
hkt_tel_sec1_t CHUNKED	FLOAT (:)	HKT TEL SEC1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Secondary Mirror T (Pri) TCS-01 A_HKT_C.chan[97]
hkt_tel_sec2_t CHUNKED	FLOAT (:)	HKT TEL SEC2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Secondary Mirror T (Red) TCS-02 A_HKT_C.chan[98]
hkt_tel_tow1_t CHUNKED	FLOAT (:)	HKT TEL TOW1 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Tower T (Pri) TCS-03 A_HKT_C.chan[99]
hkt_tel_tow2_t CHUNKED	FLOAT (:)	HKT TEL TOW2 T	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Tower T (Red) TCS-04 A_HKT_C.chan[100]
hkt_wtem_t CHUNKED	FLOAT (:)	HKT WTEM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	OFA WTEM I/F T TCS-49 A_HKT_C.chan[84]
hvpca_therm_a_t CHUNKED	FLOAT (:)	HVPCTHERM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY HVPC THERMISTOR A MEB-30 A_HKT_C.chan[68]
hvpca_therm_b_t CHUNKED	FLOAT (:)	HVPCTHERM B T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY HVPC THERMISTOR B MEB-32 A_HKT_C.chan[69]
hvpcb_therm_a_t CHUNKED	FLOAT (:)	HVPCB THERM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT HVPC THERMISTOR A MEB-31 A_HKT_C.chan[75]
hvpcb_therm_b_t CHUNKED	FLOAT (:)	HVPCB THERM B T	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT HVPC THERMISTOR B MEB-33 A_HKT_C.chan[76]
pdua_therm_ct_t CHUNKED	FLOAT (:)	PDUTHERM CT T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU CT BOARD A T-MEB-24 A_HKT_C.chan[70]
pdua_therm_dlv_a_t CHUNKED	FLOAT (:)	PDUTHERM DLV T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 1A T-MEB-26 A_HKT_C.chan[71]
pdua_therm_dlv_b_t CHUNKED	FLOAT (:)	PDUTHERM DLV B T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 2A T -MEB-28 A_HKT_C.chan[72]
pdua_therm_mi_t CHUNKED	FLOAT (:)	PDUTHERM MI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU MAIN PWR BOARD A T-MEB_22 A_HKT_C.chan[73]
pdub_therm_ct_t CHUNKED	FLOAT (:)	PDUB THERM CT T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU CT BOARD B T -MEB-25 A_HKT_C.chan[77]
pdub_therm_dlv_a_t CHUNKED	FLOAT (:)	PDUB THERM DLV T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 1B T -MEB-27 A_HKT_C.chan[78]
pdub_therm_dlv_b_t CHUNKED	FLOAT (:)	PDUB THERM DLV B T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 2B T -MEB-29 A_HKT_C.chan[79]
pdub_therm_mi_t CHUNKED	FLOAT (:)	PDUB THERM MI T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU MAIN PWR BOARD B T -MEB_23 A_HKT_C.chan[80]
spda_therm_t CHUNKED	FLOAT (:)	SPDTHERM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY SPD THERMISTOR MEB-34 A_HKT_C.chan[74]
spdb_therm_t CHUNKED	FLOAT (:)	SPDB THERM T	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT SPD THERMISTOR MEB-35 A_HKT_C.chan[81]
Group: /atlas/housekeeping/time_at_the_tone				
Description	(Attribute)	APID 1136 Spacecraft Time at the Tone Packet - Relayed to SSR. Packet Frequency is by command. ATLAS Time-At-The-Tone-Was Message		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_1pps_sec CHUNKED	UINT_4_LE (:)	gps 1pps	seconds since January 6, 1980 ATL01/APID 1136 Byte 0014-0017	GPS reported seconds.
gps_1pps_subsec CHUNKED	UINT_4_LE (:)	gps 1pps subsec	milliseconds ATL01/APID 1136 Byte 0014-0017	GPS reported subseconds

sc_time_1pps_sec CHUNKED	UINT_4_LE (:)	SC time at 1 pps	seconds since January 6, 1980 ATL01/APID 1136 Byte 0014-0017	SC time at the reception of the last 1PPS signal from the GPSR.
sc_time_1pps_subsec CHUNKED	UINT_4_LE (:)	SC time at 1 pps (subsec)	100 nanoseconds ATL01/APID 1136 Byte 0014-0017	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00)
Group: /atlas/pcex				
Description	(Attribute)	Group contains the Photon Counting Electronics x (PCEx) packet decommutated data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Data Packets. (nominally fifty per second.)		
Group: /atlas/pcex/algorithm_science				
Description	(Attribute)	The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
amet_time CHUNKED	DOUBLE (:)	AMET seconds at the Major Frame	seconds ATL01/atlas/pcex/a_pmf_algorithm_science	AMET seconds at the Major Frame
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_time CHUNKED	DOUBLE (:)	GPS seconds at the Major Frame	seconds ATL01/atlas/pcex/a_pmf_algorithm_science	GPS seconds at the Major Frame
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts ATL01/atlas/pcex/a_pmf_algorithm_science	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over.
useflag CHUNKED	UINT_1_LE (:)	Science Mode Flag	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', '14', '15'] Flag Meanings: ['stby', 'science', 'test', 'manual', 'radio', 'unknown', 'unused', 'unused', 'unused', 'unused', 'stby_alt_amcs', 'science_alt_amcs', 'test_alt_amcs', 'unknown_alt_amcs']
Group: /atlas/pcex/algorithm_science/s_w				
Description	(Attribute)	The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
daynight_flag CHUNKED	UINT_1_LE (:)	Day/Night flag	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight software Day/Night Flag associated with the major frame. 0= day, 1 =night. Based on an algorithm determination of the background rate, not on the actual position of the sun. Flag Values: ['0', '1'] Flag Meanings: ['day', 'night']
decisionflags CHUNKED	UINT_1_LE (: x 4)	Decision Flags	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w Decision Flags associated with the major frame. indication if there was an error or if no science data is sent and why
ds_4bytes CONTIGUOUS	INTEGER_1 (4)	DS for 4 bytes	1	Dimension scale for an array of 4 bytes.
flywheel CHUNKED	UINT_1_LE (:)	Flywheel	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight software Flywheel associated with the major frame.
signalflags CHUNKED	UINT_1_LE (:)	Signal Found Flags	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w signal event flags associated with the major frame.
Group: /atlas/pcex/altimetry				
Description	(Attribute)	The PCE Altimetry Science Packet data common to both beams (PCEx_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICESat-2-MEB-SPEC-0875, section 5.12, Spacewire: Major Frame Packet Data Format		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_fall_sm	FLOAT	Altimetric Latest	seconds/cell	The smoothed, calibrated value for the falling edge used to convert cell counts to units of time. time per cell count based

CHUNKED	(:)	Calibration Falling	Derived via L1B ATBD	on USO for each PCE.
cal_rise_sm CHUNKED	FLOAT (:)	Altimetric Latest Calibration Rising	seconds/cell Derived via L1B ATBD	The smoothed, calibrated value for the rising edge used to convert cell counts to units of time. time per cell count based on USO for each PCE.
ch_mask_s CHUNKED	INTEGER_1 (: x 16)	Channel Mask Strong	counts ATL01/atlas/pcex/a_alt_science	Channel Mask for DLBOs. The 16 flags are a logical OR of the two band offset masks for strong beam
ch_mask_w CHUNKED	INTEGER_1 (: x 4)	Channel Mask Weak	counts ATL01/atlas/pcex/a_alt_science	Channel Mask for DLBOs. The 4 flags are a logical OR of the two band offset masks for weak beam
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_strong_channel_index CONTIGUOUS	INTEGER_1 (16)	DS for Strong Channels	1	Dimension scale for strong channels.
ds_weak_channel_index CONTIGUOUS	INTEGER_1 (4)	DS for Weak Channels	1	Dimension scale for weak channels.
n_bands CHUNKED	INTEGER_1 (:)	Number Downlink Bands	counts ATL01/atlas/pcex/a_alt_science	Number of bands (in addition to the nominal 1 band) selected for downlink.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts ATL02	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID
useflag CHUNKED	UINT_1_LE (:)	Science Mode Flag	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', '14', '15'] Flag Meanings: ['stby', 'science', 'test', 'manual', 'radio', 'unknown', 'unused', 'unused', 'unused', 'unused', 'stby_alt_amcs', 'science_alt_amcs', 'test_alt_amcs', 'manual_alt_amcs', 'radio_alt_amcs', 'unknown_alt_amcs']
Group: /atlas/pcex/altimetry/s_w				
Description	(Attribute)	The PCE Altimetry Science Packet specific to a beam (PCEx_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICESat-2-MEB-SPEC-0875, section 5.12, Spacewire: Major Frame Packet Data Format		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
alt_rw_start CHUNKED	FLOAT (:)	Altimetric Range Window Start	seconds ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion	The number of seconds between the transmit pulse and the start of the altimetric range window for the beam
alt_rw_width CHUNKED	FLOAT (:)	Altimetric Range Window Width	seconds ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion	The number of seconds from the range window start and range window stop
band1_offset CHUNKED	FLOAT (:)	Band1 Offset	seconds L1A ATBD	Downlink band offset (DLBO) for band1.
band1_width CHUNKED	FLOAT (:)	Band1 Width	seconds L1A ATBD	Width of downlink band1.
band2_offset CHUNKED	FLOAT (:)	Band2 Offset	seconds L1A ATBD	Downlink band offset (DLBO) for band2.
band2_width CHUNKED	FLOAT (:)	Band2 Width	seconds L1A ATBD	Width of downlink band2.
n_mf_ph CHUNKED	INTEGER (:)	Number of photons	counts Derived	Number of photons within each major frame.
ph_ndx_beg CHUNKED	INTEGER_8 (:)	Photon Index Begin	counts Derived	Index (1-based) within the photon-rate data of the first photon within each major frame.
Group: /atlas/pcex/altimetry/s_w/photons				
Description	(Attribute)	Group contains the PCE Altimetric received photon event (ph) decommutated data and its matching Transmit time tag data. Note the Transmit time tag data are repeated for each received photon event. Data is from Altimetry Science Packet (alt_sci_tlm) APID 1254, 1264, 1274 with Sequence Flag = 0 or 2. See ICESat-2-MEB-SPEC-0875, section 5.12, SPACEWIRE: TIME TAG SCIENCE DATA FORMAT		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source photon events. (varies by detection; nominal value is sixty thousand per second, derived from laser_rate * photons_per_shot * beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	The Time of Day for the specific Transmit (TX) pulse associated with the Received (RX) event. (see L1B ATBD section 5 time of flight), relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts Retained from latest a_alt_science packet	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID
ph_id_channel CHUNKED	UINT_1_LE (:)	Receive channel id	1 Derived as part of Photon ID	Channel number assigned for each received photon event. This is part of the photon ID. Values range from 1 to 120 to span all channels and rise/fall edges. Values 1 to 60 are for falling edge; PCE1 (1 to 20), PCE 2 (21 to 40) and PCE3 (41 to 60). Values 61 to 120 are for rising edge; PCE1 (61 to 80), PCE 2 (81 to 100) and PC3 (101 to 120).
ph_id_count CHUNKED	UINT_1_LE (:)	photon event counter	counts Derived as part of Photon ID	photon event counter is part of photon ID and will count from 1 for each channel until reset by laser pulse counter. If ph_id_count is 0, then there was a transmit pulse without any received photons. In this case, the transmit portion of the alt_science packet is valid, but the receive portion is all 0s and should not be used.
ph_id_pulse CHUNKED	UINT_1_LE (:)	laser pulse counter	counts Derived as part of Photon ID	laser pulse counter is part of photon ID and will count from 1 to 200 and reset for each new major frame (major_fram_id). If the corresponding ph_id_count is 0, then there was a transmit pulse without any received photons.
ph_tof CHUNKED	DOUBLE (:)	Time of Flight	seconds ATL02 ATBD	Time of flight (TOF); the round trip time in seconds of the received photon relative to the beam's zero range point (ZRP). Computed from the Transmit (Tx) and Receive (Rx) Time-of-flight components and then calibrated to the centroid of the transmit pulse.
rx_band_id CHUNKED	INTEGER_1 (:)	rx downlink band id	counts ATL01/atlas/pcex/a_alt_science_ph RX data	Flag to indicate downlink band id associated with the received rx_tof (received photon event). A value of 0 indicates the photon corresponds to band1; A value of 1 indicates the photon corresponds to band2. Corresponding parameters are band_width, band_offset and band_eventcount. Flag Values: ['0', '1'] Flag Meanings: ['band1', 'band2']
tof_flag CHUNKED	INTEGER_1 (:)	TOF Flag	counts L1B ATBD Sect 2.5.4	Time Of Flight center correction flag. Values indicate what components were used to adjust the TOF to the centroid of the Tx pulse, based on the alignment of Tx components across all 3 PCEs. 1=LL_LU_TU_TL; 2=LL_TU_TL; 3=LL_LU_TL; 4=LL_LU_TU; 5=LL_TL; 6=LL_TU; 7=LL_LU; 8=LL. Values greater than 10 indicate the same sequence of conditions indicated for a potential TEP photon. Flag Values: ['1', '2', '3', '4', '5', '6', '7', '8', '11', '12', '13', '14', '15', '16', '17', '18'] Flag Meanings: ['LL_LU_TU_TL', 'LL_TU_TL', 'LL_LU_TL', 'LL_LU_TU', 'LL_TL', 'LL_TU', 'LL_LU', 'LL', 'TEP_LL_LU_TU_TL', 'TEP_LL_TU_TL', 'TEP_LL_LU_TL', 'TEP_LL_LU_TU', 'TEP_LL_TL', 'TEP_LL_TU', 'TEP_LL_LU', 'TEP_LL']
tx_ll_tof CHUNKED	FLOAT (:)	Transmit LL time from T0	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip time in seconds from the detected lower leading edge of the transmit pulse relative to the ATLAS T0. Includes all calibrations of coarse and fine counts.
tx_other_tof CHUNKED	FLOAT (:)	Other Transmit Time from LL	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Time of flight from the PCE-specific leading-lower (LL) threshold (tx_ll_tof) to the detected other transmit pulse edge. For PCE1, this is the time from the PCE1 LL to the Transmit Leading Upper edge (LU) threshold; for PCE2, this is the time from the PCE2 LL to the Transmit Trailing Upper edge (TU) threshold; and for PCE3, this is the time from the PCE3 LL to the Transmit Trailing Lower edge (TL) threshold.
Group: /atlas/pcex/atmosphere_sw				
Description	(Attribute)	Contains parameters relating to the PCE Atmospheric Data Histograms. Normally 25 hz. (APID 1255, 1259, 1265, 1269, 1275, 1279). P1 S,P1 W, P2 S, P2 W, P3 S, P3 W.		
data_rate	(Attribute)	Data in this group is stored at a 25hz (25 per second) rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_bins CHUNKED	UINT_2_LE (: x 467)	Atmospheric Science Histogram	counts ATL01/atlas/pcex/a_atm_hist_x	The histogram bins for the Atmospheric beam.Once every 400 shots (laser pulses). Bin 1 (clouds) is nearest to spacecraft .Bin 467 is under ground.
atm_rw_start CHUNKED	FLOAT (:)	Atmospheric Range Window Start	seconds ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of seconds between the transmit pulse and the start of the Atmospheric range window
atm_rw_width CHUNKED	FLOAT (:)	Atmospheric Range Window Width	seconds ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of seconds from the Atmospheric range window start and range window stop.
atm_shift_amount CHUNKED	INTEGER_2 (:)	Atmospheric Range Window Shift	counts ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of bins the range window start of one of the histograms was shifted to align them before they are added together.
delta_time	DOUBLE	Elapsed GPS seconds	seconds since 2018-01-01	The time of the first TX pulse in major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products

CHUNKED	(:)	time	Derived via L1B ATBD	(SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_hist_bin_index CONTIGUOUS	INTEGER_2 (467)	DS for ATM histogram bins	1	Dimension scale for atmosphere histogram bins.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts ATL01/atlas/pcex/a_atm_hist_x	Major Frame Counter - The major frame counter is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID
useflag CHUNKED	UINT_1_LE (:)	Science Mode Flag	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', '14', '15'] Flag Meanings: ['stby', 'science', 'test', 'manual', 'radio', 'unknown', 'unused', 'unused', 'unused', 'unused', 'stby_alt_amcs', 'science_alt_amcs', 'test_alt_amcs', 'unknown_alt_amcs']
Group: /atlas/pcex/background				
Description	(Attribute)	The background data is specific to each beam and reported at a 50-shot rate.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bg_cnt_50shot_s CHUNKED	UINT_2_LE (:)	Strong background counts	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) during the range windows associated with a set of 50 laser pulses of the major frame.
bg_cnt_50shot_w CHUNKED	UINT_2_LE (:)	Weak background counts	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) during the range windows associated with a set of 50 laser pulses of the major frame.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the 50 laser pulses used for background, in seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts Derived	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID
useflag CHUNKED	UINT_1_LE (:)	Science Mode Flag	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', '14', '15'] Flag Meanings: ['stby', 'science', 'test', 'manual', 'radio', 'unknown', 'unused', 'unused', 'unused', 'unused', 'stby_alt_amcs', 'science_alt_amcs', 'test_alt_amcs', 'unknown_alt_amcs']
Group: /atlas/pcex/tep				
Description	(Attribute)	Group contains the PCE TEP (transmit Echo Path) Data.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source photon events. (varies by detection; nominal value is sixty thousand per second, derived from laser_rate * photons_per_shot * beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via L1B ATBD	The Time of Day associated with the Transmit (TX) pulse, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts Retained from prior a_alt_science_ph packet	The major frame counter is read from the digital flow controller in a given PCE card. The counter identifies individual major frames across diag and science packets. Used as part of the photon ID.
ph_id_channel CHUNKED	UINT_1_LE (:)	Receive channel id	1 Derived as part of Photon ID	Channel number assigned for each received photon event. This is part of the photon ID. Values range from 1 to 120 to span all channels and rise/fall edges. Values 1 to 60 are for falling edge; PCE1 (1 to 20), PCE 2 (21 to 40) and PCE3 (41 to 60). Values 61 to 120 are for rising edge; PCE1 (61 to 80), PCE 2 (81 to 100) and PC3 (101 to 120).
ph_id_count CHUNKED	INTEGER_1 (:)	photon event counter	counts Derived as part of Photon ID	The photon event counter is part of photon ID and counts from 1 for each channel until reset by laser pulse counter.
ph_id_pulse CHUNKED	UINT_1_LE (:)	laser pulse counter	counts Derived as part of Photon ID	The laser pulse counter is part of photon ID and counts from 1 to 200 and is reset for each new major frame.
rx_band_id	UINT_1_LE	rx downlink band id	counts	Flag to indicate downlink band id associated with the received time tag. Note that in order to reconstruct the event time tag,

CHUNKED	(:)		ATL01/atlas/pcex/a_alt_science_ph RX data	the 10-bit offset even coarse value must be added to the specified downlink band offset relating to that time tag.
rx_channel_id CHUNKED	UINT_1_LE (:)	receive PCE channel id	counts ATL01/atlas/pcex/a_alt_science_ph RX data	channel number that Received photon event (as from Telemetry)
tep_pulse_num CHUNKED	UINT_1_LE (:)	TEP Pulse Number	counts Derived as part of TEP Detection	The number of laser pulses from the TEP laser pulse to the laser pulse for which ATLAS is currently receiving non-TEP photons.
tof_tep CHUNKED	DOUBLE (:)	TEP Time of Flight	seconds ATL01/atlas/pcex/a_alt_science_ph RX data L1B ATBD section tof	Transmit Echo Pulse (TEP) Time of flight (TOF); the round trip time in seconds of the TEP photon relative to the beam's zero range point (ZRP., Computed from the Transmit (Tx) pulse of the TEP and Receive (Rx) Time-of-flight components; then calibrated to the centroid of the transmit pulse.
tx_ll_tof_tep CHUNKED	FLOAT (:)	TEP Transmit time from T0	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit Echo Pulse (TEP) Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip time in seconds of the detected lower leading edge of the TEP transmit pulse relative to the ATLAS T0; includes all calibrations of coarse and fine counts. Associated with the pulse from which the TEP originates (offset identified by tep_pulse_num.)
tx_other_tof_tep CHUNKED	FLOAT (:)	Other TEP Transmit Time from LL	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit Echo Pulse (TEP) time of flight from the PCE-specific leading-lower (LL) threshold (tep_ll_tof) to the detected other transmit pulse edge. For PCE1, this is the time from the PCE1 LL to the Transmit Leading Upper edge (LU) threshold; for PCE2, this is the time from the PCE2 LL to the Transmit Trailing Upper edge (TU) threshold.
Group: /atlas/tx_pulse_width				
Description	(Attribute)	Contains parameters to characterize the ATLAS pulse shape, derived from the Start Pulse Detector data.		
data_rate	(Attribute)	Parameters in this group are stored at the ATLAS shot rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Operations	Elapsed seconds since the ATLAS SDP GPS Epoch, associated with the transmit time where data from all 3 PCEs are present and aligned. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
tx_pulse_skew_est CHUNKED	FLOAT (:)	Transmit Pulse Skew Estimate	seconds ATL02 ATBD, Section 7.2	The difference between the averages of the lower and upper threshold crossing times. This is an estimate of the transmit pulse skew.
tx_pulse_width_lower CHUNKED	FLOAT (:)	Transmit Pulse Energy Lower Width	seconds ATL03 ATBD	The distance between the lower threshold crossing times measured by the Start Pulse Detector. Only present when data from all 3 PCEs are available and aligned.
tx_pulse_width_upper CHUNKED	FLOAT (:)	Transmit Pulse Energy Upper Width	seconds ATL03 ATBD	The distance between the upper threshold crossing times measured by the Start Pulse Detector. Only present when data from all 3 PCEs are available and aligned.
Group: /gpsr				
Description	(Attribute)	Contains parameters related to the GPS Receiver.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source GPS Receiver Data Packets. (nominally one per second.)		
Group: /gpsr/carrier_amplitude				
Description	(Attribute)	Contains parameters related to Carrier Amplitude Data Record (CADR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id CHUNKED	INTEGER_1 (: x 16)	CADR Antenna Identifier	1 ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['first_antenna', 'second_antenna']
carrier_amp CHUNKED	FLOAT (: x 16)	CADR Carrier Amplitude	dB ATL01/sc3/gpsr/carrier_amplitude converted	Carrier Amplitude Data Record (CADR) - Carrier Amplitude - Multiple Frequency Processing. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
channel_num CHUNKED	INTEGER_1 (: x 16)	CADR Channel Number	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id CHUNKED	INTEGER_1 (: x 16)	CADR Constellation ID	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
delta_time	DOUBLE	Elapsed GPS seconds	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time

CHUNKED	(:)	time	Derived via Time Tagging	correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_16_slots CONTIGUOUS	INTEGER_1 (16)	DS for 16 slots	1	Dimension scale representing each of the 16 slots.
noise_ratio CHUNKED	FLOAT (: x 16)	CADR Carrier to Noise Power Density Ratio	dBHz ATL01/sc3/gpsr/carrier_amplitude converted	Carrier Amplitude Data Record (CADR) - Carrier to Noise Power Density Ratio. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
num_valid_slots CHUNKED	INTEGER_1 (:)	Number of slots filled	counts ATL01/sc3/gpsr/carrier_amplitude/dfh/raw_num_recs	Number of the 16 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 16, then the remaining unused data fields within the arrays will be zero-filled.
signal_type CHUNKED	INTEGER_1 (: x 16)	CADR GPS Signal Type	1 ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['gps_l1a_ca', 'gps_l1_p', 'gps_l2_ca', 'gps_l2_p', 'gps_l2_cm', 'gps_l2_cl', 'no_signal_processing']
sv_id CHUNKED	INTEGER_1 (: x 16)	CADR Space Vehicle ID	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
Group: /gpsr/carrier_phase				
Description	(Attribute)	Contains parameters related to the GPSR Carrier Phase Data Record (CrPDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id CHUNKED	INTEGER_1 (: x 24)	CRPDR Antenna Identifier	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['first_antenna', 'second_antenna']
carrier_c_fract CHUNKED	FLOAT (: x 24)	CRPDR Carrier Cycle Fraction	degrees ATL01/sc3/gpsr/carrier_phase converted	Carrier Phase Data Record (CrPDR) - Carrier Cycle Fraction - Fraction corresponding to 360 degrees divided by 4096. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
carrier_c_int CHUNKED	INTEGER_8 (: x 24)	CRPDR Integer Carrier Cycle Counter	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Integer Carrier Cycle Counter - Note: At the beginning of each track the integer carrier cycle count starts with 0. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
channel_num CHUNKED	INTEGER_1 (: x 24)	CRPDR Channel Number	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id CHUNKED	INTEGER_1 (: x 24)	CRPDR Constellation ID	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
delta_range CHUNKED	DOUBLE (: x 24)	CRPDR Delta Range	meters/second ATL01/sc3/gpsr/carrier_phase converted	Carrier Phase Data Record (CrPDR) - Delta Range. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
deter_f CHUNKED	INTEGER_1 (: x 24)	CRPDR Deterioration Flag	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Deterioration Flag. 0= Carrier Loop Lock Steady 1 = Carrier Loop Lock Unsteady (Measurement data may be deteriorated). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the

				ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['steady', 'unsteady']
ds_24_slots CONTIGUOUS	INTEGER_1 (24)	DS for 24 slots	1	Dimension scale representing each of the 24 slots.
num_valid_slots CHUNKED	INTEGER_1 (:)	Number of slots filled	counts ATL01/sc3/gpsr/carrier_phase/dfh_x/raw_num_recs	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled.
signal_type CHUNKED	INTEGER_1 (: x 24)	CRPDR GPS Signal Type	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['gps_l1a_ca', 'gps_l1_p', 'gps_l2_ca', 'gps_l2_p', 'gps_l2_cm', 'gps_l2_cl', 'no_signal_processing']
sv_id CHUNKED	INTEGER_1 (: x 24)	CRPDR Space Vehicle ID	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
Group: /gpsr/channel_status				
Description	(Attribute)	Contains parameters related to Channel Status record (CSR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id CHUNKED	INTEGER_1 (: x 24)	CSR Antenna Identifier	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['first_antenna', 'second_antenna']
carrier_loop_bw CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Bandwidth	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual carrier loop bandwidth setting - Single Frequency Channel 1-24 Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
carrier_loop_bw_ff CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Bandwidth Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Bandwidth (CrLB) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop bandwidth not final, 1 = Final carrier bandwidth time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
carrier_loop_disc_ff CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Discriminator Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Discriminator (CrLD) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop discriminator not final, 1 = Final carrier loop discriminator applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
carrier_loop_int_t CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Int Time	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual carrier loop integration time setting - Single Frequency Channel 1-24. Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
carrier_loop_int_t_ff CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Int Time Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Int Time (CrLIT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop integration time not final, 1 = Final carrier loop integration time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
carrier_loop_lock CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Lock	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Lock (CrLL) - Single Frequency Channel 1-24. 0 = Not locked, 1 = Locked. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_locked', 'locked']

carrier_loop_mode CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Mode	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Mode) - Single Frequency Channel 1-24. 0 = No carrier loop activities; 1 = Carrier acquisition ongoing; 2 = Carrier tracking ongoing; 3 = Carrier acquisition error. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['no_activities', 'acquisition', 'tracking', 'acq_error']
carrier_loop_thres_ff CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Loop Threshold Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Threshold (CrLT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop threshold not final, 1 = Final carrier loop threshold applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
carrier_ph_deter CHUNKED	INTEGER_1 (: x 24)	CSR Carrier Phase Deterioration	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Phase Deterioration; 0 = No deterioration, 1 = Measurement quality deterioration. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['no_deterioration', 'deterioration']
channel_num CHUNKED	INTEGER_1 (: x 24)	CSR Channel Number	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Channel Number. 0 to 23; All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
code_loop_bw CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Bandwidth	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual code loop bandwidth setting - Single Frequency Channel 1-24, Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid
code_loop_bw_ff CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Bandwidth Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Bandwidth (CdLB) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop bandwidth not final, 1 = Final code bandwidth time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
code_loop_corr_ff CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Correlator Spacing Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Correlator Spacing (CdLCS) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop correlator not final, 1 = Final code loop correlator applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
code_loop_int_t CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Int Time	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual code loop integration time setting - Single Frequency Channel 1-24. Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
code_loop_int_t_ff CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Int Time Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Int Time Final (CdLIT) Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop integration time not final, 1 = Final code loop integration time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
code_loop_lock CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Lock	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Lock (CdLL) - Single Frequency Channel 1-24. 0 = Not locked, 1 = Locked. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_locked', 'locked']
code_loop_mode CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Mode	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Mode - Single Frequency Channel 1-24. 0 = No code loop activities, 1 = Code acquisition ongoing, 2 = Code tracking ongoing, 3 = Code acquisition error. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['no_activities', 'acquisition', 'tracking', 'acq_error']
code_loop_thres_ff CHUNKED	INTEGER_1 (: x 24)	CSR Code Loop Threshold Final Flag	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Threshold (CdLT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop threshold not final, 1 = Final code loop threshold applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_final', 'applied']
code_phase_deter CHUNKED	INTEGER_1 (: x 24)	CSR Code Phase Deterioration	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Phase Deterioration (CdPD) - Single Frequency Channel 1-24. 0 = No deterioration, 1 = Measurement quality deterioration. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.

				Flag Values: ['0', '1'] Flag Meanings: ['no_deterioration', 'deterioration']
constell_id CHUNKED	INTEGER_1 (: x 24)	CSR Constellation ID	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_24_slots CONTIGUOUS	INTEGER_1 (24)	DS for 24 slots	1	Dimension scale representing each of the 24 slots.
logical_track_state CHUNKED	UINT_1_LE (: x 24)	CSR Logical Tracking State	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Logical Tracking State - Single Frequency Channel 1-24. See Appendix C within DN-ICESAT2-SYS-024 for enumerated values. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
nav_d_sync CHUNKED	INTEGER_1 (: x 24)	CSR Navigation Data Sync Status	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Navigation Data Sync Status - Single Frequency Channel 1-24. 0 = Nav Data Not Synchronized, 1 = Nav Data Synchronized, Data Stream Not Inverted, 3 = Nav Data Synchronized, Data Stream Inverted. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1', '3'] Flag Meanings: ['not_synced', 'synced_not_inverted', 'synced_inverted']
num_valid_slots CHUNKED	INTEGER_1 (:)	Number of slots filled	counts ATL01/sc4/gpsr/channel_status/dfh/raw_num_recs	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled.
signal_type CHUNKED	INTEGER_1 (: x 24)	CSR GPS Signal Type	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Flag Values: ['0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['gps_l1a_ca', 'gps_l1_p', 'gps_l2_ca', 'gps_l2_p', 'gps_l2_cm', 'gps_l2_cl', 'no_signal_processing']
sv_id CHUNKED	INTEGER_1 (: x 24)	CSR Space Vehicle ID	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
Group: /gpsr/code_phase				
Description	(Attribute)	Contains parameters related to Code Phase Data Record (CdPDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id CHUNKED	INTEGER_1 (: x 24)	CDPDR Antenna Identifier	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['first_antenna', 'second_antenna']
channel_num CHUNKED	INTEGER_1 (: x 24)	CDPDR Channel Number	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
code_chip_count CHUNKED	UINT_8_LE (: x 24)	CDPDR Chip Count	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
code_chip_fract CHUNKED	FLOAT (: x 24)	CDPDR Fractional Chip Count	counts ATL01/sc3/gpsr/code_phase converted	Code Phase Data Record (CdPDR) - Fractional Portion of Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id CHUNKED	INTEGER_1 (: x 24)	CDPDR Constellation ID	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
delta_time	DOUBLE	Elapsed GPS seconds	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time

CHUNKED	(:)	time	Derived via Time Tagging	correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
deter_f CHUNKED	INTEGER_1 (: x 24)	CDPDR Deterioration Flag	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Deterioration Flag. 0= Carrier Loop Lock Steady 1 = Carrier Loop Lock Unsteady (Measurement data may be deteriorated). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['steady', 'unsteady']
ds_24_slots CONTIGUOUS	INTEGER_1 (24)	DS for 24 slots	1	Dimension scale representing each of the 24 slots.
num_valid_slots CHUNKED	INTEGER_1 (:)	Number of slots filled	counts ATL01/sc3/gpsr/code_phase/dfh_x/raw_num_recs	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled.
signal_type CHUNKED	INTEGER_1 (: x 24)	CDPDR GPS Signal Type	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['gps_l1a_ca', 'gps_l1_p', 'gps_l2_ca', 'gps_l2_p', 'gps_l2_cm', 'gps_l2_cl', 'no_signal_processing']
smooth_flg CHUNKED	INTEGER_1 (: x 24)	CDPDR Smoothing Flag	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Smoothing Flag. 0 = Smoothing Not Applied 1 = Carrier phase-based smoothing applied for the reported code phase. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Flag Values: ['0', '1'] Flag Meanings: ['not_applied', 'applied']
sv_id CHUNKED	INTEGER_1 (: x 24)	CDPDR Space Vehicle ID	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
Group: /gpsr/hk				
Description	(Attribute)	Contains parameters related to GPSR housekeeping.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
clock_source CHUNKED	INTEGER_1 (:)	HK Clock Source	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Clock Source Flag Values: ['0', '1'] Flag Meanings: ['internal_clock', 'value_invalid']
cpu_processor_load CHUNKED	UINT_2_LE (:)	HK CPU Processor Load	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - CPU Load of most recent PPS interval
dc_data_error CHUNKED	UINT_1_LE (:)	HK Data Cache Data Error Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Data Cache Data Error Counter
dc_tag_error CHUNKED	UINT_1_LE (:)	HK Data Cache Tag Error Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Data Cache Tag Error Counter
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
discarded_tc_packets CHUNKED	UINT_1_LE (:)	HK Discarded TC Packet Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TC packets discarded since start of GPSR (wrapping counter).
discarded_tm_packets CHUNKED	UINT_1_LE (:)	HK Discarded TM Packet Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TM packets discarded since start of GPSR (wrapping counter).
edac_double_bit_error CHUNKED	INTEGER_1 (:)	HK MilBus I/F EDAC Double Bit Error	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Double Bit Error

edac_single_bit_error CHUNKED	UINT_1_LE (:)	HK MilBus I/F EDAC Single Bit Error	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Single Bit Error
front_end_t CHUNKED	UINT_1_LE (:)	DFH Front End Temperature	counts GPSR_DFH	GPSR Data Field Header - R/F Front End Temperature (raw counts; not EU-converted)
ic_data_error CHUNKED	UINT_1_LE (:)	HK Instr Cache Data Error Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Instr Cache Data Error Counter
ic_tag_error CHUNKED	UINT_1_LE (:)	HK Instr Cache Tag Error Counter	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Instr Cache Tag Error Counter
memory_dump_status CHUNKED	UINT_2_LE (:)	HK Memory Dump Status	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TM packets to be generated until the current Memory Dump is finished
n_sv_w_all CHUNKED	INTEGER_1 (:)	HK Number of Tracked SVs w All Components in Tracking State	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with all signal components in final tracking state at the most recent PPS
n_svs_acquired CHUNKED	INTEGER_1 (:)	HK Number of SVs Being Acquired	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being acquired at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 2...4
n_svs_used CHUNKED	INTEGER_1 (:)	HK Number of SVs Used for PVT	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being used for PVT at the PPS before the most recent PPS
n_svs_wo_all CHUNKED	INTEGER_1 (:)	HK Number of Tracked SVs w/o All Components in Tracking State	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with not all signal components in a final tracking state at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 5...10 (L1 C/A & P(Y)) or Multi-Frequency Tracking state 5...7 (L1 C/A & L2 CM)
nsm CHUNKED	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM)	1 ATL01/sc4/gpsr/hk	GPSR - Navigation Solution Method. 1 = Propagated; 2 = Cold Start - First Nav Fix; 3 = Cold Start - Least Squares Method w/ no GDOP Optimization; 4 = Least Squares Method w/ all Visible SVs; 5 = Kalman Filter Method (Normal Operation); 7 = Invalid Navigation Solution. All other values are invalid. Flag Values: ['0', '1', '2', '3', '4', '5', '7'] Flag Meanings: ['unknown', 'propagated', 'cold_first_nav', 'cold_lsq_no_gdop', 'lsqm_w_svs', 'normal_kalman', 'invalid_solution']
prom_edac_status CHUNKED	INTEGER_1 (:)	HK PROM EDAC Status	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - PROM EDAC Single bit or uncorrectable error Flag Values: ['0', '1'] Flag Meanings: ['no_error_detected', 'error_detected']
protocol_selection_f CHUNKED	INTEGER_1 (:)	HK MilBus Protocol Selection Flag	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus Protocol Selection Flag
register_file_errors CHUNKED	INTEGER_1 (:)	HK Corrected Register File Errors	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Corrected Register File Errors Flag Values: ['0', '1'] Flag Meanings: ['no_error_detected', 'error_detected']
sram_edac_status CHUNKED	INTEGER_1 (:)	HK SRAM EDAC Status	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - SRAM EDAC Single bit error Flag Values: ['0', '1'] Flag Meanings: ['no_error_detected', 'error_detected']
transient_protocol_errors CHUNKED	UINT_2_LE (:)	HK MilBus Transient Protocol Error Count	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus Transient Protocol Error Count
transmit_buffer_occupancy CHUNKED	UINT_2_LE (:)	HK Transmit Buffer Occupancy	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of bytes buffered for transmission
Group: /gpsr/navigation				
Description	(Attribute)	Contains parameters related to navigation solution.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
clock_freq_error CHUNKED	INTEGER (:)	NAV Receiver Clock Frequency Error	seconds ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Receiver Clock Frequency Error
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.

gdop CHUNKED	FLOAT (:)	NAV Geometric Dilution of Precision	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Geometric Dilution of Precision (Values greater than 655.34 m are saturated to 655.34 m.)
gnss_time_error CHUNKED	FLOAT (:)	NAV GNSS System Time Error	seconds ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - GNSS System Time Error
gps_time_sec CHUNKED	UINT_4_LE (:)	TCDR GPS Time (Seconds)	seconds ATL01/sc4/gpsr/navigation	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT)
gps_time_subsec CHUNKED	UINT_4_LE (:)	TCDR GPS Time (Subseconds)	1/4294967296 seconds ATL01/sc4/gpsr/navigation	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT)
h_ell CHUNKED	DOUBLE (:)	NAV Height Above Reference Ellipsoid (WGS84)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Height Above Reference Ellipsoid (WGS84)
latitude CHUNKED	DOUBLE (:)	NAV Latitude (WGS84)	degrees_north ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Latitude (WGS84)
longitude CHUNKED	DOUBLE (:)	NAV Longitude (WGS84)	degrees_east ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Longitude (WGS84)
max_curve_fit CHUNKED	INTEGER_1 (:)	NAV Maximum Curve Fit	1 ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Maximum Curve Fit interval taken from all SVs used in current navigation solution Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '15'] Flag Meanings: ['4h', '6h', '8h', '14h', '26h', '50h', '74h', '98h', '122h', '146h', 'no_curve_fit']
max_ura CHUNKED	INTEGER_1 (:)	NAV Maximum User Range Accuracy (URA)	counts ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Maximum User Range Accuracy (-16 means that no URA is available)
n_svs CHUNKED	INTEGER_1 (:)	NAV Number of SVs in Solution	counts ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - The number of SVs the receiver was able to use for the Navigation Solution computation, i.e. SVs for which code and carrier phase measurements and Ephemeris data were available
nsm CHUNKED	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM)	1 ATL01/sc4/gpsr/navigation	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - Least Squares Method w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (Normal Operation) 7 = Invalid Navigation Solution All other values invalid Flag Values: ['1', '2', '3', '4', '5', '7'] Flag Meanings: ['propagated', 'cold_lsq_no_gdop', 'lsqm_w_svs', 'normal_kalman', 'invalid_solution']
pdop CHUNKED	FLOAT (:)	NAV Position Dilution of Precision	counts ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Position Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available.
position_error_x CHUNKED	FLOAT (:)	NAV Position Error X	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X position error
position_error_y CHUNKED	FLOAT (:)	NAV Position Error Y	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y position error
position_error_z CHUNKED	FLOAT (:)	NAV Position Error Z	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z position error
position_qa CHUNKED	INTEGER_2 (:)	NAV Time Quality Index	seconds ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Time Quality Index; Values greater than 4095 ns are saturated to 4095 ns.
position_x CHUNKED	DOUBLE (:)	NAV Position X (WGS84)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)
position_y CHUNKED	DOUBLE (:)	NAV Position Y (WGS84)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)
position_z CHUNKED	DOUBLE (:)	NAV Position Z (WGS84)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)
tdop CHUNKED	FLOAT (:)	GPSR Time Dilution of Precision	meters ATL01/sc4/gpsr/navigation converted	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available.
velocity_error_x CHUNKED	FLOAT (:)	NAV Velocity Error X	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X velocity error
velocity_error_y CHUNKED	FLOAT (:)	NAV Velocity Error Y	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y velocity error
velocity_error_z CHUNKED	FLOAT (:)	NAV Velocity Error Z	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z velocity error
velocity_x CHUNKED	DOUBLE (:)	NAV Velocity X (WGS84)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)

velocity_y CHUNKED	DOUBLE (:)	NAV Velocity Y (WGS84)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)
velocity_z CHUNKED	DOUBLE (:)	NAV Velocity Z (WGS84)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84)
vertical_speed CHUNKED	DOUBLE (:)	NAV Vertical Speed	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Vertical Speed
Group: /gpsr/noise_histogram				
Description	(Attribute)	Contains parameters related to the GPS Noise Histogram Data Record (NHDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
chain_index CHUNKED	INTEGER_1 (: x 2)	NHDR Chain Index - Chain 1-2	1 ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Chain Index - Down Conversion Chain Identifier 1-2 Flag Values: ['0', '1'] Flag Meanings: ['antenna1_l1carrier', 'antenna1_l2carrier']
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_chain CONTIGUOUS	INTEGER_1 (2)	DS for each chain	1	Dimension scale representing each of the 2 chains.
noise_power CHUNKED	FLOAT (: x 2)	NHDR Noise Power - Chain 1-2	dB ATL01/sc3/gpsr/noise_histogram converted	Noise Histogram Data Record (NHDR) - Noise Power as seen at the input of the variable gain IF amplifier - Down Conversion Chain Identifier 1-2
norm_neg_in_phase_m1 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Negative In-Phase Counts M1 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M1) - Down Conversion Chain Identifier 1-2
norm_neg_in_phase_m3 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Negative In-Phase Counts M3 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M3) - Down Conversion Chain Identifier 1-2
norm_neg_quad_phase_m1 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Negative Quadrature-Phase Counts M1 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M1) - Down Conversion Chain Identifier 1-2
norm_neg_quad_phase_m3 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Negative Quadrature-Phase Counts M3 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M3) - Down Conversion Chain Identifier 1-2
norm_pos_in_phase_p1 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Positive In-Phase Counts P1 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P1) - Down Conversion Chain Identifier 1-2
norm_pos_in_phase_p3 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Positive In-Phase Counts P3 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P3) - Down Conversion Chain Identifier 1-2
norm_pos_quad_phase_p1 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Positive Quadrature-Phase Counts P1 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P1) - Down Conversion Chain Identifier 1-2
norm_pos_quad_phase_p3 CHUNKED	UINT_2_LE (: x 2)	NHDR Normalized Positive Quadrature-Phase Counts P3 - Chain 1-2	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P3) - Down Conversion Chain Identifier 1-2
Group: /gpsr/time_correlation				
Description	(Attribute)	Contains parameters related to GPSR time correlation data record (TCDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time	DOUBLE	Elapsed GPS seconds	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time

CHUNKED	(:)	time	Derived via Time Tagging	correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_time_sec CHUNKED	UINT_4_LE (:)	TCDR GPS Time (Seconds)	seconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT)
gps_time_subsec CHUNKED	UINT_4_LE (:)	TCDR GPS Time (Subseconds)	1/4294967296 seconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT)
imt CHUNKED	DOUBLE (:)	TCDR Instrument Measurement Time	seconds ATL01/sc4/gpsr/time_correlation converted	Time Correlation Data Record (TCDR) - Time Correlation Data Record (TCDR) - Instrument Measurement Time (IMT) representation of the synchronization time stamp. IMT precisely describes how the GPSR clock oscillator behaves, and is for internal and maintenance use only.
nsm CHUNKED	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM)	1 ATL01/sc4/gpsr/time_correlation	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - Least Squares Method w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (Normal Operation) 7 = Invalid Navigation Solution All other values invalid Flag Values: ['1', '2', '3', '4', '5', '7'] Flag Meanings: ['propagated', 'cold_lsq_no_gdop', 'lsqm_w_svs', 'normal_kalman', 'invalid_solution']
tdop CHUNKED	FLOAT (:)	GPSR Time Dilution of Precision	meters ATL01/sc4/gpsr/time_correlation converted	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available.
time_qa CHUNKED	INTEGER_2 (:)	TCDR Time Quality Index	nanoseconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - Time Quality Index. Nanoseconds; Values greater than 4095 ns are saturated to 4095 ns.
utc_days CHUNKED	UINT_2_LE (:)	TCDR TCDR UTC Time - Days	days ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of days since 1st January 2000, 00:00:00 starting with 0.
utc_msec CHUNKED	UINT_4_LE (:)	TCDR TCDR UTC Time - Milliseconds	msec ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of milliseconds of current day.
utc_usec CHUNKED	UINT_2_LE (:)	TCDR TCDR UTC Time - Microseconds	usec ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of microseconds of current day.
Group: /lrs				
Description	(Attribute)	Group contains the Laser Reference System (LRS) packet decommutated data		
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding LRS APIDs (varies per APID).		
Group: /lrs/hk_1120				
Description	(Attribute)	Contains parameters relating to the Application Housekeeping Packet (LRStmHK)(APID 1120). The (Application Mode) Housekeeping Packet provides all LRS health and safety data. It is normally reported and stored at a 1 Hz rate.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Housekeeping Data (nominally once per second).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
chkstat_e_ad CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Application Text Checksum	1 LRS_HK	EEPROM Application Data (AD) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_e_at CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Application Text Checksum	1 LRS_HK	EEPROM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_e_bc CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Boot Config Checksum	1 LRS_HK	EEPROM Boot Configuration (BC) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_e_ld_df CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Laser Detector Dark Frame Checksum	1 LRS_HK	EEPROM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_e_sd_df CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Stellar Detector Dark Frame Checksum	1 LRS_HK	EEPROM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']

chkstat_s_at CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register -SRAM Application Text Checksum	1 LRS_HK	SRAM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_s_ld_df CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - SRAM Laser Detector Dark Frame Checksum	1 LRS_HK	SRAM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
chkstat_s_sd_df CHUNKED	INTEGER_1 (:)	LRS_HK Checksum Status Register - SRAM Stellar Detector Dark Frame Checksum	1 LRS_HK	SRAM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Flag Values: ['0', '1'] Flag Meanings: ['passed', 'failed']
cmdcnt CHUNKED	UINT_2_LE (:)	LRS_HK Valid User Command Counter	counts LRS_HK	The Valid User Command Counter is a 16-bit counter that increments each time that the Failsafe Mode processes a valid command of the corresponding command type. A valid command is defined as a command that passes all verification tests. The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
cmderrcnt CHUNKED	UINT_2_LE (:)	LRS_HK User Command Error Counter	counts LRS_HK	The 16-bit User Command Error Counter is incremented every time the Failsafe Mode has one or more command verification or processing errors with the corresponding command type (abnormal conditions). The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter increments only once per command when there is at least one verification/processing error for that command. CMDERRCODE will indicate the type of error. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
cmderrcode CHUNKED	UINT_2_LE (:)	LRS_HK Unique Code for User Command Errors	counts LRS_HK	The 16-bit Command Error Unique Code indicates the last type of command error that occurred in Failsafe Mode. This code will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The error codes are defined in Table 19: Command Validation Error Codes in the LRS command and data ICD.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
dmpmemcnt CHUNKED	UINT_4_LE (:)	LRS_HK Number of memory words dumped	counts LRS_HK	This 32-bit counter records the total number of memory words dumped during Failsafe Mode processing of Failsafe Dump Memory Command (LRSfscmDPMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
dmppktleft CHUNKED	UINT_2_LE (:)	LRS_HK Remaining number of dump packets to go	counts LRS_HK	This 16-bit counter indicates the remaining number of dump packets to send during Failsafe Mode processing of a Failsafe Dump Memory Command (LRSfscmDPMEM). It is 0x0000 whenever no dump command is active.
ground1_v CHUNKED	FLOAT (:)	LRS_HK Ground 1 Voltage	volts LRS_HK	Voltage of Ground 1 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[0]
ground2_v CHUNKED	FLOAT (:)	LRS_HK Ground 2 Voltage	volts LRS_HK	Voltage of Ground 2 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[1]
laser_barrel1_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #1 (Laser Side Barrel #1 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #1 (Laser Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
laser_barrel2_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #2 (Laser Side Barrel #2 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #2 (Laser Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
laser_barrel3_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #3 (Laser Side Barrel #3 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #3 (Laser Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
ldbackground CHUNKED	UINT_2_LE (:)	LRS_HK LD background	counts LRS_HK	The 16-bit values are measures of the measured detector background for the laser side after subtracting the predicted dark frame. Each is a scaled average of the background levels from all tracking windows on that detector, for all measurements in the preceding one (1) second. Because the search and imaging windows move around, these values should be expected to fluctuate significantly; however, they are an indication of how well the predicted dark frame matches the background (stray light) levels. If they are occasionally very large, there is probably a stray light problem. If they are consistently very large, there is probably error in the dark frame calibration.
ldc_t CHUNKED	FLOAT (:)	LRS_HK Laser Detector Card Temperature	degreesC LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
ldmemcnt	UINT_4_LE	LRS_HK Number of	counts	This 32-bit counter records the total number of memory words loaded during Failsafe Mode processing of Failsafe Load

CHUNKED	(:)	memory words loaded	LRS_HK	Memory Command (LRSfscmLDMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT)
ldmemconflict CHUNKED	UINT_2_LE (:)	LRS_HK LD Memory Conflicts	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still accessing Laser-Side shared memory when a new LRS cycle starts. This conflict is an error, which indicates that shared memory access did not complete in the allocated time and may have caused stale or invalid laser centroids. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT).
ldoverrun CHUNKED	UINT_2_LE (:)	LRS_HK LD Processing Overruns	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still processing Laser-Side data when a new LRS cycle starts. This overrun condition is a warning, which indicates that some processor activity did not complete in the allocated time and may delay reporting of the next laser data packets. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT).
m12v_cmon_a CHUNKED	FLOAT (:)	LRS_HK -12VDC Current Monitor	amps LRS_HK	Amperage of -12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[6]
m12v_ldc_mon_v CHUNKED	FLOAT (:)	LRS_HK -12VDC LDC Monitor	volts LRS_HK	Voltage of -12VDC LDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[11]
m12v_sdc_mon_v CHUNKED	FLOAT (:)	LRS_HK -12VDC SDC Monitor	volts LRS_HK	Voltage of -12VDC SDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[10]
m12v_supp_mon_v CHUNKED	FLOAT (:)	LRS_HK -12VDC Supply Monitor	volts LRS_HK	Voltage of 112VDC Supply Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[14]
meter_bar1_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #4 (Metering Bars #1 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #4 (Metering Bars #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
meter_bar2_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #5 (Metering Bars #2 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #5 (Metering Bars #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
meter_bar3_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #6 (Metering Bars #3 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #6 (Metering Bars #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
p12v_ana_mon_v CHUNKED	FLOAT (:)	LRS_HK +12VDC Analog Monitor	volts LRS_HK	Voltage of +12VDC Analog Monitor - 0x0000 = 0.000 V; 0xC000 = +12.000 V (nominal value); 0xFFFF = +16.000 V : A_LRS_HK.ANALOGHK[15]
p12v_cmon_a CHUNKED	FLOAT (:)	LRS_HK +12VDC Current Monitor	amps LRS_HK	Amperage of +12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[7]
p1_5v_mon_v CHUNKED	FLOAT (:)	LRS_HK +1.5VDC Monitor	volts LRS_HK	Voltage of +1.5VDC Monitor - 0x0000 = 0.000 V; 0x6000 = +1.500 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[3]
p1_8v_mon_v CHUNKED	FLOAT (:)	LRS_HK +1.8VDC Monitor Voltage	volts LRS_HK	Volage of +1.8VDC Monitor - 0x0000 = 0.000 V; 0x7332 = 1.800 V (nominal); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[19]
p3_3v_cmon_a CHUNKED	FLOAT (:)	LRS_HK +3.3VDC Current Monitor	amps LRS_HK	Amperage of +3.3VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +4.000 A : A_LRS_HK.ANALOGHK[9]
p3_3v_mon_v CHUNKED	FLOAT (:)	LRS_HK +3.3VDC Monitor	volts LRS_HK	Voltage of +3.3VDC Monitor - 0x0000 = 0.000 V; 0xD333 = +3.300 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[18]
p5v_ana_mon_v CHUNKED	FLOAT (:)	LRS_HK +5VDC Analog Monitor	volts LRS_HK	Voltage of +5VDC Analog Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[16]
p5v_cmon_a CHUNKED	FLOAT (:)	LRS_HK +5VDC Current Monitor	amps LRS_HK	Amperage of +5VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[8]
p5v_ldc_mon_v CHUNKED	FLOAT (:)	LRS_HK +5VDC LDC Monitor	volts LRS_HK	Voltage of +5VDC LDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[12]
p5v_sdc_mon_v CHUNKED	FLOAT (:)	LRS_HK +5VDC SDC Monitor	volts LRS_HK	Voltage of +5VDC SDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[13]
p5v_supp_mon_v CHUNKED	FLOAT (:)	LRS_HK +5VDC Supply Monitor	volts LRS_HK	Voltage of +5VDC Supply Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[16]
pc_t CHUNKED	FLOAT (:)	LRS_HK Processor Card Thermistor	degreesC LRS_HK	Temperature of Processor Card - 0x0000 = 0.000 V (nominal short;) 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
pcc_t CHUNKED	FLOAT (:)	LRS_HK Power Converter Card	degreesC LRS_HK	Temperature of Power Converter Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]

		Temperature		
ppscount CHUNKED	UINT_4_LE (:)	LRS_HK 1PPS sync counter	counts LRS_HK	A 32-bit count of sync pulses registered by the LRS FPGA. The value of the pulse counter starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF.
ppsoffset_ms CHUNKED	UINT_4_LE (:)	LRS_HK Oscillator Offset	ms LRS_HK	Oscillator Offset (milliseconds) for TOD (time of day) correction.
ppsoffset_ticks CHUNKED	UINT_4_LE (:)	LRS_HK Oscillator Offset Ticks	counts LRS_HK	Oscillator Offset (ticks) for TOD (time of day) correction.
ppsoscval CHUNKED	UINT_4_LE (:)	LRS_HK Latched oscillator value at 1PPS sync	counts LRS_HK	The 32-bit count of internal 27 MHz oscillator ticks at the time when the last 1 PPS sync pulse was registered by the LRS FPGA.
reference_v CHUNKED	FLOAT (:)	LRS_HK Reference Voltage	volts LRS_HK	Reference Voltage - 0x0000 = 0.000 V; 0x8000 = +2.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[2]
sdbackground CHUNKED	UINT_2_LE (:)	LRS_HK SD background	counts LRS_HK	The 16-bit values are measures of the measured detector background of the stellar side after subtracting the predicted dark frame. Each is a scaled average of the background levels from all tracking windows on that detector, for all measurements in the preceding one (1) second. Because the search and imaging windows move around, these values should be expected to fluctuate significantly; however, they are an indication of how well the predicted dark frame matches the background (stray light) levels. If they are occasionally very large, there is probably a stray light problem. If they are consistently very large, there is probably error in the dark frame calibration.
sdc_t CHUNKED	FLOAT (:)	LRS_HK Stellar Detector Card Temperature	counts LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
sdmemconflict CHUNKED	UINT_2_LE (:)	LRS_HK SD Memory Conflicts	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still accessing Stellar-Side shared memory when a new LRS cycle starts that includes new Stellar-Side data collection. This conflict is an error, which indicates that shared memory access did not complete in the allocated time and may have caused stale or invalid stellar centroids. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT).
sdoverrun CHUNKED	UINT_2_LE (:)	LRS_HK SD Processing Overruns	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still processing Stellar-Side data when a new LRS cycle starts that should include new Stellar-Side data collection. This overrun condition is a warning, which indicates that some processor activity did not complete in the allocated time and may delay reporting of the next stellar data packets. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT).
spwdiscardbkup CHUNKED	UINT_4_LE (:)	LRS_HK Spacewire tlm packets dropped due to buffer not being empty	counts LRS_HK	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe Mode while waiting for the transmission buffer to empty (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
spwdiscardcmd CHUNKED	UINT_4_LE (:)	LRS_HK Spacewire words dropped due to timeout waiting for full CCSDS packet	counts LRS_HK	This 32-bit counter is incremented each time a spacewire command word is dropped by Failsafe Mode due to a timeout while waiting for a full CCSDS packet (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
spwdiscardlink CHUNKED	UINT_4_LE (:)	LRS_HK Spacewire tlm packets dropped due to link not available	counts LRS_HK	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe Mode while waiting for a valid spacewire link between the LRS and MEB (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
spwoutofsync CHUNKED	UINT_4_LE (:)	LRS_HK Spacewire words skipped to find sync	counts LRS_HK	This 32-bit counter is incremented each time a spacewire command word is skipped by Failsafe Mode to reach a valid packet sync (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
spwstat_ll_err CHUNKED	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Last Link Error	1 LRS_HK	This is the Last Link Error Code portion of the LRS spacewire interface register. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['disconnected', 'parity_err', 'esc_rec', 'credit_err']
spwstat_lp_err CHUNKED	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Last Packet Error	1 LRS_HK	This is the Last Packet Error Code portion of the LRS spacewire interface register. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['no_error', 'eep_rec', 'incomplete_sw', 'invalid']
spwstat_pec CHUNKED	UINT_1_LE (:)	LRS_HK Spacewire Status Register _ Packet Error Counter	counts LRS_HK	This is the 6-bit Packet Error Counter portion of the LRS spacewire interface status register
spwstat_st_f CHUNKED	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Status	1 LRS_HK	This is the status flag portion of the LRS spacewire interface status register. Flag Values: ['0', '1'] Flag Meanings: ['not_running', 'running']

srate_x CHUNKED	FLOAT (:)	LRS_HK Stellar Pattern Rate X	pixels/sec LRS_HK	X component (tip/tilt) of the stellar rate pattern estimate.
srate_y CHUNKED	FLOAT (:)	LRS_HK Stellar Pattern Rate Y	pixels/second LRS_HK	Y component (tip/tilt) of the stellar rate pattern estimate
srate_z CHUNKED	FLOAT (:)	LRS_HK Stellar Pattern Rate Z	radians/second LRS_HK	Z (rotation) component of the stellar rate pattern estimate
stellar_barrel1_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #7 (Stellar Side Barrel #1 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #7 (Stellar Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_barrel2_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #8 (Stellar Side Barrel #2 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #8 (Stellar Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_barrel3_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #9 (Stellar Side Barrel #3 Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #9 (Stellar Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_shroud_t CHUNKED	FLOAT (:)	LRS_HK Optics Thermistor #10 (Stellar Side Shroud Temperature)	degreesC LRS_HK	Temperature of Optics Thermistor #10 (Stellar Side Shroud) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
sysstat_ac_en CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - Analog Converter Status	1 LRS_HK	The current status of the LRS FPGA Analog Converter. (0 =DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disabled', 'enabled']
sysstat_hk CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register HK Working	1 LRS_HK	The current status of the Housekeeping working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Flag Values: ['0', '1'] Flag Meanings: ['finished', 'executing']
sysstat_j1 CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - Jumper 1	1 LRS_HK	Jumper 1 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_j2 CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - Jumper 2	1 LRS_HK	Jumper 2 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition) Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_ldc CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - LDC Status	1 LRS_HK	The current status of the Laser Detector Card (LDC) working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Flag Values: ['0', '1'] Flag Meanings: ['finished', 'executing']
sysstat_ldc_en CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - LDC Power and Signals Enable Status	1 LRS_HK	The current status of the LRS FPGA LDC (Laser Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disabled', 'enabled']
sysstat_ldca_cable CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - LDC Analog Cable Status	1 LRS_HK	The current status of the LRS FPGA LDCA (Laser Detector Card Analog) Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_ldcd_cable CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - LDC Digital Cable Status	1 LRS_HK	The current status of the LRS FPGA LDCD (Laser Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_lsync CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - Laser	1 LRS_HK	The current validity of the Laser Sync (0 = INVALID (abnormal condition); 1 = VALID (normal operating condition))

		Sync validity Status		Flag Values: ['0', '1'] Flag Meanings: ['invalid', 'valid']
sysstat_sdc CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - SDC Status	1 LRS_HK	The current status of the Stellar Detector Card (SDC) working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Flag Values: ['0', '1'] Flag Meanings: ['finished', 'executing']
sysstat_sdc_en CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - SDC Power and Signals Enable Status	1 LRS_HK	The current status of the LRS FPGA SDC (Stellar Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disabled', 'enabled']
sysstat_sdca_cable CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - SDC Analog Cable Status	1 LRS_HK	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_sdcd_cable CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - SDC Digital Cable Status	1 LRS_HK	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['disconnected', 'connected']
sysstat_sw CHUNKED	INTEGER_1 (:)	LRS_HK System Status Register - Spacewire Module Status	1 LRS_HK	The current status of the Spacewire Module (0 = NOT RUNNING (abnormal condition); 1 = RUNNING (normal operating condition)) Flag Values: ['0', '1'] Flag Meanings: ['not_running', 'running']
therm_gnd_ref_v CHUNKED	FLOAT (:)	LRS_HK Thermistor Reference (ground)	volts LRS_HK	Voltage of Thermistor Reference (ground) - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[20]
therm_open_ref_v CHUNKED	FLOAT (:)	LRS_HK Thermistor Reference (open)	volts LRS_HK	Voltage of Thermistor Reference (open) - 0x0000 = 0.000 V; 0xFFFF = +4.000 V (nominal value) : A_LRS_HK.ANALOGHK[21]
timecnt CHUNKED	UINT_2_LE (:)	LRS_HK Valid Time Sync Command Counter	counts LRS_HK	The Valid Time Sync Command Counter is a 16-bit counter that increments each time that the Failsafe Mode processes a valid command of the corresponding command type. A valid command is defined as a command that passes all verification tests. The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
timeerrcnt CHUNKED	UINT_2_LE (:)	LRS_HK Time Sync Command Error Counter	counts LRS_HK	The 16-bit Time Sync Command error Counter is incremented every time the Failsafe Mode has one or more command verification or processing errors with the corresponding command type (abnormal conditions). The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter increments only once per command when there is at least one verification/processing error for that command. TIMEERRCODE will indicate the type of error. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
timeerrcode CHUNKED	UINT_2_LE (:)	LRS_HK Time Sync Command Error Code	counts LRS_HK	The 16-bit Time Sync Error Code indicates the last type of time sync error that occurred in Failsafe Mode. This code will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The error codes are defined in Table 19: Command Validation Error Codes.
Group: /lrs/laser_centroid				
Description	(Attribute)	Contains parameters relating to the Application Laser Centroid (LCENT) Data. The (Application Mode) Laser Centroid Data Packet contains reported Laser-Side Centroids, which are part of the core LRS data output. This packet normally will contain 10 valid centroids, reported and stored at a nominally 50 Hz rate and is available through all data channels (SSR, real time telemetry, and onboard to the spacecraft ACS).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Application Laser Centroid Data (nominally fifty per second).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cent_h CHUNKED	FLOAT (:)	LRS_LCENT centroid H	pixels LRS_LCENT	The centroid H value. The centroids are the Transmit Laser Centroids and TAMS Centroids.
cent_mag CHUNKED	INTEGER_2 (:)	LRS_LCENT centroid magitude	counts LRS_LCENT	The 12-bit centroid magnitude. The centroids are the Transmit Laser Centroids and TAMS Centroids.
cent_v CHUNKED	FLOAT (:)	LRS_LCENT centroid V	pixels LRS_LCENT	The centroid V value. The centroids are the Transmit Laser Centroids and TAMS Centroids.
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator

				(divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
coi_offset CHUNKED	INTEGER_2 (:)	Center of integration offset	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time values retrieved from the CCSDS header timestamps, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
quality_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Centroid quality	1 LRS_LCENT	Flag indicates centroids pass basic validity checks in the LRS software. 0 = valid centroids; 1 = the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the windows to the actual tams/laser spots is not guaranteed. Flag Values: ['0', '1'] Flag Meanings: ['valid', 'questionable']
trackstat_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Tracking status	1 LRS_LCENT	Flag indicates tracking status for centroid; 1 = valid tracking of that centroid window; 0 = the corresponding window is in a searching or acquiring state (that is, the corresponding centroid should not be considered to report a valid target). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the windows to the actual tams/laser spots is not guaranteed. Flag Values: ['0', '1'] Flag Meanings: ['acq_state', 'track_state']
win CHUNKED	INTEGER_1 (:)	Window	1 LRS_LCENT	Indicates the window corresponding to each component of the centmagtime and corresponding flags. Values of 1-4 correspond to TAMS windows; values of 5-10 correspond to laser windows. Assignment of a window to a particular spot is not guaranteed. Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10'] Flag Meanings: ['none', 'tams0', 'tams1', 'tams2', 'tams3', 'laser1', 'laser2', 'laser3', 'laser4', 'laser5', 'laser6']
Group: /lrs/laser_image				
Description	(Attribute)	The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
datatype CHUNKED	UINT_2_LE (:)	LRS_xIMG Type of pixel data	1 LRS_SIMG	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The valid codes are defined as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Corrected Data, 8738 Data Corrected for both Dark Frame and Local Dark Flag Values: ['0', '4369', '8738'] Flag Meanings: ['raw', 'dark', 'adj']
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	The base age of the centroids in GPS seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ldc_t CHUNKED	FLOAT (:)	LRS_HK Laser Detector Card Temperature	degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
nread CHUNKED	UINT_2_LE (:)	LRSxLIMG Window read count	counts LRS_xIMG	This 16-bit value is the number of reads performed on the window. This value will count up to the requested number of reads on successive packets. The detector has a settling behavior when read on successive cycles, so it may be necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windows are tracked.
Group: /lrs/laser_image/window_nn				

Description	(Attribute)	This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_pixel_64_index CONTIGUOUS	INTEGER_1 (64)	Pixel Index for 64 pixel arrays	1	Dimension scale for 64-pixel arrays.
hloc CHUNKED	UINT_2_LE (:)	LRS_LIMG Horizontal location of window	pixels LRS_LIMG	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.
pixeldata CHUNKED	UINT_2_LE (: x 64)	LRS_LIMG pixel data	counts LRS_LIMG	Pixel data for window- The arrays contains the 64 pixels of a TAMS window. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+7, VLOC+7]).
vloc CHUNKED	UINT_2_LE (:)	LRS_LIMG Vertical location of window	pixels LRS_LIMG	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.
Group: /lrs/laser_window				
Description	(Attribute)	The (Application Mode) Transmit Laser Window Data Packet (LRStmLWIN) contains measured pixel data from a Transmit Laser (Laser-Side) centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Transmit Laser Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata CHUNKED	UINT_2_LE (: x 25)	LRS_LWIN Adjusted Pixel data for window	counts LRS_LWIN	Adjusted Pixel data for window - The array contains 25 pixels of the window corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]).
cent_h CHUNKED	FLOAT (:)	LRS_LCENT centroid H	pixels LRS_LCENT	The centroid H value (in 256ths of a pixel)
cent_mag CHUNKED	INTEGER_2 (:)	LRS_LCENT centroid magitude	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4
cent_v CHUNKED	FLOAT (:)	LRS_LCENT centroid V	pixels LRS_LCENT	The centroid V value (in 256ths of a pixel).
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
coi_offset CHUNKED	INTEGER_2 (:)	Center of integration offset	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata CHUNKED	UINT_2_LE (: x 25)	LRS_LWIN Dark pixel data for window	counts LRS_LWIN	Dark pixel data for window- The array contains 25 pixels corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]).
darkfactor CHUNKED	UINT_2_LE (:)	LRS_xWIN Dark Factor	counts LRS_TWIN	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame.
darkoff_next CHUNKED	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset	counts LRS_TWIN	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroids in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_pixel_25_index CONTIGUOUS	INTEGER_1 (25)	Pixel Index for 25 pixel arrays	1	Dimension scale for 25-pixel arrays.
hdot_avg CHUNKED	FLOAT (:)	LRS_xWIN Average Horizontal Velocity	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format.
hloc	UINT_2_LE	LRS_LWIN Horizontal	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window.

CHUNKED	(:)	location of window	LRS_LWIN	The Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater in each axis.
ldc_t CHUNKED	FLOAT (:)	LRS_HK Laser Detector Card Temperature	Degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
localdark CHUNKED	UINT_2_LE (:)	LRS_xWIN Local Dark	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias.
max_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.
min_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Centroid quality	1 LRS_LCENT	This 16-bit value contains a single bit for the quality of this image only. Flag Values: ['0', '1'] Flag Meanings: ['valid', 'questionable']
rawdata CHUNKED	UINT_2_LE (: x 25)	LRS_LWIN Raw pixel data for window	counts LRS_LWIN	Raw pixel data for window- The array contains 25 uncorrected pixel values. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]).
status_f CHUNKED	UINT_2_LE (:)	LRS_xWIN Target status	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Flag Values: ['0', '1', '2', '3', '65532', '65534', '65535'] Flag Meanings: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated']
tickattime CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick.
tickfirst CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
ticklast CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
use_f CHUNKED	INTEGER_1 (:)	LRS_xWIN Window Use Flag	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['inactive', 'image_gen', 'search', 'track']
vdot_avg CHUNKED	FLOAT (:)	LRS_LWIN Average Vertical Velocity	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format.
vloc CHUNKED	UINT_2_LE (:)	LRS_LWIN Vertical location of window	pixels LRS_LWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater in each axis.
windex CHUNKED	UINT_2_LE (:)	LRS_xWIN Window Index	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.
Group: /lrs/stellar_centroid				
Description	(Attribute)	The (Application Mode) Stellar Centroid Data Packet contains reported Stellar-Side Centroids, which are part of the core LRS data output. This packet is normally reported and stored at a nominally 10 Hz rate with a variable number of stars reported and is available through all data channels (SSR, real time telemetry, and onboard to the spacecraft ACS).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Centroid Data Packet. (nominally 10 per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cent_h CHUNKED	FLOAT (:)	LRS_LCENT centroid H	pixels LRS_LCENT	The centroid H value.
cent_mag CHUNKED	INTEGER_2 (:)	LRS_LCENT centroid magitude	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4
cent_v CHUNKED	FLOAT (:)	LRS_LCENT centroid V	pixels LRS_LCENT	The centroid V value.
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids

				reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
coi_offset CHUNKED	INTEGER_2 (:)	Center of integration offset	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Retrieved times from the CCSDS header timestamps, in seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
quality_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Centroid quality	1 LRS_LCENT	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 indicate the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy). Flag Values: ['0', '1'] Flag Meanings: ['valid', 'questionable']
trackstat_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Tracking status	1 LRS_LCENT	Flag indicates tracking status for centroid. 1 indicate valid tracking of that centroid window; 0 indicate the corresponding window is in a searching or acquiring state (that is, the corresponding centroid should not be considered to report a valid target). Flag Values: ['0', '1'] Flag Meanings: ['acq_state', 'track_state']
Group: /lrs/stellar_image				
Description	(Attribute)	The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes. Packets contain pixel data in the form of 6 8x8 windows. Each 'pixeldata' array contains 64 pixels of an image. All 6 images are put together to make a 1024 by 1024 image. During the image dump, no spots are tracked (the LCENT packets are not telemetered to ground while dumping the image).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
cycle CHUNKED	UINT_2_LE (:)	cycle LRS_SIMG Cycle	counts LRS_SIMG	This 16-bit value is the number (0 to 4 are valid) of the cycle within the 100 millisecond integration period on which this packet was generated. The actual window used for the pixel data will be window (6*CYCLE + n).
datatype CHUNKED	UINT_2_LE (:)	LRS_xIMG Type of pixel data	1 LRS_SIMG	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The valid codes are defined as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Corrected Data, 8738 Data Corrected for both Dark Frame and Local Dark Flag Values: ['0', '4369', '8738'] Flag Meanings: ['raw', 'dark', 'adj']
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time computed from the base age of the centroids, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
nread CHUNKED	UINT_2_LE (:)	LRSxLIMG Window read count	counts LRS_xIMG	This 16-bit value is the number of reads performed on the window. This value will count up to the requested number of reads on successive packets. The detector has a settling behavior when read on successive cycles, so it may be necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windows are tracked.
sdc_t CHUNKED	FLOAT (:)	LRS_HK Stellar Detector Card Temperature	Degrees LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
Group: /lrs/stellar_image/window_nn				
Description	(Attribute)	This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes. Window 0 is a vertical slice of 8 pixels starting at 1, windows step 48 verticals, the next image starts at vertical 49, Window 1 is a vertical slice of 8 pixels starting at 9, windows step 48 verticals,		

		the next image starts at vertical 57,		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Image Data Packet. This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_pixel_64_index CONTIGUOUS	INTEGER_1 (64)	Pixel Index for 64 pixel arrays	1	Dimension scale for 64-pixel arrays.
hloc CHUNKED	UINT_2_LE (:)	LRS_LIMG Horizontal location of window	pixels LRS_LIMG	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. All windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixels greater in each axis.
pixeldata CHUNKED	UINT_2_LE (: x 64)	LRS_LIMG pixel data	counts LRS_LIMG	Pixel data for window- The arrays contains the 64 pixels of a TAMS window. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+7, VLOC+7]).
vloc CHUNKED	UINT_2_LE (:)	LRS_LIMG Vertical location of window	pixels LRS_LIMG	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. All windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixels greater in each axis.
Group: /lrs/stellar_window				
Description	(Attribute)	The (Application Mode) Stellar Window Data Packet contains measured pixel data from a Stellar-Side centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata CHUNKED	UINT_2_LE (: x 64)	LRS_SWIN Adjusted Pixel data for window	counts LRS_SWIN	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixel readings after they are corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
cent_h CHUNKED	FLOAT (:)	LRS_SWIN centroid H	pixels LRS_SWIN	The centroid H value (in 256ths of a pixel).
cent_mag CHUNKED	INTEGER_2 (:)	LRS_SWIN centroid magitude	counts LRS_SWIN	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4. This is a copy of the word that should be reported in the (Application mode) Stellar Centroid Data Packet for the window reported here.
cent_v CHUNKED	FLOAT (:)	LRS_SWIN centroid V	pixels LRS_SWIN	The centroid V value (in 256ths of a pixel).
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
coi_offset CHUNKED	INTEGER_2 (:)	Center of integration offset	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata CHUNKED	UINT_2_LE (: x 64)	LRS_SWIN Dark pixel data for window	counts LRS_SWIN	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel readings after they are corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
darkfactor CHUNKED	UINT_2_LE (:)	LRS_xWIN Dark Factor	counts LRS_TWIN	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame.
darkoff_next CHUNKED	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset	counts LRS_TWIN	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_pixel_64_index CONTIGUOUS	INTEGER_1 (64)	Pixel Index for 64 pixel arrays	1	Dimension scale for 64-pixel arrays.
hdot_avg CHUNKED	FLOAT (:)	LRS_xWIN Average Horizontal Velocity	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format.
hloc CHUNKED	UINT_2_LE (:)	LRS_SWIN Horizontal location of window	pixels LRS_SWIN	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.

localdark CHUNKED	UINT_2_LE (:)	LRS_xWIN Local Dark	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias.
max_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.
min_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f CHUNKED	INTEGER_1 (:)	LRS_SWIN Centroid quality flag	1 LRS_SWIN	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 indicate the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy). Flag Values: ['0', '1'] Flag Meanings: ['valid', 'questionable']
rawdata CHUNKED	UINT_2_LE (: x 64)	LRS_SWIN Raw pixel data for window	counts LRS_SWIN	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC readings for the pixels without onboard corrections. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
sdc_t CHUNKED	FLOAT (:)	LRS_HK Stellar Detector Card Temperature	degrees LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
status_f CHUNKED	UINT_2_LE (:)	LRS_xWIN Target status	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Flag Values: ['0', '1', '2', '3', '65532', '65534', '65535'] Flag Meanings: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated']
tickattime CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick.
tickfirst CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
ticklast CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
tickoverlap CHUNKED	UINT_4_LE (:)	LRS_SWIN Oscillator ticks when last pixel is read	counts LRS_SWIN	Oscillator ticks at the start or end of a pixel row overlap. The 32-bit value reading from the internal 27 MHz oscillator when the overlap started/ended. They can be used to confirm the calculation of the center of integration offsets.
use_f CHUNKED	INTEGER_1 (:)	LRS_xWIN Window Use Flag	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['inactive', 'image_gen', 'search', 'track']
vdot_avg CHUNKED	FLOAT (:)	LRS_LWIN Average Vertical Velocity	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format.
vloc CHUNKED	UINT_2_LE (:)	LRS_SWIN Vertical location of window	pixels LRS_SWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.
windex CHUNKED	UINT_2_LE (:)	LRS_xWIN Window Index	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.
Group: /lrs/tams_window				
Description	(Attribute)	The (Application Mode) TAMS Window Data Packet contains measured pixel data from a TAMS (Laser-Side) centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS TAMS Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata CHUNKED	UINT_2_LE (: x 64)	LRS_TWIN Adjusted Pixel data for window	counts LRS_TWIN	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixel readings after they are corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).

cent_h CHUNKED	FLOAT (:)	LRS_LCENT centroid H	pixels LRS_LCENT	The centroid H value (in 256ths of a pixel).
cent_mag CHUNKED	INTEGER_2 (:)	LRS_LCENT centroid magitude	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4
cent_v CHUNKED	FLOAT (:)	LRS_LCENT centroid V	pixels LRS_LCENT	The centroid V value (in 256ths of a pixel).
centofintbase CHUNKED	UINT_4_LE (:)	Center of integration base	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose).
coi_offset CHUNKED	INTEGER_2 (:)	Center of integration offset	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata CHUNKED	UINT_2_LE (: x 64)	LRS_TWIN Dark pixel data for window	counts LRS_TWIN	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel readings after they are corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
darkfactor CHUNKED	UINT_2_LE (:)	LRS_xWIN Dark Factor	counts LRS_TWIN	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame.
darkoff_next CHUNKED	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset	counts LRS_TWIN	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_pixel_64_index CONTIGUOUS	INTEGER_1 (64)	Pixel Index for 64 pixel arrays	1	Dimension scale for 64-pixel arrays.
hdot_avg CHUNKED	FLOAT (:)	LRS_xWIN Average Horizontal Velocity	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format.
hloc CHUNKED	UINT_2_LE (:)	LRS_TWIN Horizontal location of window	pixels LRS_TWIN	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.
ldc_t CHUNKED	FLOAT (:)	LRS_HK Laser Detector Card Temperature	Degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
localdark CHUNKED	UINT_2_LE (:)	LRS_xWIN Local Dark	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias.
max_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.
min_mag CHUNKED	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f CHUNKED	INTEGER_1 (:)	LRS_LCENT Centroid quality	1 LRS_LCENT	This 16-bit value contains a single bit for the quality of this image only. Flag Values: ['0', '1'] Flag Meanings: ['valid', 'questionable']
rawdata CHUNKED	UINT_2_LE (: x 64)	LRS_TWIN Raw pixel data for window	counts LRS_TWIN	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC readings for the pixels without onboard corrections. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
status_f CHUNKED	UINT_2_LE (:)	LRS_xWIN Target status	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Flag Values: ['0', '1', '2', '3', '65532', '65534', '65535'] Flag Meanings: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated']
tickattime CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick.

tickfirst CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
ticklast CHUNKED	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets.
use_f CHUNKED	INTEGER_1 (:)	LRS_xWIN Window Use Flag	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['inactive', 'image_gen', 'search', 'track']
vdot_avg CHUNKED	FLOAT (:)	LRS_LWIN Average Vertical Velocity	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format.
vloc CHUNKED	UINT_2_LE (:)	LRS_TWIN Vertical location of window	pixels LRS_TWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis.
windex CHUNKED	UINT_2_LE (:)	LRS_xWIN Window Index	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.
Group: /orbit_info				
Description	(Attribute)	Contains orbit information.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cycle_number CHUNKED	INTEGER_1 (:)	Cycle Number	1 Operations	A count of the number of exact repeats of this reference orbit.
delta_time CHUNKED	DOUBLE (:)	Granule Start Time time	seconds since 2018-01-01 Operations	Number of GPS seconds since the ATLAS SDP epoch at the start of the granule. At the time of ATL02 creation, the equator crossing time is not precisely known.. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
orbit_number CHUNKED	UINT_2_LE (:)	Orbit Number	1 Operations	Unique identifying number for each planned ICESat-2 orbit.
rgt CHUNKED	INTEGER_2 (:)	Reference Ground track	1 Operations	The reference ground track (RGT) is the track on the earth at which a specified unit vector within the observatory is pointed. Under nominal operating conditions, there will be no data collected along the RGT, as the RGT is spanned by GT3 and GT4. During slews or off-pointing, it is possible that ground tracks may intersect the RGT. The ICESat-2 mission has 1387 RGTs.
Group: /quality_assessment				
Description	(Attribute)	Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_statistics CONTIGUOUS	INTEGER_1 (5)	Dimension scale for QA statistics	1 Derived (QA)	QA statistics array index Flag Values: ['1', '2', '3', '4', '5'] Flag Meanings: ['number_of_points', 'minimum', 'maximum', 'average', 'standard_deviation']
qa_granule_fail_reason COMPACT	INTEGER (1)	Granule Failure Reason	1 Operations	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=TBD Failure; 4=TBD_Failure; 5=other failure. Flag Values: ['0', '1', '2', '3', '4', '5'] Flag Meanings: ['no_failure', 'PROCESS_ERROR', 'INSUFFICIENT_OUTPUT', 'failure_3', 'failure_4', 'OTHER_FAILURE']
qa_granule_pass_fail COMPACT	INTEGER (1)	Granule Pass Flag	1 Operations	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. Flag Values: ['0', '1'] Flag Meanings: ['PASS', 'FAIL']
Group: /quality_assessment/along_track				
Description	(Attribute)	Along-track statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description

delta_time_end CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
delta_time_start CHUNKED	DOUBLE (:)	Elapsed UTC seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.

Group: /quality_assessment/along_track/pcex

Description	(Attribute)	Along-track statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_at_n_dupe CHUNKED	INTEGER (:)	Number of duplicates	counts Derived (QA)	The number of duplicate Rx events detected in the along-track interval.
qa_at_n_rx_s CHUNKED	INTEGER (:)	Number of Strong Rx Events	counts Derived (QA)	The number of Strong Rx events in the along-track interval.
qa_at_n_rx_w CHUNKED	INTEGER (:)	Number of Weak Rx Events	counts Derived (QA)	The number of Weak Rx events in the along-track interval.
qa_at_n_tep CHUNKED	INTEGER (:)	Number of TEPs	counts Derived (QA)	The number of TEP events detected in the along-track interval.
qa_at_n_tx CHUNKED	INTEGER (:)	Number of Tx Pulses	counts Derived (QA)	The number of Tx Pulses in the along-track interval.
qa_at_tx_ll_stat CHUNKED	DOUBLE (: x 5)	QA Tx LL Stat	counts Derived (QA)	Along-track statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_at_tx_other_stat CHUNKED	DOUBLE (: x 5)	QA Tx Other Stat	counts Derived (QA)	Along-track statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Leading Upper edge (LU) time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Lower edge (TL) time. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.

Group: /quality_assessment/record_counts

Description	(Attribute)	Packet count statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time_end COMPACT	DOUBLE (1)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
delta_time_start COMPACT	DOUBLE (1)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
qa_n_a_hkt_a COMPACT	INTEGER (1)	Number of A_HKT_A inputs.	counts Derived (QA)	The number of A_HKT_A inputs processed.
qa_n_a_hkt_b COMPACT	INTEGER (1)	Number of A_HKT_B inputs.	counts Derived (QA)	The number of A_HKT_B inputs processed.
qa_n_a_hkt_c COMPACT	INTEGER (1)	Number of A_HKT_C inputs.	counts Derived (QA)	The number of A_HKT_C inputs processed.
qa_n_a_hkt_d COMPACT	INTEGER (1)	Number of A_HKT_D inputs.	counts Derived (QA)	The number of A_HKT_D inputs processed.
qa_n_a_hkt_e COMPACT	INTEGER (1)	Number of A_HKT_E inputs.	counts Derived (QA)	The number of A_HKT_E inputs processed.
qa_n_a_hkt_status COMPACT	INTEGER (1)	Number of A_HKT_STATUS inputs.	counts Derived (QA)	The number of A_HKT_STATUS inputs processed.
qa_n_a_mce_pos COMPACT	INTEGER (1)	Number of A_MCE_POS inputs.	counts Derived (QA)	The number of A_MCE_POS inputs processed.
qa_n_a_sc_pon COMPACT	INTEGER (1)	Number of A_SC_PON inputs.	counts Derived (QA)	The number of A_SC_PON inputs processed.

qa_n_a_sc_pos COMPACT	INTEGER (1)	Number of A_SC_POS inputs.	counts Derived (QA)	The number of A_SC_POS inputs processed.
qa_n_a_sc_tat COMPACT	INTEGER (1)	Number of A_SC_TAT inputs.	counts Derived (QA)	The number of A_SC_TAT inputs processed.
qa_n_a_sla_hk COMPACT	INTEGER (1)	Number of A_SLA_HK inputs.	counts Derived (QA)	The number of A_SLA_HK inputs processed.
qa_n_lrs_hk COMPACT	INTEGER (1)	Number of LRS HK inputs.	counts Derived (QA)	The number of LRS HK inputs processed.
qa_n_lrs_laser_cent COMPACT	INTEGER (1)	Number of LRS Laser Centroid inputs.	counts Derived (QA)	The number of LRS Laser Centroid inputs processed.
qa_n_lrs_laser_image COMPACT	INTEGER (1)	Number of LRS Laser Image inputs.	counts Derived (QA)	The number of LRS Laser Image inputs processed.
qa_n_lrs_laser_window COMPACT	INTEGER (1)	Number of LRS Laser Window inputs.	counts Derived (QA)	The number of LRS Laser Window inputs processed.
qa_n_lrs_stellar_cent COMPACT	INTEGER (1)	Number of LRS Stellar Centroid inputs.	counts Derived (QA)	The number of LRS Stellar Centroid inputs processed.
qa_n_lrs_stellar_image COMPACT	INTEGER (1)	Number of LRS Stellar Image inputs.	counts Derived (QA)	The number of LRS Stellar Image inputs processed.
qa_n_lrs_stellar_window COMPACT	INTEGER (1)	Number of LRS Stellar Window inputs.	counts Derived (QA)	The number of LRS Stellar Window inputs processed.
qa_n_lrs_tams_window COMPACT	INTEGER (1)	Number of LRS TAMS Window inputs.	counts Derived (QA)	The number of LRS TAMS Window inputs processed.
qa_n_sc1 COMPACT	INTEGER (1)	Number of SC1 inputs.	counts Derived (QA)	The number of SC1 inputs processed.
qa_n_sc2 COMPACT	INTEGER (1)	Number of SC2 inputs.	counts Derived (QA)	The number of SC2 inputs processed.
qa_n_sc3 COMPACT	INTEGER (1)	Number of SC3 inputs.	counts Derived (QA)	The number of SC3 inputs processed.
qa_n_sc4 COMPACT	INTEGER (1)	Number of SC4 inputs.	counts Derived (QA)	The number of SC4 inputs processed.
qa_n_sim_hk COMPACT	INTEGER (1)	Number of SIM_HK inputs.	counts Derived (QA)	The number of SIM_HK inputs processed.
Group: /quality_assessment/record_counts/pcex				
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_n_a_dfc_hk COMPACT	INTEGER (1)	Number of DFC HK Inputs	counts Derived (QA)	The number of A_DFC_HK inputs processed.
qa_n_alt_mframe COMPACT	INTEGER (1)	Number of major frame inputs.	counts Derived (QA)	The number of major frame inputs processed.
qa_n_atm_hist_s COMPACT	INTEGER (1)	Number of ATM Strong inputs.	counts Derived (QA)	The number of ATM strong inputs processed.
qa_n_atm_hist_w COMPACT	INTEGER (1)	Number of ATM weak inputs.	counts Derived (QA)	The number of ATM weak inputs processed.
qa_n_pmf_algorithm_science COMPACT	INTEGER (1)	Number of PMF Algorithm Science inputs.	counts Derived (QA)	The number of PMF Algorithm Science inputs processed.
qa_n_pmf_timekeeping COMPACT	INTEGER (1)	Number of PMF Timekeeping inputs.	counts Derived (QA)	The number of PMF TImekeeping inputs processed.
Group: /quality_assessment/summary				
Description	(Attribute)	Summary statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time_end COMPACT	DOUBLE (1)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within

				atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
delta_time_start COMPACT	DOUBLE (1)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
qa_amet_r1 COMPACT	INTEGER (1)	AMET Increment OOB	counts Derived (QA)	Number of instances where the difference between external AMET counter and the GPS 1PPS exceeds the limit of 1.0.
qa_amet_r2 COMPACT	INTEGER (1)	AMET Increment OOB	counts Derived (QA)	Number of instances where the difference between internal AMET at 1PPS and GPS 1PPS exceed the limit of 100.e6.
qa_bias_offset_x COMPACT	INTEGER (1)	Num Bias Offset X OOB	counts Derived (QA)	Number of instances where the bias offset X value is outside the limit of -70 to 70 microradians.
qa_bias_offset_y COMPACT	INTEGER (1)	Num Bias Offset Y OOB	counts Derived (QA)	Number of instances where the bias offset Y value is outside the limit of -70 to 70 microradians.
qa_cal47_temp COMPACT	INTEGER (1)	CAL47 temperature OOB	counts Derived (QA)	Number of instances where the CAL-47 temperature is outside the limit of -20 to 50 degC.
qa_fw_flag COMPACT	INTEGER (1)	Freewheel Indicated	counts Derived (QA)	Number of instances where the freewheel flag is non-zero.
qa_hvpc_mod_1 COMPACT	INTEGER (1)	Num HVPC Bias Mod 1 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod1 value is outside the limit of -2000 to 0 counts.
qa_hvpc_mod_2 COMPACT	INTEGER (1)	Num HVPC Bias Mod 2 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod2 value is outside the limit of -2000 to 0 counts.
qa_hvpc_mod_3 COMPACT	INTEGER (1)	Num HVPC Bias Mod 3 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod3 value is outside the limit of -2000 to 0 counts.
qa_hvpc_mod_4 COMPACT	INTEGER (1)	Num HVPC Bias Mod 4 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod4 value is outside the limit of -2000 to 0 counts.
qa_hvpc_mod_5 COMPACT	INTEGER (1)	Num HVPC Bias Mod 5 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod5 value is outside the limit of -2000 to 0 counts.
qa_hvpc_mod_6 COMPACT	INTEGER (1)	Num HVPC Bias Mod 6 OOB	counts Derived (QA)	Number of instances where the HVPC Bias Mod6 value is outside the limit of -2000 to 0 counts.
qa_int_e_tx COMPACT	INTEGER (1)	Num Internal Energy OOB	counts Derived (QA)	Number of instances where the computed total internal laser energy is outside the limit of 130 to 2700 microjoules.
qa_internal_energy COMPACT	INTEGER (1)	Num Internal Energy OOB	counts Derived (QA)	Number of instances where input internal laser energy values exceed the limit of 0 to 200 counts.
qa_internal_temp COMPACT	INTEGER (1)	Num Internal Temp OOB	counts Derived (QA)	Number of instances where input laser temperature values exceed the limit of 20 to 40 degC.
qa_lrs_e_tx COMPACT	INTEGER (1)	Num LRS Energy OOB	counts Derived (QA)	Number of instances where the computed total LRS laser energy is outside the limit of 130 to 2700 microjoules.
qa_lrs_inv_mag COMPACT	INTEGER (1 x 6)	Num LRS Mag Invalid	counts Derived (QA)	Number of instances where an LRS laser magnitude is outside the limit of 0-500.
qa_lrs_inv_spot COMPACT	INTEGER (1)	Num LRS Spots Missing	counts Derived (QA)	Number of instances where not all 6 laser spots are valid when computing LRS laser energy.
qa_lrs_inv_sum COMPACT	INTEGER (1)	Num LRS Sums Invalid	counts Derived (QA)	Number of instances where the sum of the 6 LRS laser spots is outside the limit of 0 to 2000.
qa_lrs_temp COMPACT	INTEGER (1)	Num LRS Temp OOB	counts Derived (QA)	Number of instances where the LRS temperature is outside the limit of -20 to 50 degC.
qa_s_tod_a_sla_hk COMPACT	DOUBLE (1 x 5)	QA for a_sla_hk TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive A_SLA_HK time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_gpsr COMPACT	DOUBLE (1 x 5)	QA for gpsr TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /gpsr time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_laser_energy COMPACT	DOUBLE (1 x 5)	QA for hk_laser_energy TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/laser_energy time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_meb COMPACT	DOUBLE (1 x 5)	QA for hk_pdu TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/meb time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_pdu COMPACT	DOUBLE (1 x 5)	QA for hk_pdu TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/pdu time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.

qa_s_tod_hk_pointing COMPACT	DOUBLE (1 x 5)	QA for hk_pointing TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/pointing time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_pos_vel COMPACT	DOUBLE (1 x 5)	QA for hk_pos_vel TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/position_velocity time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_tat COMPACT	DOUBLE (1 x 5)	QA for hk_tat TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/time_at_the_tone time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_thermal COMPACT	DOUBLE (1 x 5)	QA for hk_therm TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/hk_thermal time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_mce_position COMPACT	DOUBLE (1 x 5)	QA for mce_position TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/mce_position time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_acs COMPACT	DOUBLE (1 x 5)	QA for acs TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/attitude_control_system time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_ephemeris COMPACT	DOUBLE (1 x 5)	QA for sc_ephemeris TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/ephemeris time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_hk COMPACT	DOUBLE (1 x 5)	QA for sc_hk TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/hk time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_imu COMPACT	DOUBLE (1 x 5)	QA for sc_imu TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/intertial_measurement_unit time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_st COMPACT	DOUBLE (1 x 5)	QA for sc_star_tracker TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_stoh1 COMPACT	DOUBLE (1 x 5)	QA for sc_star_tracker_oh1 TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker/optical_head1 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_stoh2 COMPACT	DOUBLE (1 x 5)	QA for sc_star_tracker_oh2 TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker/optical_head2 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_spd_e_tx COMPACT	INTEGER (1)	Num SPD Energy OOB	counts Derived (QA)	Number of instances where the computed total SPD laser energy is outside the limit of 130 to 2700 microjoules.
qa_spd_energy COMPACT	INTEGER (1)	Num SPD Energy OOB	counts Derived (QA)	Number of instances where input SPD laser energy values exceed the limit of -30000 to 0 counts.
qa_spd_temp COMPACT	INTEGER (1)	Num SPD Temp OOB	counts Derived (QA)	Number of instances where SPD temperature values exceed the limit of -20 to 50 degC.
qa_time_corr COMPACT	INTEGER (1)	Shot Time correlation OOB	counts Derived (QA)	Where the ratio of unaligned shots/aligned shots exceeds the limit of 0.9; 0=Doesn?t Exceed Limit, 1=Exceeds Limit
Group: /quality_assessment/summary/pcex				
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_bg_sens_s COMPACT	INTEGER (1)	Num Strong Bg Sensitivity OOB	counts Derived (QA)	Number of instances where the computed strong background sensitivity value is outside the limit of 5e17 to 2e18.
qa_bg_sens_w COMPACT	INTEGER (1)	Num Weak Bg Sensitivity OOB	counts Derived (QA)	Number of instances where the computed weak background sensitivity value is outside the limit of 5e17 to 2e18.
qa_dupe_percent COMPACT	INTEGER (1 x 20)	Channel Dupe Percent OOB	counts Derived (QA)	Number of instances where the per-channel number of duplicates is greater than 10% of the total number of per-channel events.
qa_ph_tx_ll COMPACT	INTEGER (1)	Tx LL OOB	counts Derived (QA)	Where the maximum minus minimum Tx leading lower exceeds the limit of 39 ns.
qa_ret_sens_s COMPACT	INTEGER (1)	Num Strong Return Sensitivity OOB	counts Derived (QA)	Number of instances where the computed strong return sensitivity value is outside the limit of 0 to 2e18.
qa_ret_sens_w COMPACT	INTEGER (1)	Num Weak Return Sensitivity OOB	counts Derived (QA)	Number of instances where the computed weak return sensitivity value is outside the limit of 0 to 2e18.
qa_rx_channel_id COMPACT	INTEGER (1)	Rx Channel ID OOB	counts Derived (QA)	Number of instances where the Rx channel ID contains an unexpected value.
qa_rx_coarse_count COMPACT	INTEGER (1)	Rx Coarse Count OOB	counts Derived (QA)	Number of instances where the Rx coarse count value exceeds the limit of 10000 counts.
qa_rx_fine_count COMPACT	INTEGER (1)	Rx Fine Count OOB	counts Derived (QA)	Number of instances where the Rx fine count value exceeds the limit of 75 counts.

qa_s_alt_cal_fall COMPACT	DOUBLE (1 x 5)	QA alt_cal_fall	counts Derived (QA)	Summary statistic of the full-rate (before interpolation) alt_cal_fall computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_alt_cal_rise COMPACT	DOUBLE (1 x 5)	QA alt_cal_rise	counts Derived (QA)	Summary statistic of the full-rate (before interpolation) alt_cal_rise computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_n_1pps_skip COMPACT	INTEGER (1)	QA 1PPS missed	counts Derived via L1B ATBD	Number of times 1 pps was not consecutive.
qa_s_n_dupe COMPACT	INTEGER (1)	Number of duplicates	counts Derived (QA)	The number of duplicate Rx events detected in the granule.
qa_s_n_mf_skip COMPACT	INTEGER (1)	QA 1P MF missed	counts Derived via L1B ATBD	The number of times major frame counter was not consecutive.
qa_s_n_missed_thres COMPACT	INTEGER_8 (1)	Number of Missed Tx Threshold Crossings	counts Derived (QA)	The number of Tx pulses in which a missed threshold crossing was detected. The condition occurs if the Tx leading and trailing fine raw counts are the exact same value.
qa_s_n_rx_s COMPACT	INTEGER_8 (1)	Number of Strong Rx Events	counts Derived (QA)	The number of Strong Rx events in the granule.
qa_s_n_rx_w COMPACT	INTEGER_8 (1)	Number of Weak Rx Events	counts Derived (QA)	The number of Weak Rx events in the granule.
qa_s_n_swapped_txfine COMPACT	INTEGER_8 (1)	Number of Tx Fine Swaps	counts Derived (QA)	The number of Tx pulses for which a PCE anomaly forced the Tx fine count values to be swapped.
qa_s_n_tep COMPACT	INTEGER (1)	Number of TEPs	counts Derived (QA)	The number of TEP events detected in the granule.
qa_s_n_tx COMPACT	INTEGER_8 (1)	Number of Tx Pulses	counts Derived (QA)	The number of Tx Pulses in the granule.
qa_s_n_tx_oob COMPACT	INTEGER (1)	QA number of instances TX out of bounds	counts Derived via L1B ATBD	The number of times the Tx count is out of bounds (oob); i.e.: 199 to 201 TX pulses were not reported in a major frame.
qa_s_tod_alt COMPACT	DOUBLE (1 x 5)	QA for pcex_alt TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pcex/altimetry time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_atm_hist_s COMPACT	DOUBLE (1 x 5)	QA for atm_his_st TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pcex/atmosphere_strong time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_atm_hist_w COMPACT	DOUBLE (1 x 5)	QA for atm_hist_w TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pcex/atmosphere_weak time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_background COMPACT	DOUBLE (1 x 5)	QA for pcex_background TOD	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pcex/background time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_method COMPACT	DOUBLE (1 x 5)	QA from TOD Methods	counts Derived via L1B ATBD	Summary statistics on the differences between Time_T0_Method1 and Time _T0_Method2. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tx_ll_stat COMPACT	DOUBLE (1 x 5)	QA Tx LL Stat	counts Derived (QA)	Summary statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tx_other_stat COMPACT	DOUBLE (1 x 5)	QA Tx Other Stat	counts Derived (QA)	Summary statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Leading Upper edge (LU) time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Lower edge (TL) time. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_tep_tof COMPACT	INTEGER (1)	Num TEP OOB	counts Derived (QA)	Number of instances where TEP TOF values exceed the limit of 0 to 110ns.
qa_tx_coarse_count COMPACT	INTEGER (1)	Tx Coarse Count OOB	counts Derived (QA)	Number of instances where the Tx coarse count value exceeds the limit of 10000 counts.
qa_tx_leading_fine COMPACT	INTEGER (1)	Tx Leading Fine Count OOB	counts Derived (QA)	Number of instances where the Tx leading fine count value exceeds the limit of 75 counts.
qa_tx_trailing_fine COMPACT	INTEGER (1)	Tx Trailing Fine Count OOB	counts Derived (QA)	Number of instances where the Tx trailing fine count value exceeds the limit of 75 counts.
Group: /sc				
Description	(Attribute)	Group contains the Spacecraft (SC) Ancillary Science packet #1 decommutated data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
acs_time_sec CHUNKED	UINT_4_LE (:)	ACS time (sec)	seconds ATL01/sc	SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan-1980 00:00:00) (Same time provided within the Attitude/Rate message to ATLAS in RT at 1Hz)

acs_time_subsec CHUNKED	UINT_4_LE (:)	ACS time (subsec)	100 nanoseconds ATL01/sc	Subsecond portion of the SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan-1980 00:00:00) (Same time provided within the Attitude/Rate message to ATLAS in RT at 1Hz)
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch. By adding atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch time can be computed.
sc_time_1pps_sec CHUNKED	UINT_4_LE (:)	SC time at 1 pps (sec)	seconds ATL01/sc	SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00)
sc_time_1pps_subsec CHUNKED	UINT_4_LE (:)	SC time at 1 pps (subsec)	100 nanoseconds ATL01/sc	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00)
Group: /sc/attitude_control_system				
Description	(Attribute)	Contains parameters related to spacecraft ACS (attitude control system) software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
acs_mode CHUNKED	UINT_1_LE (:)	ACS Software Mode	counts ATL01/sc1/attitude_control_system	ACS Active ACS Software Mode 0 = Idle 1 = Rate Capture 2 = Sun Acquisition 3 = (Reserved - N/A for ICESat-2) 4 = Slew 5 = Inertial Sun Point 6 = Earth Pointing 7 = ACS Calibration 8 = Inertial Pointing 9 = Reference Ground Track (RGT) 10 = Roll Off-Point (ROP) 11 = Instrument Calibration (ICAL) 12 = DV Wheel Standby 13 = DV Thruster Standby 14 = DV Burn Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', '14'] Flag Meanings: ['idle', 'rate_capture', 'sun_acquisition', 'reserved', 'slew', 'inertial_sun_point', 'earth_pointing', 'acs_calibration', 'inertial_pointing', 'reference_ground_track', 'roll_off_point', 'instrument_calibration', 'dv_wheel_standby', 'dv_thruster_standby', 'dv_burn']
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	The time tag of the data computed from raw_acs_time_sec and subseconds in the L1A Attitude_control_ group, relative to the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_body_rate_x CHUNKED	DOUBLE (:)	SC Body Rate (X)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body X axis. (Same data provided to ATLAS in RT at 1Hz)
sc_body_rate_y CHUNKED	DOUBLE (:)	SC Body Rate (Y)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body Y axis. (Same data provided to ATLAS in RT at 1Hz)
sc_body_rate_z CHUNKED	DOUBLE (:)	SC Body Rate (Z)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body Z axis. (Same data provided to ATLAS in RT at 1Hz)
sc_to_lrs_quat_1 CHUNKED	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 1	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion1. (Same data provided to ATLAS in RT at 1Hz).
sc_to_lrs_quat_2 CHUNKED	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 2	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 2. (Same data provided to ATLAS in RT at 1Hz).
sc_to_lrs_quat_3 CHUNKED	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 3	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 3. (Same data provided to ATLAS in RT at 1Hz).
sc_to_lrs_quat_4 CHUNKED	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 4	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion4. (Same data provided to ATLAS in RT at 1Hz).
Group: /sc/ephemeris				
Description	(Attribute)	Contains parameters related to spacecraft Ephemeris Propagator.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	The time tag of the data by using raw_prop_time_sec and subsecs in the L1A ephemeris group, relative to the ATLAS SDP GSP epoch. The ATLAS Standard Data Products (SDP) GPS epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.

eci_position_res_x CHUNKED	FLOAT (:)	SC ECI Position residual X	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of X frame residual.
eci_position_res_y CHUNKED	FLOAT (:)	SC ECI Position residualY	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of Y frame residual.
eci_position_res_z CHUNKED	FLOAT (:)	SC ECI Position residual Z	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of Z frame residual.
eci_position_x CHUNKED	DOUBLE (:)	SC ECI Position X	meters ATL01/sc1/ephemeris converted	ACS SC X position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_position_y CHUNKED	DOUBLE (:)	SC ECI Position Y	meters ATL01/sc1/ephemeris converted	ACS SC Y position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_position_z CHUNKED	DOUBLE (:)	SC ECI Position Z	meters ATL01/sc1/ephemeris converted	ACS SC Z position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_res_x CHUNKED	FLOAT (:)	SC ECI velocity residual X	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of X frame residual.
eci_velocity_res_y CHUNKED	FLOAT (:)	SC ECI velocity residual Y	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of Y frame residual.
eci_velocity_res_z CHUNKED	FLOAT (:)	SC ECI velocity residual Z	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of Z frame residual.
eci_velocity_x CHUNKED	DOUBLE (:)	SC ECI Velocity X	meters/second ATL01/sc1/ephemeris converted	ACS SC X velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_y CHUNKED	DOUBLE (:)	SC ECI Velocity Y	meters/second ATL01/sc1/ephemeris converted	ACS SCY velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_z CHUNKED	DOUBLE (:)	SC ECI Velocity Z	meters/second ATL01/sc1/ephemeris converted	ACS SC Z velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
Group: /sc/hk				
Description	(Attribute)	Contains parameters related to spacecraft housekeeping data.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
at_det_p CHUNKED	FLOAT (: x 2)	ATLAS Currents - Detector Power (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Detector power feed current measured by the SC PDU (7.5A; Sides A, B)
at_det_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Detector (Sides A, B)	1 ATL01/sc1/hk	ATLAS Detector power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_heater_1_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - Survival Heater 1 (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 1 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_1_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Survival Heater 1 (Sides A, B)	1 ATL01/sc1/hk	ATLAS Survival Heater 1 power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_heater_2_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - Survival Heater 2 (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 2 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_2_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Survival Heater 2 (Sides A, B)	1 ATL01/sc1/hk	ATLAS Survival Heater 2 power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_heater_3_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - Survival Heater 3 (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 3 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_3_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Survival Heater 3 (Sides A, B)	1 ATL01/sc1/hk	ATLAS Survival Heater 3 power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']

at_heater_4_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - Survival Heater 4 (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 4 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_4_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Survival Heater 4 (Sides A, B)	1 ATL01/sc1/hk	ATLAS Survival Heater 4 power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_laser_a_c CHUNKED	FLOAT (:)	ATLAS Currents - Laser A	amps ATL01/sc1/hk converted	ATLAS Laser A power feed current measured by the SC PDU (20A)
at_laser_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Laser (Sides A, B)	1 ATL01/sc1/hk	ATLAS Laser power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_lhp_sdhtr_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - LHP Shutdown HTR (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Loop Heat Pipe Shutdown power feed current measured by the SC PDU (7.5A; Sides A, B)
at_lhp_sdhtr_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - LHP Shutdown HTR (Sides A, B)	1 ATL01/sc1/hk	ATLAS LHP Shutdown Heater power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_main_c CHUNKED	FLOAT (: x 2)	ATLAS Currents - ATLAS Main (Sides A, B)	amps ATL01/sc1/hk converted	ATLAS Main power feed current measured by the SC PDU (20A; Sides A, B)
at_main_sw CHUNKED	INTEGER_1 (: x 2)	ATLAS Switch Status - Main (Sides A, B)	1 ATL01/sc1/hk	ATLAS Main power feed status measured by the SC PDU (Sides A, B) Flag Values: ['0', '1'] Flag Meanings: ['on', 'off']
at_t CHUNKED	FLOAT (: x 15)	ATLAS Temperatures (1-15)	degreesC ATL01/sc1/hk converted	SC Monitored ATLAS Temperatures (1 to 15)
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	The derived time tag of the data, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_ab_index CONTIGUOUS	INTEGER_1 (2)	Dimension scale for Side A or B	1	Dimension scale for Side A or B Flag Values: ['1', '2'] Flag Meanings: ['side_a', 'side_b']
ds_flexure_index CONTIGUOUS	INTEGER_1 (3)	Dimension scale for flexure thermistors	1	Dimension scale for flexure thermistor temperatures.
ds_temp_index CONTIGUOUS	INTEGER_1 (15)	Dimension scale for ATLAS Temperatures	1	Dimension scale for ATLAS temperatures.
sa_1_in_bk_t CHUNKED	FLOAT (:)	Solar Array Panel 1 (Inboard) Back-Side Temperature	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Back-Side of Solar Panel 1 (Inboard Panel)
sa_1_in_cell_t CHUNKED	FLOAT (:)	Solar Array Panel 1 (Inboard) Cell-Side Temp	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Cell-Side of Solar Panel 1 (Inboard Panel)
sa_4_ot_bk_t CHUNKED	FLOAT (:)	Solar Array Panel 4 (Outboard) Back- Side Temperature	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Back-Side of Solar Panel 4 (Outboard Panel)
sa_4_ot_cell_t CHUNKED	FLOAT (:)	Solar Array Panel 4 (Outboard) Cell- Side Temperature	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Cell-Side of Solar Panel 4 (Outboard Panel)
sc_at_flex_t CHUNKED	FLOAT (: x 3)	SC-to-ATLAS Flexure Temperature	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of Mechanical I/F Flexure 1, 2 and 3
sc_e_bus_v CHUNKED	FLOAT (: x 2)	SC Essential Bus Voltage (Sides A, B)	volts ATL01/sc1/hk converted	SC Essential Bus Voltage measured by the SC PDU. (Sides A, B)
Group: /sc/inertial_measurement_unit				
Description	(Attribute)	Contains parameters related to spacecraft IMU (Inertial Measurement Unit).		

data_rate	(Attribute)	Data within this main group are stored at the data rate of the source IMU within the Spacecraft Ancillary Science Data Packet. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	IMU delta time tag at the end of the IDL frame over which the integrated gyro angle data was collected, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sync_event_ttag CHUNKED	DOUBLE (:)	IMU Sync Event Time Tag	seconds ATL01/sc1/inertial_measurement_unit/hi_rate converted	IMU Time remaining on the countdown timer which triggers the IDL interrupt (between the event strobe and the timetag of the next IDL data packet). IMU time at the reception of the last IMU time sync pulse. This word contains the time stamp that is recorded when the Event Strobe input to the SSIRU transitions to the active (low) state.
Group: /sc/inertial_measurement_unit/gyro_abcd				
Description	(Attribute)	Contains parameters related to spacecraft IMU (Inertial Measurement Unit) gyros.		
data_rate	(Attribute)	Data within this main group are stored at the data rate of the source IMU high_rate data within the Spacecraft Ancillary Science Data Packet. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
gyro_angle CHUNKED	FLOAT (:)	IMU Gyro Integrated Angle Counter (Gyros A, B, C, D)	arcseconds ATL01/sc1/inertial_measurement_unit/hi_rate converted	IMU integrated angle sensed by the SSIRU Gyro. The data word shall increment from 0 to full scale (0xFFFF) and roll over to zero for positive input rates about the Gyro input axis. The data word shall decrement from full scale to 0 and roll over to 0xFFFF for negative input rates about the Gyro input axis.
gyro_rate_f CHUNKED	INTEGER_1 (:)	IMU Gyro Rate Valid (Gyros A, B, C, D)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro Integrated Angular Rate data validity status. 0=invalid, 1=valid. Flag Values: ['0', '1'] Flag Meanings: ['invalid', 'valid']
gyro_sat_f CHUNKED	INTEGER_1 (:)	IMU Gyro Saturation Bit (Gyros A, B, C, D)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro saturation mode: Force to Rebalance (FTR) Mode (The gyro operates in this mode during low inertial rates) or Whole Angle Saturation (WAS) Mode (The gyro operates in this mode during high inertial rates). Flag Values: ['0', '1'] Flag Meanings: ['ftr_mode', 'was_mode']
gyro_scal_f CHUNKED	INTEGER_1 (:)	IMU Gyro Scaling Factor (Gyros A, B, C, D)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro scale factor mode: low scaling factor mode with the corresponding Integrated Angle word being 0.05 arc-sec/LSB or high scaling factor with the corresponding Integrated Angle word being 1.6 arc-sec/LSB. Flag Values: ['0', '1'] Flag Meanings: ['low_scale_factor', 'high_scale_factor']
Group: /sc/solar_array				
Description	(Attribute)	Contains parameters related to solar array driver assembly.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
azimuth_est CHUNKED	FLOAT (:)	SADA Azimuth Estimated Position	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth position used for ACS control
azimuth_meas_1 CHUNKED	FLOAT (:)	SADA Azimuth Measured Position (Pot 1)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 1 (as reported by ACS software).
azimuth_meas_2 CHUNKED	FLOAT (:)	SADA Azimuth Measured Position (Pot 2)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 2 (as reported by ACS software).
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	SC time at the initiation of the ACS task, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
elev_est CHUNKED	FLOAT (:)	SADA Elevation Estimated Position	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation position used for ACS control
elev_meas_1 CHUNKED	FLOAT (:)	SADA Elevation Measured Position (Pot 1)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 1 (as reported by ACS software).
elev_meas_2 CHUNKED	FLOAT (:)	SADA Elevation Measured Position (Pot 2)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 2 (as reported by ACS software).

Group: /sc/star_tracker				
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etr_counter CHUNKED	UINT_2_BE (:)	ATM ETR Counter	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) delay ticks - Used to determine measurement time of reported ATM TLM with respect to SC-provided sync pulse; Additional delay of quaternion measurement time in ticks of 20 usec from ETR.
atm_frame_counter CHUNKED	UINT_2_BE (:)	ATM Frame Counter	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) counter - Used to determine measurement time of reported ATM TLM with respect to SC-provided sync pulse; This item increments upon the reception of the SC-provided sync pulse.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Time of the Star track subaddress 1 data, relative to the ATLAS SDP GPS Epoch and computed from raw_ace_time_sec/subseconds and etr_delay_tm1. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
etr_counter CHUNKED	UINT_2_BE (:)	STE Star Tracker ETR Counter	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - External Time Reference (ETR) counter - Used to determine measurement time of reported STE/OH mode status with respect to SC-provided sync pulse; This item increments upon the reception of the SC-provided sync pulse - Sample 1-10
mode_status CHUNKED	UINT_2_BE (:)	STE Star Tracker Mode Status	1 ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - Mode Status - Represents the current mode of the STE software . 0 = Initialization 1 = Standby 2 = Memory Read 3 = Memory Write 4 = Self Test 5 = Photo 9 = Angular Rate 10 = Attitude Acquisition 11 = Attitude Tracking 14 = AOM/Attitude Acquisition Phase 15 = AOM/Attitude Tracking Phase All other values invalid Flag Values: ['0', '1', '2', '3', '4', '5', '9', '10', '11', '14', '15'] Flag Meanings: ['init', 'stby', 'mem_read', 'mem_write', 'self_test', 'photon', 'angular_rate', 'att_acq', 'att_track', 'aom_acq', 'aom_track']
Group: /sc/star_tracker/optical_head_1				
Description	(Attribute)	Contains parameters related to spacecraft Star Tracker Optical Head 1 (STOH1).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etr_counter CHUNKED	UINT_2_LE (:)	ATM ETR Counter	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - External Time Reference (ETR) counter - Used to determine measurement time of reported quaternions with respect to SC- provided sync pulse; This item increments upon the reception of the SC-provided sync pulse.
atm_frame_counter CHUNKED	UINT_2_LE (:)	STOH1 ATM Frame Counter	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - Frame Counter
att_qa_x CHUNKED	FLOAT (:)	STOH Attitude Quality (X)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X)
att_qa_y CHUNKED	FLOAT (:)	STOH Attitude Quality (Y)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y)
att_qa_z CHUNKED	FLOAT (:)	STOH Attitude Quality (Z)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z)
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Elapsed GPS seconds since the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and subseconds and atm_etr_delay_tm7. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
n_stars CHUNKED	INTEGER_1 (:)	STOHx Number of Coherent Stars	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation.
quaternion1 CHUNKED	DOUBLE (:)	STOH1 Quaternion1	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion2 CHUNKED	DOUBLE (:)	STOH1 Quaternion2	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion3 CHUNKED	DOUBLE (:)	STOH1 Quaternion3	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion4 CHUNKED	DOUBLE (:)	STOH1 Quaternion4	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame

seq_mode_st CHUNKED	INTEGER_1 (:)	Sequencing Mode Status	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) Status Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7'] Flag Meanings: ['off', 'standby', 'photo', 'acquire', 'track', 'autotest', 'win_acq', 'powered']
Group: /sc/star_tracker/optical_head_2				
Description	(Attribute)	Contains parameters related to spacecraft Star Tracker Optical Head 2 (STOH2).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etr_counter CHUNKED	UINT_2_LE (:)	ATM ETR Counter	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - External Time Reference (ETR) counter - Used to determine measurement time of reported quaternions with respect to SC- provided sync pulse; This item increments upon the reception of the SC-provided sync pulse
atm_frame_counter CHUNKED	UINT_2_LE (:)	STOH2 ATM Frame Counter	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - Frame Counter
att_qa_x CHUNKED	FLOAT (:)	STOH Attitude Quality (X)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X)
att_qa_y CHUNKED	FLOAT (:)	STOH Attitude Quality (Y)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y)
att_qa_z CHUNKED	FLOAT (:)	STOH Attitude Quality (Z)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z)
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Elapsed GPS seconds from the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and subseconds and atm_etr_delay_tm8. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
n_stars CHUNKED	INTEGER_1 (:)	STOHx Number of Coherent Stars	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation
quaternion1 CHUNKED	DOUBLE (:)	STOH1 Quaternion1	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion2 CHUNKED	DOUBLE (:)	STOH1 Quaternion2	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion3 CHUNKED	DOUBLE (:)	STOH1 Quaternion3	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
quaternion4 CHUNKED	DOUBLE (:)	STOH1 Quaternion4	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame
seq_mode_st CHUNKED	INTEGER_1 (:)	Sequencing Mode Status	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) Status. A value of 127 indicates that the data could not be filled from the vc5 packets. Flag Values: ['0', '1', '2', '3', '4', '5', '6', '7'] Flag Meanings: ['off', 'standby', 'photo', 'acquire', 'track', 'autotest', 'win_acq', 'powered']