ATL02 Product Data Dictionary

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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.
level	(Attribute)	L1B
short_name	(Attribute)	ATL02
title	(Attribute)	SET_BY_META
Group: /		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.
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
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
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		
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		
Group: /ancillary_data		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(Dims) Fillvalue	long_name standard_name	units	description
atlas_sdp_gps_epoch COMPACT	DOUBLE(1)	ATLAS Epoch Offset None	seconds since 1980-01-06T00:00:00.000000Z	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. (Source: Operations)
control CONTIGUOUS	STRING(1)	Control File None	1	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds. (Source: Operations)
data_end_utc COMPACT	STRING(1)	End UTC Time of Granule (CCSDS-A, Actual) None	1	UTC (in CCSDS-A format) of the last data point within the granule. (Source: Derived)
data_start_utc COMPACT	STRING(1)	Start UTC Time of Granule (CCSDS-A, Actual) None	1	UTC (in CCSDS-A format) of the first data point within the granule. (Source: Derived)
end_cycle COMPACT	INTEGER(1)	Ending Cycle None	1	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. (Source: Derived)
end_delta_time COMPACT	DOUBLE(1)	ATLAS End Time (Actual) time	seconds since 2018-01-01	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. (Source: Derived)
end_geoseg COMPACT	INTEGER(1)	Ending Geolocation Segment None	1	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. (Source: Derived)
end_gpssow COMPACT	DOUBLE(1)	Ending GPS SOW of Granule (Actual) None	seconds	GPS seconds-of-week of the last data point in the granule. (Source: Derived)
end_gpsweek COMPACT	INTEGER(1)	Ending GPSWeek of Granule (Actual) None	weeks from 1980-01-06	GPS week number of the last data point in the granule. (Source: Derived)
end_orbit COMPACT	INTEGER(1)	Ending Orbit Number None	1	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. (Source: Derived)
end_region COMPACT	INTEGER(1)	Ending Region None	1	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. (Source: Derived)
end_rgt COMPACT	INTEGER(1)	Ending Reference Groundtrack None	1	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. (Source: Derived)

granule_end_utc COMPACT	STRING(1)	End UTC Time of Granule (CCSDS-A, Requested) None	1	Requested end time (in UTC CCSDS-A) of this granule. (Source: Derived)
granule_start_utc COMPACT	STRING(1)	Start UTC Time of Granule (CCSDS-A, Requested) None	1	Requested start time (in UTC CCSDS-A) of this granule. (Source: Derived)
qa_at_interval COMPACT	DOUBLE(1)	QA Along-Track Interval None	1	Statistics time interval for along-track QA data. (Source: control)
release COMPACT	STRING(1)	Release Number None	1	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed. (Source: Operations)
start_cycle COMPACT	INTEGER(1)	Starting Cycle None	1	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. (Source: Derived)
start_delta_time COMPACT	DOUBLE(1)	ATLAS Start Time (Actual) time	seconds since 2018-01-01	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. (Source: Derived)
start_geoseg COMPACT	INTEGER(1)	Starting Geolocation Segment None	1	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. (Source: Derived)
start_gpssow COMPACT	DOUBLE(1)	Start GPS SOW of Granule (Actual) None	seconds	GPS seconds-of-week of the first data point in the granule. (Source: Derived)
start_gpsweek COMPACT	INTEGER(1)	Start GPSWeek of Granule (Actual) None	weeks from 1980-01-06	GPS week number of the first data point in the granule. (Source: Derived)
start_orbit COMPACT	INTEGER(1)	Starting Orbit Number None	1	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. (Source: Derived)
start_region COMPACT	INTEGER(1)	Starting Region None	1	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. (Source: Derived)
start_rgt COMPACT	INTEGER(1)	Starting Reference Groundtrack None	1	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. (Source: Derived)
version COMPACT	STRING(1)	Version None	1	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. (Source: Operations)
Group: /ancillary_data/calibrations		This group contains calibrations derived from the ATLAS CAL products.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
ds_channel CONTIGUOUS	INTEGER_1(20)	Channel None	1	Dimension scale for ATLAS PCE channels (1-16=strong, 17-20=weak) (Source: Dimension Scale)
ds_fine_counts CONTIGUOUS	INTEGER_1(75)	Fine Counts None	1	Dimension scale for ATLAS Time-of-flight fine counts. (Source: Dimension Scale)
Group: /ancillary_data/calibrations/dead_time		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(Dims) Fillvalue	long_name standard_name	units	description
cal42_product COMPACT	STRING(1)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL42)

side COMPACT	INTEGER(1)	Detector Bank Side None	1	A or B side of the detector bank (Source: CAL42); (Meanings: [1 2]) (Values: ['A', 'B'])
temperature COMPACT	FLOAT(1)	Temperature None	degreesC	Temperature for which calibrations are provided. (Source: CAL42)
Group: /ancillary_data/calibrations/dead_time/pcex		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(Dims) Fillvalue	long_name standard_name	units	description
dead_time COMPACT	DOUBLE(20)	DeadTime None	seconds	Dead Time (channel) (Source: CAL42)
sigma COMPACT	DOUBLE(20)	Sigma None	seconds	Sigma (channel) (Source: CAL42)
Group: /ancillary_data/calibrations/dead_time_radiometric_signal_loss		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(Dims) Fillvalue	long_name standard_name	units	description
cal34_product CHUNKED	STRING(:)	CAL Product Name None	1	Name of ATLAS CAL Products containing the calibration data (Source: CAL34)
dead_time CHUNKED	FLOAT(:)	Dead Time None	ns	Dead time value (Source: CAL34)
rad_corr CHUNKED	DOUBLE(:,:,:)	Radiometric Correction None	1	Radiometric Correction (width, strength, deadtime) (Source: CAL34)
strength_strong CHUNKED	DOUBLE(:,:)	Strong Beam Strength None	events/shot	Strong spot strength in events/shot (strength, deadtime) (Source: CAL34)
strength_weak CHUNKED	DOUBLE(:,:)	Weak Beam Strength None	events/shot	Weak spot strength in events/shot (strength, deadtime) (Source: CAL34)
width CHUNKED	DOUBLE(:,:)	Apparent Width None	ns	Apparent width (width, deadtime) (Source: CAL34)
Group: /ancillary_data/calibrations/effective_cell_delay		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(Dims) Fillvalue	long_name standard_name	units	description
cal17_product CHUNKED	STRING(:)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL17)
Group: /ancillary_data/calibrations/effective_cell_delay/pcex		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(Dims) Fillvalue	long_name standard_name	units	description
cal_fall CHUNKED	FLOAT(:)	Call Falling None	1	Cal_fall value which calibrations are provided (indexed by raw_cal_fall/256) (Source: CAL17)
cal_rise CHUNKED	FLOAT(:)	Call Rising None	1	Cal_rise value which calibrations are provided (index to raw_cal_rise/256) (Source: CAL17)
efc_fall CHUNKED	FLOAT(:,:,:)	EFC Falling None	counts	Effective Rx falling fine cell count (cell, channel, temp) (Source: CAL17)
efc_ll CHUNKED	FLOAT(:,:)	EFC LL None	counts	Effective Tx fine cell count for leading lower (cell, temp) (Source: CAL17)
efc_ot CHUNKED	FLOAT(:,:)	EFC Other None	counts	Effective Tx fine cell count for other (cell, temp) (Source: CAL17)
efc_rise CHUNKED	FLOAT(:,:,:)	EFC Rising None	counts	Effective rising Rx fine cell count (cell, channel, temp) (Source: CAL17)
temperature CHUNKED	FLOAT(:)	Temperature None	degreesC	Temperature for which calibrations are provided. (Source: CAL17)
Group: /ancillary_data/calibrations/first_photon_bias		CAL19 -First Photon Bias. Provides a correction for first photon bias.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal19_product	STRING(:)	CAL Product Name	1	Name of ATLAS CAL Products containing the calibration data

CHUNKED		None		(Source: Derived)
dead_time CHUNKED	FLOAT(:)	Dead Time None	ns	Dead time value (Source: Derived)
ffb_corr CHUNKED	DOUBLE(:,:,:)	FFB Correction None	1	First Photon Bias Correction (width, strength, deadtime) (Source: Derived)
strength_strong CHUNKED	DOUBLE(:,:)	Strong Beam Strength None	events/shot	Strong spot strength in events/shot (strength, deadtime) (Source: Derived)
strength_weak CHUNKED	DOUBLE(:,:)	Weak Beam Strength None	events/shot	Weak spot strength in events/shot (strength, deadtime) (Source: Derived)
width CHUNKED	DOUBLE(:,:)	Apparent Width None	ns	Apparent width (width, deadtime) (Source: Derived)
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity		CAL46 - Relationship describing detector responsivity as the PMT high voltage deviates from nominal high voltage setting (V0).		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal46_product COMPACT	STRING(1)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL46)
side COMPACT	INTEGER(1)	Detector Bank Side None	1	A or B side of the detector bank (Source: CAL46); (Meanings: [1 2]) (Values: ['A', 'B'])
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity/pcex		CAL46 - Per-PCE.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
b_strong COMPACT	FLOAT(1)	b_strong None	1/v	Strong spot coefficient b (Source: CAL46)
b_weak COMPACT	FLOAT(1)	b_weak None	1/v	Weak spot coefficient b (Source: CAL46)
c_strong COMPACT	FLOAT(1)	c_strong None	1/v^2	Strong spot coefficient c (Source: CAL46)
c_weak COMPACT	FLOAT(1)	c_weak None	1/v^2	Weak spot coefficient c (Source: CAL46)
npoints_strong COMPACT	FLOAT(1)	npoints_strong None	1	Strong spot number of points (Source: CAL46)
npoints_weak COMPACT	FLOAT(1)	npoints_weak None	1	Weak spot number of points (Source: CAL46)
rnom_strong COMPACT	FLOAT(1)	r_nom None	1	Strong spot Rnom (Source: CAL46)
rnom_weak COMPACT	FLOAT(1)	r_nom None	1	Weak spot Rnom (Source: CAL46)
sigma_b_strong COMPACT	FLOAT(1)	sigma_b_strong None	1/v	Strong spot sigma of coefficient b (Source: CAL46)
sigma_b_weak COMPACT	FLOAT(1)	sigma_b_weak None	1/v	Weak spot sigma of coefficient b (Source: CAL46)
sigma_c_strong COMPACT	FLOAT(1)	sigma_c_strong None	1/v^2	Strong spot sigma of coefficient c (Source: CAL46)
sigma_c_weak COMPACT	FLOAT(1)	sigma_c_weak None	1/v^2	Weak spot sigma of coefficient c (Source: CAL46)
sigma_fit_strong COMPACT	FLOAT(1)	sigma_fit_strong None	1	Strong spot sigma of fit (Source: CAL46)
sigma_fit_weak COMPACT	FLOAT(1)	sigma_fit_weak None	1	Weak spot sigma of fit (Source: CAL46)
vnom_strong COMPACT	FLOAT(1)	v_nom None	v	Strong spot nominal voltage (Source: CAL46)
vnom_weak COMPACT	FLOAT(1)	v_nom None	v	Weak spot nominal voltage (Source: CAL46)
Group: /ancillary_data/calibrations/laser_energy_conversion		Contains CAL54 - absolute, energy monitor		

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
base_temp COMPACT	FLOAT(1)	Base Temperature None	degC	Base temperature coefficient. (Source: CAL54)
cal54_product COMPACT	STRING(1)	CAL File Name None	1	Name of source file containing the calibration data (Source: CAL54)
internal COMPACT	DOUBLE(8)	Laser Internal Coeffs None	1	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) (Source: CAL54)
lrs COMPACT	DOUBLE(8)	LRS Coeffs None	1	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 (Source: CAL54)
spd COMPACT	DOUBLE(8)	SPD Coeffs None	1	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 (Source: CAL54)
Group: /ancillary_data/calibrations/laser_energy_fraction		Contains CAL45 data - Transmit Energy Fraction per Beam		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal45_product COMPACT	STRING(1)	CAL File Name None	1	Name of source file containing the calibration data (Source: CAL45)
energy_fract COMPACT	FLOAT(6)	Energy Fraction None	1	Energy Fraction, Per Spot (Source: CAL45)
optics_throughput COMPACT	FLOAT(3)	Optics Throughput None	1	Optics Throughput, Per PCE (Source: CAL45)
Group: /ancillary_data/calibrations/low_link_impulse_response		CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
bin_width COMPACT	FLOAT(1)	Bin Width None	seconds	Histogram bin width (Source: CAL20)
cal20_product COMPACT	STRING(1)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL20)
hist_x CONTIGUOUS	DOUBLE(2000)	Histogram Bin X Values None	1	Histogram bin x-values (Source: CAL20)
laser COMPACT	INTEGER(1)	Laser None	1	Laser Number (Source: CAL20)
mode COMPACT	INTEGER(1)	Laser Power Setting None	1	Laser Power Setting (Source: CAL20)
num_bins COMPACT	INTEGER(1)	Number of Bins None	1	Number of bins in the histogram (Source: CAL20)
return_source COMPACT	INTEGER(1)	Return Source None	1	Source of the events from which the data are derived. (Source: CAL20); (Meanings: [0 1 2 3]) (Values: ['none', 'tep', 'maat', 'echo'])
side COMPACT	INTEGER(1)	A_or_B None	1	A or B Side Component (Source: CAL20); (Meanings: [1 2]) (Values: ['A', 'B'])
temperature COMPACT	FLOAT(1)	Temperature None	degreesC	Temperature for which calibrations are provided. (Source: CAL20)
Group: /ancillary_data/calibrations/low_link_impulse_response/pcex		CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
hist CONTIGUOUS	DOUBLE(20,2000)	Histogram None	1	Per-Channel Histogram (Source: CAL20)
total_events COMPACT	INTEGER_8(20)	Total Events None	1	Number of events used in constructing the per-channel histogram (Source: CAL20)
Group: /ancillary_data/calibrations/nominal_rx_sensitivity		CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal30_product	STRING(1)	CAL Product Name	1	Name of ATLAS CAL Product containing the calibration data

COMPACT		None		(Source: CAL30)
side COMPACT	INTEGER(1)	Detector Bank Side None	1	A or B side of the detector bank (Source: CAL30); (Meanings: [1 2]) (Values: ['A', 'B'])
Group: /ancillary_data/calibrations/nominal_rx_sensitivity/pcex		CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
rms_resid_strong COMPACT	DOUBLE(1)	RMS Residual None	1	Strong spot RMS Residual fraction (Source: CAL30)
rms_resid_weak COMPACT	DOUBLE(1)	RMS Residual None	1	Weak spot RMS Residual fraction (Source: CAL30)
sdev_strong COMPACT	DOUBLE(1)	sdev_strong None	counts/s/pW	Strong spot standard deviation (Source: CAL30)
sdev_weak COMPACT	DOUBLE(1)	sdev_weak None	counts/s/pW	Weak spot standard deviation (Source: CAL30)
slope_strong COMPACT	DOUBLE(1)	Slope None	counts/s/pW	Strong spot Slope (Source: CAL30)
slope_weak COMPACT	DOUBLE(1)	Slope None	counts/s/pW	Weak spot Slope (Source: CAL30)
Group: /ancillary_data/calibrations/receiver_channel_skews		CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Group: /ancillary_data/calibrations/receiver_channel_skews/pcex		CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal49_product COMPACT	STRING(1)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL49)
side COMPACT	INTEGER(1)	Primary_Redundant None	1	Primary or Redundant Component (Source: CAL49); (Meanings: [1 2]) (Values: ['PRIM', 'REDU'])
skew_fall COMPACT	FLOAT(20)	Skew_Fall None	seconds	Per-channel skew (Fall) (Source: CAL49)
skew_fall_stderr COMPACT	FLOAT(20)	Skew_Fall StdErr None	seconds	Standard error of the calculated skew (Fall) (Source: CAL49)
skew_rise CONTIGUOUS	FLOAT(20)	Skew_Rise None	seconds	Per-channel skew (Rise) (Source: CAL49)
skew_rise_stderr COMPACT	FLOAT(20)	Skew_Rise StdErr None	seconds	Standard error of the calculated skew (Rise) (Source: CAL49)
temperature COMPACT	FLOAT(1)	Temperature None	degreesC	Temperature for which calibrations are retrieved. (Source: CAL49)
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment		CAL47 - Provides a calibration for Receiver Sensitivity as a function of Transmit-to-Receiver Beam Misalignment.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
azimuth CHUNKED	DOUBLE(:)	Azimuth None	microradians	Azimuth (Source: CAL47_IMG)
azimuth_grid_range COMPACT	FLOAT(2)	Azimuth Grid Range None	microradians	Azimuth Grid Range (Source: CAL47_IMG)
cal47_product COMPACT	STRING(6)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL47_IMG)
elevation CHUNKED	DOUBLE(:)	Elevation None	microradians	Elevation (Source: CAL47_IMG)
elevation_grid_range COMPACT	FLOAT(2)	Elevation Grid Range None	microradians	Elevation Grid Range (Source: CAL47_IMG)
grid_spacing COMPACT	FLOAT(1)	Grid Spacing None	microradians	GridSpacing (Source: CAL47_IMG)
temperature COMPACT	FLOAT(1)	Temperature None	degC	Reference temperature within the CAL47 product. (Source: CAL47_IMG)
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment/pcex		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(Dims) Fillvalue	long_name standard_name	units	description
rel_intensity_strong CHUNKED	DOUBLE(:,:)	Relative intensity None	1	Strong spot relative intensity (Source: CAL47_IMG)
rel_intensity_weak CHUNKED	DOUBLE(:,:)	Relative intensity None	1	Weak spot relative intensity (Source: CAL47_IMG)
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom		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(Dims) Fillvalue	long_name standard_name	units	description
cal61_product COMPACT	STRING(1)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL61)
laser COMPACT	INTEGER(1)	Laser None	1	Laser Number (Source: CAL61)
mode COMPACT	INTEGER(1)	Laser Power Setting None	1	Laser Power Setting (Source: CAL61)
side COMPACT	INTEGER(1)	Detector Bank Side None	1	A or B side of the detector bank (Source: CAL61); (Meanings: [1 2]) (Values: ['A', 'B'])
temperature COMPACT	FLOAT(1)	Temperature None	degreesC	Temperature for which calibrations are provided. (Source: CAL61)
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom/pcex		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(Dims) Fillvalue	long_name standard_name	units	description
h_strong COMPACT	DOUBLE(1)	h_strong None	1	h_strong; used in Eqn 5-17. (Source: CAL61)
h_weak COMPACT	DOUBLE(1)	h_weak None	1	h_weak; used in Eqn 5-17. (Source: CAL61)
rms_of_fit_strong COMPACT	DOUBLE(1)	rms_of_fit_strong None	1	rms_of_fit_strong (Source: CAL61)
rms_of_fit_weak COMPACT	DOUBLE(1)	rms_of_fit_weak None	1	rms_of_fit_weak (Source: CAL61)
sdev_h_strong COMPACT	DOUBLE(1)	sdev_h_strong None	1	sdev_h_strong (Source: CAL61)
sdev_h_weak COMPACT	DOUBLE(1)	sdev_h_weak None	1	sdev_h_weak (Source: CAL61)
sdev_xpeak_strong COMPACT	DOUBLE(1)	sdev_xpeak_strong None	1	sdev_xpeak_strong (Source: CAL61)
sdev_xpeak_weak COMPACT	DOUBLE(1)	sdev_xpeak_weak None	1	sdev_xpeak_weak (Source: CAL61)
sdev_ypeak_strong COMPACT	DOUBLE(1)	sdev_ypeak_strong None	counts/s	sdev_ypeak_strong (Source: CAL61)
sdev_ypeak_weak COMPACT	DOUBLE(1)	sdev_ypeak_weak None	counts/s	sdev_ypeak_weak (Source: CAL61)
xpeak_strong COMPACT	DOUBLE(1)	xpeak_strong None	1	xpeak_strong; used in Eqn 5-17. (Source: CAL61)
xpeak_weak COMPACT	DOUBLE(1)	xpeak_weak None	1	xpeak_weak; used in Eqn 5-17. (Source: CAL61)
ypeak_strong COMPACT	DOUBLE(1)	ypeak_strong None	counts/s	ypeak_strong (Source: CAL61)
ypeak_weak COMPACT	DOUBLE(1)	ypeak_weak None	counts/s	ypeak_weak (Source: CAL61)
Group: /ancillary_data/calibrations/start_timing_skews		CAL44 - Start Timing Skews. Produces START pulse timing skews within & among PCEs to properly align all start pulse timing channels.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cal44_product CHUNKED	STRING(:)	CAL Product Name None	1	Name of ATLAS CAL Product containing the calibration data (Source: CAL44)

ll1 CHUNKED	FLOAT(:)	LL1 None	seconds	Leading Lower Skew, PCE1 (Source: CAL44)
ll2_ll1 CHUNKED	FLOAT(:)	LL2-LL1 None	seconds	LL2-LL1 (Source: CAL44)
ll3_ll1 CHUNKED	FLOAT(:)	LL3-LL1 None	seconds	LL3-LL1 (Source: CAL44)
lu_ll1 CHUNKED	FLOAT(:)	LU-LL1 None	seconds	LU-LL1 (Source: CAL44)
side COMPACT	INTEGER(1)	SPD Side None	1	A or B side of the Start Pulse Detector (Source: CAL44); (Meanings: [1 2]) (Values: ['A', 'B'])
spd_temp CHUNKED	FLOAT(:)	SPD_Temp None	degreesC	SPD Temperature (Source: CAL44)
tl_ll3 CHUNKED	FLOAT(:)	TL-LL3 None	seconds	TL-LL3 (Source: CAL44)
tu_ll2 CHUNKED	FLOAT(:)	TU-LL2 None	seconds	TU-LL2 (Source: CAL44)
Group: /ancillary_data/housekeeping		Constants and calibrations related to ATLAS housekeeping data.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
det_ab_flag COMPACT	INTEGER(1)	Detector Side, A or B None	1	Indicates if the active detector (DET) is side A (1) or side B (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
hvpc_ab_flag COMPACT	INTEGER(1)	HVPC Side, A or B None	1	Indicates if the active High Voltage Power Converter (HVPC) is side A (1) or side B (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
laser_12_flag COMPACT	INTEGER(1)	Laser 1 or Laser 2 None	1	Indicates if the active Laser is laser 1 or laser 2. (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['1', '2'])
lrs_ab_flag COMPACT	INTEGER(1)	LRS Side A or B None	1	Indicates if the active LRS is side A (1) or side B (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
pdu_ab_flag COMPACT	INTEGER(1)	PDU Side A or B None	1	Indicates if the active PDU is side a (1) or side b (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
spd_ab_flag COMPACT	INTEGER(1)	SPD A or B None	1	Indicates if the active Start Pulse Detector (SPD) is side a (1) or side b (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
tams_ab_flag COMPACT	INTEGER(1)	TAMS Side A or B None	1	Indicates if the active TAMS is side a (1) or side b (2). (Source: Derived, L1B ATBD); (Meanings: [1 2]) (Values: ['a', 'b'])
Group: /ancillary_data/isf		Constants and calibrations provided by the ICESat-2 Instrument Support Facility (via ANC27)		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
bias_offset_x COMPACT	DOUBLE(2)	AMCS Bias Offset X None	microradians	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. (Source: ANC27 (ATBD Section 5.3.3.1))
bias_offset_y COMPACT	DOUBLE(2)	AMCS Bias Offset Y None	microradians	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. (Source: ANC27 (ATBD Section 5.3.3.1))
bias_rate COMPACT	DOUBLE(1)	AMCS bias rate None	microradians/undefined_time	Currently a placeholder, not used in calculations. (Source: ANC27 (ATBD Section 5.3.3.1))
bias_time COMPACT	DOUBLE(2)	AMCS Bias Time None	seconds since 2018-01-01	Times of surrounding AMCS bias corrections (Source: ANC27 (ATBD Section 5.3.3.1))
cal46_aging COMPACT	DOUBLE(1)	CAL46 Aging Factor None	1	CAL46 Aging correction factor (Source: ANC27 (ATBD Section 5.3.14))
start_time_coeff COMPACT	DOUBLE(8,4)	Start Time Coefficients None	ns	Start time coefficients for TOF center correction (coefficent x scenario) (Source: ANC27 (ATBD Section 3.5.6))
uso_freq_dev COMPACT	DOUBLE(1)	USO Frequence Deviation None	hz	USO frequency deviation; Used in Eqn 2-4. (Source: ANC27)
wtom_alt_tune_corr COMPACT	DOUBLE(1)	WTOM Alt Tuning Correction None	1	W" in Eqn 5-15. Used only for alternate tuning; method for calculating not defined. (Source: ANC27 (ATBD Section 5.3.3.2))
wtom_lambda_off COMPACT	DOUBLE(1)	WTOM Wavelength Offset None	1	WTOM Wavelength Offset. Currently zero. An "off-tuning" value to be used with alternate tuning; method for calculating not defined. (Source: ANC27 (ATBD Section 5.3.3.2))

wtom_tune_flag COMPACT	INTEGER(1)	WTOM Tuning Flag None	1	WTOM Tuning Flag (1=standard method, 2=alternate method) (Source: ANC27 (ATBD Section 5.3.3.2)); (Meanings: [1 2]) (Values: ['std', 'alt'])
Group: /ancillary_data/tep		Contains ancillary values related to TEP detection.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
tep_check_pce1 COMPACT	INTEGER(1)	TEP flag for PCE1. None	1	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. (Source: ATLAS L1B ATBD); (Meanings: [0 1]) (Values: ['do_not_check', 'check'])
tep_check_pce2 COMPACT	INTEGER(1)	TEP flag for PCE2. None	1	Flag indicating that the PCE2 strong channels should be checked for TEP events. Default value is 1 (indicating that TEP is possible on PCE2). A value of 0 indicates that PCE2 data are not examined for TEP. (Source: ATLAS L1B ATBD); (Meanings: [0 1]) (Values: ['do_not_check', 'check'])
tep_check_pce3 COMPACT	INTEGER(1)	TEP flag for PCE3. None	1	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). (Source: ATLAS L1B ATBD); (Meanings: [0 1]) (Values: ['do_not_check', 'check'])
thres_tep_max COMPACT	DOUBLE(1)	TEP Detection Maximum None	seconds	Maximum value used to classify TEP photons. Default value per ATBD is 100ns. (100e-9 sec) (Source: ATLAS L1B ATBD)
thres_tep_min COMPACT	DOUBLE(1)	TEP Detection Minimum None	seconds	Minimum value used to classify TEP photons. Default value per ATBD is 0ns. (0e-9 sec) (Source: ATLAS L1B ATBD)
Group: /ancillary_data/tod_tof		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(Dims) Fillvalue	long_name standard_name	units	description
cal_risefall_box_int COMPACT	DOUBLE(1)	cal_risefall boxcar interval None	counts	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. (Source: ATLAS L1B ATBD)
cal_uso_scale COMPACT	DOUBLE(1)	Calibration value for USO None	1	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. (Source: ATLAS L1B ATBD)
corr_rx_coarse_pce1 COMPACT	INTEGER(20)	Correction value for PCE1 Rx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
corr_rx_coarse_pce2 COMPACT	INTEGER(20)	Correction value for PCE2 Rx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
corr_rx_coarse_pce3 COMPACT	INTEGER(20)	Correction value for PCE3 Rx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
corr_tx_coarse_pce1 COMPACT	INTEGER(1)	Correction value for PCE1 Tx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
corr_tx_coarse_pce2 COMPACT	INTEGER(1)	Correction value for PCE2 Tx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
corr_tx_coarse_pce3 COMPACT	INTEGER(1)	Correction value for PCE3 Tx coarse clock offset None	counts	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. (Source: ATLAS L1B ATBD)
discard_short_mframes COMPACT	INTEGER(1)	Discard_Short_MFrames None	1	If TRUE, discard the photons associated with major frames containing less than 199 Tx. (Source: ATLAS L1B ATBD,)
dt_imet COMPACT	DOUBLE(1)	IMET Clock Tick None	seconds/count	IMET clock tick. (Source: ATLAS L1B ATBD, Section 4.2.1)
dt_t0 COMPACT	DOUBLE(1)	T0 Clock Tick None	seconds/count	T0 clock tick. (Source: ATLAS L1B ATBD, Section 4.2.1)
dt_uso COMPACT	DOUBLE(1)	USO (AMET) Clock Tick None	seconds/count	The AMET clock tick (Source: ATLAS L1B ATBD, Section 4.2.1)
dupe_fc_tol COMPACT	FLOAT(1)	Duplicate_Tolerance None	counts	Tolerance used when comparing fine counts within duplicate detection (Source: ATLAS L1B ATBD)
lrs_clock	DOUBLE(1)	LRS Clock Rate	seconds/count	The nominal rate of the LRS internal 27 MHz oscillator (divided by 32).

COMPACT		None		(Source: ATLAS L1B ATBD)
min_conf COMPACT	INTEGER(1)	Minimum Confidence None	1	Minimum TxRx histogram confidence level to fail a granule. (Source: ATLAS L1B ATBD,)
repair_txrx_slip COMPACT	INTEGER(1)	TXRX_Slip_Repair None	1	If TRUE, attempt to repair any detected TXRX slip. (Source: ATLAS L1B ATBD,)
tof_bin_size COMPACT	DOUBLE(1)	TOF Histogram Bin Size None	seconds	Binsize of peak-aligned, windowed TOF histograms. (Source: ATLAS L1B ATBD,)
tof_extracted_s COMPACT	DOUBLE(1)	Duration of TOF Histogram Window None	seconds	Duration of peak-aligned, windowed TOF histograms. (Source: ATLAS L1B ATBD,)
tof_lower_win_ctr COMPACT	DOUBLE(1)	Center of TOF Histogram Lower Window None	seconds	Center of the lower TxRx slip detection window within the peak-aligned, windowed TOF histograms. (Source: ATLAS L1B ATBD,)
tof_upper_win_ctr COMPACT	DOUBLE(1)	Center of TOF Histogram Upper Window None	seconds	Center of the upper TxRx slip detection window within the peak-aligned, windowed TOF histograms. (Source: ATLAS L1B ATBD,)
tof_win_size COMPACT	DOUBLE(1)	Size of TOF Histogram Windows None	seconds	Size of the TxRx slip detection windows within the peak-aligned, windowed TOF histograms. (Source: ATLAS L1B ATBD,)
Group: /atlas		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		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		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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) (Source: Derived via Time Tagging)
e_tx CHUNKED	FLOAT(:)	total laser energy None	joules	Total laser energy derived from the internal laser energy monitor (APID 1032). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_s CHUNKED	FLOAT(:)	Spot laser energy for PCE1, strong None	joules	Laser energy for the PCE1 strong spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_w CHUNKED	FLOAT(:)	Spot laser energy for PCE1, weak None	joules	Laser energy for the PCE1 weak spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_s CHUNKED	FLOAT(:)	Spot laser energy for PCE2, strong None	joules	Laser energy for the PCE2 strong spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_w CHUNKED	FLOAT(:)	Spot laser energy for PCE2, weak None	joules	Laser energy for the PCE2 weak spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce3_s CHUNKED	FLOAT(:)	Spot laser energy for PCE3, strong None	joules	Laser energy for the PCE3 strong spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce3_w CHUNKED	FLOAT(:)	Spot laser energy for PCE3, weak None	joules	Laser energy for the PCE3 weak spot, derived from the internal laser energy monitor and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
laser_mode CHUNKED	INTEGER_1(:)	Laser Mode Setting None	1	Laser Mode setting reported in A_SLA_HK (APID 1032). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
laser_temp CHUNKED	FLOAT(:)	Laser Temperature None	degreesC	Laser Temperature. From SLA_HK Telemetry packet (APID 1032, Laser Cmd Code 0xFE LAS-14, raw_lem_temp). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)

Group: /atlas/housekeeping/laser_energy_lrs		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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) (Source: Derived via Time Tagging)
e_tx CHUNKED	FLOAT(:) INVALID_R4B	total laser energy None	joules	Total laser energy from derived from LRS laser centroid magnitudes. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_s CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE1, strong None	joules	Laser energy for the PCE1 strong spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_w CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE1, weak None	joules	Laser energy for the PCE1 weak spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_s CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE2, strong None	joules	Laser energy for the PCE2 strong spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_w CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE2, weak None	joules	Laser energy for the PCE2 weak spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce3_s CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE3, strong None	joules	Laser energy for the PCE3 strong spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce3_w CHUNKED	FLOAT(:) INVALID_R4B	Spot laser energy for PCE3, weak None	joules	Laser energy for the PCE3 weak spot, derived from LRS laser centroids and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
lrs_temp CHUNKED	FLOAT(:) INVALID_R4B	Laser Temperature None	degreesC	LRS Temperature. From A_HKT_C Telemetry packet (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
Group: /atlas/housekeeping/laser_energy_spd		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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) (Source: Derived via Time Tagging)
ds_10 CONTIGUOUS	INTEGER_1(10)	DS for 10 measurements None	1	Dimension scale for10 measurements. (Source: ATLAS)
e_tx CHUNKED	FLOAT(:,:)	total laser energy None	joules	Total laser energy from Analog HK Telemetry packet E (APID 1063). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_s CHUNKED	FLOAT(:,:)	Spot laser energy for PCE1, strong None	joules	Laser energy for the PCE1 strong spot, derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce1_w CHUNKED	FLOAT(:,:)	Spot laser energy for PCE1, weak None	joules	Laser energy for the PCE1 weak spot derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_s CHUNKED	FLOAT(:,:)	Spot laser energy for PCE2, strong None	joules	Laser energy for the PCE2 strong spot, derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce2_w CHUNKED	FLOAT(:,:)	Spot laser energy for PCE2, weak None	joules	Laser energy for the PCE2 weak spot, derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)

e_tx_pce3_s CHUNKED	FLOAT(:,:)	Spot laser energy for PCE3, strong None	joules	Laser energy for the PCE3 strong spot, derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
e_tx_pce3_w CHUNKED	FLOAT(:,:)	Spot laser energy for PCE3, weak None	joules	Laser energy for the PCE3 weak spot, derived from the analog HK telemetry and split by calibration. (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
edge_xmtnc CHUNKED	FLOAT(:)	SPD Edge None	mV	edge_xmtnc. From Analog HK Telemetry packet E (APID 1063). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
laser_temp CHUNKED	FLOAT(:)	Laser Temperature None	degreesC	Laser Temperature. From A_HKT_C PRIMARY SPD THERMISTOR MED_34 chan[74] or REDUNDANT SPD THERMISTOR MED_35 chan[81] (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
peak_xmtnc CHUNKED	FLOAT(:)	SPD Peak None	mV	peak_xmtnc. From Analog HK Telemetry packet E (APID 1063). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
thrhi_rdbk CHUNKED	FLOAT(:)	SPD Upper Thres None	volts	Start Pulse Detector (SPD) upper threshold readback value. Reported as an analog voltage whose nominal setting puts the threshold at 80% of full laser energy. From Analog HK Telemetry packet E (APID 1063). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
thrlo_rdbk CHUNKED	FLOAT(:)	SPD Lower Thres None	volts	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). (Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy)
Group: /atlas/housekeeping/mce_position		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (nominally 1 HZ.)		
ds_50 CONTIGUOUS	INTEGER_1(50)	DS for 50 measurements None	1	Dimension scale for 50 measurements. (Source: ATLAS)
mce_az CHUNKED	FLOAT(:,:)	A MCE AZ None	microradians	MCE azimuth values. (Source: ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE)
mce_el CHUNKED	FLOAT(:,:)	MCE EL None	microradians	MCE elevation values. (Source: ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE)
mce_total_cycles CHUNKED	UINT_4_LE(:)	A MCE total cycles None	counts	MCE reported total number of cycles (Source: ATL01/atlas/a_mce_pos_1057)
Group: /atlas/housekeeping/meb		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
hkt_ground_check CHUNKED	FLOAT(:)	Ground check None	counts	Ground check - A_HKT_D.chan[30] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5v_asc_v CHUNKED	FLOAT(:)	1P5VTLM-ASC None	volts	1P5VTLM-ASC - A_HKT_D.chan[22] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5v_mon_v CHUNKED	FLOAT(:)	HKT 1.5V Monitor None	volts	HKT 1.5V Monitor - A_HKT_D.chan[5] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5va_pce1_v CHUNKED	FLOAT(:)	1P5VATLM-PCE1 None	volts	1P5VATLM-PCE1 - A_HKT_D.chan[23] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5va_pce2_v CHUNKED	FLOAT(:)	1P5VATLM-PCE2 None	volts	1P5VATLM-PCE2 - A_HKT_D.chan[16] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5va_pce3_v CHUNKED	FLOAT(:)	1P5VATLM-PCE3 None	volts	1P5VATLM-PCE3 - A_HKT_D.chan[17] (Source: ATL01/atlas/a_hkt_d_1062 converted)

hkt_meb_1p5vb_pce1_v CHUNKED	FLOAT(:)	1P5VBTLM-PCE1 None	volts	1P5VBTLM-PCE1 - A_HKT_D.chan[24] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5vb_pce2_v CHUNKED	FLOAT(:)	1P5VBTLM-PCE2 None	volts	1P5VBTLM-PCE2 - A_HKT_D.chan[25] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_1p5vb_pce3_v CHUNKED	FLOAT(:)	1P5VBTLM-PCE3 None	volts	1P5VBTLM-PCE3 - A_HKT_D.chan[18] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_2p5v_pce1_v CHUNKED	FLOAT(:)	2P5VTLM-PCE1 None	volts	2P5VTLM-PCE1 - A_HKT_D.chan[19] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_2p5v_pce2_v CHUNKED	FLOAT(:)	2P5VTLM-PCE2 None	volts	2P5VTLM-PCE2 - A_HKT_D.chan[26] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_2p5v_pce3_v CHUNKED	FLOAT(:)	2P5VTLM-PCE3 None	volts	2P5VTLM-PCE3 - A_HKT_D.chan[27] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_3p3i_lvpc_i CHUNKED	FLOAT(:)	3P3ITLM-LVPC None	amps	3P3ITLM-LVPC - A_HKT_D.chan[12] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_3p3v_mon_v CHUNKED	FLOAT(:)	3.3V Monitor None	volts	3.3V Monitor - A_HKT_D.chan[6] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_5p0i_lvpc_i CHUNKED	FLOAT(:)	5P0ITLM-LVPC None	amps	5P0ITLM-LVPC - A_HKT_D.chan[13] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_5p0i_sbc_i CHUNKED	FLOAT(:)	5P0I_SBC_TLM None	amps	5P0I_SBC_TLM - A_HKT_D.chan[28] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_5p0v_sbc_v CHUNKED	FLOAT(:)	5P0V_SBC_TLM None	volts	5P0V_SBC_TLM - A_HKT_D.chan[29] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_cal_n35p9_t CHUNKED	FLOAT(:)	CAL -35.9 None	degreesC	CAL -35.9 - A_HKT_D.chan[3] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_cal_n62p5_t CHUNKED	FLOAT(:)	CAL -62.5 None	degreesC	CAL -62.5 - A_HKT_D.chan[4] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_cal_n6p6_t CHUNKED	FLOAT(:)	CAL -6.6 None	degreesC	CAL -6.6 - A_HKT_D.chan[2] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_cal_p25_t CHUNKED	FLOAT(:)	CAL +25 None	degreesC	CAL +25 - A_HKT_D.chan[1] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_cal_p65p3_t CHUNKED	FLOAT(:)	CAL +65.3 None	degreesC	CAL +65.3 - A_HKT_D.chan[0] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_i_uso_i CHUNKED	FLOAT(:)	ITLM-USO None	amps	ITLM-USO - A_HKT_D.chan[15] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_n15p0i_lvpc_i CHUNKED	FLOAT(:)	15P0I_NEG_TLM-LVPC None	amps	15P0I_NEG_TLM-LVPC - A_HKT_D.chan[21] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_n15v_mon_v CHUNKED	FLOAT(:)	-15V Monitor None	volts	-15V Monitor - A_HKT_D.chan[10] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_n5a_mon_v CHUNKED	FLOAT(:)	HKT -5A Monitor None	volts	HKT -5A Monitor - A_HKT_D.chan[11] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_p15p0i_lvpc_i CHUNKED	FLOAT(:)	15P0I_POS_TLM-LVPC None	amps	15P0I_POS_TLM-LVPC - A_HKT_D.chan[20] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_p15v_mon_v CHUNKED	FLOAT(:)	+15V Monitor None	volts	+15V Monitor - A_HKT_D.chan[9] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_p5a_mon_v CHUNKED	FLOAT(:)	HKT +5A Monitor None	volts	HKT +5A Monitor - A_HKT_D.chan[8] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_p5d_mon_v CHUNKED	FLOAT(:)	+5D Monitor None	volts	+5D Monitor - A_HKT_D.chan[7] (Source: ATL01/atlas/a_hkt_d_1062 converted)
hkt_meb_v_uso_v CHUNKED	FLOAT(:)	VTLM-USO None	volts	VTLM-USO - A_HKT_D.chan[14] (Source: ATL01/atlas/a_hkt_d_1062 converted)
Group: /atlas/housekeeping/pdu		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time	DOUBLE(:)	Elapsed GPS seconds	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP GPS Epoch. This is computed based on the housekeeping design to

CHUNKED		time		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. (Source: Derived via Time Tagging)
hvpc_mod_1 CHUNKED	FLOAT(:)	HVPC Module 1 None	counts	HVPC Module 1 - A_HKT.chan[70] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_mod_2 CHUNKED	FLOAT(:)	HVPC Module 2 None	counts	HVPC Module 2 - A_HKT.chan[71] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_mod_3 CHUNKED	FLOAT(:)	HVPC Module 3 None	counts	HVPC Module 3 - A_HKT.chan[72] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_mod_4 CHUNKED	FLOAT(:)	HVPC Module 4 None	counts	HVPC Module 4 - A_HKT.chan[73] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_mod_5 CHUNKED	FLOAT(:)	HVPC Module 5 None	counts	HVPC Module 5 - A_HKT.chan[74] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_mod_6 CHUNKED	FLOAT(:)	HVPC Module 6 None	counts	HVPC Module 6 - A_HKT.chan[75] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_tlm_6 CHUNKED	FLOAT(:)	HVPC TLM 6 None	volts	HVPC TLM 6 - A_HKT.chan[76] (Source: ATL01/atlas/a_hkt_a_1059 converted)
hvpc_tlm_7 CHUNKED	FLOAT(:)	HVPC TLM 7 None	volts	HVPC TLM 7 - A_HKT.chan[77] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_daa_opts_htr_i CHUNKED	FLOAT(:)	PDU DAA OPTS HTR I None	amps	PDU DAA OPTS HTR I - A_HKT.chan[46] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_det_i CHUNKED	FLOAT(:)	PDU DET I None	amps	PDU DET I - A_HKT.chan[23] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_det_v CHUNKED	FLOAT(:)	PDU DET V None	volts	PDU DET V - A_HKT.chan[17] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_hvpc_i CHUNKED	FLOAT(:)	PDU HVPC I None	amps	PDU HVPC I - A_HKT.chan[24] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_laser_1_i CHUNKED	FLOAT(:)	PDU LASER 1 I None	amps	PDU LASER 1 I - A_HKT.chan[21] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_laser_1_v CHUNKED	FLOAT(:)	PDU LASER 1 V None	volts	PDU LASER 1 V - A_HKT.chan[14] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_laser_2_i CHUNKED	FLOAT(:)	PDU LASER 2 I None	amps	PDU LASER 2 I - A_HKT.chan[22] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_laser_2_v CHUNKED	FLOAT(:)	PDU LASER 2 V None	volts	PDU LASER 2 V - A_HKT.chan[15] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_lhp1_i CHUNKED	FLOAT(:)	PDU LHP1 I None	amps	PDU LHP1 I - A_HKT.chan[43] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_lhp2_i CHUNKED	FLOAT(:)	PDU LHP2 I None	amps	PDU LHP2 I - A_HKT.chan[44] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_lhp_startup_htr_i CHUNKED	FLOAT(:)	PDU LHP STARTUP HTR I None	amps	PDU LHP STARTUP HTR I - A_HKT.chan[42] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_lrs_i CHUNKED	FLOAT(:)	PDU LRS I None	amps	PDU LRS I - A_HKT.chan[25] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_lrs_opts_heater_i CHUNKED	FLOAT(:)	PDU LRS OPTS HEATER I None	amps	PDU LRS OPTS HEATER I - A_HKT.chan[45] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_meb_lvpc_i CHUNKED	FLOAT(:)	PDU MEB LVPC I None	amps	PDU MEB LVPC I - A_HKT.chan[26] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_meb_lvpc_v CHUNKED	FLOAT(:)	PDU MEB LVPC V None	volts	PDU MEB LVPC V - A_HKT.chan[16] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem1_i CHUNKED	FLOAT(:)	PDU N3V DEM1 I None	amps	PDU N3V DEM1 I - A_HKT.chan[52] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem1_v CHUNKED	FLOAT(:)	PDU N3V DEM1 V None	volts	PDU N3V DEM1 V - A_HKT.chan[2] (Source: ATL01/atlas/a_hkt_a_1059 converted)

pdu_n3v_dem2_i CHUNKED	FLOAT(:)	PDU N3V DEM2 I None	amps	PDU N3V DEM2 I - A_HKT.chan[63] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem2_v CHUNKED	FLOAT(:)	PDU N3V DEM2 V None	volts	PDU N3V DEM2 V - A_HKT.chan[5] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem3_i CHUNKED	FLOAT(:)	PDU N3V DEM3 I None	amps	PDU N3V DEM3 I - A_HKT.chan[55] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem3_v CHUNKED	FLOAT(:)	PDU N3V DEM3 V None	volts	PDU N3V DEM3 V - A_HKT.chan[8] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem4_i CHUNKED	FLOAT(:)	PDU N3V DEM4 I None	amps	PDU N3V DEM4 I - A_HKT.chan[66] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem5_i CHUNKED	FLOAT(:)	PDU N3V DEM5 I None	amps	PDU N3V DEM5 I - A_HKT.chan[58] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem5_v CHUNKED	FLOAT(:)	PDU N3V DEM5 V None	volts	PDU N3V DEM5 V - A_HKT.chan[11] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_n3v_dem6_i CHUNKED	FLOAT(:)	PDU N3V DEM6 I None	amps	PDU N3V DEM6 I - A_HKT.chan[69] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_ofa_n12v_v CHUNKED	FLOAT(:)	PDU OFA N12V V None	volts	PDU OFA N12V V - A_HKT.chan[13] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_ofa_p12v_i CHUNKED	FLOAT(:)	PDU OFA P12V I None	amps	PDU OFA P12V I - A_HKT.chan[59] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_ofa_p12v_v CHUNKED	FLOAT(:)	PDU OFA P12V V None	volts	PDU OFA P12V V - A_HKT.chan[12] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem1_i CHUNKED	FLOAT(:)	PDU P3P3V DEM1 I None	amps	PDU P3P3V DEM1 I - A_HKT.chan[51] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem1_v CHUNKED	FLOAT(:)	PDU P3P3V DEM1 V None	volts	PDU P3P3V DEM1 V - A_HKT.chan[1] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem2_i CHUNKED	FLOAT(:)	PDU P3P3V DEM2 I None	amps	PDU P3P3V DEM2 I - A_HKT.chan[62] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem2_v CHUNKED	FLOAT(:)	PDU P3P3V DEM2 V None	volts	PDU P3P3V DEM2 V - A_HKT.chan[4] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem3_i CHUNKED	FLOAT(:)	PDU P3P3V DEM3 I None	amps	PDU P3P3V DEM3 I - A_HKT.chan[54] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem3_v CHUNKED	FLOAT(:)	PDU P3P3V DEM3 V None	volts	PDU P3P3V DEM3 V - A_HKT.chan[7] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem4_i CHUNKED	FLOAT(:)	PDU P3P3V DEM4 I None	amps	PDU P3P3V DEM4 I - A_HKT.chan[65] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem5_i CHUNKED	FLOAT(:)	PDU P3P3V DEM5 I None	amps	PDU P3P3V DEM5 I - A_HKT.chan[57] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem5_v CHUNKED	FLOAT(:)	PDU P3P3V DEM5 V None	volts	PDU P3P3V DEM5 V - A_HKT.chan[10] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p3p3v_dem6_i CHUNKED	FLOAT(:)	PDU P3P3V DEM6 I None	amps	PDU P3P3V DEM6 I - A_HKT.chan[68] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem1_i CHUNKED	FLOAT(:)	PDU P5V DEM1 I None	amps	PDU P5V DEM1 I - A_HKT.chan[50] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem1_v CHUNKED	FLOAT(:)	PDU P5V DEM1 V None	volts	PDU P5V DEM1 V - A_HKT.chan[0] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem2_i CHUNKED	FLOAT(:)	PDU P5V DEM2 I None	amps	PDU P5V DEM2 I - A_HKT.chan[61] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem2_v CHUNKED	FLOAT(:)	PDU P5V DEM2 V None	volts	PDU P5V DEM2 V - A_HKT.chan[3] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem3_i CHUNKED	FLOAT(:)	PDU P5V DEM3 I None	amps	PDU P5V DEM3 I - A_HKT.chan[53] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem3_v CHUNKED	FLOAT(:)	PDU P5V DEM3 V None	volts	PDU P5V DEM3 V - A_HKT.chan[6] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem4_i CHUNKED	FLOAT(:)	PDU P5V DEM4 I None	amps	PDU P5V DEM4 I - A_HKT.chan[64] (Source: ATL01/atlas/a_hkt_a_1059 converted)

pdu_p5v_dem5_i CHUNKED	FLOAT(:)	PDU P5V DEM5 I None	amps	PDU P5V DEM5 I - A_HKT.chan[56] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem5_v CHUNKED	FLOAT(:)	PDU P5V DEM5 V None	volts	PDU P5V DEM5 V - A_HKT.chan[9] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_p5v_dem6_i CHUNKED	FLOAT(:)	PDU P5V DEM6 I None	amps	PDU P5V DEM6 I - A_HKT.chan[67] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_pwm_tlsp_pri_i CHUNKED	FLOAT(:)	PDU PWM TLSP PRI I None	amps	PDU PWM TLSP PRI I - A_HKT.chan[39] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_pwm_tlsp_sec_i CHUNKED	FLOAT(:)	PDU PWM TLSP SEC I None	amps	PDU PWM TLSP SEC I - A_HKT.chan[40] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_pwm_tlsp_tower_i CHUNKED	FLOAT(:)	PDU PWM TLSP TOWER I None	amps	PDU PWM TLSP TOWER I - A_HKT.chan[41] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spare_1_v CHUNKED	FLOAT(:)	PDU SPARE 1 V None	volts	PDU SPARE 1 V - A_HKT.chan[27] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spare_2_v CHUNKED	FLOAT(:)	PDU SPARE 2 V None	volts	PDU SPARE 2 V - A_HKT.chan[28] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spare_3_v CHUNKED	FLOAT(:)	PDU SPARE 3 V None	volts	PDU SPARE 3 V - A_HKT.chan[29] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spare_4_v CHUNKED	FLOAT(:)	PDU SPARE 4 V None	volts	PDU SPARE 4 V - A_HKT.chan[30] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spare_5_v CHUNKED	FLOAT(:)	A PDU SPARE 5V None	counts	A_PDU_SPARE_5_V - HKT.chan[60] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_n5v_i CHUNKED	FLOAT(:)	PDU SPD N5V I None	amps	PDU SPD N5V I - A_HKT.chan[48] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_n5v_v CHUNKED	FLOAT(:)	PDU SPD N5V V None	volts	PDU SPD N5V V - A_HKT.chan[19] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_p3p3v_i CHUNKED	FLOAT(:)	PDU SPD P3P3V I None	amps	PDU SPD P3P3V I - A_HKT.chan[49] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_p3p3v_v CHUNKED	FLOAT(:)	PDU SPD P3P3V V None	volts	PDU SPD P3P3V V - A_HKT.chan[20] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_p5v_i CHUNKED	FLOAT(:)	PDU SPD P5V I None	amps	PDU SPD P5V I - A_HKT.chan[47] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_spd_p5v_v CHUNKED	FLOAT(:)	PDU SPD P5V V None	volts	PDU SPD P5V V - A_HKT.chan[18] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tams_i CHUNKED	FLOAT(:)	PDU TAMS I None	amps	PDU TAMS I - A_HKT.chan[31] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr1_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR1 I None	amps	PDU TCS OFA HTR1 I - A_HKT.chan[32] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr2_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR2 I None	amps	PDU TCS OFA HTR2 I - A_HKT.chan[33] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr3_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR3 I None	amps	PDU TCS OFA HTR3 I - A_HKT.chan[34] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr4_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR4 I None	amps	PDU TCS OFA HTR4 I - A_HKT.chan[35] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr5_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR5 I None	amps	PDU TCS OFA HTR5 I - A_HKT.chan[36] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr6_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR6 I None	amps	PDU TCS OFA HTR6 I - A_HKT.chan[37] (Source: ATL01/atlas/a_hkt_a_1059 converted)
pdu_tcs_ofa_htr7_i CHUNKED	FLOAT(:)	PDU TCS OFA HTR7 I None	amps	PDU TCS OFA HTR7 I - A_HKT.chan[38] (Source: ATL01/atlas/a_hkt_a_1059 converted)
Group: /atlas/housekeeping/pointing		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
q_sc_i2b_1 CHUNKED	DOUBLE(:)	q_sc_i2b_1 None	1	SC Inertial to ATLAS Body Frame quaternion 1 (Source: ATL01/atlas/a_sc_pon_1138)
q_sc_i2b_2 CHUNKED	DOUBLE(:)	q_sc_i2b_2 None	1	SC Inertial to ATLAS Body Frame quaternion 2 (Source: ATL01/atlas/a_sc_pon_1138)
q_sc_i2b_3 CHUNKED	DOUBLE(:)	q_sc_i2b_3 None	1	SC Inertial to ATLAS Body Frame quaternion 3 (Source: ATL01/atlas/a_sc_pon_1138)
q_sc_i2b_4 CHUNKED	DOUBLE(:)	q_sc_i2b_4 None	1	SC Inertial to ATLAS Body Frame quaternion 4 (Source: ATL01/atlas/a_sc_pon_1138)
sc_solution_sec CHUNKED	UINT_4_LE(:)	sc_solution_sec None	seconds	Recorded time of the pointing solution in seconds from the spacecraft epoch (Source: ATL01/atlas/a_sc_pon_1138)
sc_solution_subsec CHUNKED	UINT_4_LE(:)	sc_solution_subsec None	subseconds	Spacecraft recorded time counts - 24 bits, 100 ns per count (Source: ATL01/atlas/a_sc_pon_1138)
x_sc_body_rate CHUNKED	DOUBLE(:)	x_sc_body_rate None	radians/second	SC body rate as measured about the X axis in the ATLAS frame (Source: ATL01/atlas/a_sc_pon_1138)
y_sc_body_rate CHUNKED	DOUBLE(:)	y_sc_body_rate None	radians/second	SC body rate as measured about the Y axis in the ATLAS frame (Source: ATL01/atlas/a_sc_pon_1138)
z_sc_body_rate CHUNKED	DOUBLE(:)	z_sc_body_rate None	radians/second	SC body rate as measured about the Z axis in the ATLAS frame (Source: ATL01/atlas/a_sc_pon_1138)
Group: /atlas/housekeeping/position_velocity		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
sc_solution_sec CHUNKED	UINT_4_LE(:)	sc_solution_sec None	seconds	Recorded time of the position/velocity solution in seconds from the spacecraft epoch (Source: ATL01/atlas/a_sc_pos_1137)
sc_solution_subsec CHUNKED	UINT_4_LE(:)	sc_solution_subsec None	seconds	Spacecraft recorded time counts - 24 bits, 100 ns per count (Source: ATL01/atlas/a_sc_pos_1137)
x_sc_eci_pos CHUNKED	DOUBLE(:)	x_sc_eci_pos None	meters	Spacecraft Earth-Centered-Inertial Position: X axis (Source: ATL01/atlas/a_sc_pos_1137)
x_sc_eci_vel CHUNKED	DOUBLE(:)	x_sc_eci_vel None	meters/second	Spacecraft Earth-Centered-Inertial Velocity: X axis (Source: ATL01/atlas/a_sc_pos_1137)
y_sc_eci_pos CHUNKED	DOUBLE(:)	y_sc_eci_pos None	meters	Spacecraft Earth-Centered-Inertial Position: Y axis (Source: ATL01/atlas/a_sc_pos_1137)
y_sc_eci_vel CHUNKED	DOUBLE(:)	y_sc_eci_vel None	meters/second	Spacecraft Earth-Centered-Inertial Velocity: Y axis (Source: ATL01/atlas/a_sc_pos_1137)
z_sc_eci_pos CHUNKED	DOUBLE(:)	z_sc_eci_pos None	meters	Spacecraft Earth-Centered-Inertial Position: Z axis (Source: ATL01/atlas/a_sc_pos_1137)
z_sc_eci_vel CHUNKED	DOUBLE(:)	z_sc_eci_vel None	meters/second	Spacecraft Earth-Centered-Inertial Velocity: Z axis (Source: ATL01/atlas/a_sc_pos_1137)
Group: /atlas/housekeeping/radiometry		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(Dims) Fillvalue	long_name standard_name	units	description
bg_sensitivity_pce1_s CHUNKED	FLOAT(:)	PCE1 Strong background sensitivity None	events/s/Watt	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. (Source: ATBD Section 5.5.2)
bg_sensitivity_pce1_w CHUNKED	FLOAT(:)	PCE1 Weak background sensitivity None	events/s/Watt	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. (Source: ATBD Section 5.5.2)
bg_sensitivity_pce2_s	FLOAT(:)	PCE2 Strong background	events/s/Watt	PCE2, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger

CHUNKED		sensitivity None		than the field of view, in the absence of any dead time effects. (Source: ATBD Section 5.5.2)
bg_sensitivity_pce2_w CHUNKED	FLOAT(:)	PCE2 Weak background sensitivity None	events/s/Watt	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. (Source: ATBD Section 5.5.2)
bg_sensitivity_pce3_s CHUNKED	FLOAT(:)	PCE3 Strong background sensitivity None	events/s/Watt	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. (Source: ATBD Section 5.5.2)
bg_sensitivity_pce3_w CHUNKED	FLOAT(:)	PCE3 Weak background sensitivity None	events/s/Watt	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. (Source: ATBD Section 5.5.2)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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) (Source: Derived via L1B ATBD)
ret_sensitivity_pce1_s CHUNKED	FLOAT(:)	PCE1 Strong return sensitivity None	events/s/Watt	PCE1, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
ret_sensitivity_pce1_w CHUNKED	FLOAT(:)	PCE1 Weak return sensitivity None	events/s/Watt	PCE1, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
ret_sensitivity_pce2_s CHUNKED	FLOAT(:)	PCE2 Strong return sensitivity None	events/s/Watt	PCE2, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
ret_sensitivity_pce2_w CHUNKED	FLOAT(:)	PCE2 Weak return sensitivity None	events/s/Watt	PCE2, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
ret_sensitivity_pce3_s CHUNKED	FLOAT(:)	PCE3 Strong return sensitivity None	events/s/Watt	PCE3, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
ret_sensitivity_pce3_w CHUNKED	FLOAT(:)	PCE3 Weak return sensitivity None	events/s/Watt	PCE3, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATBD Section 5.5.3)
Group: /atlas/housekeeping/status		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
pdua_daa_opt CHUNKED	INTEGER_1(:)	PDUA_DAA_OPT status flag None	counts	PDUA_DAA_OPT status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_det_ps CHUNKED	INTEGER_1(:)	PDUA_DET_PS status flag None	counts	PDUA_DET_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_hvpc CHUNKED	INTEGER_1(:)	PDUA_HVPC status flag None	counts	PDUA_HVPC status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_laser_1 CHUNKED	INTEGER_1(:)	PDUA_LASER_1 status flag None	counts	PDUA_LASER_1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_laser_2 CHUNKED	INTEGER_1(:)	PDUA_LASER_2 status flag None	counts	PDUA_LASER_2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_lhp1 CHUNKED	INTEGER_1(:)	PDUA_LHP1 status flag None	counts	PDUA_LHP1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_lhp2 CHUNKED	INTEGER_1(:)	PDUA_LHP2 status flag None	counts	PDUA_LHP2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_lhp_startup CHUNKED	INTEGER_1(:)	PDUA_LHP_STARTUP status flag None	counts	PDUA_LHP_STARTUP status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_lrs CHUNKED	INTEGER_1(:)	PDUA_LRS status flag None	counts	PDUA_LRS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_lrs_opt	INTEGER_1(:)	PDUA_LRS_OPT status flag	counts	PDUA_LRS_OPT status flag. 0=ON, 1=OFF

CHUNKED		None		(Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa1 CHUNKED	INTEGER_1(:)	PDUA_OFA1 status flag None	counts	PDUA_OFA1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa2 CHUNKED	INTEGER_1(:)	PDUA_OFA2 status flag None	counts	PDUA_OFA2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa3 CHUNKED	INTEGER_1(:)	PDUA_OFA3 status flag None	counts	PDUA_OFA3 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa4 CHUNKED	INTEGER_1(:)	PDUA_OFA4 status flag None	counts	PDUA_OFA4 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa5 CHUNKED	INTEGER_1(:)	PDUA_OFA5 status flag None	counts	PDUA_OFA5 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa6 CHUNKED	INTEGER_1(:)	PDUA_OFA6 status flag None	counts	PDUA_OFA6 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa7 CHUNKED	INTEGER_1(:)	PDUA_OFA7 status flag None	counts	PDUA_OFA7 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_ofa_ps CHUNKED	INTEGER_1(:)	PDUA_OFA_PS status flag None	counts	PDUA_OFA_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_pri_mir CHUNKED	INTEGER_1(:)	PDUA_PRI_MIR status flag None	counts	PDUA_PRI_MIR status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_sec_mir CHUNKED	INTEGER_1(:)	PDUA_SEC_MIR status flag None	counts	PDUA_SEC_MIR status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_spare_sig CHUNKED	INTEGER_1(:)	PDUA_SPARE_SIG status flag None	counts	PDUA_SPARE_SIG status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_spd_ps CHUNKED	INTEGER_1(:)	PDUA_SPD_PS status flag None	counts	PDUA_SPD_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_tams_ls CHUNKED	INTEGER_1(:)	PDUA_TAMS_LS status flag None	counts	PDUA_TAMS_LS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdua_tower CHUNKED	INTEGER_1(:)	PDUA_TOWER status flag None	counts	PDUA_TOWER status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_daa_opt CHUNKED	INTEGER_1(:)	PDUB_DAA_OPT status flag None	1	PDUB_DAA_OPT status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_det_ps CHUNKED	INTEGER_1(:)	PDUB_DET_PS status flag None	1	PDUB_DET_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_hvpc CHUNKED	INTEGER_1(:)	PDUB_HVPC status flag None	1	PDUB_HVPC status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_laser_1 CHUNKED	INTEGER_1(:)	PDUB_LASER_1 status flag None	1	PDUB_LASER_1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_laser_2 CHUNKED	INTEGER_1(:)	PDUB_LASER_2 status flag None	1	PDUB_LASER_2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_lhp1 CHUNKED	INTEGER_1(:)	PDUB_LHP1 status flag None	1	PDUB_LHP1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_lhp2 CHUNKED	INTEGER_1(:)	PDUB_LHP2 status flag None	1	PDUB_LHP2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_lhp_startup CHUNKED	INTEGER_1(:)	PDUB_LHP_STARTUP status flag None	1	PDUB_LHP_STARTUP status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_lrs CHUNKED	INTEGER_1(:)	PDUB_LRS status flag None	1	PDUB_LRS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_lrs_opt CHUNKED	INTEGER_1(:)	PDUB_LRS_OPT status flag None	1	PDUB_LRS_OPT status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa1 CHUNKED	INTEGER_1(:)	PDUB_OFA1 status flag None	1	PDUB_OFA1 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa2 CHUNKED	INTEGER_1(:)	PDUB_OFA2 status flag None	1	PDUB_OFA2 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa3 CHUNKED	INTEGER_1(:)	PDUB_OFA3 status flag None	1	PDUB_OFA3 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])

pdub_ofa4 CHUNKED	INTEGER_1(:)	PDUB_OFA4 status flag None	1	PDUB_OFA4 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa5 CHUNKED	INTEGER_1(:)	PDUB_OFA5 status flag None	1	PDUB_OFA5 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa6 CHUNKED	INTEGER_1(:)	PDUB_OFA6 status flag None	1	PDUB_OFA6 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa7 CHUNKED	INTEGER_1(:)	PDUB_OFA7 status flag None	1	PDUB_OFA7 status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_ofa_ps CHUNKED	INTEGER_1(:)	PDUB_OFA_PS status flag None	1	PDUB_OFA_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_pri_mir CHUNKED	INTEGER_1(:)	PDUB_PRI_MIR status flag None	1	PDUB_PRI_MIR status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_sec_mir CHUNKED	INTEGER_1(:)	PDUB_SEC_MIR status flag None	1	PDUB_SEC_MIR status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_spare_sig CHUNKED	INTEGER_1(:)	PDUB_SPARE_SIG status flag None	1	PDUB_SPARE_SIG status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_spd_ps CHUNKED	INTEGER_1(:)	PDUB_SPD_PS status flag None	1	PDUB_SPD_PS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_tams_ls CHUNKED	INTEGER_1(:)	PDUB_TAMS_LS status flag None	1	PDUB_TAMS_LS status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
pdub_tower CHUNKED	INTEGER_1(:)	PDUB_TOWER status flag None	1	PDUB_TOWER status flag. 0=ON, 1=OFF (Source: ATL01/atlas/a_hkt_status_1065 converted); (Meanings: [0 1]) (Values: ['on', 'off'])
Group: /atlas/housekeeping/thermal		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
hkt_a_beam_px_t CHUNKED	FLOAT(:)	HKT_BEAMX_PX_T None	degreesC	A_HKT_BEAMX_PX_T A_HKT_C.chan[62] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_beamx_t CHUNKED	FLOAT(:)	HKT BEAMX T None	degreesC	Beam Expander I/F mTTCS-21 or 30 A_HKT_C.chan[82] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_bsm_t CHUNKED	FLOAT(:)	HKT BSM T None	degreesC	HKT BSM I/F T TCS-20 - A_HKT_C.chan[33] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_cchp_adiab_t CHUNKED	FLOAT(:)	HKT CCHP ADIAB T None	degreesC	Laser CCHP Adiabatic Section T TCS-12 A_HKT_C.chan[55] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_cchp_las1_t CHUNKED	FLOAT(:)	HKT CCHP LAS1 T None	degreesC	Laser 1 I/F T TCS-14 A_HKT_C.chan[59] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem1_t1_eb_t CHUNKED	FLOAT(:)	HKT_DEM1_T1_EB_T None	degreesC	HKT A/D Ch 74 - DEM1_TH_B-MEB-37 External Bottom t A_HKT_C.chan[38] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem1_t2_it_t CHUNKED	FLOAT(:)	HKT_DEM1_T2_IT_T None	degreesC	HKT A/D Ch 76 - DEM1_TH_D-MEB-39 Internal Top T A_HKT_C.chan[40] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem1_t3_ib_t CHUNKED	FLOAT(:)	HKT_DEM1_T3_IB_T None	degreesC	HKT A/D Ch 75 - DEM1_TH_C-MEB-38 Internal Bottom T A_HKT_C.chan[39] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem1_t4_et_t CHUNKED	FLOAT(:)	HKT_DEM1_T4_ET_T None	degreesC	HKT A/D Ch 73 - DEM1_TH_A-MEB-36 External Top T A_HKT_C.chan[37] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem2_t CHUNKED	FLOAT(:)	HKT_DEM2_T None	degreesC	HKT A/D Ch 77 - DEM2_TH_A-MEB-40 External Bottom T A_HKT_C.chan[41] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem3_t1_eb_t CHUNKED	FLOAT(:)	HKT_DEM3_T1_EB_T None	degreesC	HKT A/D Ch 79 - DEM3_TH_B-MEB-42 External Bottom T A_HKT_C.chan[43] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem3_t2_it_t CHUNKED	FLOAT(:)	HKT_DEM3_T2_IT_T None	degreesC	HKT A/D Ch 81 - DEM3_TH_D-MEB-44 Internal Top T A_HKT_C.chan[45] (Source: ATL01/atlas/a_hkt_c_1061 converted)

hkt_dem3_t3_ib_t CHUNKED	FLOAT(:)	HKT_DEM3_T3_IB_T None	degreesC	HKT A/D Ch 80 - DEM3_TH_C-MEB-43 Internal Bottom T A_HKT_C.chan[44] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem3_t4_et_t CHUNKED	FLOAT(:)	HKT_DEM3_T4_ET_T None	degreesC	HKT A/D Ch 78 - DEM3_TH_A-MEB-41 External Top T A_HKT_C.chan[42] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem4_t CHUNKED	FLOAT(:)	HKT_DEM4_T None	degreesC	HKT A/D Ch 82 - DEM4_TH_A-MEB-45 External Bottom T A_HKT_C.chan[46] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem5_t1_eb_t CHUNKED	FLOAT(:)	HKT_DEM5_T1_EB_T None	degreesC	HKT A/D Ch 84 - DEM5_TH_B-MEB-47 External Bottom T A_HKT_C.chan[48] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem5_t2_it_t CHUNKED	FLOAT(:)	HKT_DEM5_T2_IT_T None	degreesC	HKT A/D Ch 86 - DEM5_TH_D-MEB-49 Internal Top T A_HKT_C.chan[50] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem5_t3_ib_t CHUNKED	FLOAT(:)	HKT_DEM5_T3_IB_T None	degreesC	HKT A/D Ch 85 - DEM5_TH_C-MEB-48 Internal Bottom T A_HKT_C.chan[49] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem5_t4_et_t CHUNKED	FLOAT(:)	HKT_DEM5_T4_ET_T None	degreesC	HKT A/D Ch 83 - DEM5_TH_A-MEB-46 External Top T A_HKT_C.chan[47] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dem6_t CHUNKED	FLOAT(:)	HKT_DEM6_T None	degreesC	HKT A/D Ch 87 - DEM6_TH_A-MEB-50 External Bottom T A_HKT_C.chan[51] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dom_rad1_t CHUNKED	FLOAT(:)	HKT DOM RAD1 T None	degreesC	HKT DAA DOM Radiator T (Pri) TCS-47 - A_HKT_C.chan[36] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_dom_rad2_t CHUNKED	FLOAT(:)	HKT DOM RAD2 T None	degreesC	HKT DAA DOM Radiator T (Red) TCS-48 - A_HKT_C.chan[34] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_foldm_t CHUNKED	FLOAT(:)	HKT FOLDM T None	degreesC	Fold Mirror I/F I TCS-22 A_HKT_C.chan[83] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_imsc_myflex_t CHUNKED	FLOAT(:)	HKT IMSC MYFLEX T None	degreesC	IMSC Flexure 1 T TCS-28 A_HKT_C.chan[88] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_imsc_mzflex_t CHUNKED	FLOAT(:)	HKT IMSC MZFLEX T None	degreesC	IMSC Flexure 2 T TCS-29 A_HKT_C.chan[89] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lasrad_t CHUNKED	FLOAT(:)	HKT LASRAD T None	degreesC	Laser LHP Radiator T TCS_54 A_HKT_C.chan[61] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lhp_evap_t CHUNKED	FLOAT(:)	HKT LHP EVAP T None	degreesC	LHP Evaporator T TCS-15 A_HKT_C.chan[54] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lhp_liqline_t CHUNKED	FLOAT(:)	HKT LHP LIQLINE T None	degreesC	LHP Liquid Line T TCS-16 A_HKT_C.chan[60] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lhp_res1_t CHUNKED	FLOAT(:)	HKT LHP RES1 T None	degreesC	LHP Compensation Chamber T (Pri) TCS-10 A_HKT_C.chan[52] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lhp_res2_t CHUNKED	FLOAT(:)	HKT LHP RES2 T None	degreesC	LHP Compensation Chamber T (Red) TCS-11 A_HKT_C.chan[53] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lhp_vapline_t CHUNKED	FLOAT(:)	HKT LHP VAPLINE T None	degreesC	A_HKT_LHP_VAPLINE_T TCS-17 A_HKT_C.chan[90] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lrs_orad1_t CHUNKED	FLOAT(:)	HKT LRS ORAD1 T None	degreesC	LRS Optics RadiatorT (Pri) TCS-08 A_HKT_C.chan[56] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lrs_orad2_t CHUNKED	FLOAT(:)	HKT LRS ORAD2 T None	degreesC	LRS Optics Radiator T (Red) TCS-09 A_HKT_C.chan[57] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_lrs_ss_t CHUNKED	FLOAT(:)	HKT LRS SS T None	degreesC	LRS Sunshade I/F T TCS-13 A_HKT_C.chan[58] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ltr_tams_t CHUNKED	FLOAT(:)	HKT LTR TAMS T None	degreesC	TAMS LTR T TCS-18 A_HKT_C.chan[94] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ltr_trans_t CHUNKED	FLOAT(:)	HKT LTR TRANS T None	degreesC	Transmitter LTR T TCS_19 A_HKT_C.chan[102] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_asc1_t CHUNKED	FLOAT(:)	HKT MEB ASC1 T None	degreesC	HKT MEB ASC1 T MEB-01F - A_HKT_C.chan[0] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_asc2_t CHUNKED	FLOAT(:)	HKT MEB ASC2 T None	degreesC	HKT MEB ASC2 T MEB-02 - A_HKT_C.chan[1] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_hkt_t CHUNKED	FLOAT(:)	HKT MEB HKT T None	degreesC	HKT MEB HKT T MEB-21 - A_HKT_C.chan[2] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_lvpc1_t CHUNKED	FLOAT(:)	HKT MEB LVPC1 T None	degreesC	HKT MEB LVPC1 T MEB-03 - A_HKT_C.chan[3] (Source: ATL01/atlas/a_hkt_c_1061 converted)

hkt_meb_lvpc2_t CHUNKED	FLOAT(:)	HKT MEB LVPC2 T None	degreesC	HKT MEB LVPC2 T MEB-04 - A_HKT_C.chan[4] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_mce1_t CHUNKED	FLOAT(:)	HKT MEB MCE1 T None	degreesC	HKT MEB MCE1 T MEB-07 - A_HKT_C.chan[5] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_mce2_t CHUNKED	FLOAT(:)	HKT MEB MCE2 T None	degreesC	HKT MEB MCE2 T MEB-08 - A_HKT_C.chan[6] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_mce3_t CHUNKED	FLOAT(:)	HKT MEB MCE3 T None	degreesC	HKT MEB MCE3 T MEB-09 - A_HKT_C.chan[7] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_mce4_t CHUNKED	FLOAT(:)	HKT MEB MCE4 T None	degreesC	HKT MEB MCE4 T MEB-10 - A_HKT_C.chan[8] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce1_1_t CHUNKED	FLOAT(:)	HKT MEB PCE1 1 T None	degreesC	HKT MEB PCE1 1 T MEB-11 - A_HKT_C.chan[9] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce1_2_t CHUNKED	FLOAT(:)	HKT MEB PCE1 2 T None	degreesC	HKT MEB PCE1 2 T MEB-12 - A_HKT_C.chan[10] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce2_1_t CHUNKED	FLOAT(:)	HKT MEB PCE2 1 T None	degreesC	HKT MEB PCE2 1 T MEB-13 - A_HKT_C.chan[11] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce2_2_t CHUNKED	FLOAT(:)	HKT MEB PCE2 2 T None	degreesC	HKT MEB PCE2 2 T MEB-14 - A_HKT_C.chan[12] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce3_1_t CHUNKED	FLOAT(:)	HKT MEB PCE3 1 T None	degreesC	HKT MEB PCE3 1 T MEB-15 - A_HKT_C.chan[13] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_pce3_2_t CHUNKED	FLOAT(:)	HKT MEB PCE3 2 T None	degreesC	HKT MEB PCE3 2 T MEB-16 - A_HKT_C.chan[14] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_sbc1_t CHUNKED	FLOAT(:)	HKT MEB SBC1 T None	degreesC	HKT MEB SBC1 T MEB-17 - A_HKT_C.chan[15] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_sbc2_t CHUNKED	FLOAT(:)	HKT MEB SBC2 T None	degreesC	HKT MEB SBC2 T MEB-18 - A_HKT_C.chan[16] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_uso1_t CHUNKED	FLOAT(:)	HKT MEB USO1 T None	degreesC	HKT MEB USO1 T MEB-19 - A_HKT_C.chan[17] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_meb_uso2_t CHUNKED	FLOAT(:)	HKT MEB USO2 T None	degreesC	HKT MEB USO2 T MEB-20 - A_HKT_C.chan[18] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_mz1_t CHUNKED	FLOAT(:)	HKT OB MZ1 T None	degreesC	Optical Bench, -Z Side T TCS-23 A_HKT_C.chan[65] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_mz2_t CHUNKED	FLOAT(:)	HKT OB MZ2 T None	degreesC	Optical Bench, -Z Side T TCS-24 A_HKT_C.chan[66] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_mz3_t CHUNKED	FLOAT(:)	HKT OB MZ3 T None	degreesC	Optical Bench, -Z Side T TCS-25 A_HKT_C.chan[67] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_pz1_t CHUNKED	FLOAT(:)	HKT OB PZ1 T None	degreesC	Optical Bench, +Z Side T TCS-26 A_HKT_C.chan[63] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_pz2_t CHUNKED	FLOAT(:)	HKT OB PZ2 T None	degreesC	Optical Bench, +Z Side T TCS-27 A_HKT_C.chan[64] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_pz3_t CHUNKED	FLOAT(:)	HKT_OB_PZ3_T None	degreesC	Optical Bench +z3 T TCS_31 A_HKT_C.chan[103] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ob_pz4_t CHUNKED	FLOAT(:)	HKT_OB_PZ4_T None	degreesC	Optical Bench +z4 T TCS_32 A_HKT_C.chan[105] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa1_et_t CHUNKED	FLOAT(:)	HKT_OFA1_ET_T None	degreesC	OFA1 ETALON T TCS_58 A_HKT_C.chan[104] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa1_pri_t CHUNKED	FLOAT(:)	HKT OFA1 PRI T None	degreesC	HKT TCS-33 OFA1 PRI T - A_HKT_C.chan[19] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa1_red_t CHUNKED	FLOAT(:)	HKT OFA1 RED T None	degreesC	HKT TCS-34 OFA1 RED T - A_HKT_C.chan[26] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa2_pri_t CHUNKED	FLOAT(:)	HKT OFA2 PRI T None	degreesC	HKT TCS-35 OFA2 PRI T - A_HKT_C.chan[20] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa2_red_t CHUNKED	FLOAT(:)	HKT OFA2 RED T None	degreesC	HKT TCS-36 OFA2 RED T - A_HKT_C.chan[27] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa3_pri_t CHUNKED	FLOAT(:)	HKT OFA3 PRI T None	degreesC	HKT TCS-37 OFA3 PRI T - A_HKT_C.chan[21] (Source: ATL01/atlas/a_hkt_c_1061 converted)

hkt_ofa3_red_t CHUNKED	FLOAT(:)	HKT OFA3 RED T None	degreesC	HKT TCS-38 OFA3 RED T - A_HKT_C.chan[28] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa4_pri_t CHUNKED	FLOAT(:)	HKT OFA4 PRI T None	degreesC	HKT TCS-39 OFA4 PRI T - A_HKT_C.chan[22] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa4_red_t CHUNKED	FLOAT(:)	HKT OFA4 RED T None	degreesC	HKT TCS-40 OFA4 RED T - A_HKT_C.chan[29] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa5_pri_t CHUNKED	FLOAT(:)	HKT OFA5 PRI T None	degreesC	HKT TCS-41 OFA5 PRI T - A_HKT_C.chan[23] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa5_red_t CHUNKED	FLOAT(:)	HKT OFA5 RED T None	degreesC	HKT TCS-42 OFA5 RED T - A_HKT_C.chan[30] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa6_pri_t CHUNKED	FLOAT(:)	HKT OFA6 PRI T None	degreesC	HKT TCS-43 OFA6 PRI T - A_HKT_C.chan[24] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa6_red_t CHUNKED	FLOAT(:)	HKT OFA6 RED T None	degreesC	HKT TCS-44 OFA6 RED T - A_HKT_C.chan[31] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa7_et_t CHUNKED	FLOAT(:)	HKT_OFA7_ET_T None	degreesC	OFA7 ETALON T TCS_59 A_HKT_C.chan[106] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa7_pri_t CHUNKED	FLOAT(:)	HKT OFA7 PRI T None	degreesC	HKT TCS-45 OFA7 PRI T - A_HKT_C.chan[25] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_ofa7_red_t CHUNKED	FLOAT(:)	HKT OFA7 RED T None	degreesC	HKT TCS-46 OFA7 RED T - A_HKT_C.chan[32] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_scif_myflex_t CHUNKED	FLOAT(:)	HKT SCIF MYFLEX T None	degreesC	-Y S/C Flexure T A_HKT_C.chan[93] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_scif_pxflex_t CHUNKED	FLOAT(:)	HKT SCIF PXFLEX T None	degreesC	+X S/C Flexure T TCS-51 A_HKT_C.chan[87] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_scif_pyflex_t CHUNKED	FLOAT(:)	HKT SCIF PYFLEX T None	degreesC	-+Y S/C Flexure T TCS-53 A_HKT_C.chan[101] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_spd_t CHUNKED	FLOAT(:)	HKT SPD T None	degreesC	SPD I/F T TCS-50 A_HKT_C.chan[85] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_struc_my_t CHUNKED	FLOAT(:)	HKT STRUC MY T None	degreesC	Structure Y Panel T TCS_55 A_HKT_C.chan[91] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_struc_mz_t CHUNKED	FLOAT(:)	HKT STRUC MZ T None	degreesC	Structure Z Panel T TCS_57 A_HKT_C.chan[92] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_sunshade_t CHUNKED	FLOAT(:)	HKT_SUNSHADE_T None	degreesC	Structure +Z Panel T A_HKT_C.chan[86] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_pri1_t CHUNKED	FLOAT(:)	HKT TEL PRI1 T None	degreesC	Telescope, Primary Mirror T (Pri) TCS-05 A_HKT_C.chan[95] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_pri2_t CHUNKED	FLOAT(:)	HKT TEL PRI2 T None	degreesC	Telescope, Primary Mirror T (Red) TCS-06 A_HKT_C.chan[96] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_pri3_t CHUNKED	FLOAT(:)	HKT TEL PRI3 T None	degreesC	HKT Telescope, Primary Mirror T TCS-07 - A_HKT_C.chan[35] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_sec1_t CHUNKED	FLOAT(:)	HKT TEL SEC1 T None	degreesC	Telescope, Secondary Mirror T (Pri) TCS-01 A_HKT_C.chan[97] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_sec2_t CHUNKED	FLOAT(:)	HKT TEL SEC2 T None	degreesC	Telescope, Secondary Mirror T (Red) TCS-02 A_HKT_C.chan[98] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_tow1_t CHUNKED	FLOAT(:)	HKT TEL TOW1 T None	degreesC	Telescope, Tower T (Pri) TCS-03 A_HKT_C.chan[99] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_tel_tow2_t CHUNKED	FLOAT(:)	HKT TEL TOW2 T None	degreesC	Telescope, Tower T (Red) TCS-04 A_HKT_C.chan[100] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hkt_wtem_t CHUNKED	FLOAT(:)	HKT WTEM T None	degreesC	OFA WTEM I/F T TCS-49 A_HKT_C.chan[84] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hvpca_therm_a_t CHUNKED	FLOAT(:)	HVPCTHERM T None	degreesC	PRIMARY HVPC THERMISTOR A MEB-30 A_HKT_C.chan[68] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hvpca_therm_b_t CHUNKED	FLOAT(:)	HVPCTHERM B T None	degreesC	PRIMARY HVPC THERMISTOR B MEB-32 A_HKT_C.chan[69] (Source: ATL01/atlas/a_hkt_c_1061 converted)
hvpcb_therm_a_t CHUNKED	FLOAT(:)	HVPCB THERM T None	degreesC	REDUNDANT HVPC THERMISTOR A MEB-31 A_HKT_C.chan[75] (Source: ATL01/atlas/a_hkt_c_1061 converted)

hvpcb_therm_b_t CHUNKED	FLOAT(:)	HVPCB THERM B T None	degreesC	REDUNDANT HVPC THERMISTOR B MEB-33 A_HKT_C.chan[76] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdua_therm_ct_t CHUNKED	FLOAT(:)	PDUTHERM CT T None	degreesC	PDU CT BOARD A T-MEB-24 A_HKT_C.chan[70] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdua_therm_dlv_a_t CHUNKED	FLOAT(:)	PDUTHERM DLV T None	degreesC	PDU LOW VOLTAGE 1A T-MEB-26 A_HKT_C.chan[71] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdua_therm_dlv_b_t CHUNKED	FLOAT(:)	PDUTHERM DLV B T None	degreesC	PDU LOW VOLTAGE 2A T -MEB-28 A_HKT_C.chan[72] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdua_therm_mi_t CHUNKED	FLOAT(:)	PDUTHERM MI T None	degreesC	PDU MAIN PWR BOARD A T-MEB_22 A_HKT_C.chan[73] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdub_therm_ct_t CHUNKED	FLOAT(:)	PDUB THERM CT T None	degreesC	PDU CT BOARD B T -MEB-25 A_HKT_C.chan[77] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdub_therm_dlv_a_t CHUNKED	FLOAT(:)	PDUB THERM DLV T None	degreesC	PDU LOW VOLTAGE 1B T -MEB-27 A_HKT_C.chan[78] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdub_therm_dlv_b_t CHUNKED	FLOAT(:)	PDUB THERM DLV B T None	degreesC	PDU LOW VOLTAGE 2B T -MEB-29 A_HKT_C.chan[79] (Source: ATL01/atlas/a_hkt_c_1061 converted)
pdub_therm_mi_t CHUNKED	FLOAT(:)	PDUB THERM MI T None	degreesC	PDU MAIN PWR BOARD B T -MEB_23 A_HKT_C.chan[80] (Source: ATL01/atlas/a_hkt_c_1061 converted)
spda_therm_t CHUNKED	FLOAT(:)	SPDTHERM T None	degreesC	PRIMARY SPD THERMISTOR MEB-34 A_HKT_C.chan[74] (Source: ATL01/atlas/a_hkt_c_1061 converted)
spdb_therm_t CHUNKED	FLOAT(:)	SPDB THERM T None	degreesC	REDUNDANT SPD THERMISTOR MEB-35 A_HKT_C.chan[81] (Source: ATL01/atlas/a_hkt_c_1061 converted)
Group: /atlas/housekeeping/time_at_the_tone		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
gps_1pps_sec CHUNKED	UINT_4_LE(:)	gps 1pps None	seconds since January 6, 1980	GPS reported seconds. (Source: ATL01/APID 1136 Byte 0014-0017)
gps_1pps_subsec CHUNKED	UINT_4_LE(:)	gps 1pps subsec None	milliseconds	GPS reported subseconds (Source: ATL01/APID 1136 Byte 0014-0017)
sc_time_1pps_sec CHUNKED	UINT_4_LE(:)	SC time at 1 pps None	seconds since January 6, 1980	SC time at the reception of the last 1PPS signal from the GPSR. (Source: ATL01/APID 1136 Byte 0014-0017)
sc_time_1pps_subsec CHUNKED	UINT_4_LE(:)	SC time at 1 pps (subsec) None	100 nanoseconds	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) (Source: ATL01/APID 1136 Byte 0014-0017)
Group: /atlas/pcex		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		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(Dims) Fillvalue	long_name standard_name	units	description
alt_band_channel_mask CHUNKED	UINT_4_BE(:,:)	Band Channel Mask None	counts	ATLAS flight software Band Channel Mask. (Bands 1-4) (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
alt_band_mask CHUNKED	UINT_1_BE(:,:)	Band Mask None	counts	ATLAS flight software Band Mask. Each byte corresponds to a single Band, in the order of 1-4. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
alt_nbands CHUNKED	UINT_1_BE(:)	Number of bands None	counts	ATLAS flight software Number of bands. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
amet_time CHUNKED	DOUBLE(:)	AMET seconds at the Major Frame None	seconds	AMET seconds at the Major Frame (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
delta_time	DOUBLE(:)	Elapsed GPS seconds	seconds since 2018-01-01	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data

CHUNKED		time		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. (Source: Derived via L1B ATBD)
ds_2samples CONTIGUOUS	INTEGER_1(2)	DS for 2 bytes None	1	Dimension scale for an array of 2 samples. (Source: Dimension Scale)
ds_4bytes CONTIGUOUS	INTEGER_1(4)	DS for 4 bytes None	1	Dimension scale for an array of 4 bytes. (Source: Dimension Scale)
gps_time CHUNKED	DOUBLE(:)	GPS seconds at the Major Frame None	seconds	GPS seconds at the Major Frame (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
useflag CHUNKED	UINT_1_LE(:)	Science Mode Flag None	counts	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 (Source: ATL01/atlas/pcex/a_alt_sci/); (Meanings: [0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15]) (Values: ['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/algorithm_science/s_w		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(Dims) Fillvalue	long_name standard_name	units	description
alt_error_flags CHUNKED	UINT_1_BE(:,:)	Error Flags None	counts	FSW error flags (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
daynight_flag CHUNKED	UINT_1_LE(:)	Day/Night flag None	counts	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. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science); (Meanings: [0 1]) (Values: ['day', 'night'])
decisionflags CHUNKED	UINT_1_LE(:,:)	Decision Flags None	counts	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 (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
flywheel CHUNKED	UINT_1_LE(:)	Flywheel None	counts	ATLAS flight software Flywheel associated with the major frame. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
signalflags CHUNKED	UINT_1_LE(:)	Signal Found Flags None	counts	ATLAS flight s/w signal event flags associated with the major frame. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
Group: /atlas/pcex/altimetry		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(Dims) Fillvalue	long_name standard_name	units	description
cal_fall_sm CHUNKED	FLOAT(:)	Altimetric Latest Calibration Falling None	seconds/cell	The smoothed, calibrated value for the falling edge used to convert cell counts to units of time. time per cell count based on USO for each PCE. (Source: Derived via L1B ATBD)
cal_rise_sm CHUNKED	FLOAT(:)	Altimetric Latest Calibration Rising None	seconds/cell	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. (Source: Derived via L1B ATBD)
ch_mask_s CHUNKED	INTEGER_1(:,:)	Channel Mask Strong None	counts	Channel Mask for DLBOs. The 16 flags are a logical OR of the two band offset masks for strong beam (Source: ATL01/atlas/pcex/a_alt_science)
ch_mask_w CHUNKED	INTEGER_1(:,:)	Channel Mask Weak None	counts	Channel Mask for DLBOs. The 4 flags are a logical OR of the two band offset masks for weak beam (Source: ATL01/atlas/pcex/a_alt_science)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via L1B ATBD)
ds_hist CONTIGUOUS	FLOAT(199)	Histogram Dimension Scale None	seconds	Relative bin values of windowed, peak-centered TOF histograms. Peak value = 0 (Source: ATL02)

ds_strong_channel_index CONTIGUOUS	INTEGER_1(16)	DS for Strong Channels None	1	Dimension scale for strong channels. (Source: Dimension Scale)
ds_weak_channel_index CONTIGUOUS	INTEGER_1(4)	DS for Weak Channels None	1	Dimension scale for weak channels. (Source: Dimension Scale)
n_bands CHUNKED	INTEGER_1(:)	Number Downlink Bands None	counts	Number of bands (in addition to the nominal 1 band) selected for downlink. (Source: ATL01/atlas/pcex/a_alt_science)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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 (Source: ATL02)
useflag CHUNKED	UINT_1_LE(:)	Science Mode Flag None	counts	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 (Source: ATL01/atlas/pcex/a_alt_sci/); (Meanings: [0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15]) (Values: ['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		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(Dims) Fillvalue	long_name standard_name	units	description
alt_rw_start CHUNKED	FLOAT(:)	Altimetric Range Window Start None	seconds	The number of seconds between the transmit pulse and the start of the altimetric range window for the beam (Source: ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion)
alt_rw_width CHUNKED	FLOAT(:)	Altimetric Range Window Width None	seconds	The number of seconds from the range window start and range window stop (Source: ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion)
band1_offset CHUNKED	FLOAT(:)	Band1 Offset None	seconds	Downlink band offset (DLBO) for band1. (Source: L1A ATBD)
band1_width CHUNKED	FLOAT(:)	Band1 Width None	seconds	Width of downlink band1. (Source: L1A ATBD)
band2_offset CHUNKED	FLOAT(:)	Band2 Offset None	seconds	Downlink band offset (DLBO) for band2. (Source: L1A ATBD)
band2_width CHUNKED	FLOAT(:)	Band2 Width None	seconds	Width of downlink band2. (Source: L1A ATBD)
hist CHUNKED	INTEGER(:,:)	Center-aligned TOF Histogram None	counts	Per-major frame, peak-aligned, windowed time-of-flight histograms. (Source: ATL02)
n_mf_ph CHUNKED	INTEGER(:)	Number of photons None	counts	Number of photons within each major frame. (Source: Derived)
ph_ndx_beg CHUNKED	INTEGER_8(:)	Photon Index Begin None	counts	Index (1-based) within the photon-rate data of the first photon within each major frame. (Source: Derived)
Group: /atlas/pcex/altimetry/s_w/photons		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via L1B ATBD)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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 (Source: Retained from latest a_alt_science packet)
ph_id_channel CHUNKED	UINT_1_LE(:)	Receive channel id None	1	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). (Source: Derived as part of Photon ID)
ph_id_count	UINT_1_LE(:)	photon event counter	counts	photon event counter is part of photon ID and will count from 1 for each channel until reset by laser pulse counter. If

CHUNKED		None		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. (Source: Derived as part of Photon ID)
ph_id_pulse CHUNKED	UINT_1_LE(:)	laser pulse counter None	counts	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. (Source: Derived as part of Photon ID)
ph_tof CHUNKED	DOUBLE(:)	Time of Flight None	seconds	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. (Source: ATL02 ATBD)
rx_band_id CHUNKED	INTEGER_1(:)	rx downlink band id None	counts	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. (Source: ATL01/atlas/pcex/a_alt_science_ph RX data); (Meanings: [0 1]) (Values: ['band1', 'band2'])
tof_flag CHUNKED	INTEGER_1(:)	TOF Flag None	counts	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. (Source: L1B ATBD Sect 2.5.4); (Meanings: [1 2 3 4 5 6 7 8 11 12 13 14 15 16 17 18]) (Values: ['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 None	seconds	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. (Source: ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof)
tx_other_tof CHUNKED	FLOAT(:)	Other Transmit Time from LL None	seconds	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. (Source: ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof)
Group: /atlas/pcex/atmosphere_sw		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(Dims) Fillvalue	long_name standard_name	units	description
atm_bins CHUNKED	UINT_2_LE(:,:)	Atmospheric Science Histogram None	counts	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. (Source: ATL01/atlas/pcex/a_atm_hist_x)
atm_rw_start CHUNKED	FLOAT(:)	Atmospheric Range Window Start None	seconds	The number of seconds between the transmit pulse and the start of the Atmospheric range window (Source: ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM)
atm_rw_width CHUNKED	FLOAT(:)	Atmospheric Range Window Width None	seconds	The number of seconds from the Atmospheric range window start and range window stop. (Source: ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM)
atm_shift_amount CHUNKED	INTEGER_2(:)	Atmospheric Range Window Shift None	counts	The number of bins the range window start of one of the histograms was shifted to align them before they are added together. (Source: ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 (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. (Source: Derived via L1B ATBD)
ds_hist_bin_index CONTIGUOUS	INTEGER_2(467)	DS for ATM histogram bins None	1	Dimension scale for atmosphere histogram bins. (Source: Dimension Scale)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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 (Source: ATL01/atlas/pcex/a_atm_hist_x)
useflag CHUNKED	UINT_1_LE(:)	Science Mode Flag None	counts	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 (Source: ATL01/atlas/pcex/a_alt_sci/); (Meanings: [0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15]) (Values: ['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/background		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(Dims) Fillvalue	long_name standard_name	units	description
bg_cnt_50shot_s CHUNKED	UINT_2_LE(:)	Strong background counts None	counts	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. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
bg_cnt_50shot_w CHUNKED	UINT_2_LE(:)	Weak background counts None	counts	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. (Source: ATL01/atlas/pcex/a_pmf_algorithm_science)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via L1B ATBD)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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 (Source: Derived)
useflag CHUNKED	UINT_1_LE(:)	Science Mode Flag None	counts	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 (Source: ATL01/atlas/pcex/a_alt_sci/); (Meanings: [0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15]) (Values: ['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/dfc_hk		This DFCx_hk is a diagnostic packet (APID 1072, 1088, 1104) that contains some of the parameters normally part of APID 1254, 1264, 1274 (as sequence flag 01). Also know as the PCE Altimetric Science Data Major Frame described in ICESat-2-MEB-SPEC-0875, section 5.13 Table 19. The data in the group are neither calibrated nor EU-converted, but preserved from ATL01 in order provided diagnostics for TOF processing.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID (nominally 50 Hz).		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
alt_1pps_count CHUNKED	UINT_4_BE(:)	MET 1pps counter None	counts	ATLAS flight s/w 1PPS counter (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0012-0015)
alt_cal_fall CHUNKED	UINT_2_BE(:)	Altimetric Latest Calibration Falling None	counts	The PCE latest calibration value for the falling edge. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0052-0053)
alt_cal_interval CHUNKED	UINT_1_BE(:)	Calibration request interval from TDC None	counts	Calibration request interval from TDC (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0068)
alt_cal_rise CHUNKED	UINT_2_BE(:)	Altimetric Latest Calibration Rising None	counts	The PCE latest calibration value for the rising edge (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0050-0051)
alt_cmd_count CHUNKED	UINT_2_BE(:)	Command Counter None	counts	Command Counter; Indicates the number of good commands received by the DFC prior to the Major Frame Packet being transmitted (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0062-0063)
alt_config CHUNKED	UINT_1_BE(:)	Configuration None	counts	Configuration bits (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0075)
alt_debug_reg CHUNKED	UINT_1_BE(:,:)	Debug Control Register None	counts	Debug Control Register (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0096-0099)
alt_debug_status CHUNKED	UINT_1_BE(:,:)	Debug Status Bits None	counts	Debug Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0112-0114)
alt_dfc_hk_status CHUNKED	UINT_1_BE(:,:)	DFC Housekeeping Status Bits None	counts	DFC Housekeeping Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0106-0110)
alt_dfc_status CHUNKED	UINT_1_BE(:)	DFC Status Bits None	counts	DFC Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0111)
alt_dupe_margin CHUNKED	UINT_2_BE(:)	Duplicate time tag removal None	counts	Duplicate time tag removal ; initialization Value (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0066-0067)
alt_edac_status CHUNKED	UINT_1_BE(:,:)	EDAC Status Bits None	counts	EDAC Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted)

				(Source: APID 1072, 1088, 1104 Byte 102-105)
alt_gp_reg CHUNKED	UINT_1_BE(:,:)	General Purpose Register None	counts	General Purpose Register (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0100-0101)
alt_imet_at_1pps CHUNKED	INTEGER_8(:)	IMET at 1 pps None	counts	ATLAS flight s/w 25 MHz IMET counter value when 1PPS is received (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0016-0021)
alt_imet_at_first_t0 CHUNKED	INTEGER_8(:)	IMET at first T0 after 1 pps None	counts	ATLAS flight s/w 25 MHz IMET counter value when 1PPS is received (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0022-0027)
alt_last_opcode CHUNKED	UINT_1_BE(:)	Last Opcode Received None	counts	Indicates the last good opcode received prior to the Major Frame Packet being transmitted; 0xFF indicates an error condition of either protocol ID mismatch, invalid opcode, or invalid length (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0064)
alt_last_seq_count CHUNKED	UINT_2_BE(:)	last sequence packet count None	counts	CCSDS Packet Sequence Count value of the last downlink packet prior to the major frame. This should be the last packet associated with the previous major frame. That packet should contain the last Tx/RX data for the last shot of the previous major frame. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0060-0061)
alt_mframe_freq CHUNKED	UINT_1_BE(:)	Major frame frequency None	counts	The number of shots per major frame. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0074)
alt_rw_start_reg_s CHUNKED	UINT_4_BE(:)	Altimetric Strong Range Window Start Reg None	counts	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the altimetric range window for the strong spot (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0076-0078)
alt_rw_start_reg_w CHUNKED	UINT_4_BE(:)	Altimetric Weak Range Window Start Reg None	counts	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the altimetric range window for the weak spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0086-0088)
alt_rw_width_reg_s CHUNKED	UINT_2_BE(:)	Altimetric Strong Range Window Width Reg None	counts	Value of register set in initialization command for the number of 10ns ticks between the range window start and range window stop for the strong spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0079-0080)
alt_rw_width_reg_w CHUNKED	UINT_2_BE(:)	Altimetric Weak Range Window Width Reg None	counts	Value of register set in initialization command for the number of 10ns ticks between the range window start and range window stop for the weak spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0089-0090)
alt_sci_addr CHUNKED	UINT_1_BE(:)	Logical address for science data transmit None	counts	Logical address for science data transmit ; initialization Value (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0065)
alt_sci_seg_limit CHUNKED	UINT_2_BE(:)	Science Data Segment Limit Size None	counts	Science Data Segment Limit Size ; initialization Value (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0069-0070)
alt_spot_tag_cnts_s CHUNKED	UINT_2_BE(:,:)	strong spot tag counter None	counts	The number of events received by the DFC on channels 1 through 16 summed over 50 range window openings. The four elements of the array correspond to dividing the major frame up into 50 shots. The last element of the array can be 49 or 51 shots depending on the alignment of the range windows with respect to the major frame. Note that these counts are time tag counts and are subject to all the limitations and behaviors associated with time tags (duplicates, FIFO overflows, etc.). (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0034-0041)
alt_spot_tag_cnts_w CHUNKED	UINT_2_BE(:,:)	weak spot tag counter None	counts	The number of events received by the DFC on channels 17 through 20 summed over 50 range window openings. The four elements of the array correspond to dividing the major frame up into 50 shots. The last element of the array can be 49 or 51 shots depending on the alignment of the range windows with respect to the major frame. Note that these counts are time tag counts and are subject to all the limitations and behaviors associated with time tags (duplicates, FIFO overflows, etc.). (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0042-48)
alt_spw_not_ready_cnt CHUNKED	UINT_2_BE(:)	SpW Not Ready Counter None	counts	Counts each time SpW causes DFC to wait to transmit data to back-end (Status Only) (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0115)
alt_t0_cnt CHUNKED	UINT_2_BE(:)	T0 counter None	counts	ATLAS flight s/w T0 counter that clears with 1PPS (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0028-0029)
alt_wait_watchdog CHUNKED	UINT_1_BE(:)	Tag wait watchdog value None	counts	Tag wait watchdog value ; initialization Value (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0071)
alt_write_watchdog CHUNKED	UINT_2_BE(:)	Tag write watchdog value None	counts	Tag write watchdog value ; initialization Value (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0072-0073)
atm_rw_start_reg_s CHUNKED	UINT_4_BE(:)	Atmospheric Strong Range Window Start Reg None	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the Atmospheric range window for the strong spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0081-0083)
atm_rw_start_reg_w CHUNKED	UINT_4_BE(:)	Atmospheric Weak Range Window Start Reg None	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the Atmospheric range window for the weak spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0091-0093)
atm_rw_width_reg_s	UINT_2_BE(:)	Atmospheric Strong Range	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the Atmospheric range window start

CHUNKED		Window Width Reg None		and range window stop for the strong spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0084-0085)
atm_rw_width_reg_w CHUNKED	UINT_2_BE(:)	Atmospheric Weak Range Window Width Reg None	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the Atmospheric range window start and range window stop for the weak spot. (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0094-0095)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
pce_mframe_cnt CHUNKED	UINT_4_BE(:)	PCE Major frame counter None	counts	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 (Source: APID 1072, 1088, 1104 Byte 0030-0033)
tx_leading_cell CHUNKED	UINT_1_BE(:)	tx latest leading edge fine None	counts	Latest Leading Start Time Tag-acquired leading start time tag value (paired with trailing start time time tag value) cell counts (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0054-0056)
tx_leading_coarse CHUNKED	INTEGER_2(:)	tx latest leading edge coarse None	counts	Latest Leading Start Time Tag-acquired leading start time tag value (paired with trailing start time time tag value) coarse time in counts (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0054-0056)
tx_trailing_cell CHUNKED	UINT_1_BE(:)	tx latest trailing edge fine None	counts	Latest trailing Start Time Tag-acquired trailing start time tag value (paired with trailing start time time tag value) cell counts (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0057-0059)
tx_trailing_coarse CHUNKED	INTEGER_2(:)	tx latest trailing edge coarse None	counts	Latest trailing Start Time Tag-acquired trailing start time tag value (paired with trailing start time time tag value) coarse time in counts (not EU-converted) (Source: APID 1072, 1088, 1104 Byte 0057-0059)
Group: /atlas/pcex/pmf_hk		PCE Diagnostic Telemetry Packet from one of the following APIDs : 1073, 1089, 1105 (each APID is associated with a specific PCE). Packet Frequency is 1 Hertz.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
activeknobstable CHUNKED	UINT_1_BE(:)	ActiveKnobsTable None	counts	The active knobs table. (Source: APID 1073, 1089, 1105 Byte 0037-0037)
autorestartdfccount CHUNKED	UINT_2_BE(:)	AutoRestartDFCCount None	counts	Number of DFC Auto Restarts (Source: APID 1073, 1089, 1105 Byte 0090-0091)
cmd_err_cntr CHUNKED	UINT_1_BE(:)	cmd_err_cntr None	counts	Command error counter (Source: APID 1073, 1089, 1105 Byte 0012-0012)
cmd_suc_cntr CHUNKED	UINT_1_BE(:)	cmd_suc_cntr None	counts	Command success counter. (Source: APID 1073, 1089, 1105 Byte 0013-0013)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
mode CHUNKED	UINT_1_BE(:)	Mode None	counts	PCE Mode. 0=STBY; 1=Science; 2=Test; 3=Manual; 4=Radio; 5=Unknown (Source: APID 1073, 1089, 1105 Byte 0036-0036); (Meanings: [0 1 2 3 4 5]) (Values: ['STBY', 'Science', 'Test', 'Manual', 'Radio', 'Test'])
Group: /atlas/pcex/sxp_ssr_sw		SBC Extrapolation Task telemetry containing Flight Science Receiver Algorithm team requested telemetry for the first set of PCE extrapolation data for a major frame.: lat, long, range, nadir angle, etc. (from APIDs 1152 thru 1157)		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
cosb CHUNKED	DOUBLE(:,:)	cosB None	counts	Cosine of the off-nadir angle as calculated onboard from the spacecraft information (Source: ATL01/atlas/pcex/a_sxp_ssr)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via L1B ATBD)
ds_50samples CONTIGUOUS	INTEGER_1(50)	DS for 50 bytes None	1	Dimension scale for an array of 50 samples. (Source: ATL01/atlas/pcex/a_sxp_ssr)
latitude CHUNKED	DOUBLE(:,:)	latitude None	degrees	Latitude (Source: ATL01/atlas/pcex/a_sxp_ssr)

longitude CHUNKED	DOUBLE(:,:)	longitude None	degrees	Longitude (Source: ATL01/atlas/pcex/a_sxp_ssr)
mf_cosz CHUNKED	DOUBLE(:)	First Major Frame cosZ None	counts	Cosine of the solar zenith angle (Source: ATL01/atlas/pcex/a_sxp_ssr)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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. (Source: ATL01/atlas/pcex/a_sxp_ssr)
srm CHUNKED	UINT_1_BE(:,:)	srm None	1	Surface type, vegetation and coastline information from the SRM. (bit 0-1 = surface type (0=ocean, 1=land, 2=sea ice, 3=land ice). Bit 2 = vegetation present, Bit 3 = coastline present) (Source: ATL01/atlas/pcex/a_sxp_ssr)
Group: /atlas/pcex/tep		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via L1B ATBD)
pce_mframe_cnt CHUNKED	UINT_4_LE(:)	PCE Major frame counter None	counts	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. (Source: Retained from prior a_alt_science_ph packet)
ph_id_channel CHUNKED	UINT_1_LE(:)	Receive channel id None	1	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). (Source: Derived as part of Photon ID)
ph_id_count CHUNKED	INTEGER_1(:)	photon event counter None	counts	The photon event counter is part of photon ID and counts from 1 for each channel until reset by laser pulse counter. (Source: Derived as part of Photon ID)
ph_id_pulse CHUNKED	UINT_1_LE(:)	laser pulse counter None	counts	The laser pulse counter is part of photon ID and counts from 1 to 200 and is reset for each new major frame. (Source: Derived as part of Photon ID)
rx_band_id CHUNKED	UINT_1_LE(:)	rx downlink band id None	counts	Flag to indicate downlink band id associated with the received time tag. Note that in order to reconstruct the event time tag, the 10-bit offset even coarse value must be added to the specified downlink band offset relating to that time tag. (Source: ATL01/atlas/pcex/a_alt_science_ph RX data)
rx_channel_id CHUNKED	UINT_1_LE(:)	receive PCE channel id None	counts	channel number that Received photon event (as from Telemetry) (Source: ATL01/atlas/pcex/a_alt_science_ph RX data)
tep_pulse_num CHUNKED	UINT_1_LE(:)	TEP Pulse Number None	counts	The number of laser pulses from the TEP laser pulse to the laser pulse for which ATLAS is currently receiving non-TEP photons. (Source: Derived as part of TEP Detection)
tof_tep CHUNKED	DOUBLE(:)	TEP Time of Flight None	seconds	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. (Source: ATL01/atlas/pcex/a_alt_science_ph RX data L1B ATBD section tof)
tx_ll_tof_tep CHUNKED	FLOAT(:)	TEP Transmit time from T0 None	seconds	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.) (Source: ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof)
tx_other_tof_tep CHUNKED	FLOAT(:)	Other TEP Transmit Time from LL None	seconds	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. (Source: ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof)
Group: /atlas/tx_pulse_width		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Operations)
tx_pulse_skew_est CHUNKED	FLOAT(:) INVALID_R4B	Transmit Pulse Skew Estimate None	seconds	The difference between the averages of the lower and upper threshold crossing times. This is an estimate of the transmit pulse skew. (Source: ATL02 ATBD, Section 7.2)
tx_pulse_width_lower CHUNKED	FLOAT(:) INVALID_R4B	Transmit Pulse Energy Lower Width None	seconds	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. (Source: ATL03 ATBD)
tx_pulse_width_upper CHUNKED	FLOAT(:) INVALID_R4B	Transmit Pulse Energy Upper Width None	seconds	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. (Source: ATL03 ATBD)
Group: /gpsr		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		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(Dims) Fillvalue	long_name standard_name	units	description
antenna_id CHUNKED	INTEGER_1(:,:)	CADR Antenna Identifier None	1	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. (Source: ATL01/sc3/gpsr/carrier_amplitude); (Meanings: [0 1]) (Values: ['first_antenna', 'second_antenna'])
carrier_amp CHUNKED	FLOAT(:,:)	CADR Carrier Amplitude None	dB	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. (Source: ATL01/sc3/gpsr/carrier_amplitude converted)
channel_num CHUNKED	INTEGER_1(:,:)	CADR Channel Number None	counts	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. (Source: ATL01/sc3/gpsr/carrier_amplitude)
constell_id CHUNKED	INTEGER_1(:,:)	CADR Constellation ID None	counts	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. (Source: ATL01/sc3/gpsr/carrier_amplitude)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
ds_16_slots CONTIGUOUS	INTEGER_1(16)	DS for 16 slots None	1	Dimension scale representing each of the 16 slots. (Source: Dimension Scale)
noise_ratio CHUNKED	FLOAT(:,:)	CADR Carrier to Noise Power Density Ratio None	dBHz	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. (Source: ATL01/sc3/gpsr/carrier_amplitude converted)
num_valid_slots CHUNKED	INTEGER_1(:)	Number of slots filled None	counts	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. (Source: ATL01/sc3/gpsr/carrier_amplitude/dfh/raw_num_recs)
signal_type CHUNKED	INTEGER_1(:,:)	CADR GPS Signal Type None	1	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. (Source: ATL01/sc3/gpsr/carrier_amplitude); (Meanings: [0 1 2 3 4 5 6]) (Values: ['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(:,:)	CADR Space Vehicle ID None	counts	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. (Source: ATL01/sc3/gpsr/carrier_amplitude)

Group: /gpsr/carrier_phase		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(Dims) Fillvalue	long_name standard_name	units	description
antenna_id CHUNKED	INTEGER_1(:,:) 	CRPDR Antenna Identifier None	1	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. (Source: ATL01/sc3/gpsr/carrier_phase); (Meanings: [0 1]) (Values: ['first_antenna', 'second_antenna'])
carrier_c_fract CHUNKED	FLOAT(:,:) 	CRPDR Carrier Cycle Fraction None	degrees	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. (Source: ATL01/sc3/gpsr/carrier_phase converted)
carrier_c_int CHUNKED	INTEGER_8(:,:) 	CRPDR Integer Carrier Cycle Counter None	counts	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. (Source: ATL01/sc3/gpsr/carrier_phase)
channel_num CHUNKED	INTEGER_1(:,:) 	CRPDR Channel Number None	counts	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. (Source: ATL01/sc3/gpsr/carrier_phase)
constell_id CHUNKED	INTEGER_1(:,:) 	CRPDR Constellation ID None	counts	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. (Source: ATL01/sc3/gpsr/carrier_phase)
delta_range CHUNKED	DOUBLE(:,:) 	CRPDR Delta Range None	meters/second	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. (Source: ATL01/sc3/gpsr/carrier_phase converted)
delta_time CHUNKED	DOUBLE(:) 	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
deter_f CHUNKED	INTEGER_1(:,:) 	CRPDR Deterioration Flag None	1	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. (Source: ATL01/sc3/gpsr/carrier_phase); (Meanings: [0 1]) (Values: ['steady', 'unsteady'])
ds_24_slots CONTIGUOUS	INTEGER_1(24) 	DS for 24 slots None	1	Dimension scale representing each of the 24 slots. (Source: Dimension Scale)
num_valid_slots CHUNKED	INTEGER_1(:) 	Number of slots filled None	counts	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. (Source: ATL01/sc3/gpsr/carrier_phase/dfh_x/raw_num_recs)
signal_type CHUNKED	INTEGER_1(:,:) 	CRPDR GPS Signal Type None	1	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. (Source: ATL01/sc3/gpsr/carrier_phase); (Meanings: [0 1 2 3 4 5 6]) (Values: ['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(:,:) 	CRPDR Space Vehicle ID None	counts	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. (Source: ATL01/sc3/gpsr/carrier_phase)
Group: /gpsr/channel_status		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	Datatype(Dims)	long_name	units	description

(Layout)	Fillvalue	standard_name		
antenna_id CHUNKED	INTEGER_1(:,:)	CSR Antenna Identifier None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['first_antenna', 'second_antenna'])
carrier_loop_bw CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Bandwidth None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
carrier_loop_bw_ff CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Bandwidth Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
carrier_loop_disc_ff CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Discriminator Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
carrier_loop_int_t CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Int Time None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
carrier_loop_int_t_ff CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Int Time Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
carrier_loop_lock CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Lock None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_locked', 'locked'])
carrier_loop_mode CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Mode None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1 2 3]) (Values: ['no_activities', 'acquisition', 'tracking', 'acq_error'])
carrier_loop_thres_ff CHUNKED	INTEGER_1(:,:)	CSR Carrier Loop Threshold Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
carrier_ph_deter CHUNKED	INTEGER_1(:,:)	CSR Carrier Phase Deterioration None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['no_deterioration', 'deterioration'])
channel_num CHUNKED	INTEGER_1(:,:)	CSR Channel Number None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
code_loop_bw CHUNKED	INTEGER_1(:,:)	CSR Code Loop Bandwidth None	counts	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 (Source: ATL01/sc4/gpsr/channel_status)
code_loop_bw_ff CHUNKED	INTEGER_1(:,:)	CSR Code Loop Bandwidth Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
code_loop_corr_ff CHUNKED	INTEGER_1(:,:)	CSR Code Loop Correlator Spacing Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
code_loop_int_t CHUNKED	INTEGER_1(:,:)	CSR Code Loop Int Time None	1	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. (Source: ATL01/sc4/gpsr/channel_status)
code_loop_int_t_ff CHUNKED	INTEGER_1(:,:)	CSR Code Loop Int Time Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])

code_loop_lock CHUNKED	INTEGER_1(:,:) 	CSR Code Loop Lock None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_locked', 'locked'])
code_loop_mode CHUNKED	INTEGER_1(:,:) 	CSR Code Loop Mode None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1 2 3]) (Values: ['no_activities', 'acquisition', 'tracking', 'acq_error'])
code_loop_thres_ff CHUNKED	INTEGER_1(:,:) 	CSR Code Loop Threshold Final Flag None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['not_final', 'applied'])
code_phase_deter CHUNKED	INTEGER_1(:,:) 	CSR Code Phase Deterioration None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1]) (Values: ['no_deterioration', 'deterioration'])
constell_id CHUNKED	INTEGER_1(:,:) 	CSR Constellation ID None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
delta_time CHUNKED	DOUBLE(:) 	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
ds_24_slots CONTIGUOUS	INTEGER_1(24) 	DS for 24 slots None	1	Dimension scale representing each of the 24 slots. (Source: Dimension Scale)
logical_track_state CHUNKED	UINT_1_LE(:,:) 	CSR Logical Tracking State None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
nav_d_sync CHUNKED	INTEGER_1(:,:) 	CSR Navigation Data Sync Status None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1 3]) (Values: ['not_synced', 'synced_not_inverted', 'synced_inverted'])
num_valid_slots CHUNKED	INTEGER_1(:) 	Number of slots filled None	counts	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. (Source: ATL01/sc4/gpsr/channel_status/dfh/raw_num_recs)
signal_type CHUNKED	INTEGER_1(:,:) 	CSR GPS Signal Type None	1	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. (Source: ATL01/sc4/gpsr/channel_status); (Meanings: [0 1 2 3 4 5 6]) (Values: ['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(:,:) 	CSR Space Vehicle ID None	counts	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. (Source: ATL01/sc4/gpsr/channel_status)
Group: /gpsr/code_phase		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(Dims) Fillvalue	long_name standard_name	units	description
antenna_id CHUNKED	INTEGER_1(:,:) 	CDPDR Antenna Identifier None	1	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. (Source: ATL01/sc3/gpsr/code_phase); (Meanings: [0 1]) (Values: ['first_antenna', 'second_antenna'])
channel_num CHUNKED	INTEGER_1(:,:) 	CDPDR Channel Number None	counts	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. (Source: ATL01/sc3/gpsr/code_phase)
code_chip_count CHUNKED	UINT_8_LE(:,:)	CDPDR Chip Count None	counts	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. (Source: ATL01/sc3/gpsr/code_phase)
code_chip_fract CHUNKED	FLOAT(:,:)	CDPDR Fractional Chip Count None	counts	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. (Source: ATL01/sc3/gpsr/code_phase converted)
constell_id CHUNKED	INTEGER_1(:,:)	CDPDR Constellation ID None	counts	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. (Source: ATL01/sc3/gpsr/code_phase)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
deter_f CHUNKED	INTEGER_1(:,:)	CDPDR Deterioration Flag None	1	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. (Source: ATL01/sc3/gpsr/code_phase); (Meanings: [0 1]) (Values: ['steady', 'unsteady'])
ds_24_slots CONTIGUOUS	INTEGER_1(24)	DS for 24 slots None	1	Dimension scale representing each of the 24 slots. (Source: Dimension Scale)
num_valid_slots CHUNKED	INTEGER_1(:)	Number of slots filled None	counts	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. (Source: ATL01/sc3/gpsr/code_phase/dfh_x/raw_num_recs)
signal_type CHUNKED	INTEGER_1(:,:)	CDPDR GPS Signal Type None	1	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. (Source: ATL01/sc3/gpsr/code_phase); (Meanings: [0 1 2 3 4 5 6]) (Values: ['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(:,:)	CDPDR Smoothing Flag None	1	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. (Source: ATL01/sc3/gpsr/code_phase); (Meanings: [0 1]) (Values: ['not_applied', 'applied'])
sv_id CHUNKED	INTEGER_1(:,:)	CDPDR Space Vehicle ID None	counts	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. (Source: ATL01/sc3/gpsr/code_phase)
Group: /gpsr/hk		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(Dims) Fillvalue	long_name standard_name	units	description
clock_source CHUNKED	INTEGER_1(:)	HK Clock Source None	1	Housekeeping Parameter Report (HK) - Clock Source (Source: ATL01/sc4/gpsr/hk); (Meanings: [0 1]) (Values: ['internal_clock', 'value_invalid'])
cpu_processor_load CHUNKED	UINT_2_LE(:)	HK CPU Processor Load None	counts	Housekeeping Parameter Report (HK) - CPU Load of most recent PPS interval (Source: ATL01/sc4/gpsr/hk)
dc_data_error CHUNKED	UINT_1_LE(:)	HK Data Cache Data Error Counter None	counts	Housekeeping Parameter Report (HK) - Data Cache Data Error Counter (Source: ATL01/sc4/gpsr/hk)
dc_tag_error CHUNKED	UINT_1_LE(:)	HK Data Cache Tag Error Counter None	counts	Housekeeping Parameter Report (HK) - Data Cache Tag Error Counter (Source: ATL01/sc4/gpsr/hk)

delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
discarded_tc_packets CHUNKED	UINT_1_LE(:)	HK Discarded TC Packet Counter None	counts	Housekeeping Parameter Report (HK) - Number of TC packets discarded since start of GPSR (wrapping counter). (Source: ATL01/sc4/gpsr/hk)
discarded_tm_packets CHUNKED	UINT_1_LE(:)	HK Discarded TM Packet Counter None	counts	Housekeeping Parameter Report (HK) - Number of TM packets discarded since start of GPSR (wrapping counter). (Source: ATL01/sc4/gpsr/hk)
edac_double_bit_error CHUNKED	INTEGER_1(:)	HK MilBus I/F EDAC Double Bit Error None	counts	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Double Bit Error (Source: ATL01/sc4/gpsr/hk)
edac_single_bit_error CHUNKED	UINT_1_LE(:)	HK MilBus I/F EDAC Single Bit Error None	counts	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Single Bit Error (Source: ATL01/sc4/gpsr/hk)
front_end_t CHUNKED	UINT_1_LE(:)	DFH Front End Temperature None	counts	GPSR Data Field Header - R/F Front End Temperature (raw counts; not EU-converted) (Source: GPSR_DFH)
ic_data_error CHUNKED	UINT_1_LE(:)	HK Instr Cache Data Error Counter None	counts	Housekeeping Parameter Report (HK) - Instr Cache Data Error Counter (Source: ATL01/sc4/gpsr/hk)
ic_tag_error CHUNKED	UINT_1_LE(:)	HK Instr Cache Tag Error Counter None	counts	Housekeeping Parameter Report (HK) - Instr Cache Tag Error Counter (Source: ATL01/sc4/gpsr/hk)
memory_dump_status CHUNKED	UINT_2_LE(:)	HK Memory Dump Status None	counts	Housekeeping Parameter Report (HK) - Number of TM packets to be generated until the current Memory Dump is finished (Source: ATL01/sc4/gpsr/hk)
n_sv_w_all CHUNKED	INTEGER_1(:)	HK Number of Tracked SVs w All Components in Tracking State None	counts	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with all signal components in final tracking state at the most recent PPS (Source: ATL01/sc4/gpsr/hk)
n_svs_acquired CHUNKED	INTEGER_1(:)	HK Number of SVs Being Acquired None	counts	Housekeeping Parameter Report (HK) - GNSS satellites being acquired at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 2...4 (Source: ATL01/sc4/gpsr/hk)
n_svs_used CHUNKED	INTEGER_1(:)	HK Number of SVs Used for PVT None	counts	Housekeeping Parameter Report (HK) - GNSS satellites being used for PVT at the PPS before the most recent PPS (Source: ATL01/sc4/gpsr/hk)
n_svs_wo_all CHUNKED	INTEGER_1(:)	HK Number of Tracked SVs w/o All Components in Tracking State None	counts	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) (Source: ATL01/sc4/gpsr/hk)
nsm CHUNKED	INTEGER_1(:)	GPSR Navigation Solution Method (NSM) None	1	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. (Source: ATL01/sc4/gpsr/hk); (Meanings: [0 1 2 3 4 5 7]) (Values: ['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 None	counts	Housekeeping Parameter Report (HK) - PROM EDAC Single bit or uncorrectable error (Source: ATL01/sc4/gpsr/hk); (Meanings: [0 1]) (Values: ['no_error_detected', 'error_detected'])
protocol_selection_f CHUNKED	INTEGER_1(:)	HK MilBus Protocol Selection Flag None	counts	Housekeeping Parameter Report (HK) - MilBus Protocol Selection Flag (Source: ATL01/sc4/gpsr/hk)
register_file_errors CHUNKED	INTEGER_1(:)	HK Corrected Register File Errors None	1	Housekeeping Parameter Report (HK) - Corrected Register File Errors (Source: ATL01/sc4/gpsr/hk); (Meanings: [0 1]) (Values: ['no_error_detected', 'error_detected'])
sram_edac_status CHUNKED	INTEGER_1(:)	HK SRAM EDAC Status None	1	Housekeeping Parameter Report (HK) - SRAM EDAC Single bit error (Source: ATL01/sc4/gpsr/hk); (Meanings: [0 1]) (Values: ['no_error_detected', 'error_detected'])
transient_protocol_errors CHUNKED	UINT_2_LE(:)	HK MilBus Transient Protocol Error Count None	counts	Housekeeping Parameter Report (HK) - MilBus Transient Protocol Error Count (Source: ATL01/sc4/gpsr/hk)
transmit_buffer_occupancy CHUNKED	UINT_2_LE(:)	HK Transmit Buffer Occupancy None	counts	Housekeeping Parameter Report (HK) - Number of bytes buffered for transmission (Source: ATL01/sc4/gpsr/hk)

Group: /gpsr/navigation		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(Dims) Fillvalue	long_name standard_name	units	description
clock_freq_error CHUNKED	INTEGER(:)	NAV Receiver Clock Frequency Error None	seconds	Navigation Solution Data Record (NAV) - Receiver Clock Frequency Error (Source: ATL01/sc4/gpsr/navigation)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
gdop CHUNKED	FLOAT(:)	NAV Geometric Dilution of Precision None	meters	Navigation Solution Data Record (NAV) - Geometric Dilution of Precision (Values greater than 655.34 m are saturated to 655.34 m.) (Source: ATL01/sc4/gpsr/navigation converted)
gnss_time_error CHUNKED	FLOAT(:)	NAV GNSS System Time Error None	seconds	Navigation Solution Data Record (NAV) - GNSS System Time Error (Source: ATL01/sc4/gpsr/navigation converted)
gps_time_sec CHUNKED	UINT_4_LE(:)	TCDR GPS Time (Seconds) None	seconds	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) (Source: ATL01/sc4/gpsr/navigation)
gps_time_subsec CHUNKED	UINT_4_LE(:)	TCDR GPS Time (Subseconds) None	1/4294967296 seconds	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) (Source: ATL01/sc4/gpsr/navigation)
h_ell CHUNKED	DOUBLE(:)	NAV Height Above Reference Ellipsoid (WGS84) None	meters	Navigation Solution Data Record (NAV) - Height Above Reference Ellipsoid (WGS84) (Source: ATL01/sc4/gpsr/navigation converted)
latitude CHUNKED	DOUBLE(:)	NAV Latitude (WGS84) None	degrees_north	Navigation Solution Data Record (NAV) - Latitude (WGS84) (Source: ATL01/sc4/gpsr/navigation converted)
longitude CHUNKED	DOUBLE(:)	NAV Longitude (WGS84) None	degrees_east	Navigation Solution Data Record (NAV) - Longitude (WGS84) (Source: ATL01/sc4/gpsr/navigation converted)
max_curve_fit CHUNKED	INTEGER_1(:)	NAV Maximum Curve Fit None	1	Navigation Solution Data Record (NAV) - Maximum Curve Fit interval taken from all SVs used in current navigation solution (Source: ATL01/sc4/gpsr/navigation); (Meanings: [0 1 2 3 4 5 6 7 8 9 15]) (Values: ['4h', '6h', '8h', '14h', '26h', '50h', '74h', '98h', '122h', '146h', 'no_curve_fit'])
max_ura CHUNKED	INTEGER_1(:)	NAV Maximum User Range Accuracy (URA) None	counts	Navigation Solution Data Record (NAV) - Maximum User Range Accuracy (-16 means that no URA is available) (Source: ATL01/sc4/gpsr/navigation)
n_svs CHUNKED	INTEGER_1(:)	NAV Number of SVs in Solution None	counts	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 (Source: ATL01/sc4/gpsr/navigation)
nsm CHUNKED	INTEGER_1(:)	GPSR Navigation Solution Method (NSM) None	1	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 (Source: ATL01/sc4/gpsr/navigation); (Meanings: [1 2 3 4 5 6 7]) (Values: ['propagated', 'cold_lsq_no_gdop', 'lsqm_w_svs', 'normal_lsqm', 'normal_kalman', 'unused', 'invalid_solution'])
pdop CHUNKED	FLOAT(:)	NAV Position Dilution of Precision None	counts	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. (Source: ATL01/sc4/gpsr/navigation converted)
position_error_x CHUNKED	FLOAT(:)	NAV Position Error X None	meters	Navigation Solution Data Record (NAV) - Estimated X position error (Source: ATL01/sc4/gpsr/navigation converted)
position_error_y CHUNKED	FLOAT(:)	NAV Position Error Y None	meters	Navigation Solution Data Record (NAV) - Estimated Y position error (Source: ATL01/sc4/gpsr/navigation converted)
position_error_z CHUNKED	FLOAT(:)	NAV Position Error Z None	meters	Navigation Solution Data Record (NAV) - Estimated Z position error (Source: ATL01/sc4/gpsr/navigation converted)
position_qa CHUNKED	INTEGER_2(:)	NAV Time Quality Index None	seconds	Navigation Solution Data Record (NAV) - Time Quality Index; Values greater than 4095 ns are saturated to 4095 ns. (Source: ATL01/sc4/gpsr/navigation)
position_x CHUNKED	DOUBLE(:)	NAV Position X (WGS84) None	meters	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) (Source: ATL01/sc4/gpsr/navigation converted)

position_y CHUNKED	DOUBLE(:) 	NAV Position Y (WGS84) None	meters	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) (Source: ATL01/sc4/gpsr/navigation converted)
position_z CHUNKED	DOUBLE(:) 	NAV Position Z (WGS84) None	meters	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) (Source: ATL01/sc4/gpsr/navigation converted)
tdop CHUNKED	FLOAT(:) 	GPSR Time Dilution of Precision None	meters	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. (Source: ATL01/sc4/gpsr/navigation converted)
velocity_error_x CHUNKED	FLOAT(:) 	NAV Velocity Error X None	meters/second	Navigation Solution Data Record (NAV) - Estimated X velocity error (Source: ATL01/sc4/gpsr/navigation converted)
velocity_error_y CHUNKED	FLOAT(:) 	NAV Velocity Error Y None	meters/second	Navigation Solution Data Record (NAV) - Estimated Y velocity error (Source: ATL01/sc4/gpsr/navigation converted)
velocity_error_z CHUNKED	FLOAT(:) 	NAV Velocity Error Z None	meters/second	Navigation Solution Data Record (NAV) - Estimated Z velocity error (Source: ATL01/sc4/gpsr/navigation converted)
velocity_x CHUNKED	DOUBLE(:) 	NAV Velocity X (WGS84) None	meters/second	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) (Source: ATL01/sc4/gpsr/navigation converted)
velocity_y CHUNKED	DOUBLE(:) 	NAV Velocity Y (WGS84) None	meters/second	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) (Source: ATL01/sc4/gpsr/navigation converted)
velocity_z CHUNKED	DOUBLE(:) 	NAV Velocity Z (WGS84) None	meters/second	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) (Source: ATL01/sc4/gpsr/navigation converted)
vertical_speed CHUNKED	DOUBLE(:) 	NAV Vertical Speed None	meters/second	Navigation Solution Data Record (NAV) - Vertical Speed (Source: ATL01/sc4/gpsr/navigation converted)
Group: /gpsr/noise_histogram		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(Dims) Fillvalue	long_name standard_name	units	description
chain_index CHUNKED	INTEGER_1(:,:) 	NHDR Chain Index - Chain 1-2 None	1	Noise Histogram Data Record (NHDR) - Chain Index - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram); (Meanings: [0 1]) (Values: ['antenna1_I1carrier', 'antenna1_I2carrier'])
delta_time CHUNKED	DOUBLE(:) 	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
ds_chain CONTIGUOUS	INTEGER_1(2) 	DS for each chain None	1	Dimension scale representing each of the 2 chains. (Source: Dimension Scale)
noise_power CHUNKED	FLOAT(:,:) 	NHDR Noise Power - Chain 1-2 None	dB	Noise Histogram Data Record (NHDR) - Noise Power as seen at the input of the variable gain IF amplifier - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram converted)
norm_neg_in_phase_m1 CHUNKED	UINT_2_LE(:,:) 	NHDR Normalized Negative In-Phase Counts M1 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M1) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_neg_in_phase_m3 CHUNKED	UINT_2_LE(:,:) 	NHDR Normalized Negative In-Phase Counts M3 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M3) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_neg_quad_phase_m1 CHUNKED	UINT_2_LE(:,:) 	NHDR Normalized Negative Quadrature-Phase Counts M1 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M1) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_neg_quad_phase_m3 CHUNKED	UINT_2_LE(:,:) 	NHDR Normalized Negative Quadrature-Phase Counts M3 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M3) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_pos_in_phase_p1 CHUNKED	UINT_2_LE(:,:) 	NHDR Normalized Positive In-Phase Counts P1 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P1) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)

norm_pos_in_phase_p3 CHUNKED	UINT_2_LE(:,:)	NHDR Normalized Positive In-Phase Counts P3 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P3) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_pos_quad_phase_p1 CHUNKED	UINT_2_LE(:,:)	NHDR Normalized Positive Quadrature-Phase Counts P1 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P1) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
norm_pos_quad_phase_p3 CHUNKED	UINT_2_LE(:,:)	NHDR Normalized Positive Quadrature-Phase Counts P3 - Chain 1-2 None	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P3) - Down Conversion Chain Identifier 1-2 (Source: ATL01/sc3/gpsr/noise_histogram)
Group: /gpsr/time_correlation		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	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 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. (Source: Derived via Time Tagging)
gps_time_sec CHUNKED	UINT_4_LE(:)	TCDR GPS Time (Seconds) None	seconds	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) (Source: ATL01/sc4/gpsr/time_correlation)
gps_time_subsec CHUNKED	UINT_4_LE(:)	TCDR GPS Time (Subseconds) None	1/4294967296 seconds	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) (Source: ATL01/sc4/gpsr/time_correlation)
imt CHUNKED	UINT_8_LE(:)	TCDR Instrument Measurement Time None	counts	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. This field contains the raw 64-bit IMT value. (Be aware of possible precision loss possible when converting to seconds.) (Source: ATL01/sc4/gpsr/time_correlation)
nsm CHUNKED	INTEGER_1(:)	GPSR Navigation Solution Method (NSM) None	1	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 (Source: ATL01/sc4/gpsr/time_correlation); (Meanings: [1 2 3 4 5 6 7]) (Values: ['propagated', 'cold_lsq_no_gdop', 'lsqm_w_svs', 'normal_lsqm', 'normal_kalman', 'unused', 'invalid_solution'])
tdop CHUNKED	FLOAT(:)	GPSR Time Dilution of Precision None	meters	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. (Source: ATL01/sc4/gpsr/time_correlation converted)
time_qa CHUNKED	INTEGER_2(:)	TCDR Time Quality Index None	nanoseconds	Time Correlation Data Record (TCDR) - Time Quality Index. Nanoseconds; Values greater than 4095 ns are saturated to 4095 ns. (Source: ATL01/sc4/gpsr/time_correlation)
utc_days CHUNKED	UINT_2_LE(:)	TCDR TCDR UTC Time - Days None	days	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. (Source: ATL01/sc4/gpsr/time_correlation)
utc_msec CHUNKED	UINT_4_LE(:)	TCDR TCDR UTC Time - Milliseconds None	msec	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of milliseconds of current day. (Source: ATL01/sc4/gpsr/time_correlation)
utc_usec CHUNKED	UINT_2_LE(:)	TCDR TCDR UTC Time - Microseconds None	usec	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of microseconds of current day. (Source: ATL01/sc4/gpsr/time_correlation)
Group: /lrs		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		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(Dims) Fillvalue	long_name standard_name	units	description
chkstat_e_ad	INTEGER_1(:)	LRS_HK Checksum Status	1	EEPROM Application Data (AD) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition))

CHUNKED		Register - EEPROM Application Text Checksum None		(Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_e_at CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - EEPROM Application Text Checksum None	1	EEPROM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_e_bc CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - EEPROM Boot Config Checksum None	1	EEPROM Boot Configuration (BC) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_e_ld_df CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - EEPROM Laser Detector Dark Frame Checksum None	1	EEPROM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_e_sd_df CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - EEPROM Stellar Detector Dark Frame Checksum None	1	EEPROM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_s_at CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register -SRAM Application Text Checksum None	1	SRAM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_s_ld_df CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - SRAM Laser Detector Dark Frame Checksum None	1	SRAM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
chkstat_s_sd_df CHUNKED	INTEGER_1(:)	LRS_HK Checksum Status Register - SRAM Stellar Detector Dark Frame Checksum None	1	SRAM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['passed', 'failed'])
cmdcnt CHUNKED	UINT_2_LE(:)	LRS_HK Valid User Command Counter None	counts	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). (Source: LRS_HK)
cmderrcnt CHUNKED	UINT_2_LE(:)	LRS_HK User Command Error Counter None	counts	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). (Source: LRS_HK)
cmderrcode CHUNKED	UINT_2_LE(:)	LRS_HK Unique Code for User Command Errors None	counts	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. (Source: LRS_HK)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
dmpmemcnt CHUNKED	UINT_4_LE(:)	LRS_HK Number of memory words dumped None	counts	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). (Source: LRS_HK)
dmppktleft CHUNKED	UINT_2_LE(:)	LRS_HK Remaining number of dump packets to go None	counts	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. (Source: LRS_HK)
ground1_v CHUNKED	FLOAT(:)	LRS_HK Ground 1 Voltage None	volts	Voltage of Ground 1 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[0] (Source: LRS_HK)
ground2_v	FLOAT(:)	LRS_HK Ground 2 Voltage	volts	Voltage of Ground 2 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[1]

CHUNKED		None		(Source: LRS_HK)
laser_barrel1_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #1 (Laser Side Barrel #1 Temperature) None	degreesC	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] (Source: LRS_HK)
laser_barrel2_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #2 (Laser Side Barrel #2 Temperature) None	degreesC	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] (Source: LRS_HK)
laser_barrel3_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #3 (Laser Side Barrel #3 Temperature) None	degreesC	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] (Source: LRS_HK)
ldbackground CHUNKED	UINT_2_LE(:)	LRS_HK LD background None	counts	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. (Source: LRS_HK)
ldc_t CHUNKED	FLOAT(:)	LRS_HK Laser Detector Card Temperature None	degreesC	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] (Source: LRS_HK)
ldmemcnt CHUNKED	UINT_4_LE(:)	LRS_HK Number of memory words loaded None	counts	This 32-bit counter records the total number of memory words loaded during Failsafe Mode processing of Failsafe Load 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) (Source: LRS_HK)
ldmemconflict CHUNKED	UINT_2_LE(:)	LRS_HK LD Memory Conflicts None	counts	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). (Source: LRS_HK)
ldoverrun CHUNKED	UINT_2_LE(:)	LRS_HK LD Processing Overruns None	counts	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). (Source: LRS_HK)
m12v_cmon_a CHUNKED	FLOAT(:)	LRS_HK -12VDC Current Monitor None	amps	Amperage of -12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[6] (Source: LRS_HK)
m12v_ldc_mon_v CHUNKED	FLOAT(:)	LRS_HK -12VDC LDC Monitor None	volts	Voltage of -12VDC LDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[11] (Source: LRS_HK)
m12v_sdc_mon_v CHUNKED	FLOAT(:)	LRS_HK -12VDC SDC Monitor None	volts	Voltage of -12VDC SDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[10] (Source: LRS_HK)
m12v_supp_mon_v CHUNKED	FLOAT(:)	LRS_HK -12VDC Supply Monitor None	volts	Voltage of 112VDC Supply Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[14] (Source: LRS_HK)
meter_bar1_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #4 (Metering Bars #1 Temperature) None	degreesC	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] (Source: LRS_HK)
meter_bar2_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #5 (Metering Bars #2 Temperature) None	degreesC	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] (Source: LRS_HK)
meter_bar3_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #6 (Metering Bars #3 Temperature) None	degreesC	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] (Source: LRS_HK)
p12v_ana_mon_v	FLOAT(:)	LRS_HK +12VDC Analog	volts	Voltage of +12VDC Analog Monitor - 0x0000 = 0.000 V; 0xC000 = +12.000 V (nominal value); 0xFFFF = +16.000 V :

CHUNKED		Monitor None		A_LRS_HK.ANALOGHK[15] (Source: LRS_HK)
p12v_cmon_a CHUNKED	FLOAT(:)	LRS_HK +12VDC Current Monitor None	amps	Amperage of +12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[7] (Source: LRS_HK)
p1_5v_mon_v CHUNKED	FLOAT(:)	LRS_HK +1.5VDC Monitor None	volts	Voltage of +1.5VDC Monitor - 0x0000 = 0.000 V; 0x6000 = +1.500 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[3] (Source: LRS_HK)
p1_8v_mon_v CHUNKED	FLOAT(:)	LRS_HK +1.8VDC Monitor Voltage None	volts	Volage of +1.8VDC Monitor - 0x0000 = 0.000 V; 0x7332 = 1.800 V (nominal); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[19] (Source: LRS_HK)
p3_3v_cmon_a CHUNKED	FLOAT(:)	LRS_HK +3.3VDC Current Monitor None	amps	Amperage of +3.3VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +4.000 A : A_LRS_HK.ANALOGHK[9] (Source: LRS_HK)
p3_3v_mon_v CHUNKED	FLOAT(:)	LRS_HK +3.3VDC Monitor None	volts	Voltage of +3.3VDC Monitor - 0x0000 = 0.000 V; 0xD333 = +3.300 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[18] (Source: LRS_HK)
p5v_ana_mon_v CHUNKED	FLOAT(:)	LRS_HK +5VDC Analog Monitor None	volts	Voltage of +5VDC Analog Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[16] (Source: LRS_HK)
p5v_cmon_a CHUNKED	FLOAT(:)	LRS_HK +5VDC Current Monitor None	amps	Amperage of +5VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[8] (Source: LRS_HK)
p5v_ldc_mon_v CHUNKED	FLOAT(:)	LRS_HK +5VDC LDC Monitor None	volts	Voltage of +5VDC LDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[12] (Source: LRS_HK)
p5v_sdc_mon_v CHUNKED	FLOAT(:)	LRS_HK +5VDC SDC Monitor None	volts	Voltage of +5VDC SDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[13] (Source: LRS_HK)
p5v_supp_mon_v CHUNKED	FLOAT(:)	LRS_HK +5VDC Supply Monitor None	volts	Voltage of +5VDC Supply Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[16] (Source: LRS_HK)
pc_t CHUNKED	FLOAT(:)	LRS_HK Processor Card Thermistor None	degreesC	Temperature of Processor Card - 0x0000 = 0.000 V (nominal short;) 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] (Source: LRS_HK)
pcc_t CHUNKED	FLOAT(:)	LRS_HK Power Converter Card Temperature None	degreesC	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] (Source: LRS_HK)
ppscount CHUNKED	UINT_4_LE(:)	LRS_HK 1PPS sync counter None	counts	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. (Source: LRS_HK)
ppsoffset_ms CHUNKED	UINT_4_LE(:)	LRS_HK Oscillator Offset None	ms	Oscillator Offset (milliseconds) for TOD (time of day) correction. (Source: LRS_HK)
ppsoffset_ticks CHUNKED	UINT_4_LE(:)	LRS_HK Oscillator Offset Ticks None	counts	Oscillator Offset (ticks) for TOD (time of day) correction. (Source: LRS_HK)
ppsoscval CHUNKED	UINT_4_LE(:)	LRS_HK Latched oscillator value at 1PPS sync None	counts	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. (Source: LRS_HK)
reference_v CHUNKED	FLOAT(:)	LRS_HK Reference Voltage None	volts	Reference Voltage - 0x0000 = 0.000 V; 0x8000 = +2.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[2] (Source: LRS_HK)
sdbackground CHUNKED	UINT_2_LE(:)	LRS_HK SD background None	counts	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. (Source: LRS_HK)
sdc_t CHUNKED	FLOAT(:)	LRS_HK Stellar Detector Card Temperature None	counts	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] (Source: LRS_HK)
sdmemconflict	UINT_2_LE(:)	LRS_HK SD Memory Conflicts	counts	This 16-bit counter is incremented each time the Application Mode is still accessing Stellar-Side shared memory when a

CHUNKED		None		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). (Source: LRS_HK)
sdoverrun CHUNKED	UINT_2_LE(:)	LRS_HK SD Processing Overruns None	counts	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). (Source: LRS_HK)
spwdiscardbkup CHUNKED	UINT_4_LE(:)	LRS_HK Spacewire tlm packets dropped due to buffer not being empty None	counts	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). (Source: LRS_HK)
spwdiscardcmd CHUNKED	UINT_4_LE(:)	LRS_HK Spacewire words dropped due to timeout waiting for full CCSDS packet None	counts	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). (Source: LRS_HK)
spwdiscardlink CHUNKED	UINT_4_LE(:)	LRS_HK Spacewire tlm packets dropped due to link not available None	counts	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). (Source: LRS_HK)
spwoutofsync CHUNKED	UINT_4_LE(:)	LRS_HK Spacewire words skipped to find sync None	counts	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). (Source: LRS_HK)
spwstat_ll_err CHUNKED	INTEGER_1(:)	LRS_HK Spacewire Status Register - Last Link Error None	1	This is the Last Link Error Code portion of the LRS spacewire interface register. (Source: LRS_HK); (Meanings: [0 1 2 3]) (Values: ['disconnected', 'parity_err', 'esc_rec', 'credit_err'])
spwstat_lp_err CHUNKED	INTEGER_1(:)	LRS_HK Spacewire Status Register - Last Packet Error None	1	This is the Last Packet Error Code portion of the LRS spacewire interface register. (Source: LRS_HK); (Meanings: [0 1 2 3]) (Values: ['no_error', 'eep_rec', 'incomplete_sw', 'invalid'])
spwstat_pec CHUNKED	UINT_1_LE(:)	LRS_HK Spacewire Status Register _ Packet Error Counter None	counts	This is the 6-bit Packet Error Counter portion of the LRS spacewire interface status register (Source: LRS_HK)
spwstat_st_f CHUNKED	INTEGER_1(:)	LRS_HK Spacewire Status Register - Status None	1	This is the status flag portion of the LRS spacewire interface status register. (Source: LRS_HK); (Meanings: [0 1]) (Values: ['not_running', 'running'])
srate_x CHUNKED	FLOAT(:)	LRS_HK Stellar Pattern Rate X None	pixels/sec	X component (tip/tilt) of the stellar rate pattern estimate. (Source: LRS_HK)
srate_y CHUNKED	FLOAT(:)	LRS_HK Stellar Pattern Rate Y None	pixels/second	Y component (tip/tilt) of the stellar rate pattern estimate (Source: LRS_HK)
srate_z CHUNKED	FLOAT(:)	LRS_HK Stellar Pattern Rate Z None	radians/second	Z (rotation) component of the stellar rate pattern estimate (Source: LRS_HK)
stellar_barrel1_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #7 (Stellar Side Barrel #1 Temperature) None	degreesC	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] (Source: LRS_HK)
stellar_barrel2_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #8 (Stellar Side Barrel #2 Temperature) None	degreesC	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] (Source: LRS_HK)
stellar_barrel3_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #9 (Stellar Side Barrel #3 Temperature) None	degreesC	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] (Source: LRS_HK)
stellar_shroud_t CHUNKED	FLOAT(:)	LRS_HK Optics Thermistor #10 (Stellar Side Shroud Temperature)	degreesC	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] (Source: LRS_HK)

		None		
sysstat_ac_en CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - Analog Converter Status None	1	The current status of the LRS FPGA Analog Converter. (0 =DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disabled', 'enabled'])
sysstat_hk CHUNKED	INTEGER_1(:)	LRS_HK System Status Register HK Working None	1	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 (Source: LRS_HK); (Meanings: [0 1]) (Values: ['finished', 'executing'])
sysstat_j1 CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - Jumper 1 None	1	Jumper 1 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_j2 CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - Jumper 2 None	1	Jumper 2 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_ldc CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - LDC Status None	1	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 (Source: LRS_HK); (Meanings: [0 1]) (Values: ['finished', 'executing'])
sysstat_ldc_en CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - LDC Power and Signals Enable Status None	1	The current status of the LRS FPGA LDC (Laser Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disabled', 'enabled'])
sysstat_ldca_cable CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - LDC Analog Cable Status None	1	The current status of the LRS FPGA LDCA (Laser Detector Card Analog) Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_ldcd_cable CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - LDC Digital Cable Status None	1	The current status of the LRS FPGA LDCD (Laser Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_lsync CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - Laser Sync validity Status None	1	The current validity of the Laser Sync (0 = INVALID (abnormal condition); 1 = VALID (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['invalid', 'valid'])
sysstat_sdc CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - SDC Status None	1	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 (Source: LRS_HK); (Meanings: [0 1]) (Values: ['finished', 'executing'])
sysstat_sdc_en CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - SDC Power and Signals Enable Status None	1	The current status of the LRS FPGA SDC (Stellar Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disabled', 'enabled'])
sysstat_sdca_cable CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - SDC Analog Cable Status None	1	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_sdcd_cable CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - SDC Digital Cable Status None	1	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['disconnected', 'connected'])
sysstat_sw CHUNKED	INTEGER_1(:)	LRS_HK System Status Register - Spacewire Module Status None	1	The current status of the Spacewire Module (0 = NOT RUNNING (abnormal condition); 1 = RUNNING (normal operating condition)) (Source: LRS_HK); (Meanings: [0 1]) (Values: ['not_running', 'running'])
therm_gnd_ref_v CHUNKED	FLOAT(:)	LRS_HK Thermistor Reference (ground) None	volts	Voltage of Thermistor Reference (ground) - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[20] (Source: LRS_HK)
therm_open_ref_v CHUNKED	FLOAT(:)	LRS_HK Thermistor Reference (open) None	volts	Voltage of Thermistor Reference (open) - 0x0000 = 0.000 V; 0xFFFF = +4.000 V (nominal value) : A_LRS_HK.ANALOGHK[21] (Source: LRS_HK)
timecnt CHUNKED	UINT_2_LE(:)	LRS_HK Valid Time Sync Command Counter None	counts	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).

				(Source: LRS_HK)
timeerrcnt CHUNKED	UINT_2_LE(:)	LRS_HK Time Sync Command Error Counter None	counts	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). (Source: LRS_HK)
timeerrcode CHUNKED	UINT_2_LE(:)	LRS_HK Time Sync Command Error Code None	counts	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. (Source: LRS_HK)
Group: /lrs/laser_centroid		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(Dims) Fillvalue	long_name standard_name	units	description
cent_h CHUNKED	FLOAT(:)	LRS_LCENT centroid H None	pixels	The centroid H value. The centroids are the Transmit Laser Centroids and TAMS Centroids. (Source: LRS_LCENT)
cent_mag CHUNKED	INTEGER_2(:)	LRS_LCENT centroid magitude None	counts	The 12-bit centroid magnitude. The centroids are the Transmit Laser Centroids and TAMS Centroids. (Source: LRS_LCENT)
cent_v CHUNKED	FLOAT(:)	LRS_LCENT centroid V None	pixels	The centroid V value. The centroids are the Transmit Laser Centroids and TAMS Centroids. (Source: LRS_LCENT)
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
coi_offset CHUNKED	INTEGER_2(:)	Center of integration offset None	counts	The signed 16-bit center of integration offset for this specific centroid. (Source: LRS)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
quality_f CHUNKED	INTEGER_1(:)	LRS_LCENT Centroid quality None	1	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. (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['valid', 'questionable'])
trackstat_f CHUNKED	INTEGER_1(:)	LRS_LCENT Tracking status None	1	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. (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['acq_state', 'track_state'])
win CHUNKED	INTEGER_1(:)	Window None	1	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. (Source: LRS_LCENT); (Meanings: [0 1 2 3 4 5 6 7 8 9 10]) (Values: ['none', 'tams0', 'tams1', 'tams2', 'tams3', 'laser1', 'laser2', 'laser3', 'laser4', 'laser5', 'laser6'])
Group: /lrs/laser_image		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(Dims) Fillvalue	long_name standard_name	units	description
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
datatype CHUNKED	UINT_2_LE(:)	LRS_xIMG Type of pixel data None	1	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 (Source: LRS_SIMG); (Meanings: [0 4369 8738]) (Values: ['raw', 'dark', 'adj'])
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
ldc_t CHUNKED	FLOAT(:)	LRS_HK Laser Detector Card Temperature None	degrees	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] (Source: LRS_HK)
nread CHUNKED	UINT_2_LE(:)	LRSxLIMG Window read count None	counts	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. (Source: LRS_xIMG)
Group: /lrs/laser_image/window_nn		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(Dims) Fillvalue	long_name standard_name	units	description
ds_pixel_64_index CONTIGUOUS	INTEGER_1(64)	Pixel Index for 64 pixel arrays None	1	Dimension scale for 64-pixel arrays. (Source: Dimension Scale)
hloc CHUNKED	UINT_2_LE(:)	LRS_LIMG Horizontal location of window None	pixels	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. (Source: LRS_LIMG)
pixeldata CHUNKED	UINT_2_LE(:,:)	LRS_LIMG pixel data None	counts	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]). (Source: LRS_LIMG)
vloc CHUNKED	UINT_2_LE(:)	LRS_LIMG Vertical location of window None	pixels	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. (Source: LRS_LIMG)
Group: /lrs/laser_window		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(Dims) Fillvalue	long_name standard_name	units	description
adjdata CHUNKED	UINT_2_LE(:,:)	LRS_LWIN Adjusted Pixel data for window None	counts	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]). (Source: LRS_LWIN)
cent_h CHUNKED	FLOAT(:)	LRS_LCENT centroid H None	pixels	The centroid H value (in 256ths of a pixel) (Source: LRS_LCENT)
cent_mag CHUNKED	INTEGER_2(:)	LRS_LCENT centroid magitude None	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 (Source: LRS_LCENT)
cent_v CHUNKED	FLOAT(:)	LRS_LCENT centroid V None	pixels	The centroid V value (in 256ths of a pixel). (Source: LRS_LCENT)
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
coi_offset CHUNKED	INTEGER_2(:)	Center of integration offset None	counts	The signed 16-bit center of integration offset for this specific centroid. (Source: LRS)
darkdata CHUNKED	UINT_2_LE(:,:)	LRS_LWIN Dark pixel data for window None	counts	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]). (Source: LRS_LWIN)
darkfactor CHUNKED	UINT_2_LE(:)	LRS_xWIN Dark Factor None	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame. (Source: LRS_TWIN)
darkoff_next CHUNKED	UINT_2_LE(:)	LRS_xWIN Next Frame Dark Offset None	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. (Source: LRS_TWIN)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
ds_pixel_25_index CONTIGUOUS	INTEGER_1(25)	Pixel Index for 25 pixel arrays None	1	Dimension scale for 25-pixel arrays. (Source: Dimension Scale)
hdot_avg CHUNKED	FLOAT(:)	LRS_xWIN Average Horizontal Velocity None	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_xWIN)
hloc CHUNKED	UINT_2_LE(:)	LRS_LWIN Horizontal location of window None	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column 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. (Source: LRS_LWIN)
ldc_t CHUNKED	FLOAT(:)	LRS_HK Laser Detector Card Temperature None	Degrees	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] (Source: LRS_HK)
localdark CHUNKED	UINT_2_LE(:)	LRS_xWIN Local Dark None	counts	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. (Source: LRS_xWIN)
max_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Maximum Magnitude None	counts	This 16-bit value contains the maximum magnitude value for the target. (Source: LRS_xWIN)
min_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Minimum Magnitude None	counts	This 16-bit value contains the minimum magnitude value for the target. (Source: LRS_xWIN)
quality_f CHUNKED	INTEGER_1(:)	LRS_LCENT Centroid quality None	1	This 16-bit value contains a single bit for the quality of this image only. (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['valid', 'questionable'])
rawdata CHUNKED	UINT_2_LE(:,:)	LRS_LWIN Raw pixel data for window None	counts	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]). (Source: LRS_LWIN)
status_f CHUNKED	UINT_2_LE(:)	LRS_xWIN Target status None	1	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 (Source: LRS_xWIN); (Meanings: [0 1 2 3 65532 65534 65535]) (Values: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated'])
tickattime CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator Tick Value None	counts	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. (Source: LRS_xWIN)
tickfirst CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when first pixel is read None	counts	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. (Source: LRS_xWIN)
ticklast CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when last pixel is read None	counts	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. (Source: LRS_xWIN)
use_f	INTEGER_1(:)	LRS_xWIN Window Use Flag	1	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking

CHUNKED		None		algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking (Source: LRS_xWIN); (Meanings: [0 1 2 3]) (Values: ['inactive', 'image_gen', 'search', 'track'])
vdot_avg CHUNKED	FLOAT(:)	LRS_LWIN Average Vertical Velocity None	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_LWIN)
vloc CHUNKED	UINT_2_LE(:)	LRS_LWIN Vertical location of window None	pixels	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. (Source: LRS_LWIN)
windex CHUNKED	UINT_2_LE(:)	LRS_xWIN Window Index None	counts	Window Index- The 16-bit value contains the window index reported in this packet. (Source: LRSxTWIN)
Group: /lrs/stellar_centroid		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(Dims) Fillvalue	long_name standard_name	units	description
cent_h CHUNKED	FLOAT(:)	LRS_LCENT centroid H None	pixels	The centroid H value. (Source: LRS_LCENT)
cent_mag CHUNKED	INTEGER_2(:)	LRS_LCENT centroid magitude None	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 (Source: LRS_LCENT)
cent_v CHUNKED	FLOAT(:)	LRS_LCENT centroid V None	pixels	The centroid V value. (Source: LRS_LCENT)
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
coi_offset CHUNKED	INTEGER_2(:)	Center of integration offset None	counts	The signed 16-bit center of integration offset for this specific centroid. (Source: LRS)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
quality_f CHUNKED	INTEGER_1(:)	LRS_LCENT Centroid quality None	1	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). (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['valid', 'questionable'])
trackstat_f CHUNKED	INTEGER_1(:)	LRS_LCENT Tracking status None	1	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). (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['acq_state', 'track_state'])
Group: /lrs/stellar_image		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(Dims) Fillvalue	long_name standard_name	units	description
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)

cycle CHUNKED	UINT_2_LE(:)	cycle LRS_SIMG Cycle	counts	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). (Source: LRS_SIMG)
datatype CHUNKED	UINT_2_LE(:)	LRS_xIMG Type of pixel data None	1	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 (Source: LRS_SIMG); (Meanings: [0 4369 8738]) (Values: ['raw', 'dark', 'adj'])
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
nread CHUNKED	UINT_2_LE(:)	LRSxLIMG Window read count None	counts	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. (Source: LRS_xIMG)
sdc_t CHUNKED	FLOAT(:)	LRS_HK Stellar Detector Card Temperature None	Degrees	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] (Source: LRS_HK)
Group: /lrs/stellar_image/window_nn		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(Dims) Fillvalue	long_name standard_name	units	description
ds_pixel_64_index CONTIGUOUS	INTEGER_1(64)	Pixel Index for 64 pixel arrays None	1	Dimension scale for 64-pixel arrays. (Source: Dimension Scale)
hloc CHUNKED	UINT_2_LE(:)	LRS_LIMG Horizontal location of window None	pixels	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. (Source: LRS_LIMG)
pixeldata CHUNKED	UINT_2_LE(:,:)	LRS_LIMG pixel data None	counts	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]). (Source: LRS_LIMG)
vloc CHUNKED	UINT_2_LE(:)	LRS_LIMG Vertical location of window None	pixels	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. (Source: LRS_LIMG)
Group: /lrs/stellar_window		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(Dims) Fillvalue	long_name standard_name	units	description
adjdata CHUNKED	UINT_2_LE(:,:)	LRS_SWIN Adjusted Pixel data for window None	counts	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]). (Source: LRS_SWIN)
cent_h CHUNKED	FLOAT(:)	LRS_SWIN centroid H None	pixels	The centroid H value (in 256ths of a pixel). (Source: LRS_SWIN)
cent_mag CHUNKED	INTEGER_2(:)	LRS_SWIN centroid magitude None	counts	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. (Source: LRS_SWIN)
cent_v CHUNKED	FLOAT(:)	LRS_SWIN centroid V None	pixels	The centroid V value (in 256ths of a pixel). (Source: LRS_SWIN)
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
coi_offset CHUNKED	INTEGER_2(:)	Center of integration offset None	counts	The signed 16-bit center of integration offset for this specific centroid. (Source: LRS)
darkdata CHUNKED	UINT_2_LE(:,:)	LRS_SWIN Dark pixel data for window None	counts	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]). (Source: LRS_SWIN)
darkfactor CHUNKED	UINT_2_LE(:)	LRS_xWIN Dark Factor None	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame. (Source: LRS_TWIN)
darkoff_next CHUNKED	UINT_2_LE(:)	LRS_xWIN Next Frame Dark Offset None	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. (Source: LRS_TWIN)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
ds_pixel_64_index CONTIGUOUS	INTEGER_1(64)	Pixel Index for 64 pixel arrays None	1	Dimension scale for 64-pixel arrays. (Source: Dimension Scale)
hdot_avg CHUNKED	FLOAT(:)	LRS_xWIN Average Horizontal Velocity None	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_xWIN)
hloc CHUNKED	UINT_2_LE(:)	LRS_SWIN Horizontal location of window None	pixels	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. (Source: LRS_SWIN)
localdark CHUNKED	UINT_2_LE(:)	LRS_xWIN Local Dark None	counts	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. (Source: LRS_xWIN)
max_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Maximum Magnitude None	counts	This 16-bit value contains the maximum magnitude value for the target. (Source: LRS_xWIN)
min_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Minimum Magnitude None	counts	This 16-bit value contains the minimum magnitude value for the target. (Source: LRS_xWIN)
quality_f CHUNKED	INTEGER_1(:)	LRS_SWIN Centroid quality flag None	1	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). (Source: LRS_SWIN); (Meanings: [0 1]) (Values: ['valid', 'questionable'])
rawdata CHUNKED	UINT_2_LE(:,:)	LRS_SWIN Raw pixel data for window None	counts	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]). (Source: LRS_SWIN)
sdc_t CHUNKED	FLOAT(:)	LRS_HK Stellar Detector Card Temperature None	degrees	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] (Source: LRS_HK)
status_f CHUNKED	UINT_2_LE(:)	LRS_xWIN Target status None	1	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 (Source: LRS_xWIN); (Meanings: [0 1 2 3 65532 65534 65535]) (Values: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated'])
tickattime CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator Tick Value None	counts	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. (Source: LRS_xWIN)
tickfirst CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when first pixel is read None	counts	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. (Source: LRS_xWIN)
ticklast CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when last pixel is read None	counts	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. (Source: LRS_xWIN)

tickoverlap CHUNKED	UINT_4_LE(:)	LRS_SWIN Oscillator ticks when last pixel is read None	counts	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. (Source: LRS_SWIN)
use_f CHUNKED	INTEGER_1(:)	LRS_xWIN Window Use Flag None	1	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 (Source: LRS_xWIN); (Meanings: [0 1 2 3]) (Values: ['inactive', 'image_gen', 'search', 'track'])
vdot_avg CHUNKED	FLOAT(:)	LRS_LWIN Average Vertical Velocity None	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_LWIN)
vloc CHUNKED	UINT_2_LE(:)	LRS_SWIN Vertical location of window None	pixels	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. (Source: LRS_SWIN)
windex CHUNKED	UINT_2_LE(:)	LRS_xWIN Window Index None	counts	Window Index- The 16-bit value contains the window index reported in this packet. (Source: LRSxTWIN)
Group: /lrs/tams_window		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(Dims) Fillvalue	long_name standard_name	units	description
adjdata CHUNKED	UINT_2_LE(:,:)	LRS_TWIN Adjusted Pixel data for window None	counts	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]). (Source: LRS_TWIN)
cent_h CHUNKED	FLOAT(:)	LRS_LCENT centroid H None	pixels	The centroid H value (in 256ths of a pixel). (Source: LRS_LCENT)
cent_mag CHUNKED	INTEGER_2(:)	LRS_LCENT centroid magitude None	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 (Source: LRS_LCENT)
cent_v CHUNKED	FLOAT(:)	LRS_LCENT centroid V None	pixels	The centroid V value (in 256ths of a pixel). (Source: LRS_LCENT)
centofintbase CHUNKED	UINT_4_LE(:)	Center of integration base None	counts	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). (Source: LRS)
coi_offset CHUNKED	INTEGER_2(:)	Center of integration offset None	counts	The signed 16-bit center of integration offset for this specific centroid. (Source: LRS)
darkdata CHUNKED	UINT_2_LE(:,:)	LRS_TWIN Dark pixel data for window None	counts	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]). (Source: LRS_TWIN)
darkfactor CHUNKED	UINT_2_LE(:)	LRS_xWIN Dark Factor None	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame. (Source: LRS_TWIN)
darkoff_next CHUNKED	UINT_2_LE(:)	LRS_xWIN Next Frame Dark Offset None	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. (Source: LRS_TWIN)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
ds_pixel_64_index CONTIGUOUS	INTEGER_1(64)	Pixel Index for 64 pixel arrays None	1	Dimension scale for 64-pixel arrays. (Source: Dimension Scale)
hdot_avg CHUNKED	FLOAT(:)	LRS_xWIN Average Horizontal Velocity None	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_xWIN)

hloc CHUNKED	UINT_2_LE(:)	LRS_TWIN Horizontal location of window None	pixels	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. (Source: LRS_TWIN)
ldc_t CHUNKED	FLOAT(:)	LRS_HK Laser Detector Card Temperature None	Degrees	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] (Source: LRS_HK)
localdark CHUNKED	UINT_2_LE(:)	LRS_xWIN Local Dark None	counts	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. (Source: LRS_xWIN)
max_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Maximum Magnitude None	counts	This 16-bit value contains the maximum magnitude value for the target. (Source: LRS_xWIN)
min_mag CHUNKED	UINT_2_LE(:)	LRS_xWIN Minimum Magnitude None	counts	This 16-bit value contains the minimum magnitude value for the target. (Source: LRS_xWIN)
quality_f CHUNKED	INTEGER_1(:)	LRS_LCENT Centroid quality None	1	This 16-bit value contains a single bit for the quality of this image only. (Source: LRS_LCENT); (Meanings: [0 1]) (Values: ['valid', 'questionable'])
rawdata CHUNKED	UINT_2_LE(:,:)	LRS_TWIN Raw pixel data for window None	counts	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]). (Source: LRS_TWIN)
status_f CHUNKED	UINT_2_LE(:)	LRS_xWIN Target status None	1	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 (Source: LRS_xWIN); (Meanings: [0 1 2 3 65532 65534 65535]) (Values: ['empty', 'acq1', 'acq2', 'track', 'not_allowed', 'collided', 'violated'])
tickattime CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator Tick Value None	counts	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. (Source: LRS_xWIN)
tickfirst CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when first pixel is read None	counts	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. (Source: LRS_xWIN)
ticklast CHUNKED	UINT_4_LE(:)	LRS_xWIN Oscillator ticks when last pixel is read None	counts	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. (Source: LRS_xWIN)
use_f CHUNKED	INTEGER_1(:)	LRS_xWIN Window Use Flag None	1	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 (Source: LRS_xWIN); (Meanings: [0 1 2 3]) (Values: ['inactive', 'image_gen', 'search', 'track'])
vdot_avg CHUNKED	FLOAT(:)	LRS_LWIN Average Vertical Velocity None	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. (Source: LRS_LWIN)
vloc CHUNKED	UINT_2_LE(:)	LRS_TWIN Vertical location of window None	pixels	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. (Source: LRS_TWIN)
windex CHUNKED	UINT_2_LE(:)	LRS_xWIN Window Index None	counts	Window Index- The 16-bit value contains the window index reported in this packet. (Source: LRSxTWIN)
Group: /orbit_info		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(Dims) Fillvalue	long_name standard_name	units	description
cycle_number CHUNKED	INTEGER_1(:)	Cycle Number None	1	A count of the number of exact repeats of this reference orbit. (Source: Operations)
delta_time CHUNKED	DOUBLE(:)	Granule Start Time time	seconds since 2018-01-01	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. (Source: Operations)

orbit_number CHUNKED	UINT_2_LE(:)	Orbit Number None	1	Unique identifying number for each planned ICESat-2 orbit. (Source: Operations)
rgt CHUNKED	INTEGER_2(:)	Reference Ground track None	1	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. (Source: Operations)
Group: /quality_assessment		Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
ds_statistics CONTIGUOUS	INTEGER_1(5)	Dimension scale for QA statistics None	1	QA statistics array index (Source: Derived (QA)); (Meanings: [1 2 3 4 5]) (Values: ['number_of_points', 'minimum', 'maximum', 'average', 'standard_deviation'])
qa_granule_fail_reason COMPACT	INTEGER(1)	Granule Failure Reason None	1	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=An uncorrected TxRx slip condition was detected; 4=TBD_Failure; 5=other failure. (Source: Operations); (Meanings: [0 1 2 3 4 5]) (Values: ['no_failure', 'NO_SIM_HK', 'NO_PMF_TIME', 'TIME_OF_DAY_FAILURE', 'TIME_OF_FLIGHT_FAILURE', 'OTHER_FAILURE'])
qa_granule_pass_fail COMPACT	INTEGER(1)	Granule Pass Flag None	1	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. (Source: Operations); (Meanings: [0 1]) (Values: ['PASS', 'FAIL'])
Group: /quality_assessment/along_track		Along-track statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
delta_time_end CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
delta_time_start CHUNKED	DOUBLE(:)	Elapsed UTC seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
Group: /quality_assessment/along_track/pcex		Along-track statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
qa_at_n_dupe CHUNKED	INTEGER(:)	Number of duplicates None	counts	The number of duplicate Rx events detected in the along-track interval. (Source: Derived (QA))
qa_at_n_rx_s CHUNKED	INTEGER(:)	Number of Strong Rx Events None	counts	The number of Strong Rx events in the along-track interval. (Source: Derived (QA))
qa_at_n_rx_w CHUNKED	INTEGER(:)	Number of Weak Rx Events None	counts	The number of Weak Rx events in the along-track interval. (Source: Derived (QA))
qa_at_n_tep CHUNKED	INTEGER(:)	Number of TEPs None	counts	The number of TEP events detected in the along-track interval. (Source: Derived (QA))
qa_at_n_tx CHUNKED	INTEGER(:)	Number of Tx Pulses None	counts	The number of Tx Pulses in the along-track interval. (Source: Derived (QA))
qa_at_tx_ll_stat CHUNKED	DOUBLE(:,:)	QA Tx LL Stat None	counts	Along-track statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. (Source: Derived (QA))
qa_at_tx_other_stat CHUNKED	DOUBLE(:,:)	QA Tx Other Stat None	counts	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. (Source: Derived (QA))
Group: /quality_assessment/event_counts		Event count statistics		
Group: /quality_assessment/event_counts/pcex		Per-PCE event count statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
activeknobstable COMPACT	INTEGER(1)	activeknobstable changes None	1	Number of changes in the activeknobstable (Source: pmf_hk)
alt_cal_interval	INTEGER(1)	alt_cal_interval changes	1	Number of changes in the alt_cal_interval

COMPACT		None		(Source: dfc_hk)
alt_cmd_cnt COMPACT	INTEGER(1)	alt_cmd_cnt increments None	1	Number of increments in the alt_cmd_cnt (Source: dfc_hk)
alt_config COMPACT	INTEGER(1)	alt_config changes None	1	Number of changes in the alt_config (Source: dfc_hk)
alt_debug_reg COMPACT	INTEGER(1)	alt_debug_reg changes None	1	Number of changes in the alt_debug_reg (Source: dfc_hk)
alt_dupe_margin COMPACT	INTEGER(1)	alt_dupe_margin changes None	1	Number of changes in the alt_dupe_margin (Source: dfc_hk)
alt_gp_reg COMPACT	INTEGER(1)	alt_gp_reg changes None	1	Number of changes in the alt_gp_reg (Source: dfc_hk)
alt_last_opcode COMPACT	INTEGER(1)	alt_last_opcode changes None	1	Number of changes in the alt_last_opcode (Source: dfc_hk)
alt_mframe_freq COMPACT	INTEGER(1)	alt_mframe_freq changes None	1	Number of changes in the alt_mframe_freq (Source: dfc_hk)
alt_sci_addr COMPACT	INTEGER(1)	alt_sci_addr changes None	1	Number of changes in the alt_sci_addr (Source: dfc_hk)
alt_sci_seg_limit COMPACT	INTEGER(1)	alt_sci_seg_limit changes None	1	Number of changes in the alt_sci_seg_limit (Source: dfc_hk)
alt_t0_cnt COMPACT	INTEGER(1)	alt_t0_cnt instances None	1	Number of instances where the alt_t0_cnt increment is not 200. (Source: dfc_hk)
alt_wait_watchdog COMPACT	INTEGER(1)	alt_wait_watchdog changes None	1	Number of changes in the alt_wait_watchdog (Source: dfc_hk)
alt_write_watchdog COMPACT	INTEGER(1)	alt_write_watchdog changes None	1	Number of changes in the alt_write_watchdog (Source: dfc_hk)
autorestartdfccount COMPACT	INTEGER(1)	autorestartdfccount changes None	1	Number of changes in the autorestartdfccount (Source: pmf_hk)
burst_fifo_empty COMPACT	INTEGER(1)	Burst_FIFOEmpty changes None	1	Number of changes in the Burst_FIFOEmpty bit (Source: dfc_hk)
burst_fifo_went_full COMPACT	INTEGER(1)	Burst_FIFOWentFull changes None	1	Number of changes in the Burst_FIFOWentFull bit (Source: dfc_hk)
card_data_not_finished_err COMPACT	INTEGER(1)	CardDataNotFinished_Err changes None	1	Number of changes in the CardDataNotFinished_Err bit (Source: dfc_hk)
cmd_err_cntr COMPACT	INTEGER(1)	cmd_err_cntr changes None	1	Number of changes in the cmd_err_cntr (Source: pmf_hk)
cmd_suc_cntr COMPACT	INTEGER(1)	cmd_suc_cntr changes None	1	Number of changes in the cmd_suc_cntr (Source: pmf_hk)
current_read_sdram_buffer COMPACT	INTEGER(1)	CurrentReadSDRAMBuffer changes None	1	Number of changes in the CurrentReadSDRAMBuffer bit (Source: dfc_hk)
did_not_finish_transfer_err COMPACT	INTEGER(1)	DidNotFinishTransfer_Err changes None	1	Number of changes in the DidNotFinishTransfer_Err bit (Source: dfc_hk)
did_not_finish_writing_data_err COMPACT	INTEGER(1)	DidNotFinishWritingData_Err changes None	1	Number of changes in the DidNotFinishWritingData_Err bit (Source: dfc_hk)
edac_burst_fifo_dbe COMPACT	INTEGER(1)	EDACBurstFIFO_DBE changes None	1	Number of changes in the EDACBurstFIFO_DBE bit (Source: dfc_hk)
edac_burst_fifo_sbe COMPACT	INTEGER(1)	EDACBurstFIFO_SBE changes None	1	Number of changes in the EDACBurstFIFO_SBE bit (Source: dfc_hk)
edac_card_creation_ram_dbe COMPACT	INTEGER(1)	EDACCardCreationRAM_DBE changes None	1	Number of changes in the EDACCardCreationRAM_DBE bit (Source: dfc_hk)
edac_card_creation_ram_sbe COMPACT	INTEGER(1)	EDACCardCreationRAM_SBE changes None	1	Number of changes in the EDACCardCreationRAM_SBE bit (Source: dfc_hk)
edac_card_flag_ram_sbe	INTEGER(1)	EDACCardFlagRAM_SBE	1	Number of changes in the EDACCardFlagRAM_SBE bit

COMPACT		changes None		(Source: dfc_hk)
edac_card_readout_ram_dbe COMPACT	INTEGER(1)	EDACCardReadoutRAM_DBE changes None	1	Number of changes in the EDACCardReadoutRAM_DBE bit (Source: dfc_hk)
edac_card_readout_ram_sbe COMPACT	INTEGER(1)	EDACCardReadoutRAM_SBE changes None	1	Number of changes in the EDACCardReadoutRAM_SBE bit (Source: dfc_hk)
edac_eventtag_fifo_dbe COMPACT	INTEGER(1)	EDACEventTagFIFO_DBE changes None	1	Number of changes in the EDACEventTagFIFO_DBE bit (Source: dfc_hk)
edac_eventtag_fifo_sbe COMPACT	INTEGER(1)	EDACEventTagFIFO_SBE changes None	1	Number of changes in the EDACEventTagFIFO_SBE bit (Source: dfc_hk)
edac_mf_number_dbe COMPACT	INTEGER(1)	EDACMFNumber_DBE changes None	1	Number of changes in the EDACMFNumber_DBE bit (Source: dfc_hk)
edac_mf_number_sbe COMPACT	INTEGER(1)	EDACMFNumber_SBE changes None	1	Number of changes in the EDACMFNumber_SBE bit (Source: dfc_hk)
edac_packet_fifo_a_dbe COMPACT	INTEGER(1)	EDACPacketFIFO_A_DBE changes None	1	Number of changes in the EDACPacketFIFO_A_DBE bit (Source: dfc_hk)
edac_packet_fifo_a_sbe COMPACT	INTEGER(1)	EDACPacketFIFO_A_SBE changes None	1	Number of changes in the EDACPacketFIFO_A_SBE bit (Source: dfc_hk)
edac_packet_fifo_b_dbe COMPACT	INTEGER(1)	EDACPacketFIFO_B_DBE changes None	1	Number of changes in the EDACPacketFIFO_B_DBE bit (Source: dfc_hk)
edac_packet_fifo_b_sbe COMPACT	INTEGER(1)	EDACPacketFIFO_B_SBE changes None	1	Number of changes in the EDACPacketFIFO_B_SBE bit (Source: dfc_hk)
edac_sdram_a_dbe COMPACT	INTEGER(1)	EDACSDRAM_A_DBEchanges None	1	Number of changes in the EDACSDRAM_A_DBE bit (Source: dfc_hk)
edac_sdram_a_sbe COMPACT	INTEGER(1)	EDACSDRAM_A_SBE changes None	1	Number of changes in the EDACSDRAM_A_SBE bit (Source: dfc_hk)
edac_sdram_b_dbe COMPACT	INTEGER(1)	EDACSDRAM_B_DBE changes None	1	Number of changes in the EDACSDRAM_B_DBE bit (Source: dfc_hk)
edac_sdram_b_sbe COMPACT	INTEGER(1)	EDACSDRAM_B_SBE changes None	1	Number of changes in the EDACSDRAM_B_SBE bit (Source: dfc_hk)
edac_singlebit_error_cnt COMPACT	INTEGER(1)	EDACSingleBitErrorCnt changes None	1	Number of changes in the EDACSingleBitErrorCnt byte (Source: dfc_hk)
edac_start_tag_fifo_dbe COMPACT	INTEGER(1)	EDACStartTagFIFO_DBE changes None	1	Number of changes in the EDACStartTagFIFO_DBE bit (Source: dfc_hk)
edac_start_tag_fifo_sbe COMPACT	INTEGER(1)	EDACStartTagFIFO_SBE changes None	1	Number of changes in the EDACStartTagFIFO_SBE bit (Source: dfc_hk)
edac_start_tracking_fifo_dbe COMPACT	INTEGER(1)	EDACStartTrackingFIFO_DBE changes None	1	Number of changes in the EDACStartTrackingFIFO_DBE bit (Source: dfc_hk)
edac_start_tracking_fifo_sbe COMPACT	INTEGER(1)	EDACStartTrackingFIFO_SBE changes None	1	Number of changes in the EDACStartTrackingFIFO_SBE bit (Source: dfc_hk)
edac_starttag_fifo_dbe COMPACT	INTEGER(1)	EDACStartTagFIFO_DBE changes None	1	Number of changes in the EDACStartTagFIFO_DBE bit (Source: dfc_hk)

eventtag_fifo_empty COMPACT	INTEGER(1)	EventTag_FIFOEmpty changes None	1	Number of changes in the EventTag_FIFOEmpty bit (Source: dfc_hk)
eventtag_fifo_went_full COMPACT	INTEGER(1)	EventTag_FIFOWentFull changes None	1	Number of changes in the EventTag_FIFOWentFull bit (Source: dfc_hk)
mframe_gap COMPACT	INTEGER(1)	major frame gap instances None	1	Number of instances where there is a gap in the major_frame counter values. (Source: dfc_hk)
mode COMPACT	INTEGER(1)	mode changes None	1	Number of changes in the mode (Source: pmf_hk)
nested_exit COMPACT	INTEGER(1)	Number of nested_exits None	1	Number of instances where a nested_exit condition is possible. (Source: dfc_hk)
packetizer_a_fifo_empty COMPACT	INTEGER(1)	PacketizerA_FIFOEmpty changes None	1	Number of changes in the PacketizerA_FIFOEmpty bit (Source: dfc_hk)
packetizer_a_fifo_went_full COMPACT	INTEGER(1)	PacketizerA_FIFOWentFull changes None	1	Number of changes in the PacketizerA_FIFOWentFull bit (Source: dfc_hk)
packetizer_b_fifo_empty COMPACT	INTEGER(1)	PacketizerB_FIFOEmpty changes None	1	Number of changes in the PacketizerB_FIFOEmpty bit (Source: dfc_hk)
packetizer_b_fifo_went_full COMPACT	INTEGER(1)	PacketizerB_FIFOWentFull changes None	1	Number of changes in the PacketizerB_FIFOWentFull bit (Source: dfc_hk)
range_window_dropout_err COMPACT	INTEGER(1)	RangeWindowDropout_Err changes None	1	Number of changes in the RangeWindowDropout_Err bit (Source: dfc_hk)
sdram_mismatch_err COMPACT	INTEGER(1)	SDRAMMismatch_Err changes None	1	Number of changes in the SDRAMMismatch_Err bit (Source: dfc_hk)
spw_debug_mux_out COMPACT	INTEGER(1)	SpWDebugMuxOut changes None	1	Number of changes in the SpWDebugMuxOut bit (Source: dfc_hk)
spw_disconnect_err_cnt COMPACT	INTEGER(1)	SpWDisconnectErrorCount changes None	1	Number of changes in the SpWDisconnectErrorCount bit (Source: dfc_hk)
spw_not_ready_cnt COMPACT	INTEGER(1)	spw_not_ready_cnt changes None	1	Number of changes in spw_not_ready_cnt (Source: dfc_hk)
spw_parity_err_cnt COMPACT	INTEGER(1)	SpWParityErrorCount changes None	1	Number of changes in the SpWParityErrorCount bit (Source: dfc_hk)
spw_rx_eep_err COMPACT	INTEGER(1)	SpwRxEEP_Err changes None	1	Number of changes in the SpwRxEEP_Err bit (Source: dfc_hk)
spw_rx_invalid_length_err COMPACT	INTEGER(1)	SpwRxInvalidLength_Err changes None	1	Number of changes in the SpwRxInvalidLength_Err bit (Source: dfc_hk)
spw_rx_invalid_opcode_err COMPACT	INTEGER(1)	SpwRxInvalidOpcode_Err changes None	1	Number of changes in the SpwRxInvalidOpcode_Err bit (Source: dfc_hk)
start_data_collection COMPACT	INTEGER(1)	StartDataCollection changes None	1	Number of changes in the StartDataCollection bit (Source: dfc_hk)
starttag_fifo_empty COMPACT	INTEGER(1)	StartTag_FIFOEmpty changes None	1	Number of changes in the StartTag_FIFOEmpty bit (Source: dfc_hk)
starttag_fifo_went_full COMPACT	INTEGER(1)	StartTag_FIFOWentFull changes None	1	Number of changes in the StartTag_FIFOWentFull bit (Source: dfc_hk)
tdc_fifo_empty COMPACT	INTEGER(1)	TDC_FIFOEmpty changes None	1	Number of changes in the TDC_FIFOEmpty bit (Source: dfc_hk)
tdc_fifo_half_full COMPACT	INTEGER(1)	TDC_FIFOHalfFull changes None	1	Number of changes in the TDC_FIFOHalfFull bit (Source: dfc_hk)
tdc_fifo_went_full COMPACT	INTEGER(1)	TDC_FIFOWentFull changes None	1	Number of changes in the TDC_FIFOWentFull bit (Source: dfc_hk)
tdc_strong_path_err	INTEGER(1)	TDC_StrongPath_Err changes	1	Number of changes in the TDC_StrongPath_Err bit

COMPACT		None		(Source: dfc_hk)
tdc_weak_path_err COMPACT	INTEGER(1)	TDC_WeakPath_Err changes None	1	Number of changes in the TDC_WeakPath_Err bit (Source: dfc_hk)
tracking_fifo_empty COMPACT	INTEGER(1)	Tracking_FIFOEmpty changes None	1	Number of changes in the Tracking_FIFOEmpty bit (Source: dfc_hk)
tracking_fifo_went_full COMPACT	INTEGER(1)	Tracking_FIFOWentFull changes None	1	Number of changes in the Tracking_FIFOWentFull bit (Source: dfc_hk)
tx_pulses_in_majorframe COMPACT	INTEGER(1)	TxPulsesInMajorFrame changes None	1	Number of changes in the TxPulsesInMajorFrame bit (Source: dfc_hk)
Group: /quality_assessment/record_counts		Packet count statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
delta_time_end COMPACT	DOUBLE(1)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
delta_time_start COMPACT	DOUBLE(1)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
qa_n_a_hkt_a COMPACT	INTEGER(1)	Number of A_HKT_A inputs. None	counts	The number of A_HKT_A inputs processed. (Source: Derived (QA))
qa_n_a_hkt_b COMPACT	INTEGER(1)	Number of A_HKT_B inputs. None	counts	The number of A_HKT_B inputs processed. (Source: Derived (QA))
qa_n_a_hkt_c COMPACT	INTEGER(1)	Number of A_HKT_C inputs. None	counts	The number of A_HKT_C inputs processed. (Source: Derived (QA))
qa_n_a_hkt_d COMPACT	INTEGER(1)	Number of A_HKT_D inputs. None	counts	The number of A_HKT_D inputs processed. (Source: Derived (QA))
qa_n_a_hkt_e COMPACT	INTEGER(1)	Number of A_HKT_E inputs. None	counts	The number of A_HKT_E inputs processed. (Source: Derived (QA))
qa_n_a_hkt_status COMPACT	INTEGER(1)	Number of A_HKT_STATUS inputs. None	counts	The number of A_HKT_STATUS inputs processed. (Source: Derived (QA))
qa_n_a_mce_pos COMPACT	INTEGER(1)	Number of A_MCE_POS inputs. None	counts	The number of A_MCE_POS inputs processed. (Source: Derived (QA))
qa_n_a_sc_pon COMPACT	INTEGER(1)	Number of A_SC_PON inputs. None	counts	The number of A_SC_PON inputs processed. (Source: Derived (QA))
qa_n_a_sc_pos COMPACT	INTEGER(1)	Number of A_SC_POS inputs. None	counts	The number of A_SC_POS inputs processed. (Source: Derived (QA))
qa_n_a_sc_tat COMPACT	INTEGER(1)	Number of A_SC_TAT inputs. None	counts	The number of A_SC_TAT inputs processed. (Source: Derived (QA))
qa_n_a_sla_hk COMPACT	INTEGER(1)	Number of A_SLA_HK inputs. None	counts	The number of A_SLA_HK inputs processed. (Source: Derived (QA))
qa_n_lrs_hk COMPACT	INTEGER(1)	Number of LRS HK inputs. None	counts	The number of LRS HK inputs processed. (Source: Derived (QA))
qa_n_lrs_laser_cent COMPACT	INTEGER(1)	Number of LRS Laser Centroid inputs. None	counts	The number of LRS Laser Centroid inputs processed. (Source: Derived (QA))
qa_n_lrs_laser_image COMPACT	INTEGER(1)	Number of LRS Laser Image inputs. None	counts	The number of LRS Laser Image inputs processed. (Source: Derived (QA))
qa_n_lrs_laser_window COMPACT	INTEGER(1)	Number of LRS Laser Window inputs. None	counts	The number of LRS Laser Window inputs processed. (Source: Derived (QA))

qa_n_lrs_stellar_cent COMPACT	INTEGER(1)	Number of LRS Stellar Centroid inputs. None	counts	The number of LRS Stellar Centroid inputs processed. (Source: Derived (QA))
qa_n_lrs_stellar_image COMPACT	INTEGER(1)	Number of LRS Stellar Image inputs. None	counts	The number of LRS Stellar Image inputs processed. (Source: Derived (QA))
qa_n_lrs_stellar_window COMPACT	INTEGER(1)	Number of LRS Stellar Window inputs. None	counts	The number of LRS Stellar Window inputs processed. (Source: Derived (QA))
qa_n_lrs_tams_window COMPACT	INTEGER(1)	Number of LRS TAMS Window inputs. None	counts	The number of LRS TAMS Window inputs processed. (Source: Derived (QA))
qa_n_sc1 COMPACT	INTEGER(1)	Number of SC1 inputs. None	counts	The number of SC1 inputs processed. (Source: Derived (QA))
qa_n_sc2 COMPACT	INTEGER(1)	Number of SC2 inputs. None	counts	The number of SC2 inputs processed. (Source: Derived (QA))
qa_n_sc3 COMPACT	INTEGER(1)	Number of SC3 inputs. None	counts	The number of SC3 inputs processed. (Source: Derived (QA))
qa_n_sc4 COMPACT	INTEGER(1)	Number of SC4 inputs. None	counts	The number of SC4 inputs processed. (Source: Derived (QA))
qa_n_sim_hk COMPACT	INTEGER(1)	Number of SIM_HK inputs. None	counts	The number of SIM_HK inputs processed. (Source: Derived (QA))
Group: /quality_assessment/record_counts/pcex				
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
qa_n_a_dfc_hk COMPACT	INTEGER(1)	Number of DFC HK Inputs None	counts	The number of A_DFC_HK inputs processed. (Source: Derived (QA))
qa_n_alt_mframe COMPACT	INTEGER(1)	Number of major frame inputs. None	counts	The number of major frame inputs processed. (Source: Derived (QA))
qa_n_atm_hist_s COMPACT	INTEGER(1)	Number of ATM Strong inputs. None	counts	The number of ATM strong inputs processed. (Source: Derived (QA))
qa_n_atm_hist_w COMPACT	INTEGER(1)	Number of ATM weak inputs. None	counts	The number of ATM weak inputs processed. (Source: Derived (QA))
qa_n_pmf_algorithm_science COMPACT	INTEGER(1)	Number of PMF Algorithm Science inputs. None	counts	The number of PMF Algorithm Science inputs processed. (Source: Derived (QA))
qa_n_pmf_timekeeping COMPACT	INTEGER(1)	Number of PMF Timekeeping inputs. None	counts	The number of PMF TImekeeping inputs processed. (Source: Derived (QA))
qa_n_sxp_ssr COMPACT	INTEGER(1)	Number of SXP_SSR inputs. None	counts	The number of SXP_SSR processed. (Source: Derived (QA))
Group: /quality_assessment/summary		Summary statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
delta_time_end COMPACT	DOUBLE(1)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
delta_time_start COMPACT	DOUBLE(1)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
qa_amet_r1 COMPACT	INTEGER(1)	AMET Increment OOB None	counts	Number of instances where the difference between external AMET counter and the GPS 1PPS exceeds the limit of 1.0. (Source: Derived (QA))
qa_amet_r2 COMPACT	INTEGER(1)	AMET Increment OOB None	counts	Number of instances where the difference between internal AMET at 1PPS and GPS 1PPS exceed the limit of 100.e6. (Source: Derived (QA))
qa_bias_offset_x	INTEGER(1)	Num Bias Offset X OOB	counts	Number of instances where the bias offset X value is outside the limit of -70 to 70 microradians.

COMPACT		None		(Source: Derived (QA))
qa_bias_offset_y COMPACT	INTEGER(1)	Num Bias Offset Y OOB None	counts	Number of instances where the bias offset Y value is outside the limit of -70 to 70 microradians. (Source: Derived (QA))
qa_cal47_temp COMPACT	INTEGER(1)	CAL47 temperature OOB None	counts	Number of instances where the CAL-47 temperature is outside the limit of -20 to 50 degC. (Source: Derived (QA))
qa_fw_flag COMPACT	INTEGER(1)	Freewheel Indicated None	counts	Number of instances where the freewheel flag is non-zero. (Source: Derived (QA))
qa_hvpc_mod_1 COMPACT	INTEGER(1)	Num HVPC Bias Mod 1 OOB None	counts	Number of instances where the HVPC Bias Mod1 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_hvpc_mod_2 COMPACT	INTEGER(1)	Num HVPC Bias Mod 2 OOB None	counts	Number of instances where the HVPC Bias Mod2 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_hvpc_mod_3 COMPACT	INTEGER(1)	Num HVPC Bias Mod 3 OOB None	counts	Number of instances where the HVPC Bias Mod3 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_hvpc_mod_4 COMPACT	INTEGER(1)	Num HVPC Bias Mod 4 OOB None	counts	Number of instances where the HVPC Bias Mod4 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_hvpc_mod_5 COMPACT	INTEGER(1)	Num HVPC Bias Mod 5 OOB None	counts	Number of instances where the HVPC Bias Mod5 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_hvpc_mod_6 COMPACT	INTEGER(1)	Num HVPC Bias Mod 6 OOB None	counts	Number of instances where the HVPC Bias Mod6 value is outside the limit of -2000 to 0 counts. (Source: Derived (QA))
qa_int_e_tx COMPACT	INTEGER(1)	Num Internal Energy OOB None	counts	Number of instances where the computed total internal laser energy is outside the limit of 130 to 2700 microjoules. (Source: Derived (QA))
qa_internal_energy COMPACT	INTEGER(1)	Num Internal Energy OOB None	counts	Number of instances where input internal laser energy values exceed the limit of 0 to 200 counts. (Source: Derived (QA))
qa_internal_temp COMPACT	INTEGER(1)	Num Internal Temp OOB None	counts	Number of instances where input laser temperature values exceed the limit of 20 to 40 degC. (Source: Derived (QA))
qa_lrs_e_tx COMPACT	INTEGER(1)	Num LRS Energy OOB None	counts	Number of instances where the computed total LRS laser energy is outside the limit of 130 to 2700 microjoules. (Source: Derived (QA))
qa_lrs_inv_mag COMPACT	INTEGER(1,6)	Num LRS Mag Invalid None	counts	Number of instances where an LRS laser magnitude is outside the limit of 0-500. (Source: Derived (QA))
qa_lrs_inv_spot COMPACT	INTEGER(1)	Num LRS Spots Missing None	counts	Number of instances where not all 6 laser spots are valid when computing LRS laser energy. (Source: Derived (QA))
qa_lrs_inv_sum COMPACT	INTEGER(1)	Num LRS Sums Invalid None	counts	Number of instances where the sum of the 6 LRS laser spots is outside the limit of 0 to 2000. (Source: Derived (QA))
qa_lrs_temp COMPACT	INTEGER(1)	Num LRS Temp OOB None	counts	Number of instances where the LRS temperature is outside the limit of -20 to 50 degC. (Source: Derived (QA))
qa_s_tod_a_sla_hk COMPACT	DOUBLE(1,5)	QA for a_sla_hk TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_gpsr COMPACT	DOUBLE(1,5)	QA for gpsr TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_laser_energy COMPACT	DOUBLE(1,5)	QA for hk_laser_energy TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_meb COMPACT	DOUBLE(1,5)	QA for hk_pdu TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_pdu COMPACT	DOUBLE(1,5)	QA for hk_pdu TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_pointing COMPACT	DOUBLE(1,5)	QA for hk_pointing TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_pos_vel COMPACT	DOUBLE(1,5)	QA for hk_pos_vel TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_hk_tat COMPACT	DOUBLE(1,5)	QA for hk_tat TOD None	counts	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.

				(Source: Derived via L1B ATBD)
qa_s_tod_hk_thermal COMPACT	DOUBLE(1,5)	QA for hk_therm TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_mce_position COMPACT	DOUBLE(1,5)	QA for mce_position TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_acs COMPACT	DOUBLE(1,5)	QA for acs TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_ephemeris COMPACT	DOUBLE(1,5)	QA for sc_ephemeris TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_hk COMPACT	DOUBLE(1,5)	QA for sc_hk TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_imu COMPACT	DOUBLE(1,5)	QA for sc_imu TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_st COMPACT	DOUBLE(1,5)	QA for sc_star_tracker TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_stoh1 COMPACT	DOUBLE(1,5)	QA for sc_star_tracker_oh1 TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_sc_stoh2 COMPACT	DOUBLE(1,5)	QA for sc_star_tracker_oh2 TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_spd_e_tx COMPACT	INTEGER(1)	Num SPD Energy OOB None	counts	Number of instances where the computed total SPD laser energy is outside the limit of 130 to 2700 microjoules. (Source: Derived (QA))
qa_spd_energy COMPACT	INTEGER(1)	Num SPD Energy OOB None	counts	Number of instances where input SPD laser energy values exceed the limit of -30000 to 0 counts. (Source: Derived (QA))
qa_spd_temp COMPACT	INTEGER(1)	Num SPD Temp OOB None	counts	Number of instances where SPD temperature values exceed the limit of -20 to 50 degC. (Source: Derived (QA))
qa_time_corr COMPACT	INTEGER(1)	Shot Time correlation OOB None	counts	Where the ratio of unaligned shots/aligned shots exceeds the limit of 0.9; 0=Doesn?t Exceed Limit, 1=Exceeds Limit (Source: Derived (QA))
Group: /quality_assessment/summary/pcex				
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
qa_bg_sens_s COMPACT	INTEGER(1)	Num Strong Bg Sensitivity OOB None	counts	Number of instances where the computed strong background sensitivity value is outside the limit of 5e17 to 2e18. (Source: Derived (QA))
qa_bg_sens_w COMPACT	INTEGER(1)	Num Weak Bg Sensitivity OOB None	counts	Number of instances where the computed weak background sensitivity value is outside the limit of 5e17 to 2e18. (Source: Derived (QA))
qa_dupe_percent COMPACT	INTEGER(1,20)	Channel Dupe Percent OOB None	counts	Number of instances where the per-channel number of duplicates is greater than 10% of the total number of per-channel events. (Source: Derived (QA))
qa_ph_tx_ll COMPACT	INTEGER(1)	Tx LL OOB None	counts	Where the maximum minus minimum Tx leading lower exceeds the limit of 39 ns. (Source: Derived (QA))
qa_ret_sens_s COMPACT	INTEGER(1)	Num Strong Return Sensitivity OOB None	counts	Number of instances where the computed strong return sensitivity value is outside the limit of 0 to 2e18. (Source: Derived (QA))
qa_ret_sens_w COMPACT	INTEGER(1)	Num Weak Return Sensitivity OOB None	counts	Number of instances where the computed weak return sensitivity value is outside the limit of 0 to 2e18. (Source: Derived (QA))
qa_rx_channel_id COMPACT	INTEGER(1)	Rx Channel ID OOB None	counts	Number of instances where the Rx channel ID contains an unexpected value. (Source: Derived (QA))
qa_rx_coarse_count COMPACT	INTEGER(1)	Rx Coarse Count OOB None	counts	Number of instances where the Rx coarse count value exceeds the limit of 10000 counts. (Source: Derived (QA))

qa_rx_fine_count COMPACT	INTEGER(1)	Rx Fine Count OOB None	counts	Number of instances where the Rx fine count value exceeds the limit of 75 counts. (Source: Derived (QA))
qa_s_alt_cal_fall COMPACT	DOUBLE(1,5)	QA alt_cal_fall None	counts	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. (Source: Derived (QA))
qa_s_alt_cal_rise COMPACT	DOUBLE(1,5)	QA alt_cal_rise None	counts	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. (Source: Derived (QA))
qa_s_n_1pps_skip COMPACT	INTEGER(1)	QA 1PPS missed None	counts	Number of times 1 pps was not consecutive. (Source: Derived via L1B ATBD)
qa_s_n_dupe COMPACT	INTEGER(1)	Number of duplicates None	counts	The number of duplicate Rx events detected in the granule. (Source: Derived (QA))
qa_s_n_mf_skip COMPACT	INTEGER(1)	QA 1P MF missed None	counts	The number of times major frame counter was not consecutive. (Source: Derived via L1B ATBD)
qa_s_n_missed_thres COMPACT	INTEGER_8(1)	Number of Missed Tx Threshold Crossings None	counts	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. (Source: Derived (QA))
qa_s_n_rx_s COMPACT	INTEGER_8(1)	Number of Strong Rx Events None	counts	The number of Strong Rx events in the granule. (Source: Derived (QA))
qa_s_n_rx_w COMPACT	INTEGER_8(1)	Number of Weak Rx Events None	counts	The number of Weak Rx events in the granule. (Source: Derived (QA))
qa_s_n_swapped_txfine COMPACT	INTEGER_8(1)	Number of Tx Fine Swaps None	counts	The number of Tx pulses for which a PCE anomaly forced the Tx fine count values to be swapped. (Source: Derived (QA))
qa_s_n_tep COMPACT	INTEGER(1)	Number of TEPs None	counts	The number of TEP events detected in the granule. (Source: Derived (QA))
qa_s_n_tx COMPACT	INTEGER_8(1)	Number of Tx Pulses None	counts	The number of Tx Pulses in the granule. (Source: Derived (QA))
qa_s_n_tx_oob COMPACT	INTEGER(1)	QA number of instances TX out of bounds None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_alt COMPACT	DOUBLE(1,5)	QA for pcex_alt TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_atm_hist_s COMPACT	DOUBLE(1,5)	QA for atm_his_st TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_atm_hist_w COMPACT	DOUBLE(1,5)	QA for atm_hist_w TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_background COMPACT	DOUBLE(1,5)	QA for pcex_background TOD None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tod_method COMPACT	DOUBLE(1,5)	QA from TOD Methods None	counts	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. (Source: Derived via L1B ATBD)
qa_s_tx_ll_stat COMPACT	DOUBLE(1,5)	QA Tx LL Stat None	counts	Summary statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. (Source: Derived (QA))
qa_s_tx_other_stat COMPACT	DOUBLE(1,5)	QA Tx Other Stat None	counts	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. (Source: Derived (QA))
qa_tep_tof COMPACT	INTEGER(1)	Num TEP OOB None	counts	Number of instances where TEP TOF values exceed the limit of 0 to 110ns. (Source: Derived (QA))
qa_tx_coarse_count COMPACT	INTEGER(1)	Tx Coarse Count OOB None	counts	Number of instances where the Tx coarse count value exceeds the limit of 10000 counts. (Source: Derived (QA))
qa_tx_leading_fine COMPACT	INTEGER(1)	Tx Leading Fine Count OOB None	counts	Number of instances where the Tx leading fine count value exceeds the limit of 75 counts. (Source: Derived (QA))
qa_tx_trailing_fine COMPACT	INTEGER(1)	Tx Trailing Fine Count OOB None	counts	Number of instances where the Tx trailing fine count value exceeds the limit of 75 counts. (Source: Derived (QA))

Group: /quality_assessment/tof		Contains statistics and flags related to TOF QA.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
txrx_discard_count COMPACT	INTEGER(1)	TxRx Discard Count None	counts	The number of Tx discarded because of data gaps when attempting to repair a TxRx slip. (Source: TxRx detection)
txrx_repair_count COMPACT	INTEGER(1)	TxRx Repair Count None	counts	The number of Tx misalignments repaired for the PCE indicated in txrx_slip_repair. (0=no repair attempted) (Source: TxRx detection)
txrx_slip_repair COMPACT	INTEGER(1)	TxRx Repair flag None	1	Indicates the PCE for which a txrx slip repair was attempted. (0=no repair attempted) (Source: TxRx detection); (Meanings: [0 1 2 3]) (Values: ['not_attempted', 'pce1', 'pce2', 'pce3'])
Group: /quality_assessment/tof/pcex		Per-PCE TOF flags and statistics		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
beg_mframe_cnt COMPACT	UINT_4_LE(1)	Beginning major frame counter None	counts	Major frame count at the start of a Tx misalignment. (Source: TxRx detection)
end_mframe_cnt COMPACT	UINT_4_LE(1)	Ending major frame counter None	counts	Major frame count at the end of a Tx misalignment. (Source: TxRx detection)
hist_conf COMPACT	INTEGER(1)	Histogram Confidence None	1	Confidence level set by analysis of TOF histograms. (Source: TxRx detection)
n_dnf COMPACT	INTEGER(1)	Number_of_DNF None	1	The number of major frames containing a DNF flag, which indicates that the major frame was truncated. By default, these partial major frames are removed from processing. (Source: Tx processing)
ne_conf COMPACT	INTEGER(1)	Nested Exit Confidence None	1	Confidence level set by nested-exit checks. (Source: TxRx detection)
ne_delta_time COMPACT	DOUBLE(4) INVALID_R8B	Nested Exit Times None	seconds since 2018-01-01	Times of up to 4 NestedExit instances. Units are the number of seconds since the ATLAS SDP epoch. (Source: TxRx slip)
slip_magnitude COMPACT	FLOAT(1)	TXRX_Slip_Magnitude None	seconds	Average magnitude (and direction) of Tx sawtooth misalignment. (Source: TxRx detection)
st_conf COMPACT	INTEGER(1)	Tx Align Confidence None	1	Confidence level set by Tx alignment (sawtooth) checks. (Source: TxRx detection)
st_period COMPACT	FLOAT(1)	Sawtooth_Period None	1/frequency	Period of the Tx sawtooth. (Source: TxRx detection)
too_few_tx COMPACT	INTEGER(1)	Too_Few_Tx_in_MFrame None	1	The number of major frames with less than 199 Tx. The photons associated with these major frames have been discarded from processing. (Source: Tx processing)
txrx_slip_flag COMPACT	INTEGER(1)	TxRx Slip Flag None	1	Flag indicating if a TxRx slip condition was detected. (Source: TxRx detection); (Meanings: [0 1]) (Values: ['not_detected', 'detected'])
Group: /sc		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(Dims) Fillvalue	long_name standard_name	units	description
acs_time_sec CHUNKED	UINT_4_LE(:)	ACS time (sec) None	seconds	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) (Source: ATL01/sc)
acs_time_subsec CHUNKED	UINT_4_LE(:)	ACS time (subsec) None	100 nanoseconds	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) (Source: ATL01/sc)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
sc_time_1pps_sec CHUNKED	UINT_4_LE(:)	SC time at 1 pps (sec) None	seconds	SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00) (Source: ATL01/sc)
sc_time_1pps_subsec CHUNKED	UINT_4_LE(:)	SC time at 1 pps (subsec) None	100 nanoseconds	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) (Source: ATL01/sc)
Group: /sc/attitude_control_system		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(Dims) Fillvalue	long_name standard_name	units	description
acs_mode CHUNKED	UINT_1_LE(:)	ACS Software Mode None	counts	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 (Source: ATL01/sc1/attitude_control_system); (Meanings: [0 1 2 3 4 5 6 7 8 9 10 11 12 13 14]) (Values: ['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	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. (Source: Derived via Time Tagging)
sc_body_rate_x CHUNKED	DOUBLE(:)	SC Body Rate (X) None	radians/second	ACS Fine Rate Estimate - SC Body X axis. (Same data provided to ATLAS in RT at 1Hz) (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_body_rate_y CHUNKED	DOUBLE(:)	SC Body Rate (Y) None	radians/second	ACS Fine Rate Estimate - SC Body Y axis. (Same data provided to ATLAS in RT at 1Hz) (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_body_rate_z CHUNKED	DOUBLE(:)	SC Body Rate (Z) None	radians/second	ACS Fine Rate Estimate - SC Body Z axis. (Same data provided to ATLAS in RT at 1Hz) (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_to_lrs_quat_1 CHUNKED	DOUBLE(:)	SC Inertial to LRS Frame Quaternions 1 None	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion1. (Same data provided to ATLAS in RT at 1Hz). (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_to_lrs_quat_2 CHUNKED	DOUBLE(:)	SC Inertial to LRS Frame Quaternions 2 None	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 2. (Same data provided to ATLAS in RT at 1Hz). (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_to_lrs_quat_3 CHUNKED	DOUBLE(:)	SC Inertial to LRS Frame Quaternions 3 None	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 3. (Same data provided to ATLAS in RT at 1Hz). (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
sc_to_lrs_quat_4 CHUNKED	DOUBLE(:)	SC Inertial to LRS Frame Quaternions 4 None	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion4. (Same data provided to ATLAS in RT at 1Hz). (Source: ATL01/sc1/attitude_control_system and L1B ATBD conversion)
Group: /sc/ephemeris		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
eci_position_res_x CHUNKED	FLOAT(:)	SC ECI Position residual X None	meters	ACS Orbit Determination Filter position of X frame residual. (Source: ATL01/sc1/ephemeris)
eci_position_res_y CHUNKED	FLOAT(:)	SC ECI Position residualY None	meters	ACS Orbit Determination Filter position of Y frame residual. (Source: ATL01/sc1/ephemeris)
eci_position_res_z CHUNKED	FLOAT(:)	SC ECI Position residual Z None	meters	ACS Orbit Determination Filter position of Z frame residual. (Source: ATL01/sc1/ephemeris)
eci_position_x CHUNKED	DOUBLE(:)	SC ECI Position X None	meters	ACS SC X position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
eci_position_y CHUNKED	DOUBLE(:)	SC ECI Position Y None	meters	ACS SC Y position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
eci_position_z CHUNKED	DOUBLE(:)	SC ECI Position Z None	meters	ACS SC Z position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
eci_velocity_res_x CHUNKED	FLOAT(:)	SC ECI velocity residual X None	meters/second	ACS Orbit Determination Filter velocity of X frame residual. (Source: ATL01/sc1/ephemeris)
eci_velocity_res_y CHUNKED	FLOAT(:)	SC ECI velocity residual Y None	meters/second	ACS Orbit Determination Filter velocity of Y frame residual. (Source: ATL01/sc1/ephemeris)
eci_velocity_res_z	FLOAT(:)	SC ECI velocity residual Z	meters/second	ACS Orbit Determination Filter velocity of Z frame residual.

CHUNKED		None		(Source: ATL01/sc1/ephemeris)
eci_velocity_x CHUNKED	DOUBLE(:)	SC ECI Velocity X None	meters/second	ACS SC X velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
eci_velocity_y CHUNKED	DOUBLE(:)	SC ECI Velocity Y None	meters/second	ACS SCY velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
eci_velocity_z CHUNKED	DOUBLE(:)	SC ECI Velocity Z None	meters/second	ACS SC Z velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) (Source: ATL01/sc1/ephemeris converted)
Group: /sc/hk		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(Dims) Fillvalue	long_name standard_name	units	description
at_det_p CHUNKED	FLOAT(:,:)	ATLAS Currents - Detector Power (Sides A, B) None	amps	ATLAS Detector power feed current measured by the SC PDU (7.5A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_det_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Detector (Sides A, B) None	1	ATLAS Detector power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_heater_1_c CHUNKED	FLOAT(:,:)	ATLAS Currents - Survival Heater 1 (Sides A, B) None	amps	ATLAS Survival Heater 1 power feed current measured by the SC PDU (10A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_heater_1_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Survival Heater 1 (Sides A, B) None	1	ATLAS Survival Heater 1 power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_heater_2_c CHUNKED	FLOAT(:,:)	ATLAS Currents - Survival Heater 2 (Sides A, B) None	amps	ATLAS Survival Heater 2 power feed current measured by the SC PDU (10A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_heater_2_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Survival Heater 2 (Sides A, B) None	1	ATLAS Survival Heater 2 power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_heater_3_c CHUNKED	FLOAT(:,:)	ATLAS Currents - Survival Heater 3 (Sides A, B) None	amps	ATLAS Survival Heater 3 power feed current measured by the SC PDU (10A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_heater_3_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Survival Heater 3 (Sides A, B) None	1	ATLAS Survival Heater 3 power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_heater_4_c CHUNKED	FLOAT(:,:)	ATLAS Currents - Survival Heater 4 (Sides A, B) None	amps	ATLAS Survival Heater 4 power feed current measured by the SC PDU (10A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_heater_4_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Survival Heater 4 (Sides A, B) None	1	ATLAS Survival Heater 4 power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_laser_a_c CHUNKED	FLOAT(:)	ATLAS Currents - Laser A None	amps	ATLAS Laser A power feed current measured by the SC PDU (20A) (Source: ATL01/sc1/hk converted)
at_laser_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Laser (Sides A, B) None	1	ATLAS Laser power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_lhp_sdhtr_c CHUNKED	FLOAT(:,:)	ATLAS Currents - LHP Shutdown HTR (Sides A, B) None	amps	ATLAS Loop Heat Pipe Shutdown power feed current measured by the SC PDU (7.5A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_lhp_sdhtr_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - LHP Shutdown HTR (Sides A, B) None	1	ATLAS LHP Shutdown Heater power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_main_c CHUNKED	FLOAT(:,:)	ATLAS Currents - ATLAS Main (Sides A, B) None	amps	ATLAS Main power feed current measured by the SC PDU (20A; Sides A, B) (Source: ATL01/sc1/hk converted)
at_main_sw CHUNKED	INTEGER_1(:,:)	ATLAS Switch Status - Main (Sides A, B) None	1	ATLAS Main power feed status measured by the SC PDU (Sides A, B) (Source: ATL01/sc1/hk); (Meanings: [0 1]) (Values: ['on', 'off'])
at_t CHUNKED	FLOAT(:,:)	ATLAS Temperatures (1-15) None	degreesC	SC Monitored ATLAS Temperatures (1 to 15) (Source: ATL01/sc1/hk converted)

delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
ds_ab_index CONTIGUOUS	INTEGER_1(2)	Dimension scale for Side A or B None	1	Dimension scale for Side A or B (Source: Dimension Scale); (Meanings: [1 2]) (Values: ['side_a', 'side_b'])
ds_flexure_index CONTIGUOUS	INTEGER_1(3)	Dimension scale for flexure thermistors None	1	Dimension scale for flexure thermistor temperatures. (Source: Dimension Scale)
ds_temp_index CONTIGUOUS	INTEGER_1(15)	Dimension scale for ATLAS Temperatures None	1	Dimension scale for ATLAS temperatures. (Source: Dimension Scale)
sa_1_in_bk_t CHUNKED	FLOAT(:)	Solar Array Panel 1 (Inboard) Back-Side Temperature None	degreesC	SC Monitored Temperature of the Back-Side of Solar Panel 1 (Inboard Panel) (Source: ATL01/sc1/hk converted)
sa_1_in_cell_t CHUNKED	FLOAT(:)	Solar Array Panel 1 (Inboard) Cell-Side Temp None	degreesC	SC Monitored Temperature of the Cell-Side of Solar Panel 1 (Inboard Panel) (Source: ATL01/sc1/hk converted)
sa_4_ot_bk_t CHUNKED	FLOAT(:)	Solar Array Panel 4 (Outboard) Back- Side Temperature None	degreesC	SC Monitored Temperature of the Back-Side of Solar Panel 4 (Outboard Panel) (Source: ATL01/sc1/hk converted)
sa_4_ot_cell_t CHUNKED	FLOAT(:)	Solar Array Panel 4 (Outboard) Cell- Side Temperature None	degreesC	SC Monitored Temperature of the Cell-Side of Solar Panel 4 (Outboard Panel) (Source: ATL01/sc1/hk converted)
sc_at_flex_t CHUNKED	FLOAT(:,:)	SC-to-ATLAS Flexure Temperature None	degreesC	SC Monitored Temperature of Mechanical I/F Flexure 1, 2 and 3 (Source: ATL01/sc1/hk converted)
sc_e_bus_v CHUNKED	FLOAT(:,:)	SC Essential Bus Voltage (Sides A, B) None	volts	SC Essential Bus Voltage measured by the SC PDU. (Sides A, B) (Source: ATL01/sc1/hk converted)
Group: /sc/inertial_measurement_unit		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
sync_event_ttag CHUNKED	DOUBLE(:)	IMU Sync Event Time Tag None	seconds	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. (Source: ATL01/sc1/inertial_measurement_unit/hi_rate converted)
Group: /sc/inertial_measurement_unit/gyro_abcd		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(Dims) Fillvalue	long_name standard_name	units	description
gyro_angle CHUNKED	FLOAT(:)	IMU Gyro Integrated Angle Counter (Gyros A, B, C, D) None	arcseconds	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. (Source: ATL01/sc1/inertial_measurement_unit/hi_rate converted)
gyro_rate_f CHUNKED	INTEGER_1(:)	IMU Gyro Rate Valid (Gyros A, B, C, D) None	1	IMU Gyro Integrated Angular Rate data validity status. 0=invalid, 1=valid. (Source: ATL01/sc1/inertial_measurement_unit/hi_rate); (Meanings: [0 1]) (Values: ['invalid', 'valid'])
gyro_sat_f CHUNKED	INTEGER_1(:)	IMU Gyro Saturation Bit (Gyros A, B, C, D) None	1	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). (Source: ATL01/sc1/inertial_measurement_unit/hi_rate); (Meanings: [0 1]) (Values: ['ftr_mode', 'was_mode'])

gyro_scal_f CHUNKED	INTEGER_1(:)	IMU Gyro Scaling Factor (Gyros A, B, C, D) None	1	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. (Source: ATL01/sc1/inertial_measurement_unit/hi_rate); (Meanings: [0 1]) (Values: ['low_scale_factor', 'high_scale_factor'])
Group: /sc/solar_array		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(Dims) Fillvalue	long_name standard_name	units	description
azimuth_est CHUNKED	FLOAT(:)	SADA Azimuth Estimated Position None	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth position used for ACS control (Source: ATL01/sc1/solar_array)
azimuth_meas_1 CHUNKED	FLOAT(:)	SADA Azimuth Measured Position (Pot 1) None	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 1 (as reported by ACS software). (Source: ATL01/sc1/solar_array)
azimuth_meas_2 CHUNKED	FLOAT(:)	SADA Azimuth Measured Position (Pot 2) None	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 2 (as reported by ACS software). (Source: ATL01/sc1/solar_array)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
elev_est CHUNKED	FLOAT(:)	SADA Elevation Estimated Position None	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation position used for ACS control (Source: ATL01/sc1/solar_array)
elev_meas_1 CHUNKED	FLOAT(:)	SADA Elevation Measured Position (Pot 1) None	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 1 (as reported by ACS software). (Source: ATL01/sc1/solar_array)
elev_meas_2 CHUNKED	FLOAT(:)	SADA Elevation Measured Position (Pot 2) None	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 2 (as reported by ACS software). (Source: ATL01/sc1/solar_array)
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(Dims) Fillvalue	long_name standard_name	units	description
atm_etr_counter CHUNKED	UINT_2_BE(:)	ATM ETR Counter None	counts	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. (Source: ATL01/sc2/star_tracker)
atm_frame_counter CHUNKED	UINT_2_BE(:)	ATM Frame Counter None	counts	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. (Source: ATL01/sc2/star_tracker)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
etr_counter CHUNKED	UINT_2_BE(:)	STE Star Tracker ETR Counter None	counts	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 (Source: ATL01/sc2/star_tracker)
mode_status CHUNKED	UINT_2_BE(:)	STE Star Tracker Mode Status None	1	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 (Source: ATL01/sc2/star_tracker); (Meanings: [0 1 2 3 4 5 9 10 11 14 15]) (Values: ['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		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	Datatype(Dims)	long_name	units	description

(Layout)	Fillvalue	standard_name		
atm_etr_counter CHUNKED	UINT_2_LE(:)	ATM ETR Counter None	counts	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. (Source: ATL01/sc2/star_tracker/optical_head_1)
atm_frame_counter CHUNKED	UINT_2_LE(:)	STOH1 ATM Frame Counter None	counts	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - Frame Counter (Source: ATL01/sc2/star_tracker/optical_head_1)
att_qa_x CHUNKED	FLOAT(:)	STOH Attitude Quality (X) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X) (Source: ATL01/sc2/star_tracker/optical_head_1 converted)
att_qa_y CHUNKED	FLOAT(:)	STOH Attitude Quality (Y) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y) (Source: ATL01/sc2/star_tracker/optical_head_1 converted)
att_qa_z CHUNKED	FLOAT(:)	STOH Attitude Quality (Z) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z) (Source: ATL01/sc2/star_tracker/optical_head_1 converted)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
n_stars CHUNKED	INTEGER_1(:) INVALID_I1B	STOHx Number of Coherent Stars None	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation. (Source: ATL01/sc2/star_tracker/optical_head_1)
quaternion1 CHUNKED	DOUBLE(:)	STOH1 Quaternion1 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_1)
quaternion2 CHUNKED	DOUBLE(:)	STOH1 Quaternion2 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_1)
quaternion3 CHUNKED	DOUBLE(:)	STOH1 Quaternion3 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_1)
quaternion4 CHUNKED	DOUBLE(:)	STOH1 Quaternion4 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_1)
seq_mode_st CHUNKED	INTEGER_1(:) INVALID_I1B	Sequencing Mode Status None	counts	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) Status (Source: ATL01/sc2/star_tracker/optical_head_1); (Meanings: [0 1 2 3 4 5 6 7]) (Values: ['off', 'standby', 'photo', 'acquire', 'track', 'autotest', 'win_acq', 'powered'])
Group: /sc/star_tracker/optical_head_2		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(Dims) Fillvalue	long_name standard_name	units	description
atm_etr_counter CHUNKED	UINT_2_LE(:)	ATM ETR Counter None	counts	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 (Source: ATL01/sc2/star_tracker/optical_head_2)
atm_frame_counter CHUNKED	UINT_2_LE(:)	STOH2 ATM Frame Counter None	counts	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - Frame Counter (Source: ATL01/sc2/star_tracker/optical_head_2)
att_qa_x CHUNKED	FLOAT(:)	STOH Attitude Quality (X) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X) (Source: ATL01/sc2/star_tracker/optical_head_2)
att_qa_y CHUNKED	FLOAT(:)	STOH Attitude Quality (Y) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y) (Source: ATL01/sc2/star_tracker/optical_head_2)
att_qa_z CHUNKED	FLOAT(:)	STOH Attitude Quality (Z) None	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z) (Source: ATL01/sc2/star_tracker/optical_head_2)
delta_time CHUNKED	DOUBLE(:)	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
n_stars	INTEGER_1(:)	STOHx Number of Coherent	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation

CHUNKED	INVALID_I1B	Stars None		(Source: ATL01/sc2/star_tracker/optical_head_2)
quaternion1 CHUNKED	DOUBLE(:)	STOH1 Quaternion1 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_2)
quaternion2 CHUNKED	DOUBLE(:)	STOH1 Quaternion2 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_2)
quaternion3 CHUNKED	DOUBLE(:)	STOH1 Quaternion3 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_2)
quaternion4 CHUNKED	DOUBLE(:)	STOH1 Quaternion4 None	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame (Source: ATL01/sc2/star_tracker/optical_head_2)
seq_mode_st CHUNKED	INTEGER_1(:) INVALID_I1B	Sequencing Mode Status None	counts	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. (Source: ATL01/sc2/star_tracker/optical_head_2); (Meanings: [0 1 2 3 4 5 6 7]) (Values: ['off', 'standby', 'photo', 'acquire', 'track', 'autotest', 'win_acq', 'powered'])