

ATL02 Product Data Dictionary

Date Generated : 2019-04-24T02:15:26.000000Z

Product Type: ATL02, Format Version : SET_BY_PGE

Group: /	
Conventions	(Attribute) CF-1.6
citation	(Attribute) SET_BY_META
contributor_name	(Attribute) Thomas E Neumann (thomas.neumann@nasa.gov), Thorsten Markus (thorsten.markus@nasa.gov), Suneel Bhardwaj (suneel.bhardwaj@nasa.gov) David W Hancock III (david.w.hancock@nasa.gov)
contributor_role	(Attribute) Instrument Engineer, Investigator, Principle Investigator, Data Producer, Data Producer
creator_name	(Attribute) SET_BY_META
data_rate	(Attribute) Data within this group pertain to the granule in its entirety.
date_created	(Attribute) SET_BY_PGE
date_type	(Attribute) UTC
description	(Attribute) Science unit converted time ordered telemetry calibrated for instrument effects. All photon events per channel per transmit pulse. Includes Atmosphere raw profiles. Contains
featureType	(Attribute) trajectory
geospatial_lat_max	(Attribute) 0.0000000000000000
geospatial_lat_min	(Attribute) 0.0000000000000000
geospatial_lat_units	(Attribute) degrees_north
geospatial_lon_max	(Attribute) 0.0000000000000000
geospatial_lon_min	(Attribute) 0.0000000000000000
geospatial_lon_units	(Attribute) degrees_east
granule_type	(Attribute) ATL02
hdfversion	(Attribute) SET_BY_PGE
history	(Attribute) SET_BY_PGE
identifier_file_uuid	(Attribute) SET_BY_PGE
identifier_product_doi	(Attribute) 10.5067/ATLAS/ATL02.001
identifier_product_doi_authority	(Attribute) http://dx.doi.org
identifier_product_format_version	(Attribute) SET_BY_PGE
identifier_product_type	(Attribute) ATL02
institution	(Attribute) SET_BY_META
instrument	(Attribute) SET_BY_META
keywords	(Attribute) SET_BY_META
keywords_vocabulary	(Attribute) SET_BY_META
level	(Attribute) 1B
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 ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	(Attribute) http://dx.doi.org
platform	(Attribute) SET_BY_META
processing_level	(Attribute) L1B
project	(Attribute) SET_BY_META
publisher_email	(Attribute) SET_BY_META
publisher_name	(Attribute) SET_BY_META
publisher_url	(Attribute) SET_BY_META
references	(Attribute) SET_BY_META
short_name	(Attribute) ATL02
source	(Attribute) SET_BY_META
spatial_coverage_type	(Attribute) Horizontal
standard_name_vocabulary	(Attribute) CF-1.6
summary	(Attribute) SET_BY_META
time_coverage_duration	(Attribute) SET_BY_PGE
time_coverage_end	(Attribute) SET_BY_PGE
time_coverage_start	(Attribute) SET_BY_PGE
time_type	(Attribute) CCSDS UTC-A
title	(Attribute) SET_BY_META

Group: /ancillary_data				
Description	(Attribute)	Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atlas_sdp_gps_epoch (Compact Dataset)	DOUBLE (1)	ATLAS Epoch Offset (not_set)	seconds since 1980-01-06T00:00:00.000000Z Operations	Number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the A Product (SDP) epoch (2018-01-01:T00.00.00.000000 UTC). Add this value to delta time parameter: gps_seconds (relative to the GPS epoch) for each data point.
control (Contiguous Dataset)	STRING:100000 (1)	Control File (not_set)	1 Operations	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeed
data_end_utc (Compact Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the last data point within the granule.
data_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the first data point within the granule.
end_cycle (Compact Dataset)	INTEGER_4 (1)	Ending Cycle (not_set)	1 Derived	The ending cycle number associated with the data contained within this granule. The cycle number number of 91-day repeat cycles completed by the mission.
end_delta_time	DOUBLE	ATLAS End 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 t

(Compact Dataset)	(1)	(Actual) (time)	Derived	(SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
end_geoseg (Compact Dataset)	INTEGER_4 (1)	Ending Geolocation Segment (not_set)	1 Derived	The ending geolocation segment number associated with the data contained within this granule. ICI geographic regions are further refined by geolocation segments. During the geolocation process, a created approximately every 20m from the start of the orbit to the end. The geolocation segments h strong a weak beams and provide a common segment length for the L2 and higher products. The g indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their r
end_gpssow (Compact Dataset)	DOUBLE (1)	Ending GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the last data point in the granule.
end_gpsweek (Compact Dataset)	INTEGER_4 (1)	Ending GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the last data point in the granule.
end_orbit (Compact Dataset)	INTEGER_4 (1)	Ending Orbit Number (not_set)	1 Derived	The ending orbit number associated with the data contained within this granule. The orbit number ir the spacecraft completes a full orbit of the Earth.
end_region (Compact Dataset)	INTEGER_4 (1)	Ending Region (not_set)	1 Derived	The ending product-specific region number associated with the data contained within this granule. I are separated by geographic regions. The data contained within a specific region are the same for , ATL03 regions differ slightly because of different geolocation segment locations caused by the irreg The region indices for other products are completely independent.
end_rgt (Compact Dataset)	INTEGER_4 (1)	Ending Reference Groundtrack (not_set)	1 Derived	The ending reference groundtrack (RGT) number associated with the data contained within this gra reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each tim completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
granule_end_utc (Compact Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested end time (in UTC CCSDS-A) of this granule.
granule_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested start time (in UTC CCSDS-A) of this granule.
qa_at_interval (Compact Dataset)	DOUBLE (1)	QA Along-Track Interval (not_set)	1 control	Statistics time interval for along-track QA data.
release (Compact Dataset)	STRING:80 (1)	Release Number (not_set)	1 Operations	Release number of the granule. The release number is incremented when the software or ancillary granule has been changed.
start_cycle (Compact Dataset)	INTEGER_4 (1)	Starting Cycle (not_set)	1 Derived	The starting cycle number associated with the data contained within this granule. The cycle number number of 91-day repeat cycles completed by the mission.
start_delta_time (Compact Dataset)	DOUBLE (1)	ATLAS Start Time (Actual) (time)	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the first data point in the file. The ATLAS : (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
start_geoseg (Compact Dataset)	INTEGER_4 (1)	Starting Geolocation Segment (not_set)	1 Derived	The starting geolocation segment number associated with the data contained within this granule. ICI geographic regions are further refined by geolocation segments. During the geolocation process, a created approximately every 20m from the start of the orbit to the end. The geolocation segments h strong a weak beams and provide a common segment length for the L2 and higher products. The g indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their r
start_gpssow (Compact Dataset)	DOUBLE (1)	Start GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the first data point in the granule.
start_gpsweek (Compact Dataset)	INTEGER_4 (1)	Start GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the first data point in the granule.
start_orbit (Compact Dataset)	INTEGER_4 (1)	Starting Orbit Number (not_set)	1 Derived	The starting orbit number associated with the data contained within this granule. The orbit number i the spacecraft completes a full orbit of the Earth.
start_region (Compact Dataset)	INTEGER_4 (1)	Starting Region (not_set)	1 Derived	The starting product-specific region number associated with the data contained within this granule. are separated by geographic regions. The data contained within a specific region are the same for , ATL03 regions differ slightly because of different geolocation segment locations caused by the irreg The region indices for other products are completely independent.
start_rgt (Compact Dataset)	INTEGER_4 (1)	Starting Reference Groundtrack (not_set)	1 Derived	The starting reference groundtrack (RGT) number associated with the data contained within this gra reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each tim completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
version (Compact Dataset)	STRING:80 (1)	Version (not_set)	1 Operations	Version number of this granule within the release. It is a sequential number corresponding to the nu granule has been reprocessed for the current release.

Group: /ancillary_data/calibrations

Description	(Attribute)	This group contains calibrations derived from the ATLAS CAL products.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_channel (Contiguous Dataset)	INTEGER_1 (20)	Channel (not_set)	1 not_set	Dimension scale for ATLAS PCE channels (1-16=strong, 17-20=weak)
ds_fine_counts (Contiguous Dataset)	INTEGER_1 (75)	Fine Counts (not_set)	1 not_set	Dimension scale for ATLAS Time-of-flight fine counts.

Group: /ancillary_data/calibrations/dead_time

Description	(Attribute)	CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/sho basis.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal42_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL42	Name of ATLAS CAL Product containing the calibration data
side (Compact Dataset)	INTEGER_4 (1)	Detector Bank Side (not_set)	1 CAL42	A or B side of the detector bank flag_values: 1, 2 flag_meanings : A B
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degreesC CAL42	Temperature for which calibrations are provided.

Group: /ancillary_data/calibrations/dead_time/pcex

Description	(Attribute)	CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/sho basis.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
dead_time (Compact Dataset)	DOUBLE (20)	DeadTime (not_set)	seconds CAL42	Dead Time (channel)
sigma (Compact Dataset)	DOUBLE (20)	Sigma (not_set)	seconds CAL42	Sigma (channel)

Group: /ancillary_data/calibrations/dead_time_radiometric_signal_loss				
Description	(Attribute)	CAL34 - Dead-time Radiometric Signal Loss. Contains a table of radiometric corrections versus apparent return strength and width for several dead-time values. Correction raw return strength to get corrected return strength		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal34_product (Chunked Dataset)	STRING:80 (:)	CAL Product Name (not_set)	1 CAL34	Name of ATLAS CAL Products containing the calibration data
dead_time (Chunked Dataset)	FLOAT (:)	Dead Time (not_set)	ns CAL34	Dead time value
rad_corr (Chunked Dataset)	DOUBLE (:, :, :)	Radiometric Correction (not_set)	1 CAL34	Radiometric Correction (width, strength, deadtime)
strength_strong (Chunked Dataset)	DOUBLE (:, :)	Strong Beam Strength (not_set)	events/shot CAL34	Strong spot strength in events/shot (strength, deadtime)
strength_weak (Chunked Dataset)	DOUBLE (:, :)	Weak Beam Strength (not_set)	events/shot CAL34	Weak spot strength in events/shot (strength, deadtime)
width (Chunked Dataset)	DOUBLE (:, :)	Apparent Width (not_set)	ns CAL34	Apparent width (width, deadtime)
Group: /ancillary_data/calibrations/effective_cell_delay				
Description	(Attribute)	CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, a falling).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal17_product (Chunked Dataset)	STRING:80 (:)	CAL Product Name (not_set)	1 CAL17	Name of ATLAS CAL Product containing the calibration data
Group: /ancillary_data/calibrations/effective_cell_delay/pcex				
Description	(Attribute)	CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, a falling).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_fall (Chunked Dataset)	FLOAT (:)	Call Falling (not_set)	1 CAL17	Cal_fall value which calibrations are provided (indexed by raw_cal_fall/256)
cal_rise (Chunked Dataset)	FLOAT (:)	Call Rising (not_set)	1 CAL17	Cal_rise value which calibrations are provided (index to raw_cal_rise/256)
efc_fall (Chunked Dataset)	FLOAT (75,20, :)	EFC Falling (not_set)	counts CAL17	Effective Rx falling fine cell count (cell, channel, temp)
efc_ll (Chunked Dataset)	FLOAT (75, :)	EFC LL (not_set)	counts CAL17	Effective Tx fine cell count for leading lower (cell, temp)
efc_ot (Chunked Dataset)	FLOAT (75, :)	EFC Other (not_set)	counts CAL17	Effective Tx fine cell count for other (cell, temp)
efc_rise (Chunked Dataset)	FLOAT (75,20, :)	EFC Rising (not_set)	counts CAL17	Effective rising Rx fine cell count (cell, channel, temp)
temperature (Chunked Dataset)	FLOAT (:)	Temperature (not_set)	degreesC CAL17	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/first_photon_bias				
Description	(Attribute)	CAL19 -First Photon Bias. Provides a correction for first photon bias.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal19_product (Chunked Dataset)	STRING:80 (:)	CAL Product Name (not_set)	1 Derived	Name of ATLAS CAL Products containing the calibration data
dead_time (Chunked Dataset)	FLOAT (:)	Dead Time (not_set)	ns Derived	Dead time value
ffb_corr (Chunked Dataset)	DOUBLE (:, :, :)	FFB Correction (not_set)	1 Derived	First Photon Bias Correction (width, strength, deadtime)
strength_strong (Chunked Dataset)	DOUBLE (:, :)	Strong Beam Strength (not_set)	events/shot Derived	Strong spot strength in events/shot (strength, deadtime)
strength_weak (Chunked Dataset)	DOUBLE (:, :)	Weak Beam Strength (not_set)	events/shot Derived	Weak spot strength in events/shot (strength, deadtime)
width (Chunked Dataset)	DOUBLE (:, :)	Apparent Width (not_set)	ns Derived	Apparent width (width, deadtime)
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity				
Description	(Attribute)	CAL46 - Relationship describing detector responsivity as the PMT high voltage deviates from nominal high voltage setting (V0).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal46_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL46	Name of ATLAS CAL Product containing the calibration data
side (Compact Dataset)	INTEGER_4 (1)	Detector Bank Side (not_set)	1 CAL46	A or B side of the detector bank flag_values: 1, 2 flag_meanings: A B
Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity/pcex				
Description	(Attribute)	CAL46 - Per-PCE.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
b_strong (Compact Dataset)	FLOAT (1)	b_strong (not_set)	1/v CAL46	Strong spot coefficient b
b_weak (Compact Dataset)	FLOAT (1)	b_weak (not_set)	1/v CAL46	Weak spot coefficient b
c_strong (Compact Dataset)	FLOAT (1)	c_strong (not_set)	1/v^2 CAL46	Strong spot coefficient c
c_weak (Compact Dataset)	FLOAT (1)	c_weak (not_set)	1/v^2 CAL46	Weak spot coefficient c
npoints_strong (Compact Dataset)	FLOAT (1)	npoints_strong (not_set)	1 CAL46	Strong spot number of points
npoints_weak (Compact Dataset)	FLOAT (1)	npoints_weak (not_set)	1 CAL46	Weak spot number of points
mom_strong (Compact Dataset)	FLOAT (1)	r_nom (not_set)	1 CAL46	Strong spot Rnom
mom_weak	FLOAT	r_nom	1	Weak spot Rnom

(Compact Dataset)	(1)	(not_set)	CAL46	
sigma_b_strong (Compact Dataset)	FLOAT (1)	sigma_b_strong (not_set)	1/v CAL46	Strong spot sigma of coefficient b
sigma_b_weak (Compact Dataset)	FLOAT (1)	sigma_b_weak (not_set)	1/v CAL46	Weak spot sigma of coefficient b
sigma_c_strong (Compact Dataset)	FLOAT (1)	sigma_c_strong (not_set)	1/v^2 CAL46	Strong spot sigma of coefficient c
sigma_c_weak (Compact Dataset)	FLOAT (1)	sigma_c_weak (not_set)	1/v^2 CAL46	Weak spot sigma of coefficient c
sigma_fit_strong (Compact Dataset)	FLOAT (1)	sigma_fit_strong (not_set)	1 CAL46	Strong spot sigma of fit
sigma_fit_weak (Compact Dataset)	FLOAT (1)	sigma_fit_weak (not_set)	1 CAL46	Weak spot sigma of fit
vnom_strong (Compact Dataset)	FLOAT (1)	v_nom (not_set)	v CAL46	Strong spot nominal voltage
vnom_weak (Compact Dataset)	FLOAT (1)	v_nom (not_set)	v CAL46	Weak spot nominal voltage

Group: /ancillary_data/calibrations/laser_energy_conversion

Description	(Attribute)	Contains CAL54 - absolute, energy monitor		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
base_temp (Compact Dataset)	FLOAT (1)	Base Temperature (not_set)	degC CAL54	Base temperature coefficient.
cal54_product (Compact Dataset)	STRING:80 (1)	CAL File Name (not_set)	1 CAL54	Name of source file containing the calibration data
internal (Compact Dataset)	DOUBLE (8)	Laser Internal Coeffs (not_set)	1 CAL54	Internal laser monitor coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/co
lrs (Compact Dataset)	DOUBLE (8)	LRS Coeffs (not_set)	1 CAL54	LRS coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/co
spd (Compact Dataset)	DOUBLE (8)	SPD Coeffs (not_set)	1 CAL54	SPD laser monitor coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/co

Group: /ancillary_data/calibrations/laser_energy_fraction

Description	(Attribute)	Contains CAL45 data - Transmit Energy Fraction per Beam		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal45_product (Compact Dataset)	STRING:80 (1)	CAL File Name (not_set)	1 CAL45	Name of source file containing the calibration data
energy_fractions (Compact Dataset)	FLOAT (6)	Energy Fraction (not_set)	1 CAL45	Energy Fraction, Per Spot
optics_throughput (Compact Dataset)	FLOAT (3)	Optics Throughput (not_set)	1 CAL45	Optics Throughput, Per PCE

Group: /ancillary_data/calibrations/low_link_impulse_response

Description	(Attribute)	CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bin_width (Compact Dataset)	FLOAT (1)	Bin Width (not_set)	seconds CAL20	Histogram bin width
cal20_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL20	Name of ATLAS CAL Product containing the calibration data
hist_x (Contiguous Dataset)	DOUBLE (2000)	Histogram Bin X Values (not_set)	1 CAL20	Histogram bin x-values
laser (Compact Dataset)	INTEGER_4 (1)	Laser (not_set)	1 CAL20	Laser Number
mode (Compact Dataset)	INTEGER_4 (1)	Laser Power Setting (not_set)	1 CAL20	Laser Power Setting
num_bins (Compact Dataset)	INTEGER_4 (1)	Number of Bins (not_set)	1 CAL20	Number of bins in the histogram
return_source (Compact Dataset)	INTEGER_4 (1)	Return Source (not_set)	1 CAL20	Source of the events from which the data are derived. flag_values: 0, 1, 2, 3 flag_meanings: none tep maat echo
side (Compact Dataset)	INTEGER_4 (1)	A_or_B (not_set)	1 CAL20	A or B Side Component flag_values: 1, 2 flag_meanings: A B
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degreesC CAL20	Temperature for which calibrations are provided.

Group: /ancillary_data/calibrations/low_link_impulse_response/pcex

Description	(Attribute)	CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
hist (Contiguous Dataset)	DOUBLE (2000,20)	Histogram (not_set)	1 CAL20	Per-Channel Histogram
total_events (Compact Dataset)	INTEGER_8 (20)	Total Events (not_set)	1 CAL20	Number of events used in constructing the per-channel histogram

Group: /ancillary_data/calibrations/nominal_rx_sensitivity

Description	(Attribute)	CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal30_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL30	Name of ATLAS CAL Product containing the calibration data
side (Compact Dataset)	INTEGER_4 (1)	Detector Bank Side (not_set)	1 CAL30	A or B side of the detector bank flag_values: 1, 2 flag_meanings: A B
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degreesC CAL30	Temperature for which calibrations are provided.

Group: /ancillary_data/calibrations/nominal_rx_sensitivity/pcex

Description	(Attribute)	CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.		
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Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
rms_resid_strong (Compact Dataset)	DOUBLE (1)	RMS Residual (not_set)	1 CAL30	Strong spot RMS Residual fraction
rms_resid_weak (Compact Dataset)	DOUBLE (1)	RMS Residual (not_set)	1 CAL30	Weak spot RMS Residual fraction
sdev_strong (Compact Dataset)	DOUBLE (1)	sdev_strong (not_set)	counts/s/Pw CAL30	Strong spot standard deviation
sdev_weak (Compact Dataset)	DOUBLE (1)	sdev_weak (not_set)	counts/s/pW CAL30	Weak spot standard deviation
slope_strong (Compact Dataset)	DOUBLE (1)	Slope (not_set)	counts/s/pW CAL30	Strong spot Slope
slope_weak (Compact Dataset)	DOUBLE (1)	Slope (not_set)	counts/s/pW CAL30	Weak spot Slope
Group: /ancillary_data/calibrations/receiver_channel_skews				
Description	(Attribute)	CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Group: /ancillary_data/calibrations/receiver_channel_skews/pcex				
Description	(Attribute)	CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal49_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL49	Name of ATLAS CAL Product containing the calibration data
side (Compact Dataset)	INTEGER_4 (1)	Primary_Redundant (not_set)	1 CAL49	Primary or Redundant Component flag_values: 1, 2 flag_meanings: PRIM REDU
skew_fall (Compact Dataset)	FLOAT (20)	Skew_Fall (not_set)	seconds CAL49	Per-channel skew (Fall)
skew_fall_stderr (Compact Dataset)	FLOAT (20)	Skew_Fall StdErr (not_set)	seconds CAL49	Standard error of the calculated skew (Fall)
skew_rise (Contiguous Dataset)	FLOAT (20)	Skew_Rise (not_set)	seconds CAL49	Per-channel skew (Rise)
skew_rise_stderr (Compact Dataset)	FLOAT (20)	Skew_Rise StdErr (not_set)	seconds CAL49	Standard error of the calculated skew (Rise)
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degreesC CAL49	Temperature for which calibrations are retrieved.
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment				
Description	(Attribute)	CAL47 - Provides a calibration for Receiver Sensitivity as a function of Transmit-to-Receiver Beam Misalignment.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
azimuth (Chunked Dataset)	DOUBLE (:)	Azimuth (not_set)	microradians CAL47_IMG	Azimuth
azimuth_grid_range (Compact Dataset)	FLOAT (2)	Azimuth Grid Range (not_set)	microradians CAL47_IMG	Azimuth Grid Range
cal47_product (Compact Dataset)	STRING:80 (6)	CAL Product Name (not_set)	1 CAL47_IMG	Name of ATLAS CAL Product containing the calibration data
elevation (Chunked Dataset)	DOUBLE (:)	Elevation (not_set)	microradians CAL47_IMG	Elevation
elevation_grid_range (Compact Dataset)	FLOAT (2)	Elevation Grid Range (not_set)	microradians CAL47_IMG	Elevation Grid Range
grid_spacing (Compact Dataset)	FLOAT (1)	Grid Spacing (not_set)	microradians CAL47_IMG	GridSpacing
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degC CAL47_IMG	Reference temperature within the CAL47 product.
Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment/pcex				
Description	(Attribute)	CAL47 - Rx Sensitivity as a function of TX-to-IFOV Misalignments. Correlates the residual misalignment of the total 6 beams (given the single BSM AZ/EI mirror) intersperse calibrations, to apparent shifts in signal gain.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
rel_intensity_strong (Chunked Dataset)	DOUBLE (:, :)	Relative intensity (not_set)	1 CAL47_IMG	Strong spot relative intensity
rel_intensity_weak (Chunked Dataset)	DOUBLE (:, :)	Relative intensity (not_set)	1 CAL47_IMG	Weak spot relative intensity
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom				
Description	(Attribute)	CAL61 - Rx Sensitivity vs. WTOM Ratio. Provides parameter values, for each spot, for the fit of Relative Sensitivity based on the reported WTEM through a quadratic curve.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal61_product (Compact Dataset)	STRING:80 (1)	CAL Product Name (not_set)	1 CAL61	Name of ATLAS CAL Product containing the calibration data
laser (Compact Dataset)	INTEGER_4 (1)	Laser (not_set)	1 CAL61	Laser Number
mode (Compact Dataset)	INTEGER_4 (1)	Laser Power Setting (not_set)	1 CAL61	Laser Power Setting
side (Compact Dataset)	INTEGER_4 (1)	Detector Bank Side (not_set)	1 CAL61	A or B side of the detector bank flag_values: 1, 2 flag_meanings: A B
temperature (Compact Dataset)	FLOAT (1)	Temperature (not_set)	degreesC CAL61	Temperature for which calibrations are provided.
Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom/pcex				
Description	(Attribute)	CAL61 - Rx Sensitivity vs. WTOM Ratio. Calibration of receiver throughput as a function of the WTOM/WTEM diode signals (D1, D2) to indicate quality of the spectral tuning for each receiver IFOV.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
h_strong (Compact Dataset)	DOUBLE (1)	h_strong (not_set)	1 CAL61	h_strong
h_weak (Compact Dataset)	DOUBLE (1)	h_weak (not_set)	1 CAL61	h_weak
rms_of_fit_strong	DOUBLE	rms_of_fit_strong	1	rms_of_fit_strong

(Compact Dataset)	(1)	(not_set)	CAL61	
rms_of_fit_weak (Compact Dataset)	DOUBLE (1)	rms_of_fit_weak (not_set)	1 CAL61	rms_of_fit_weak
sdev_h_strong (Compact Dataset)	DOUBLE (1)	sdev_h_strong (not_set)	1 CAL61	sdev_h_strong
sdev_h_weak (Compact Dataset)	DOUBLE (1)	sdev_h_weak (not_set)	1 CAL61	sdev_h_weak
sdev_xpeak_strong (Compact Dataset)	DOUBLE (1)	sdev_xpeak_strong (not_set)	1 CAL61	sdev_xpeak_strong
sdev_xpeak_weak (Compact Dataset)	DOUBLE (1)	sdev_xpeak_weak (not_set)	1 CAL61	sdev_xpeak_weak
sdev_ypeak_strong (Compact Dataset)	DOUBLE (1)	sdev_ypeak_strong (not_set)	counts/s CAL61	sdev_ypeak_strong
sdev_ypeak_weak (Compact Dataset)	DOUBLE (1)	sdev_ypeak_weak (not_set)	counts/s CAL61	sdev_ypeak_weak
xpeak_strong (Compact Dataset)	DOUBLE (1)	xpeak_strong (not_set)	1 CAL61	xpeak_strong
xpeak_weak (Compact Dataset)	DOUBLE (1)	xpeak_weak (not_set)	1 CAL61	xpeak_weak
ypeak_strong (Compact Dataset)	DOUBLE (1)	ypeak_strong (not_set)	counts/s CAL61	ypeak_strong
ypeak_weak (Compact Dataset)	DOUBLE (1)	ypeak_weak (not_set)	counts/s CAL61	ypeak_weak

Group: /ancillary_data/calibrations/start_timing_skews

Description	(Attribute)	CAL44 - Start Timing Skews. Produces START pulse timing skews within & among PCEs to properly align all start pulse timing channels.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal44_product (Chunked Dataset)	STRING:80 (:)	CAL Product Name (not_set)	1 CAL44	Name of ATLAS CAL Product containing the calibration data
ll1 (Chunked Dataset)	FLOAT (:)	LL1 (not_set)	seconds CAL44	Leading Lower Skew, PCE1
ll2_ll1 (Chunked Dataset)	FLOAT (:)	LL2-LL1 (not_set)	seconds CAL44	LL2-LL1
ll3_ll1 (Chunked Dataset)	FLOAT (:)	LL3-LL1 (not_set)	seconds CAL44	LL3-LL1
lu_ll1 (Chunked Dataset)	FLOAT (:)	LU-LL1 (not_set)	seconds CAL44	LU-LL1
side (Compact Dataset)	INTEGER_4 (1)	SPD Side (not_set)	1 CAL44	A or B side of the Start Pulse Detector flag_values: 1, 2 flag_meanings : A B
spd_temp (Chunked Dataset)	FLOAT (:)	SPD_Temp (not_set)	degreesC CAL44	SPD Temperature
tl_ll3 (Chunked Dataset)	FLOAT (:)	TL-LL3 (not_set)	seconds CAL44	TL-LL3
tu_ll2 (Chunked Dataset)	FLOAT (:)	TU-LL2 (not_set)	seconds CAL44	TU-LL2

Group: /ancillary_data/housekeeping

Description	(Attribute)	Constants and calibrations related to ATLAS housekeeping data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
det_ab_flag (Compact Dataset)	INTEGER_4 (1)	Detector Side, A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active detector (DET) is side A (1) or side B (2). flag_values: 1, 2 flag_meanings : a b
hvpc_ab_flag (Compact Dataset)	INTEGER_4 (1)	HVPC Side, A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active High Voltage Power Converter (HVPC) is side A (1) or side B (2). flag_values: 1, 2 flag_meanings : a b
laser_12_flag (Compact Dataset)	INTEGER_4 (1)	Laser 1 or Laser 2 (not_set)	1 Derived, L1B ATBD	Indicates if the active Laser is laser 1 or laser 2. flag_values: 1, 2 flag_meanings : 1 2
lrs_ab_flag (Compact Dataset)	INTEGER_4 (1)	LRS Side A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active LRS is side A (1) or side B (2). flag_values: 1, 2 flag_meanings : a b
pdu_ab_flag (Compact Dataset)	INTEGER_4 (1)	PDU Side A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active PDU is side a (1) or side b (2). flag_values: 1, 2 flag_meanings : a b
spd_ab_flag (Compact Dataset)	INTEGER_4 (1)	SPD A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active Start Pulse Detector (SPD) is side a (1) or side b (2). flag_values: 1, 2 flag_meanings : a b
tams_ab_flag (Compact Dataset)	INTEGER_4 (1)	TAMS Side A or B (not_set)	1 Derived, L1B ATBD	Indicates if the active TAMS is side a (1) or side b (2). flag_values: 1, 2 flag_meanings : a b

Group: /ancillary_data/isf

Description	(Attribute)	Constants and calibrations provided by the ICESat-2 Instrument Support Facility (via ANC27)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bias_offset_x (Compact Dataset)	DOUBLE (2)	AMCS Bias Offset X (not_set)	1 ANC27 (ATBD Section 5.3.3.1)	Surrounding AMCS bias X Offsets
bias_offset_y (Compact Dataset)	DOUBLE (2)	AMCS Bias Offset Y (not_set)	1 ANC27 (ATBD Section 5.3.3.1)	Surrounding AMCS bias Y Offsets
bias_rate (Compact Dataset)	DOUBLE (1)	AMCS bias rate (not_set)	1 ANC27 (ATBD Section 5.3.3.1)	AMCS bias rate
bias_time (Compact Dataset)	DOUBLE (2)	AMCS Bias Time (not_set)	seconds since 2018-01-01 ANC27 (ATBD Section 5.3.3.1)	Times of surrounding AMCS bias corrections
cal46_aging (Compact Dataset)	DOUBLE (1)	CAL46 Aging Factor (not_set)	1 ANC27 (ATBD Section 5.3.14)	CAL46 Aging correction factor
start_time_coeff (Compact Dataset)	DOUBLE (4,8)	Start Time Coefficients (not_set)	ns ANC27 (ATBD Section 3.5.6)	Start time coefficients for TOF center correction (coefficient x scenario)
uso_freq_dev (Compact Dataset)	DOUBLE (1)	USO Frequency Deviation (not_set)	1 ANC27	USO frequency deviation

wtom_alt_tune_corr (Compact Dataset)	DOUBLE (1)	WTOM Alt Tuning Correction (not_set)	1 ANC27 (ATBD Section 5.3.3.2)	WTOM Alt Tuning Correction
wtom_lambda_off (Compact Dataset)	DOUBLE (1)	WTOM Wavelength Offset (not_set)	1 ANC27 (ATBD Section 5.3.3.2)	WTOM Wavelength Offset
wtom_tune_flag (Compact Dataset)	INTEGER_4 (1)	WTOM Tuning Flag (not_set)	1 ANC27 (ATBD Section 5.3.3.2)	WTOM Tuning Flag (1=standard method, 2=alternate method) flag_values: 1, 2 flag_meanings: std alt
Group: /ancillary_data/tep				
Description	(Attribute)	Contains ancillary values related to TEP detection.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
tep_check_pce1 (Compact Dataset)	INTEGER_4 (1)	TEP flag for PCE1. (not_set)	1 ATLAS L1B ATBD	Flag indicating that the PCE1 strong channels should be checked for TEP events. flag_values: 0, 1 flag_meanings: do_not_check check
tep_check_pce2 (Compact Dataset)	INTEGER_4 (1)	TEP flag for PCE2. (not_set)	1 ATLAS L1B ATBD	Flag indicating that the PCE2 strong channels should be checked for TEP events. flag_values: 0, 1 flag_meanings: do_not_check check
tep_check_pce3 (Compact Dataset)	INTEGER_4 (1)	TEP flag for PCE3. (not_set)	1 ATLAS L1B ATBD	Flag indicating that the PCE3 strong channels should be checked for TEP events. flag_values: 0, 1 flag_meanings: do_not_check check
thres_tep_max (Compact Dataset)	DOUBLE (1)	TEP Detection Maximum (not_set)	ns ATLAS L1B ATBD	Maximum value used to classify TEP photons.
thres_tep_min (Compact Dataset)	DOUBLE (1)	TEP Detection Minimum (not_set)	ns ATLAS L1B ATBD	Minimum value used to classify TEP photons.
Group: /ancillary_data/tod_tof				
Description	(Attribute)	Contains ancillary parameters related to Time-of-Flight and/or Time-of-Day calculations.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_risefall_box_int (Compact Dataset)	DOUBLE (1)	cal_risefall boxcar interval (not_set)	counts ATLAS L1B ATBD	Boxcar averaging interval for cal_risefall averaging, in major-frame counts. Boxcar averages are used to create smoothed, interpolated cal_risefall values.
cal_uso_scale (Compact Dataset)	DOUBLE (1)	Calibration value for USO (not_set)	1 ATLAS L1B ATBD	Calibration value for the Ultra Stable Oscillator (USO). Computed using the number of coarse clock generated by the USO between sequential 1PPS time stamps from the on-orbit GPS to estimate the scale factor.
corr_rx_coarse_pce1 (Compact Dataset)	INTEGER_4 (20)	Correction value for PCE1 Rx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE1 Receive coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles (for each channel).
corr_rx_coarse_pce2 (Compact Dataset)	INTEGER_4 (20)	Correction value for PCE2 Rx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE2 Receive coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles (for each channel).
corr_rx_coarse_pce3 (Compact Dataset)	INTEGER_4 (20)	Correction value for PCE3 Rx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE3 Receive coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles (for each channel).
corr_tx_coarse_pce1 (Compact Dataset)	INTEGER_4 (1)	Correction value for PCE1 Tx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE1 Transmit coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles.
corr_tx_coarse_pce2 (Compact Dataset)	INTEGER_4 (1)	Correction value for PCE2 Tx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE2 Transmit coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles.
corr_tx_coarse_pce3 (Compact Dataset)	INTEGER_4 (1)	Correction value for PCE3 Tx coarse clock offset (not_set)	counts ATLAS L1B ATBD	Correction for the PCE3 Transmit coarse clock offset. This corrects for the offset between the actual clock cycles and the reported number of coarse clock cycles.
dt_imet (Compact Dataset)	DOUBLE (1)	IMET Clock Tick (not_set)	seconds/count ATLAS L1B ATBD, Section 4.2.1	IMET clock tick.
dt_t0 (Compact Dataset)	DOUBLE (1)	T0 Clock Tick (not_set)	seconds/count ATLAS L1B ATBD, Section 4.2.1	T0 clock tick.
dt_uso (Compact Dataset)	DOUBLE (1)	USO (AMET) Clock Tick (not_set)	seconds/count ATLAS L1B ATBD, Section 4.2.1	The AMET clock tick
lrs_clock (Compact Dataset)	DOUBLE (1)	LRS Clock Rate (not_set)	seconds/count ATLAS L1B ATBD	The nominal rate of the LRS internal 27 MHz oscillator (divided by 32).
Group: /atlas				
Description	(Attribute)	Group contains the ATLAS EU-converted data		
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).		
Group: /atlas/housekeeping				
Description	(Attribute)	Group contains the ATLAS EU-converted housekeeping data		
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).		
Group: /atlas/housekeeping/laser_energy_internal				
Description	(Attribute)	Internal laser energy from APID 1032 SLA_HK. Packet Frequency is 1 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 1hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The time is based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B Radiometric Corrections)
e_tx (Chunked Dataset)	FLOAT (:)	total laser energy (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy derived from the internal laser energy monitor (APID 1032).
e_tx_pce1_s	FLOAT	Spot laser energy for	joules	Laser energy for the PCE1 strong spot, derived from the internal laser energy monitor and split by c

(Chunked Dataset)	(:)	PCE1, strong (not_set)	ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	
e_tx_pce1_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE1, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce2_s (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE2, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce2_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE2, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce3_s (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE3, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from the internal laser energy monitor and split by calibration.
e_tx_pce3_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE3, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from the internal laser energy monitor and split by calibration.
laser_mode (Chunked Dataset)	INTEGER_1 (:)	Laser Mode Setting (not_set)	1 ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Mode setting reported in A_SLA_HK (APID 1032).
laser_temp (Chunked Dataset)	FLOAT (:)	Laser Temperature (not_set)	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Temperature. From SLA_HK Telemetry packet (APID 1032, Laser Cmd Code 0xFE LAS-14, Laser Cmd Code 0x00 LAS-15).

Group: /atlas/housekeeping/laser_energy_lrs

Description	(Attribute)	Laser energy derived from LRS Centroid Magnitudes. Packet Frequency is 50 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 50hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The time is based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B Radiometric Corrections)
e_tx (Chunked Dataset)	FLOAT (:)	total laser energy (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy from derived from LRS laser centroid magnitudes.
e_tx_pce1_s (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE1, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce1_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE1, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot, derived from LRS laser centroids and split by calibration.
e_tx_pce2_s (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE2, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce2_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE2, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from LRS laser centroids and split by calibration.
e_tx_pce3_s (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE3, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from LRS laser centroids and split by calibration.
e_tx_pce3_w (Chunked Dataset)	FLOAT (:)	Spot laser energy for PCE3, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from LRS laser centroids and split by calibration.
lrs_temp (Chunked Dataset)	FLOAT (:)	Laser Temperature (not_set)	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	LRS Temperature. From A_HKT_C Telemetry packet

Group: /atlas/housekeeping/laser_energy_spd

Description	(Attribute)	Laser energy from APID 1063 Analog HK Telemetry. Packet Frequency is 1 Hertz.		
data_rate	(Attribute)	Data within this group are provided at the packet rate of 1hz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The time is based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B Radiometric Corrections)
ds_10 (Contiguous Dataset)	INTEGER_1 (10)	DS for 10 measurements (not_set)	1 not_set	Dimension scale for 10 measurements.
e_tx (Chunked Dataset)	FLOAT (10, :)	total laser energy (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Total laser energy from Analog HK Telemetry packet E (APID 1063).
e_tx_pce1_s (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE1, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce1_w (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE1, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE1 weak spot derived from the analog HK telemetry and split by calibration.
e_tx_pce2_s (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE2, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce2_w (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE2, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE2 weak spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce3_s (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE3, strong (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 strong spot, derived from the analog HK telemetry and split by calibration.
e_tx_pce3_w (Chunked Dataset)	FLOAT (10, :)	Spot laser energy for PCE3, weak (not_set)	joules ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser energy for the PCE3 weak spot, derived from the analog HK telemetry and split by calibration.
edge_xmtrnc (Chunked Dataset)	FLOAT (:)	SPD Edge (not_set)	mV ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	edge_xmtrnc. From Analog HK Telemetry packet E (APID 1063).

laser_temp (Chunked Dataset)	FLOAT (:)	Laser Temperature (not_set)	degreesC ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Laser Temperature. From A_HKT_C PRIMARY SPD THERMISTOR MED_34 chan[74] or REDUND THERMISTOR MED_35 chan[81]
peak_xmtnc (Chunked Dataset)	FLOAT (:)	SPD Peak (not_set)	mV ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	peak_xmtnc. From Analog HK Telemetry packet E (APID 1063).
thrhi_rdbk (Chunked Dataset)	FLOAT (:)	SPD Upper Thres (not_set)	volts ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Start Pulse Detector (SPD) upper threshold readback value. Reported as an analog voltage whose the threshold at 80% of full laser energy. From Analog HK Telemetry packet E (APID 1063).
thrlw_rdbk (Chunked Dataset)	FLOAT (:)	SPD Lower Thres (not_set)	volts ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy	Start Pulse Detector (SPD) lower threshold readback value. Reported as an analog voltage whose threshold at 20% of full laser energy. From Analog HK Telemetry packet E (APID 1063).
Group: /atlas/housekeeping/mce_position				
Description	(Attribute)	MCE Position A/D Packet. Packet Frequency is 200 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 200HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_50 (Contiguous Dataset)	INTEGER_1 (50)	DS for 50 measurements (not_set)	1 not_set	Dimension scale for 50 measurements.
mce_az (Chunked Dataset)	FLOAT (50, :)	A MCE AZ (not_set)	counts ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE	MCE azimuth values.
mce_el (Chunked Dataset)	FLOAT (50, :)	MCE EL (not_set)	counts ATL01/atlas/a_mce_pos_1057 and L1B ATBD section MCE	MCE elevation values.
mce_total_cycles (Chunked Dataset)	UINT_4_LE (:)	A MCE total cycles (not_set)	counts ATL01/atlas/a_mce_pos_1057	MCE reported total number of cycles
Group: /atlas/housekeeping/meb				
Description	(Attribute)	Data from APID 1062 Analog HK Telemetry. Packet Frequency is 1 in Hertz. Voltage and current data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
hkt_ground_check (Chunked Dataset)	FLOAT (:)	Ground check (not_set)	counts ATL01/atlas/a_hkt_d_1062 converted	Ground check - A_HKT_D.chan[30]
hkt_meb_1p5v_asc_v (Chunked Dataset)	FLOAT (:)	1P5VTLM-ASC (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VTLM-ASC - A_HKT_D.chan[22]
hkt_meb_1p5v_mon_v (Chunked Dataset)	FLOAT (:)	HKT 1.5V Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	HKT 1.5V Monitor - A_HKT_D.chan[5]
hkt_meb_1p5va_pce1_v (Chunked Dataset)	FLOAT (:)	1P5VATLM-PCE1 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE1 - A_HKT_D.chan[23]
hkt_meb_1p5va_pce2_v (Chunked Dataset)	FLOAT (:)	1P5VATLM-PCE2 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE2 - A_HKT_D.chan[16]
hkt_meb_1p5va_pce3_v (Chunked Dataset)	FLOAT (:)	1P5VATLM-PCE3 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VATLM-PCE3 - A_HKT_D.chan[17]
hkt_meb_1p5vb_pce1_v (Chunked Dataset)	FLOAT (:)	1P5VBTLTM-PCE1 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLTM-PCE1 - A_HKT_D.chan[24]
hkt_meb_1p5vb_pce2_v (Chunked Dataset)	FLOAT (:)	1P5VBTLTM-PCE2 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLTM-PCE2 - A_HKT_D.chan[25]
hkt_meb_1p5vb_pce3_v (Chunked Dataset)	FLOAT (:)	1P5VBTLTM-PCE3 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	1P5VBTLTM-PCE3 - A_HKT_D.chan[18]
hkt_meb_2p5v_pce1_v (Chunked Dataset)	FLOAT (:)	2P5VTLM-PCE1 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE1 - A_HKT_D.chan[19]
hkt_meb_2p5v_pce2_v (Chunked Dataset)	FLOAT (:)	2P5VTLM-PCE2 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE2 - A_HKT_D.chan[26]
hkt_meb_2p5v_pce3_v (Chunked Dataset)	FLOAT (:)	2P5VTLM-PCE3 (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	2P5VTLM-PCE3 - A_HKT_D.chan[27]
hkt_meb_3p3i_lvpc_i (Chunked Dataset)	FLOAT (:)	3P3ITLM-LVPC (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	3P3ITLM-LVPC - A_HKT_D.chan[12]
hkt_meb_3p3v_mon_v (Chunked Dataset)	FLOAT (:)	3.3V Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	3.3V Monitor - A_HKT_D.chan[6]
hkt_meb_5p0i_lvpc_i (Chunked Dataset)	FLOAT (:)	5P0ITLM-LVPC (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	5P0ITLM-LVPC - A_HKT_D.chan[13]
hkt_meb_5p0i_sbc_i (Chunked Dataset)	FLOAT (:)	5P0I_SBC_TLM (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	5P0I_SBC_TLM - A_HKT_D.chan[28]
hkt_meb_5p0v_sbc_v (Chunked Dataset)	FLOAT (:)	5P0V_SBC_TLM (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	5P0V_SBC_TLM - A_HKT_D.chan[29]
hkt_meb_cal_n35p9_t (Chunked Dataset)	FLOAT (:)	CAL -35.9 (not_set)	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -35.9 - A_HKT_D.chan[3]
hkt_meb_cal_n62p5_t (Chunked Dataset)	FLOAT (:)	CAL -62.5 (not_set)	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -62.5 - A_HKT_D.chan[4]
hkt_meb_cal_n6p6_t (Chunked Dataset)	FLOAT (:)	CAL -6.6 (not_set)	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL -6.6 - A_HKT_D.chan[2]
hkt_meb_cal_p25_t (Chunked Dataset)	FLOAT (:)	CAL +25 (not_set)	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL +25 - A_HKT_D.chan[1]
hkt_meb_cal_p65p3_t (Chunked Dataset)	FLOAT (:)	CAL +65.3 (not_set)	degreesC ATL01/atlas/a_hkt_d_1062 converted	CAL +65.3 - A_HKT_D.chan[0]
hkt_meb_i_uso_i (Chunked Dataset)	FLOAT (:)	ITLM-USO (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	ITLM-USO - A_HKT_D.chan[15]
hkt_meb_n15p0i_lvpc_i (Chunked Dataset)	FLOAT (:)	15P0I_NEG_TLM- LVPC (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	15P0I_NEG_TLM-LVPC - A_HKT_D.chan[21]
hkt_meb_n15v_mon_v	FLOAT	-15V Monitor	volts	-15V Monitor - A_HKT_D.chan[10]

(Chunked Dataset)	(:)	(not_set)	ATL01/atlas/a_hkt_d_1062 converted	
hkt_meb_n5a_mon_v (Chunked Dataset)	FLOAT (:)	HKT -5A Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	HKT -5A Monitor - A_HKT_D.chan[11]
hkt_meb_p15p0i_lvpc_i (Chunked Dataset)	FLOAT (:)	15P0I_POS_TLM-LVPC (not_set)	amps ATL01/atlas/a_hkt_d_1062 converted	15P0I_POS_TLM-LVPC - A_HKT_D.chan[20]
hkt_meb_p15v_mon_v (Chunked Dataset)	FLOAT (:)	+15V Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	+15V Monitor - A_HKT_D.chan[9]
hkt_meb_p5a_mon_v (Chunked Dataset)	FLOAT (:)	HKT +5A Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	HKT +5A Monitor - A_HKT_D.chan[8]
hkt_meb_p5d_mon_v (Chunked Dataset)	FLOAT (:)	+5D Monitor (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	+5D Monitor - A_HKT_D.chan[7]
hkt_meb_v_uso_v (Chunked Dataset)	FLOAT (:)	VTLM-USO (not_set)	volts ATL01/atlas/a_hkt_d_1062 converted	VTLM-USO - A_HKT_D.chan[14]
Group: atlas/housekeeping/pdu				
Description	(Attribute)	PDU Analog HK Telemetry. The PDU analog telemetry digitized by the HKT card and collected by the SBC Thermal Control Task. Packet Frequency is 1 in Hertz. Data is from (Primary) or APID 1060 (Redundant) HK packets.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP GPS Epoch. This is computed based on the house sample a measurement every 0.003125 seconds from the internal ASC 1PPS. The time for this part of the lowest software channel number in this telemetry packet. If the specific time is needed add to actual ATLAS hardware channel number from the lowest software channel number times the 0.003 ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDC epoch contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds epoch can be computed.
hvpc_mod_1 (Chunked Dataset)	FLOAT (:)	HVPC Module 1 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 1 - A_HKT.chan[70]
hvpc_mod_2 (Chunked Dataset)	FLOAT (:)	HVPC Module 2 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 2 - A_HKT.chan[71]
hvpc_mod_3 (Chunked Dataset)	FLOAT (:)	HVPC Module 3 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 3 - A_HKT.chan[72]
hvpc_mod_4 (Chunked Dataset)	FLOAT (:)	HVPC Module 4 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 4 - A_HKT.chan[73]
hvpc_mod_5 (Chunked Dataset)	FLOAT (:)	HVPC Module 5 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 5 - A_HKT.chan[74]
hvpc_mod_6 (Chunked Dataset)	FLOAT (:)	HVPC Module 6 (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	HVPC Module 6 - A_HKT.chan[75]
hvpc_tlm_6 (Chunked Dataset)	FLOAT (:)	HVPC TLM 6 (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	HVPC TLM 6 - A_HKT.chan[76]
hvpc_tlm_7 (Chunked Dataset)	FLOAT (:)	HVPC TLM 7 (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	HVPC TLM 7 - A_HKT.chan[77]
pdu_daa_opts_htr_i (Chunked Dataset)	FLOAT (:)	PDU DAA OPTS HTR I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU DAA OPTS HTR I - A_HKT.chan[46]
pdu_det_i (Chunked Dataset)	FLOAT (:)	PDU DET I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU DET I - A_HKT.chan[23]
pdu_det_v (Chunked Dataset)	FLOAT (:)	PDU DET V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU DET V - A_HKT.chan[17]
pdu_hvpc_i (Chunked Dataset)	FLOAT (:)	PDU HVPC I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU HVPC I - A_HKT.chan[24]
pdu_laser_1_i (Chunked Dataset)	FLOAT (:)	PDU LASER 1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 1 I - A_HKT.chan[21]
pdu_laser_1_v (Chunked Dataset)	FLOAT (:)	PDU LASER 1 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 1 V - A_HKT.chan[14]
pdu_laser_2_i (Chunked Dataset)	FLOAT (:)	PDU LASER 2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 2 I - A_HKT.chan[22]
pdu_laser_2_v (Chunked Dataset)	FLOAT (:)	PDU LASER 2 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU LASER 2 V - A_HKT.chan[15]
pdu_lhp1_i (Chunked Dataset)	FLOAT (:)	PDU LHP1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP1 I - A_HKT.chan[43]
pdu_lhp2_i (Chunked Dataset)	FLOAT (:)	PDU LHP2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP2 I - A_HKT.chan[44]
pdu_lhp_startup_htr_i (Chunked Dataset)	FLOAT (:)	PDU LHP STARTUP HTR I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LHP STARTUP HTR I - A_HKT.chan[42]
pdu_lrs_i (Chunked Dataset)	FLOAT (:)	PDU LRS I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LRS I - A_HKT.chan[25]
pdu_lrs_opts_heater_i (Chunked Dataset)	FLOAT (:)	PDU LRS OPTS HEATER I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU LRS OPTS HEATER I - A_HKT.chan[45]
pdu_meb_lvpc_i (Chunked Dataset)	FLOAT (:)	PDU MEB LVPC I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU MEB LVPC I - A_HKT.chan[26]
pdu_meb_lvpc_v (Chunked Dataset)	FLOAT (:)	PDU MEB LVPC V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU MEB LVPC V - A_HKT.chan[16]
pdu_n3v_dem1_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM1 I - A_HKT.chan[52]
pdu_n3v_dem1_v (Chunked Dataset)	FLOAT (:)	PDU N3V DEM1 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM1 V - A_HKT.chan[2]
pdu_n3v_dem2_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM2 I - A_HKT.chan[63]
pdu_n3v_dem2_v (Chunked Dataset)	FLOAT (:)	PDU N3V DEM2 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM2 V - A_HKT.chan[5]
pdu_n3v_dem3_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM3 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM3 I - A_HKT.chan[55]
pdu_n3v_dem3_v (Chunked Dataset)	FLOAT (:)	PDU N3V DEM3 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM3 V - A_HKT.chan[8]
pdu_n3v_dem4_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM4 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM4 I - A_HKT.chan[66]
pdu_n3v_dem5_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM5 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM5 I - A_HKT.chan[58]

(Chunked Dataset)	(:)	(not_set)	ATL01/atlas/a_hkt_a_1059 converted	
pdu_n3v_dem5_v (Chunked Dataset)	FLOAT (:)	PDU N3V DEM5 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM5 V - A_HKT.chan[11]
pdu_n3v_dem6_i (Chunked Dataset)	FLOAT (:)	PDU N3V DEM6 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU N3V DEM6 I - A_HKT.chan[69]
pdu_ofa_n12v_v (Chunked Dataset)	FLOAT (:)	PDU OFA N12V V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU OFA N12V V - A_HKT.chan[13]
pdu_ofa_p12v_i (Chunked Dataset)	FLOAT (:)	PDU OFA P12V I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU OFA P12V I - A_HKT.chan[59]
pdu_ofa_p12v_v (Chunked Dataset)	FLOAT (:)	PDU OFA P12V V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU OFA P12V V - A_HKT.chan[12]
pdu_p3p3v_dem1_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM1 I - A_HKT.chan[51]
pdu_p3p3v_dem1_v (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM1 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM1 V - A_HKT.chan[1]
pdu_p3p3v_dem2_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM2 I - A_HKT.chan[62]
pdu_p3p3v_dem2_v (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM2 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM2 V - A_HKT.chan[4]
pdu_p3p3v_dem3_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM3 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM3 I - A_HKT.chan[54]
pdu_p3p3v_dem3_v (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM3 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM3 V - A_HKT.chan[7]
pdu_p3p3v_dem4_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM4 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM4 I - A_HKT.chan[65]
pdu_p3p3v_dem5_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM5 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM5 I - A_HKT.chan[57]
pdu_p3p3v_dem5_v (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM5 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM5 V - A_HKT.chan[10]
pdu_p3p3v_dem6_i (Chunked Dataset)	FLOAT (:)	PDU P3P3V DEM6 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P3P3V DEM6 I - A_HKT.chan[68]
pdu_p5v_dem1_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM1 I - A_HKT.chan[50]
pdu_p5v_dem1_v (Chunked Dataset)	FLOAT (:)	PDU P5V DEM1 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM1 V - A_HKT.chan[0]
pdu_p5v_dem2_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM2 I - A_HKT.chan[61]
pdu_p5v_dem2_v (Chunked Dataset)	FLOAT (:)	PDU P5V DEM2 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM2 V - A_HKT.chan[3]
pdu_p5v_dem3_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM3 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM3 I - A_HKT.chan[53]
pdu_p5v_dem3_v (Chunked Dataset)	FLOAT (:)	PDU P5V DEM3 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM3 V - A_HKT.chan[6]
pdu_p5v_dem4_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM4 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM4 I - A_HKT.chan[64]
pdu_p5v_dem5_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM5 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM5 I - A_HKT.chan[56]
pdu_p5v_dem5_v (Chunked Dataset)	FLOAT (:)	PDU P5V DEM5 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM5 V - A_HKT.chan[9]
pdu_p5v_dem6_i (Chunked Dataset)	FLOAT (:)	PDU P5V DEM6 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU P5V DEM6 I - A_HKT.chan[67]
pdu_pwm_tlsp_pri_i (Chunked Dataset)	FLOAT (:)	PDU PWM TLSP PRI I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP PRI I - A_HKT.chan[39]
pdu_pwm_tlsp_sec_i (Chunked Dataset)	FLOAT (:)	PDU PWM TLSP SEC I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP SEC I - A_HKT.chan[40]
pdu_pwm_tlsp_tower_i (Chunked Dataset)	FLOAT (:)	PDU PWM TLSP TOWER I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU PWM TLSP TOWER I - A_HKT.chan[41]
pdu_spare_1_v (Chunked Dataset)	FLOAT (:)	PDU SPARE 1 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 1 V - A_HKT.chan[27]
pdu_spare_2_v (Chunked Dataset)	FLOAT (:)	PDU SPARE 2 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 2 V - A_HKT.chan[28]
pdu_spare_3_v (Chunked Dataset)	FLOAT (:)	PDU SPARE 3 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 3 V - A_HKT.chan[29]
pdu_spare_4_v (Chunked Dataset)	FLOAT (:)	PDU SPARE 4 V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPARE 4 V - A_HKT.chan[30]
pdu_spare_5_v (Chunked Dataset)	FLOAT (:)	A PDU SPARE 5V (not_set)	counts ATL01/atlas/a_hkt_a_1059 converted	A_PDU_SPARE_5_V - HKT.chan[60]
pdu_spd_n5v_i (Chunked Dataset)	FLOAT (:)	PDU SPD N5V I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD N5V I - A_HKT.chan[48]
pdu_spd_n5v_v (Chunked Dataset)	FLOAT (:)	PDU SPD N5V V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD N5V V - A_HKT.chan[19]
pdu_spd_p3p3v_i (Chunked Dataset)	FLOAT (:)	PDU SPD P3P3V I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P3P3V I - A_HKT.chan[49]
pdu_spd_p3p3v_v (Chunked Dataset)	FLOAT (:)	PDU SPD P3P3V V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P3P3V V - A_HKT.chan[20]
pdu_spd_p5v_i (Chunked Dataset)	FLOAT (:)	PDU SPD P5V I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P5V I - A_HKT.chan[47]
pdu_spd_p5v_v (Chunked Dataset)	FLOAT (:)	PDU SPD P5V V (not_set)	volts ATL01/atlas/a_hkt_a_1059 converted	PDU SPD P5V V - A_HKT.chan[18]
pdu_tams_i (Chunked Dataset)	FLOAT (:)	PDU TAMS I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TAMS I - A_HKT.chan[31]
pdu_tcs_ofa_htr1_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR1 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR1 I - A_HKT.chan[32]
pdu_tcs_ofa_htr2_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR2 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR2 I - A_HKT.chan[33]
pdu_tcs_ofa_htr3_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR3 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR3 I - A_HKT.chan[34]

pdu_tcs_ofa_htr4_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR4 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR4 I - A_HKT.chan[35]
pdu_tcs_ofa_htr5_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR5 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR5 I - A_HKT.chan[36]
pdu_tcs_ofa_htr6_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR6 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR6 I - A_HKT.chan[37]
pdu_tcs_ofa_htr7_i (Chunked Dataset)	FLOAT (:)	PDU TCS OFA HTR7 I (not_set)	amps ATL01/atlas/a_hkt_a_1059 converted	PDU TCS OFA HTR7 I - A_HKT.chan[38]

Group: /atlas/housekeeping/pointing

Description	(Attribute)	APID 1138 ATLAS Pointing Message- Spacecraft Attitude and Rates Packet - Relayed to SSR. Packet Frequency is by command.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
q_sc_i2b_1 (Chunked Dataset)	DOUBLE (:)	q_sc_i2b_1 (not_set)	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 1
q_sc_i2b_2 (Chunked Dataset)	DOUBLE (:)	q_sc_i2b_2 (not_set)	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 2
q_sc_i2b_3 (Chunked Dataset)	DOUBLE (:)	q_sc_i2b_3 (not_set)	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 3
q_sc_i2b_4 (Chunked Dataset)	DOUBLE (:)	q_sc_i2b_4 (not_set)	1 ATL01/atlas/a_sc_pon_1138	SC Inertial to ATLAS Body Frame quaternion 4
sc_solution_sec (Chunked Dataset)	UINT_4_LE (:)	sc_solution_sec (not_set)	seconds since 2018-01-01 ATL01/atlas/a_sc_pon_1138	Spacecraft recorded seconds at time of position/velocity solution in seconds since the ATLAS SDP ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_solution_subsec (Chunked Dataset)	UINT_4_LE (:)	sc_solution_subsec (not_set)	subseconds ATL01/atlas/a_sc_pon_1138	Spacecraft recorded subseconds
x_sc_body_rate (Chunked Dataset)	DOUBLE (:)	x_sc_body_rate (not_set)	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the X axis in the ATLAS frame
y_sc_body_rate (Chunked Dataset)	DOUBLE (:)	y_sc_body_rate (not_set)	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the Y axis in the ATLAS frame
z_sc_body_rate (Chunked Dataset)	DOUBLE (:)	z_sc_body_rate (not_set)	radians/second ATL01/atlas/a_sc_pon_1138	SC body rate as measured about the Z axis in the ATLAS frame

Group: /atlas/housekeeping/position_velocity

Description	(Attribute)	APID 1137 ATLAS Position Message-Spacecraft Position and Velocity Packet - Relayed to SSR. Packet Frequency is in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_solution_sec (Chunked Dataset)	UINT_4_LE (:)	sc_solution_sec (not_set)	seconds since 2018-01-01 ATL01/atlas/a_sc_pos_1137	Spacecraft recorded seconds at time of position/velocity solution, in seconds since the ATLAS SDP ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_solution_subsec (Chunked Dataset)	UINT_4_LE (:)	sc_solution_subsec (not_set)	counts ATL01/atlas/a_sc_pos_1137	Spacecraft recorded subseconds
x_sc_eci_pos (Chunked Dataset)	DOUBLE (:)	x_sc_eci_pos (not_set)	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: X axis
x_sc_eci_vel (Chunked Dataset)	DOUBLE (:)	x_sc_eci_vel (not_set)	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: X axis
y_sc_eci_pos (Chunked Dataset)	DOUBLE (:)	y_sc_eci_pos (not_set)	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: Y axis
y_sc_eci_vel (Chunked Dataset)	DOUBLE (:)	y_sc_eci_vel (not_set)	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: Y axis
z_sc_eci_pos (Chunked Dataset)	DOUBLE (:)	z_sc_eci_pos (not_set)	meters ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Position: Z axis
z_sc_eci_vel (Chunked Dataset)	DOUBLE (:)	z_sc_eci_vel (not_set)	meters/second ATL01/atlas/a_sc_pos_1137	Spacecraft Earth-Centered-Inertial Velocity: Z axis

Group: /atlas/housekeeping/radiometry

Description	(Attribute)	The radiometry group contains background and receiver sensitivity		
data_rate	(Attribute)	Data within this group are stored at the data rate of one hertz.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bg_sensitivity_pce1_s (Chunked Dataset)	FLOAT (:)	PCE1 Strong background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE1, Strong spot - receiver response per watt of continuous illumination in the passband from a dif than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce1_w (Chunked Dataset)	FLOAT (:)	PCE1 Weak background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE1, Weak spot - receiver response per watt of continuous illumination in the passband from a dif the field of view, in the absence of any dead time effects.
bg_sensitivity_pce2_s (Chunked Dataset)	FLOAT (:)	PCE2 Strong background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE2, Strong spot - receiver response per watt of continuous illumination in the passband from a dif than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce2_w (Chunked Dataset)	FLOAT (:)	PCE2 Weak background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE2, Weak spot - receiver response per watt of continuous illumination in the passband from a dif the field of view, in the absence of any dead time effects.
bg_sensitivity_pce3_s (Chunked Dataset)	FLOAT (:)	PCE3 Strong background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE3, Strong spot - receiver response per watt of continuous illumination in the passband from a dif than the field of view, in the absence of any dead time effects.
bg_sensitivity_pce3_w (Chunked Dataset)	FLOAT (:)	PCE3 Weak background sensitivity (not_set)	events/s/Watt ATBD Section 5.5.2	PCE3, Weak spot - receiver response per watt of continuous illumination in the passband from a dif the field of view, in the absence of any dead time effects.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch

				06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The time based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B Radiometric Corrections)
ret_sensitivity_pce1_s (Chunked Dataset)	FLOAT (:)	PCE1 Strong return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE1, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of a
ret_sensitivity_pce1_w (Chunked Dataset)	FLOAT (:)	PCE1 Weak return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE1, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of a
ret_sensitivity_pce2_s (Chunked Dataset)	FLOAT (:)	PCE2 Strong return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE2, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of a
ret_sensitivity_pce2_w (Chunked Dataset)	FLOAT (:)	PCE2 Weak return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE2, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of a
ret_sensitivity_pce3_s (Chunked Dataset)	FLOAT (:)	PCE3 Strong return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE3, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of a
ret_sensitivity_pce3_w (Chunked Dataset)	FLOAT (:)	PCE3 Weak return sensitivity (not_set)	events/s/Watt ATBD Section 5.5.3	PCE3, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of a

Group: /atlas/housekeeping/status

Description	(Attribute)	Flags parsed from HKT Status Registers Housekeeping Packet. Packet Frequency is 1 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pdua_daa_opt (Chunked Dataset)	INTEGER_1 (:)	PDUA_DAA_OPT status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_DAA_OPT status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_det_ps (Chunked Dataset)	INTEGER_1 (:)	PDUA_DET_PS status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_DET_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_hvpc (Chunked Dataset)	INTEGER_1 (:)	PDUA_HVPC status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_HVPC status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_laser_1 (Chunked Dataset)	INTEGER_1 (:)	PDUA_LASER_1 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LASER_1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_laser_2 (Chunked Dataset)	INTEGER_1 (:)	PDUA_LASER_2 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LASER_2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_lhp1 (Chunked Dataset)	INTEGER_1 (:)	PDUA_LHP1 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_lhp2 (Chunked Dataset)	INTEGER_1 (:)	PDUA_LHP2 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_lhp_startup (Chunked Dataset)	INTEGER_1 (:)	PDUA_LHP_STARTUP status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LHP_STARTUP status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_lrs (Chunked Dataset)	INTEGER_1 (:)	PDUA_LRS status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LRS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_lrs_opt (Chunked Dataset)	INTEGER_1 (:)	PDUA_LRS_OPT status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_LRS_OPT status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa1 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA1 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa2 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA2 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa3 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA3 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA3 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa4 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA4 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA4 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa5 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA5 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA5 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa6 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA6 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA6 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa7 (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA7 status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA7 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_ofa_ps (Chunked Dataset)	INTEGER_1 (:)	PDUA_OFA_PS status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_OFA_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_pri_mir (Chunked Dataset)	INTEGER_1 (:)	PDUA_PRI_MIR status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_PRI_MIR status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_sec_mir (Chunked Dataset)	INTEGER_1 (:)	PDUA_SEC_MIR status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SEC_MIR status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_spare_sig (Chunked Dataset)	INTEGER_1 (:)	PDUA_SPARE_SIG status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SPARE_SIG status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off
pdua_spd_ps (Chunked Dataset)	INTEGER_1 (:)	PDUA_SPD_PS status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_SPD_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings: on off

pdua_tams_ls (Chunked Dataset)	INTEGER_1 (:)	PDUA_TAMS_LS status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_TAMS_LS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdua_tower (Chunked Dataset)	INTEGER_1 (:)	PDUA_TOWER status flag (not_set)	counts ATL01/atlas/a_hkt_status_1065 converted	PDUA_TOWER status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_daa_opt (Chunked Dataset)	INTEGER_1 (:)	PDUB_DAA_OPT status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_DAA_OPT status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_det_ps (Chunked Dataset)	INTEGER_1 (:)	PDUB_DET_PS status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_DET_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_hvpc (Chunked Dataset)	INTEGER_1 (:)	PDUB_HVPC status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_HVPC status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_laser_1 (Chunked Dataset)	INTEGER_1 (:)	PDUB_LASER_1 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LASER_1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_laser_2 (Chunked Dataset)	INTEGER_1 (:)	PDUB_LASER_2 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LASER_2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_lhp1 (Chunked Dataset)	INTEGER_1 (:)	PDUB_LHP1 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_lhp2 (Chunked Dataset)	INTEGER_1 (:)	PDUB_LHP2 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_lhp_startup (Chunked Dataset)	INTEGER_1 (:)	PDUB_LHP_STARTUP status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LHP_STARTUP status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_lrs (Chunked Dataset)	INTEGER_1 (:)	PDUB_LRS status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LRS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_lrs_opt (Chunked Dataset)	INTEGER_1 (:)	PDUB_LRS_OPT status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_LRS_OPT status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa1 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA1 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA1 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa2 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA2 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA2 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa3 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA3 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA3 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa4 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA4 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA4 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa5 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA5 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA5 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa6 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA6 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA6 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa7 (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA7 status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA7 status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_ofa_ps (Chunked Dataset)	INTEGER_1 (:)	PDUB_OFA_PS status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_OFA_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_pri_mir (Chunked Dataset)	INTEGER_1 (:)	PDUB_PRI_MIR status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_PRI_MIR status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_sec_mir (Chunked Dataset)	INTEGER_1 (:)	PDUB_SEC_MIR status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SEC_MIR status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_spare_sig (Chunked Dataset)	INTEGER_1 (:)	PDUB_SPARE_SIG status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SPARE_SIG status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_spd_ps (Chunked Dataset)	INTEGER_1 (:)	PDUB_SPD_PS status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_SPD_PS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_tams_ls (Chunked Dataset)	INTEGER_1 (:)	PDUB_TAMS_LS status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_TAMS_LS status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off
pdub_tower (Chunked Dataset)	INTEGER_1 (:)	PDUB_TOWER status flag (not_set)	1 ATL01/atlas/a_hkt_status_1065 converted	PDUB_TOWER status flag. 0=ON, 1=OFF flag_values: 0, 1 flag_meanings : on off

Group: /atlas/housekeeping/thermal

Description	(Attribute)	Thermal data from APID 1061 Analog HK Telemetry. Packet Frequency is 1 in Hertz.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. This is computed based on the housekeepi measurement every 0.003125 seconds from the internal ASC 1PPS . The time for this packet is set lowest channel number in this telemetry packet. If the specific time is needed use the channel num 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 (198 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
hkt_a_beam_px_t (Chunked Dataset)	FLOAT (:)	HKT_BEAMX_PX_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	A_HKT_BEAMX_PX_T A_HKT_C.chan[62]
hkt_beamx_t (Chunked Dataset)	FLOAT (:)	HKT BEAMX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Beam Expander I/F mTTCS-21 or 30 A_HKT_C.chan[82]
hkt_bsm_t (Chunked Dataset)	FLOAT (:)	HKT BSM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT BSM I/F T TCS-20 - A_HKT_C.chan[33]
hkt_cchp_adiab_t	FLOAT	HKT CCHP ADIAB T	degreesC	Laser CCHP Adiabatic Section T TCS-12 A_HKT_C.chan[55]

(Chunked Dataset)	(:)	(not_set)	ATL01/atlas/a_hkt_c_1061 converted	
hkt_cchp_las1_t (Chunked Dataset)	FLOAT (:)	HKT CCHP LAS1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Laser 1 I/F T TCS-14 A_HKT_C.chan[59]
hkt_dem1_t1_eb_t (Chunked Dataset)	FLOAT (:)	HKT_DEM1_T1_EB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 74 - DEM1_TH_B-MEB-37 External Bottom T A_HKT_C.chan[38]
hkt_dem1_t2_it_t (Chunked Dataset)	FLOAT (:)	HKT_DEM1_T2_IT_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 76 - DEM1_TH_D-MEB-39 Internal Top T A_HKT_C.chan[40]
hkt_dem1_t3_ib_t (Chunked Dataset)	FLOAT (:)	HKT_DEM1_T3_IB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 75 - DEM1_TH_C-MEB-38 Internal Bottom T A_HKT_C.chan[39]
hkt_dem1_t4_et_t (Chunked Dataset)	FLOAT (:)	HKT_DEM1_T4_ET_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 73 - DEM1_TH_A-MEB-36 External Top T A_HKT_C.chan[37]
hkt_dem2_t (Chunked Dataset)	FLOAT (:)	HKT_DEM2_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 77 - DEM2_TH_A-MEB-40 External Bottom T A_HKT_C.chan[41]
hkt_dem3_t1_eb_t (Chunked Dataset)	FLOAT (:)	HKT_DEM3_T1_EB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 79 - DEM3_TH_B-MEB-42 External Bottom T A_HKT_C.chan[43]
hkt_dem3_t2_it_t (Chunked Dataset)	FLOAT (:)	HKT_DEM3_T2_IT_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 81 - DEM3_TH_D-MEB-44 Internal Top T A_HKT_C.chan[45]
hkt_dem3_t3_ib_t (Chunked Dataset)	FLOAT (:)	HKT_DEM3_T3_IB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 80 - DEM3_TH_C-MEB-43 Internal Bottom T A_HKT_C.chan[44]
hkt_dem3_t4_et_t (Chunked Dataset)	FLOAT (:)	HKT_DEM3_T4_ET_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 78 - DEM3_TH_A-MEB-41 External Top T A_HKT_C.chan[42]
hkt_dem4_t (Chunked Dataset)	FLOAT (:)	HKT_DEM4_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 82 - DEM4_TH_A-MEB-45 External Bottom T A_HKT_C.chan[46]
hkt_dem5_t1_eb_t (Chunked Dataset)	FLOAT (:)	HKT_DEM5_T1_EB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 84 - DEM5_TH_B-MEB-47 External Bottom T A_HKT_C.chan[48]
hkt_dem5_t2_it_t (Chunked Dataset)	FLOAT (:)	HKT_DEM5_T2_IT_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 86 - DEM5_TH_D-MEB-49 Internal Top T A_HKT_C.chan[50]
hkt_dem5_t3_ib_t (Chunked Dataset)	FLOAT (:)	HKT_DEM5_T3_IB_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 85 - DEM5_TH_C-MEB-48 Internal Bottom T A_HKT_C.chan[49]
hkt_dem5_t4_et_t (Chunked Dataset)	FLOAT (:)	HKT_DEM5_T4_ET_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 83 - DEM5_TH_A-MEB-46 External Top T A_HKT_C.chan[47]
hkt_dem6_t (Chunked Dataset)	FLOAT (:)	HKT_DEM6_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT A/D Ch 87 - DEM6_TH_A-MEB-50 External Bottom T A_HKT_C.chan[51]
hkt_dom_rad1_t (Chunked Dataset)	FLOAT (:)	HKT DOM RAD1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT DAA DOM Radiator T (Pri) TCS-47 - A_HKT_C.chan[36]
hkt_dom_rad2_t (Chunked Dataset)	FLOAT (:)	HKT DOM RAD2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT DAA DOM Radiator T (Red) TCS-48 - A_HKT_C.chan[34]
hkt_foldm_t (Chunked Dataset)	FLOAT (:)	HKT FOLDM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Fold Mirror I/F I TCS-22 A_HKT_C.chan[83]
hkt_imsc_myflex_t (Chunked Dataset)	FLOAT (:)	HKT IMSC MYFLEX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	IMSC Flexure 1 T TCS-28 A_HKT_C.chan[88]
hkt_imsc_mzflex_t (Chunked Dataset)	FLOAT (:)	HKT IMSC MZFLEX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	IMSC Flexure 2 T TCS-29 A_HKT_C.chan[89]
hkt_lasrad_t (Chunked Dataset)	FLOAT (:)	HKT LASRAD T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Laser LHP Radiator T TCS_54 A_HKT_C.chan[61]
hkt_lhp_evap_t (Chunked Dataset)	FLOAT (:)	HKT LHP EVAP T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Evaporator T TCS-15 A_HKT_C.chan[54]
hkt_lhp_liqline_t (Chunked Dataset)	FLOAT (:)	HKT LHP LIQLINE T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Liquid Line T TCS-16 A_HKT_C.chan[60]
hkt_lhp_res1_t (Chunked Dataset)	FLOAT (:)	HKT LHP RES1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Compensation Chamber T (Pri) TCS-10 A_HKT_C.chan[52]
hkt_lhp_res2_t (Chunked Dataset)	FLOAT (:)	HKT LHP RES2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LHP Compensation Chamber T (Red) TCS-11 A_HKT_C.chan[53]
hkt_lhp_vapline_t (Chunked Dataset)	FLOAT (:)	HKT LHP VAPLINE T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	A_HKT_LHP_VAPLINE_T TCS-17 A_HKT_C.chan[90]
hkt_lrs_orad1_t (Chunked Dataset)	FLOAT (:)	HKT LRS ORAD1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LRS Optics Radiator T (Pri) TCS-08 A_HKT_C.chan[56]
hkt_lrs_orad2_t (Chunked Dataset)	FLOAT (:)	HKT LRS ORAD2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LRS Optics Radiator T (Red) TCS-09 A_HKT_C.chan[57]
hkt_lrs_ss_t (Chunked Dataset)	FLOAT (:)	HKT LRS SS T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	LRS Sunshade I/F T TCS-13 A_HKT_C.chan[58]
hkt_ltr_tams_t (Chunked Dataset)	FLOAT (:)	HKT LTR TAMS T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	TAMS LTR T TCS-18 A_HKT_C.chan[94]
hkt_ltr_trans_t (Chunked Dataset)	FLOAT (:)	HKT LTR TRANS T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Transmitter LTR T TCS_19 A_HKT_C.chan[102]
hkt_meb_asc1_t (Chunked Dataset)	FLOAT (:)	HKT MEB ASC1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB ASC1 T MEB-01F - A_HKT_C.chan[0]
hkt_meb_asc2_t (Chunked Dataset)	FLOAT (:)	HKT MEB ASC2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB ASC2 T MEB-02 - A_HKT_C.chan[1]
hkt_meb_hkt_t (Chunked Dataset)	FLOAT (:)	HKT MEB HKT T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB HKT T MEB-21 - A_HKT_C.chan[2]
hkt_meb_lvpc1_t (Chunked Dataset)	FLOAT (:)	HKT MEB LVPC1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB LVPC1 T MEB-03 - A_HKT_C.chan[3]
hkt_meb_lvpc2_t (Chunked Dataset)	FLOAT (:)	HKT MEB LVPC2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB LVPC2 T MEB-04 - A_HKT_C.chan[4]
hkt_meb_mce1_t (Chunked Dataset)	FLOAT (:)	HKT MEB MCE1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE1 T MEB-07 - A_HKT_C.chan[5]
hkt_meb_mce2_t (Chunked Dataset)	FLOAT (:)	HKT MEB MCE2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE2 T MEB-08 - A_HKT_C.chan[6]
hkt_meb_mce3_t (Chunked Dataset)	FLOAT (:)	HKT MEB MCE3 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE3 T MEB-09 - A_HKT_C.chan[7]
hkt_meb_mce4_t (Chunked Dataset)	FLOAT (:)	HKT MEB MCE4 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB MCE4 T MEB-10 - A_HKT_C.chan[8]
hkt_meb_pce1_1_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE1 1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE1 1 T MEB-11 - A_HKT_C.chan[9]
hkt_meb_pce1_2_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE1 2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE1 2 T MEB-12 - A_HKT_C.chan[10]
hkt_meb_pce2_1_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE2 1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE2 1 T MEB-13 - A_HKT_C.chan[11]

hkt_meb_pce2_2_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE2 2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE2 2 T MEB-14 - A_HKT_C.chan[12]
hkt_meb_pce3_1_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE3 1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE3 1 T MEB-15 - A_HKT_C.chan[13]
hkt_meb_pce3_2_t (Chunked Dataset)	FLOAT (:)	HKT MEB PCE3 2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB PCE3 2 T MEB-16 - A_HKT_C.chan[14]
hkt_meb_sbc1_t (Chunked Dataset)	FLOAT (:)	HKT MEB SBC1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB SBC1 T MEB-17 - A_HKT_C.chan[15]
hkt_meb_sbc2_t (Chunked Dataset)	FLOAT (:)	HKT MEB SBC2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB SBC2 T MEB-18 - A_HKT_C.chan[16]
hkt_meb_uso1_t (Chunked Dataset)	FLOAT (:)	HKT MEB USO1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB USO1 T MEB-19 - A_HKT_C.chan[17]
hkt_meb_uso2_t (Chunked Dataset)	FLOAT (:)	HKT MEB USO2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT MEB USO2 T MEB-20 - A_HKT_C.chan[18]
hkt_ob_mz1_t (Chunked Dataset)	FLOAT (:)	HKT OB MZ1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-23 A_HKT_C.chan[65]
hkt_ob_mz2_t (Chunked Dataset)	FLOAT (:)	HKT OB MZ2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-24 A_HKT_C.chan[66]
hkt_ob_mz3_t (Chunked Dataset)	FLOAT (:)	HKT OB MZ3 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, -Z Side T TCS-25 A_HKT_C.chan[67]
hkt_ob_pz1_t (Chunked Dataset)	FLOAT (:)	HKT OB PZ1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, +Z Side T TCS-26 A_HKT_C.chan[63]
hkt_ob_pz2_t (Chunked Dataset)	FLOAT (:)	HKT OB PZ2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench, +Z Side T TCS-27 A_HKT_C.chan[64]
hkt_ob_pz3_t (Chunked Dataset)	FLOAT (:)	HKT OB_PZ3_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench +z3 T TCS_31 A_HKT_C.chan[103]
hkt_ob_pz4_t (Chunked Dataset)	FLOAT (:)	HKT OB_PZ4_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Optical Bench +z4 T TCS_32 A_HKT_C.chan[105]
hkt_ofa1_et_t (Chunked Dataset)	FLOAT (:)	HKT_OFA1_ET_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	OFA1 ETALON T TCS_58 A_HKT_C.chan[104]
hkt_ofa1_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA1 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-33 OFA1 PRI T - A_HKT_C.chan[19]
hkt_ofa1_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA1 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-34 OFA1 RED T - A_HKT_C.chan[26]
hkt_ofa2_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA2 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-35 OFA2 PRI T - A_HKT_C.chan[20]
hkt_ofa2_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA2 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-36 OFA2 RED T - A_HKT_C.chan[27]
hkt_ofa3_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA3 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-37 OFA3 PRI T - A_HKT_C.chan[21]
hkt_ofa3_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA3 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-38 OFA3 RED T - A_HKT_C.chan[28]
hkt_ofa4_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA4 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-39 OFA4 PRI T - A_HKT_C.chan[22]
hkt_ofa4_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA4 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-40 OFA4 RED T - A_HKT_C.chan[29]
hkt_ofa5_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA5 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-41 OFA5 PRI T - A_HKT_C.chan[23]
hkt_ofa5_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA5 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-42 OFA5 RED T - A_HKT_C.chan[30]
hkt_ofa6_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA6 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-43 OFA6 PRI T - A_HKT_C.chan[24]
hkt_ofa6_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA6 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-44 OFA6 RED T - A_HKT_C.chan[31]
hkt_ofa7_et_t (Chunked Dataset)	FLOAT (:)	HKT_OFA7_ET_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	OFA7 ETALON T TCS_59 A_HKT_C.chan[106]
hkt_ofa7_pri_t (Chunked Dataset)	FLOAT (:)	HKT OFA7 PRI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-45 OFA7 PRI T - A_HKT_C.chan[25]
hkt_ofa7_red_t (Chunked Dataset)	FLOAT (:)	HKT OFA7 RED T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT TCS-46 OFA7 RED T - A_HKT_C.chan[32]
hkt_scif_myflex_t (Chunked Dataset)	FLOAT (:)	HKT SCIF MYFLEX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	-Y S/C Flexure T A_HKT_C.chan[93]
hkt_scif_pxflex_t (Chunked Dataset)	FLOAT (:)	HKT SCIF PXFLEX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	+X S/C Flexure T TCS-51 A_HKT_C.chan[87]
hkt_scif_pyflex_t (Chunked Dataset)	FLOAT (:)	HKT SCIF PYFLEX T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	-+Y S/C Flexure T TCS-53 A_HKT_C.chan[101]
hkt_spd_t (Chunked Dataset)	FLOAT (:)	HKT SPD T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	SPD I/F T TCS-50 A_HKT_C.chan[85]
hkt_struc_my_t (Chunked Dataset)	FLOAT (:)	HKT STRUC MY T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure Y Panel T TCS_55 A_HKT_C.chan[91]
hkt_struc_mz_t (Chunked Dataset)	FLOAT (:)	HKT STRUC MZ T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure Z Panel T TCS_57 A_HKT_C.chan[92]
hkt_sunshade_t (Chunked Dataset)	FLOAT (:)	HKT_SUNSHADE_T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Structure +Z Panel T A_HKT_C.chan[86]
hkt_tel_pri1_t (Chunked Dataset)	FLOAT (:)	HKT TEL PRI1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Primary Mirror T (Pri) TCS-05 A_HKT_C.chan[95]
hkt_tel_pri2_t (Chunked Dataset)	FLOAT (:)	HKT TEL PRI2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Primary Mirror T (Red) TCS-06 A_HKT_C.chan[96]
hkt_tel_pri3_t (Chunked Dataset)	FLOAT (:)	HKT TEL PRI3 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	HKT Telescope, Primary Mirror T TCS-07 - A_HKT_C.chan[35]
hkt_tel_sec1_t (Chunked Dataset)	FLOAT (:)	HKT TEL SEC1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Secondary Mirror T (Pri) TCS-01 A_HKT_C.chan[97]
hkt_tel_sec2_t (Chunked Dataset)	FLOAT (:)	HKT TEL SEC2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Secondary Mirror T (Red) TCS-02 A_HKT_C.chan[98]
hkt_tel_tow1_t (Chunked Dataset)	FLOAT (:)	HKT TEL TOW1 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Tower T (Pri) TCS-03 A_HKT_C.chan[99]
hkt_tel_tow2_t (Chunked Dataset)	FLOAT (:)	HKT TEL TOW2 T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	Telescope, Tower T (Red) TCS-04 A_HKT_C.chan[100]
hkt_wtem_t	FLOAT	HKT WTEM T	degreesC	OFA WTEM I/F T TCS-49 A_HKT_C.chan[84]

(Chunked Dataset)	(:)	(not_set)	ATL01/atlas/a_hkt_c_1061 converted	
hvpca_therm_a_t (Chunked Dataset)	FLOAT (:)	HVPCTHERM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY HVPC THERMISTOR A MEB-30 A_HKT_C.chan[68]
hvpca_therm_b_t (Chunked Dataset)	FLOAT (:)	HVPCTHERM B T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY HVPC THERMISTOR B MEB-32 A_HKT_C.chan[69]
hvpcb_therm_a_t (Chunked Dataset)	FLOAT (:)	HVPCB THERM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT HVPC THERMISTOR A MEB-31 A_HKT_C.chan[75]
hvpcb_therm_b_t (Chunked Dataset)	FLOAT (:)	HVPCB THERM B T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT HVPC THERMISTOR B MEB-33 A_HKT_C.chan[76]
pdua_therm_ct_t (Chunked Dataset)	FLOAT (:)	PDUTHERM CT T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU CT BOARD A T-MEB-24 A_HKT_C.chan[70]
pdua_therm_dlv_a_t (Chunked Dataset)	FLOAT (:)	PDUTHERM DLV T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 1A T-MEB-26 A_HKT_C.chan[71]
pdua_therm_dlv_b_t (Chunked Dataset)	FLOAT (:)	PDUTHERM DLV B T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 2A T -MEB-28 A_HKT_C.chan[72]
pdua_therm_mi_t (Chunked Dataset)	FLOAT (:)	PDUTHERM MI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU MAIN PWR BOARD A T-MEB_22 A_HKT_C.chan[73]
pduv_therm_ct_t (Chunked Dataset)	FLOAT (:)	PDUB THERM CT T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU CT BOARD B T -MEB-25 A_HKT_C.chan[77]
pduv_therm_dlv_a_t (Chunked Dataset)	FLOAT (:)	PDUB THERM DLV T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 1B T -MEB-27 A_HKT_C.chan[78]
pduv_therm_dlv_b_t (Chunked Dataset)	FLOAT (:)	PDUB THERM DLV B T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU LOW VOLTAGE 2B T -MEB-29 A_HKT_C.chan[79]
pduv_therm_mi_t (Chunked Dataset)	FLOAT (:)	PDUB THERM MI T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PDU MAIN PWR BOARD B T -MEB_23 A_HKT_C.chan[80]
spda_therm_t (Chunked Dataset)	FLOAT (:)	SPDTHERM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	PRIMARY SPD THERMISTOR MEB-34 A_HKT_C.chan[74]
spdb_therm_t (Chunked Dataset)	FLOAT (:)	SPDB THERM T (not_set)	degreesC ATL01/atlas/a_hkt_c_1061 converted	REDUNDANT SPD THERMISTOR MEB-35 A_HKT_C.chan[81]

Group: /atlas/housekeeping/time_at_the_tone

Description	(Attribute)	APID 1136 Spacecraft Time at the Tone Packet - Relayed to SSR. Packet Frequency is by command. ATLAS Time-At-The-Tone-Was Message		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_1pps_sec (Chunked Dataset)	UINT_4_LE (:)	gps 1pps (not_set)	seconds since January 6, 1980 ATL01/APID 1136 Byte 0014-0017	GPS reported seconds.
gps_1pps_subsec (Chunked Dataset)	UINT_4_LE (:)	gps 1pps subsec (not_set)	milliseconds ATL01/APID 1136 Byte 0014-0017	GPS reported subseconds
sc_time_1pps_sec (Chunked Dataset)	UINT_4_LE (:)	SC time at 1 pps (not_set)	seconds since January 6, 1980 ATL01/APID 1136 Byte 0014-0017	SC time at the reception of the last 1PPS signal from the GPSR.
sc_time_1pps_subsec (Chunked Dataset)	UINT_4_LE (:)	SC time at 1 pps (subsec) (not_set)	100 nanoseconds ATL01/APID 1136 Byte 0014-0017	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds Jan-1980 00:00:00)

Group: /atlas/pcex

Description	(Attribute)	Group contains the Photon Counting Electronics x (PCEx) packet decommutated data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Data Packets. (nominally fifty per second.)		

Group: /atlas/pcex/algorithm_science

Description	(Attribute)	The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
amet_time (Chunked Dataset)	DOUBLE (:)	AMET seconds at the Major Frame (not_set)	seconds ATL01/atlas/pcex/a_pmf_algorithm_science	AMET seconds at the Major Frame
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_time (Chunked Dataset)	DOUBLE (:)	GPS seconds at the Major Frame (not_set)	seconds ATL01/atlas/pcex/a_pmf_algorithm_science	GPS seconds at the Major Frame
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter identifies individual major frames across diag and science packets. This counter can go for about 2.7 over.
useflag (Chunked Dataset)	UINT_1_LE (:)	Science Mode Flag (not_set)	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=radio, 3=unknown, > 10=amcs_not_normal flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 flag_meanings : stby science test manual radio unknown unused unused unused stby_alt_sci test_alt_sci amcs unknown_alt_sci

Group: /atlas/pcex/algorithm_science/s_w

Description	(Attribute)	The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
daynight_flag (Chunked Dataset)	UINT_1_LE (:)	Day/Night flag (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight software Day/Night Flag associated with the major frame. 0= day, 1=night. Based on the determination of the background rate, not on the actual position of the sun. flag_values: 0, 1 flag_meanings : day night
decisionflags (Chunked Dataset)	UINT_1_LE (4, :)	Decision Flags (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w Decision Flags associated with the major frame. indication if there was an error or send and why
ds_4bytes (Contiguous Dataset)	INTEGER_1 (4)	DS for 4 bytes (not_set)	1 not_set	Dimension scale for an array of 4 bytes.
flywheel (Chunked Dataset)	UINT_1_LE (:)	Flywheel (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight software Flywheel associated with the major frame.

signalflags (Chunked Dataset)	UINT_1_LE (:)	Signal Found Flags (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w signal event flags associated with the major frame.
Group: /atlas/pcex/altimetry				
Description	(Attribute)	The PCE Altimetry Science Packet data common to both beams (PCEX_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICES section 5.12, Spacewire: Major Frame Packet Data Format		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_fall_sm (Chunked Dataset)	FLOAT (:)	Altimetric Latest Calibration Falling (not_set)	seconds/cell Derived via L1B ATBD	The smoothed, calibrated value for the falling edge used to convert cell counts to units of time. time on USO for each PCE.
cal_rise_sm (Chunked Dataset)	FLOAT (:)	Altimetric Latest Calibration Rising (not_set)	seconds/cell Derived via L1B ATBD	The smoothed, calibrated value for the rising edge used to convert cell counts to units of time. time USO for each PCE.
ch_mask_s (Chunked Dataset)	INTEGER_1 (16, :)	Channel Mask Strong (not_set)	counts ATL01/atlas/pcex/a_alt_science	Channel Mask for DLBOs. The 16 flags are a logical OR of the two band offset masks for strong be
ch_mask_w (Chunked Dataset)	INTEGER_1 (4, :)	Channel Mask Weak (not_set)	counts ATL01/atlas/pcex/a_alt_science	Channel Mask for DLBOs. The 4 flags are a logical OR of the two band offset masks for weak beam
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS computed.
ds_strong_channel_index (Contiguous Dataset)	INTEGER_1 (16)	DS for Strong Channels (not_set)	1 not_set	Dimension scale for strong channels.
ds_weak_channel_index (Contiguous Dataset)	INTEGER_1 (4)	DS for Weak Channels (not_set)	1 not_set	Dimension scale for weak channels.
n_bands (Chunked Dataset)	INTEGER_1 (:)	Number Downlink Bands (not_set)	counts ATL01/atlas/pcex/a_alt_science	Number of bands (in addition to the nominal 1 band) selected for downlink.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts ATL02	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter identifies individual major frames across diag and science packets. This counter can go for about 2.7 over. It is in the first time tag science packet. Used as part of the photon ID
useflag (Chunked Dataset)	UINT_1_LE (:)	Science Mode Flag (not_set)	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=radio, 5=unknown, > 10=amcs_not_normal flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 flag_meanings : stby science test manual radio unknown unused unused unused stby_alt ; test_alt_amcs manual_alt_amcs radio_alt_amcs unknown_alt_amcs
Group: /atlas/pcex/altimetry/s_w				
Description	(Attribute)	The PCE Altimetry Science Packet specific to a beam (PCEX_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICESat-2-MEB-5.12, Spacewire: Major Frame Packet Data Format		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
alt_rw_start (Chunked Dataset)	FLOAT (:)	Altimetric Range Window Start (not_set)	seconds ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion	The number of seconds between the transmit pulse and the start of the altimetric range window for
alt_rw_width (Chunked Dataset)	FLOAT (:)	Altimetric Range Window Width (not_set)	seconds ATL01/atlas/pcex/a_pmf_algorithm_science and L1B ATBD conversion	The number of seconds from the range window start and range window stop
band1_offset (Chunked Dataset)	FLOAT (:)	Band1 Offset (not_set)	seconds L1A ATBD	Downlink band offset (DLBO) for band1.
band1_width (Chunked Dataset)	FLOAT (:)	Band1 Width (not_set)	seconds L1A ATBD	Width of downlink band1.
band2_offset (Chunked Dataset)	FLOAT (:)	Band2 Offset (not_set)	seconds L1A ATBD	Downlink band offset (DLBO) for band2.
band2_width (Chunked Dataset)	FLOAT (:)	Band2 Width (not_set)	seconds L1A ATBD	Width of downlink band2.
n_photon (Chunked Dataset)	INTEGER_4 (:)	Number of photons (not_set)	counts Derived	Number of photons within each major frame.
ph_ndx_beg (Chunked Dataset)	INTEGER_8 (:)	Photon Index Begin (not_set)	counts Derived	Index (1-based) within the photon-rate data of the first photon within each major frame.
Group: /atlas/pcex/altimetry/s_w/photons				
Description	(Attribute)	Group contains the PCE Altimetric received photon event (ph) decommutated data and its matching Transmit time tag data. Note the Transmit time tag data are repeated for event. Data is from Altimetry Science Packet (alt_sci_tm) APID 1254, 1264, 1274 with Sequence Flag = 0 or 2. See ICESat-2-MEB-SPEC-0875, section 5.12, SPACEWIRE 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 * phc beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The Time of Day for the specific Transmit (TX) pulse associated with the Received (RX) event. (see 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_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts Retained from latest a_alt_science packet	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter identifies individual major frames across diag and science packets. This counter can go for about 2.7 over. It is in the first time tag science packet. Used as part of the photon ID
ph_id_channel (Chunked Dataset)	UINT_1_LE (:)	Receive channel id (not_set)	1 Derived as part of Photon ID	channel number assigned for received photon event. This is part of the photon ID. Values 1 to 240 are for falling edge PCE1 (1 to 20), PC (41 to 60). Values 61 to 120 are for falling edge PCE1 (61 to 80), PCE 2 (81 to 100) and PC3 (101 to 120) similar with values 121 to 240.
ph_id_count (Chunked Dataset)	UINT_1_LE (:)	photon event counter (not_set)	counts Derived as part of Photon ID	photon event counter is part of photon ID and will count from 1 for each channel until reset by laser. ph_id_count is 0, then there was a transmit pulse without any received photons. In this case, the transmit alt_science packet is valid, but the receive portion is all 0s and should not be used.
ph_id_pulse (Chunked Dataset)	UINT_1_LE (:)	laser pulse counter (not_set)	counts Derived as part of Photon ID	laser pulse counter is part of photon ID and will count from 1 to 200 and reset for each new major frame. ph_id_count is 0, then there was a transmit pulse without any received photons.
ph_tof (Chunked Dataset)	DOUBLE (:)	Time of Flight (not_set)	seconds ATL02 ATBD	Time of flight (TOF); the round trip time in seconds of the received photon relative to the beam's zero. Computed from the Transmit (Tx) and Receive (Rx) Time-of-flight components and then calibrated to the transmit pulse.
rx_band_id (Chunked Dataset)	INTEGER_1 (:)	rx downlink band id (not_set)	counts ATL01/atlas/pcex/a_alt_science_ph RX data	Flag to indicate downlink band id associated with the received rx_tof (received photon event). A value of 1 indicates the photon corresponds to band1; A value of 1 indicates the photon corresponds to band2. Corresponds to band_width, band_offset and band_eventcount.

				flag_values: 0, 1 flag_meanings : band1 band2
tof_flag (Chunked Dataset)	INTEGER_1 (:)	TOF Flag (not_set)	counts L1B ATBD Sect 2.5.4	Time Of Flight center correction flag. Values indicate what components were used to adjust the TOF Tx pulse, based on the alignment of Tx components across all 3 PCEs. 1=LL_LU_TU_TL; 2=LL_TL 4=LL_LU_TU; 5=LL_TL; 6=LL_TL; 7=LL_LU; 8=LL. Values greater than 10 indicate the same sequence indicated for a potential TEP photon. flag_values: 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18 flag_meanings : LL_LU_TU_TL LL_TL_LL_LU_TL_LL_LU_TU_LL_TL_LL_TU_LL_LL_LL_TEP_LL_TEP_LL_TU_TL_TEP_LL_LU_TL_TEP_LL_LU_TU_TEP_LL_TL_TEP_LL_TU_TEP_LL_TU_TEP_LL
tx_ll_tof (Chunked Dataset)	FLOAT (:)	Transmit LL time from T0 (not_set)	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip time in seconds from the detect of the transmit pulse relative to the ATLAS T0. Includes all calibrations of coarse and fine counts.
tx_other_tof (Chunked Dataset)	FLOAT (:)	Other Transmit Time from LL (not_set)	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Time of flight from the PCE-specific leading-lower (LL) threshold (tx_ll_tof) to the detected other trace PCE1, this is the time from the PCE1 LL to the Transmit Leading Upper edge (LU) threshold; for PCE2 from the PCE2 LL to the Transmit Trailing Upper edge (TU) threshold; and for PCE3, this is the time the Transmit Trailing Lower edge (TL) threshold.
Group: /atlas/pcex/atmosphere_sw				
Description	(Attribute)	Contains parameters relating to the PCE Atmospheric Data Histograms. Normally 25 hz. (APID 1255, 1259, 1265, 1269, 1275, 1279). P1 S,P1 W, P2 S, P2 W, P3 S, P3 W.		
data_rate	(Attribute)	Data in this group is stored at a 25hz (25 per second) rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_bins (Chunked Dataset)	UINT_2_LE (467, :)	Atmospheric Science Histogram (not_set)	counts ATL01/atlas/pcex/a_atm_hist_x	The histogram bins for the Atmospheric beam. Once every 400 shots (laser pulses). Bin 1 (clouds) Bin 467 is under ground.
atm_rw_start (Chunked Dataset)	FLOAT (:)	Atmospheric Range Window Start (not_set)	seconds ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of seconds between the transmit pulse and the start of the Atmospheric range window
atm_rw_width (Chunked Dataset)	FLOAT (:)	Atmospheric Range Window Width (not_set)	seconds ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of centers from the Atmospheric range window start and range window stop.
atm_shift_amount (Chunked Dataset)	INTEGER_2 (:)	Atmospheric Range Window Shift (not_set)	counts ATL01/atlas/pcex/a_atm_hist_x and L1B ATBD section ATM	The number of bins the range window start of one of the histograms was shifted to align them before together.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS 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 atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_hist_bin_index (Contiguous Dataset)	INTEGER_2 (467)	DS for ATM histogram bins (not_set)	1 not_set	Dimension scale for atmosphere histogram bins.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts ATL01/atlas/pcex/a_atm_hist_x	Major Frame Counter - The major frame counter is read from the DFC and starts counting at DFC POR used to identify individual major frames across diag and science packets. This counter can go for about 2.7 over. It is in the first time tag science packet. Used as part of the photon ID
useflag (Chunked Dataset)	UINT_1_LE (:)	Science Mode Flag (not_set)	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=radio, 3=unknown, > 10=amcs_not_normal flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 flag_meanings : stby science test manual radio unknown unused unused unused unused stby_alt_sci test_alt_amcs unknown_alt_amcs
Group: /atlas/pcex/background				
Description	(Attribute)	The background data is specific to each beam and reported at a 50-shot rate.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bg_cnt_50shot_s (Chunked Dataset)	UINT_2_LE (:)	Strong background counts (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) du associated with a set of 50 laser pulses of the major frame.
bg_cnt_50shot_w (Chunked Dataset)	UINT_2_LE (:)	Weak background counts (not_set)	counts ATL01/atlas/pcex/a_pmf_algorithm_science	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) du associated with a set of 50 laser pulses of the major frame.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The time of the first TX pulse in the 50 laser pulses used for background, in seconds relative to the Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts ATL01/atlas/pcex/a_alt_science	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter identifies individual major frames across diag and science packets. This counter can go for about 2.7 over. It is in the first time tag science packet. Used as part of the photon ID
useflag (Chunked Dataset)	UINT_1_LE (:)	Science Mode Flag (not_set)	counts ATL01/atlas/pcex/a_alt_sci/	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=radio, 3=unknown, > 10=amcs_not_normal flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 flag_meanings : stby science test manual radio unknown unused unused unused unused stby_alt_sci test_alt_amcs unknown_alt_amcs
Group: /atlas/pcex/tep				
Description	(Attribute)	Group contains the PCE TEP (transmit Echo Path) Data.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source photon events. (varies by detection; nominal value is sixty thousand per second, derived from laser_rate * phc beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via L1B ATBD	The Time of Day associated with the Transmit (TX) pulse, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	counts Retained from prior a_alt_science_ph packet	The major frame counter is read from the digital flow controller in a given PCE card. The counter identifies frames across diag and science packets. Used as part of the photon ID.
ph_id_channel (Chunked Dataset)	UINT_1_LE (:)	Receive channel id (not_set)	1 Derived as part of Photon ID	Channel number assigned for received photon event. This is part of the photon ID. Values 1 to 240 and all detectors. For the A side detectors, values 1 to 60 are for rising edge PCE1 (1 to 20), PCE2 (21 to 60). Values 61 to 120 are for falling edge PCE1 (61 to 80), PCE2 (81 to 100) and PC3 (101 to 120) detectors, values similarly span from 121 to 240.
ph_id_count (Chunked Dataset)	INTEGER_1 (:)	photon event counter (not_set)	counts Derived as part of Photon ID	The photon event counter is part of photon ID and counts from 1 for each channel until reset by laser
ph_id_pulse (Chunked Dataset)	UINT_1_LE (:)	laser pulse counter (not_set)	counts Derived as part of Photon ID	The laser pulse counter is part of photon ID and counts from 1 to 200 and is reset for each new major frame
rx_band_id (Chunked Dataset)	UINT_1_LE (:)	rx downlink band id (not_set)	counts ATL01/atlas/pcex/a_alt_science_ph RX data	Flag to indicate downlink band id associated with the received time tag. Note that in order to reconstruct the 10-bit offset even coarse value must be added to the specified downlink band offset relating to the

rx_channel_id (Chunked Dataset)	UINT_1_LE (:)	receive PCE channel id (not_set)	counts ATL01/atlas/pcex/a_alt_science_ph RX data	channel number that Received photon event (as from Telemetry)
tep_pulse_num (Chunked Dataset)	UINT_1_LE (:)	TEP Pulse Number (not_set)	counts Derived as part of TEP Detection	The number of laser pulses from the TEP laser pulse to the laser pulse for which ATLAS is currently photons.
tof_tep (Chunked Dataset)	DOUBLE (:)	TEP Time of Flight (not_set)	seconds ATL01/atlas/pcex/a_alt_science_ph RX data L1B ATBD section tof	Transmit Echo Pulse (TEP) Time of flight (TOF); the round trip time in seconds of the TEP photon r zero range point (ZRP). Computed from the Transmit (Tx) pulse of the TEP and Receive (Rx) Time-then calibrated to the centroid of the transmit pulse.
tx_ll_tof_tep (Chunked Dataset)	FLOAT (:)	TEP Transmit time from T0 (not_set)	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit Echo Pulse (TEP) Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip tim detected lower leading edge of the TEP transmit pulse relative to the ATLAS T0; includes all calibra counts.
tx_other_tof_tep (Chunked Dataset)	FLOAT (:)	Other TEP Transmit Time from LL (not_set)	seconds ATL01/atlas/pcex/a_alt_science_ph TX data L1B ATBD section tof	Transmit Echo Pulse (TEP) Time of flight from the PCE-specific leading-lower (LL) threshold (tep_ll TEP other transmit pulse edge. For PCE1, this is the time from the PCE1 (beam 5) LL to the Transr (LU) threshold; for PCE2 (beam 3), this is the time from the PCE2 LL to the Transmit Trailing Upper

Group: /atlas/tx_pulse_width

Description	(Attribute)	Contains parameters to characterize the ATLAS pulse shape, derived from the Start Pulse Detector data.		
data_rate	(Attribute)	Parameters in this group are stored at the ATLAS shot rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Operations	Elapsed seconds since the ATLAS SDP GPS Epoch, associated with the transmit time where data 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 (19 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
tx_pulse_skew_est (Chunked Dataset)	FLOAT (:)	Transmit Pulse Skew Estimate (not_set)	seconds ATL02 ATBD, Section 7.2	The difference between the averages of the lower and upper threshold crossing times. This is an es pulse skew.
tx_pulse_width_lower (Chunked Dataset)	FLOAT (:)	Transmit Pulse Energy Lower Width (not_set)	seconds ATL03 ATBD	The distance between the lower threshold crossing times measured by the Start Pulse Detector. Or from all 3 PCEs are available and aligned.
tx_pulse_width_upper (Chunked Dataset)	FLOAT (:)	Transmit Pulse Energy Upper Width (not_set)	seconds ATL03 ATBD	The distance between the upper threshold crossing times measured by the Start Pulse Detector. Or from all 3 PCEs are available and aligned.

Group: /gpsr

Description	(Attribute)	Contains parameters related to the GPS Receiver.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source GPS Receiver Data Packets. (nominally one per second.)		

Group: /gpsr/carrier_amplitude

Description	(Attribute)	Contains parameters related to Carrier Amplitude Data Record (CADR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id (Chunked Dataset)	INTEGER_1 (16, :)	CADR Antenna Identifier (not_set)	1 ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled. flag_values: 0, 1 flag_meanings: first_antenna second_antenna
carrier_amp (Chunked Dataset)	FLOAT (16, :)	CADR Carrier Amplitude (not_set)	dB ATL01/sc3/gpsr/carrier_amplitude converted	Carrier Amplitude Data Record (CADR) - Carrier Amplitude - Multiple Frequency Processing. Note: (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tr: the remaining unused CSR data fields within the ancillary packet will be zero-filled.
channel_num (Chunked Dataset)	INTEGER_1 (16, :)	CADR Channel Number (not_set)	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Channel Number. 0 to 23; All other values invalid. Note: V (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tr: the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id (Chunked Dataset)	INTEGER_1 (16, :)	CADR Constellation ID (not_set)	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Constellation ID - Single Frequency Channel 1-24 (0 = GF other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amoun by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancill filled.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (19 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_16_slots (Contiguous Dataset)	INTEGER_1 (16)	DS for 16 slots (not_set)	1 not_set	Dimension scale representing each of the 16 slots.
noise_ratio (Chunked Dataset)	FLOAT (16, :)	CADR Carrier to Noise Power Density Ratio (not_set)	dBHz ATL01/sc3/gpsr/carrier_amplitude converted	Carrier Amplitude Data Record (CADR) - Carrier to Noise Power Density Ratio. Note: Valid data rec will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, unused CSR data fields within the ancillary packet will be zero-filled.
num_valid_slots (Chunked Dataset)	INTEGER_1 (:)	Number of slots filled (not_set)	counts STE_STOHx ??	Number of the 16 available slots filled by telemetry. Data values after the number of valid slots are f data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracke remaining unused data fields within the arrays will be zero-filled.
signal_type (Chunked Dataset)	INTEGER_1 (16, :)	CADR GPS Signal Type (not_set)	1 ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS (present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No s channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled. flag_values: 0, 1, 2, 3, 4, 5, 6 flag_meanings: gps_l1a_ca gps_l1_p gps_l2_ca gps_l2_p gps_l2_cm gps_l2_cl_no_signal_proc
sv_id (Chunked Dataset)	INTEGER_1 (16, :)	CADR Space Vehicle ID (not_set)	counts ATL01/sc3/gpsr/carrier_amplitude	Carrier Amplitude Data Record (CADR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1 other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amoun by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancill filled.

Group: /gpsr/carrier_phase

Description	(Attribute)	Contains parameters related to the GPSR Carrier Phase Data Record (CrPDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR Antenna Identifier (not_set)	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (in receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled. flag_values: 0, 1 flag_meanings: first_antenna second_antenna
carrier_c_fract (Chunked Dataset)	FLOAT (24, :)	CRPDR Carrier Cycle Fraction (not_set)	degrees ATL01/sc3/gpsr/carrier_phase converted	Carrier Phase Data Record (CrPDR) - Carrier Cycle Fraction - Fraction corresponding to 360 degree Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being track tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be ze
carrier_c_int	INTEGER_8	CRPDR Integer Carrier	counts	Carrier Phase Data Record (CrPDR) - Integer Carrier Cycle Counter - Note: At the beginning of ea

(Chunked Dataset)	(24, :)	Cycle Counter (not_set)	ATL01/sc3/gpsr/carrier_phase	carrier cycle count starts with 0. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled.
channel_num (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR Channel Number (not_set)	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tr the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR Constellation ID (not_set)	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SI the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary filed.
delta_range (Chunked Dataset)	DOUBLE (24, :)	CRPDR Delta Range (not_set)	meters/second ATL01/sc3/gpsr/carrier_phase converted	Carrier Phase Data Record (CrPDR) - Delta Range. Note: Valid data records (num_valid_slots) will amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused the ancillary packet will be zero-filled.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (19 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas: delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
deter_f (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR Deterioration Flag (not_set)	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Deterioration Flag. 0 = Carrier Loop Lock Steady 1 = Carrier l (Measurement data may be deteriorated). Note: Valid data records (num_valid_slots) will only be in of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR dat ancillary packet will be zero-filled. flag_values: 0, 1 flag_meanings: steady unsteady
ds_24_slots (Contiguous Dataset)	INTEGER_1 (24)	DS for 24 slots (not_set)	1 not_set	Dimension scale representing each of the 24 slots.
num_valid_slots (Chunked Dataset)	INTEGER_1 (:)	Number of slots filled (not_set)	counts STE_STOHx ??	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are f data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked remaining unused data fields within the arrays will be zero-filled.
signal_type (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR GPS Signal Type (not_set)	1 ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal pr channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled. flag_values: 0, 1, 2, 3, 4, 5, 6 flag_meanings: gps_l1a_ca gps_l1_p gps_l2_ca gps_l2_cm gps_l2_cl no_signal_proc
sv_id (Chunked Dataset)	INTEGER_1 (24, :)	CRPDR Space Vehicle ID (not_set)	counts ATL01/sc3/gpsr/carrier_phase	Carrier Phase Data Record (CrPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SI the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary filed.

Group: /gpsr/channel_status

Description	(Attribute)	Contains parameters related to Channel Status record (CSR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id (Chunked Dataset)	INTEGER_1 (24, :)	CSR Antenna Identifier (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid f other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. data fields are zero-filled. flag_values: 0, 1 flag_meanings: first_antenna second_antenna
carrier_loop_bw (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Bandwidth (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual carrier loop bandwidth setting - Single Frequency C Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_vali number of channel that actual valid to use. the remaining unused data fields are zero-filled.
carrier_loop_bw_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Bandwidth Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Bandwidth (CrLB) Final Flag (FF) - Single Frequency C carrier loop bandwidth not final, 1 = Final carrier bandwidth time applied. Note: num_valid_slots indic channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
carrier_loop_disc_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Discriminator Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Discriminator (CrLD) Final Flag (FF) - Single Frequen Carrier loop discriminator not final, 1 = Final carrier loop discriminator applied. Note: num_valid_slo of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
carrier_loop_int_t (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Int Time (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual carrier loop integration time setting - Single Frequer Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note indicate the number of channel that actual valid to use. the remaining unused data fields are zero-fi
carrier_loop_int_t_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Int Time Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Int Time (CrLIT) Final Flag (FF) - Single Frequency C loop integration time not final, 1 = Final carrier loop integration time applied. Note: num_valid_slots channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
carrier_loop_lock (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Lock (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Lock (CrLL) - Single Frequency Channel 1-24. 0 = No Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unuse filled. flag_values: 0, 1 flag_meanings: not_locked locked
carrier_loop_mode (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Mode (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Mode) - Single Frequency Channel 1-24. 0 = No carri Carrier acquisition ongoing; 2 = Carrier tracking ongoing; 3 = Carrier acquisition error. Note: num_v number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1, 2, 3 flag_meanings: no_activities acquisition tracking acq_error
carrier_loop_thres_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Loop Threshold Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Loop Threshold (CrLT) Final Flag (FF) - Single Frequency C carrier loop threshold not final, 1 = Final carrier loop threshold applied. Note: num_valid_slots indic channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
carrier_ph_deter (Chunked Dataset)	INTEGER_1 (24, :)	CSR Carrier Phase Deterioration (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Carrier Phase Deterioration; 0 = No deterioration, 1 = Measuremer Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unuse filled. flag_values: 0, 1 flag_meanings: no_deterioration deterioration
channel_num (Chunked Dataset)	INTEGER_1 (24, :)	CSR Channel Number (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Channel Number. 0 to 23; All other values invalid. Note: num_vali number of channel that actual valid to use. the remaining unused data fields are zero-filled.
code_loop_bw (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Bandwidth (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual code loop bandwidth setting - Single Frequency Ch. Multiple Settings are not applicable for this parameter type. All other values invalid
code_loop_bw_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Bandwidth Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Bandwidth (CdLB) Final Flag (FF) - Single Frequency C loop bandwidth not final, 1 = Final code bandwidth time applied. Note: num_valid_slots indicate the actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
code_loop_corr_ff	INTEGER_1	CSR Code Loop	1	Channel Status Record (CSR) - Code Loop Correlator Spacing (CdLCS) Final Flag (FF) - Single Fr

(Chunked Dataset)	(24, :)	Correlator Spacing Final Flag (not_set)	ATL01/sc4/gpsr/channel_status	0 = Code loop correlator not final, 1 = Final code loop correlator applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
code_loop_int_t (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Int Time (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Index of actual code loop integration time setting - Single Frequency Channel 1-24. 0 = Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
code_loop_int_t_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Int Time Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Int Time Final (CdLIT) Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop integration time not final, 1 = Final code loop integration time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
code_loop_lock (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Lock (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Lock (CdLL) - Single Frequency Channel 1-24. 0 = Not applied, 1 = Code loop lock applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_locked locked
code_loop_mode (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Mode (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Mode - Single Frequency Channel 1-24. 0 = No code loop acquisition ongoing, 1 = Code tracking ongoing, 2 = Code acquisition error. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1, 2, 3 flag_meanings: no_acquisition tracking acq_error
code_loop_thres_ff (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Loop Threshold Final Flag (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Loop Threshold (CdLT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop threshold not final, 1 = Final code loop threshold applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: not_final applied
code_phase_deter (Chunked Dataset)	INTEGER_1 (24, :)	CSR Code Phase Deterioration (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Code Phase Deterioration (CdPD) - Single Frequency Channel 1-24. 0 = Measurement quality deterioration. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1 flag_meanings: no_deterioration deterioration
constell_id (Chunked Dataset)	INTEGER_1 (24, :)	CSR Constellation ID (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation ID invalid). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subsecond 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 (1998-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_24_slots (Contiguous Dataset)	INTEGER_1 (24)	DS for 24 slots (not_set)	1 not_set	Dimension scale representing each of the 24 slots.
logical_track_state (Chunked Dataset)	UINT_1_LE (24, :)	CSR Logical Tracking State (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Logical Tracking State - Single Frequency Channel 1-24. See Appendix A for enumerated values. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.
nav_d_sync (Chunked Dataset)	INTEGER_1 (24, :)	CSR Navigation Data Sync Status (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Navigation Data Sync Status - Single Frequency Channel 1-24. 0 = Synchronized, 1 = Nav Data Synchronized, Data Stream Not Inverted, 3 = Nav Data Synchronized, Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1, 3 flag_meanings: not_synced synced_not_inverted synced_inverted
num_valid_slots (Chunked Dataset)	INTEGER_1 (:)	Number of slots filled (not_set)	counts STE_STOHx	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled. Data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled.
signal_type (Chunked Dataset)	INTEGER_1 (24, :)	CSR GPS Signal Type (not_set)	1 ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal present. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. flag_values: 0, 1, 2, 3, 4, 5, 6 flag_meanings: gps_l1a_ca gps_l1_p gps_l2_ca gps_l2_p gps_l2_cm gps_l2_cl no_signal no_signal_proc
sv_id (Chunked Dataset)	INTEGER_1 (24, :)	CSR Space Vehicle ID (not_set)	counts ATL01/sc4/gpsr/channel_status	Channel Status Record (CSR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SV ID). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.

Group: /gpsr/code_phase

Description	(Attribute)	Contains parameters related to Code Phase Data Record (CdPDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
antenna_id (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Antenna Identifier (not_set)	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (inverted receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. flag_values: 0, 1 flag_meanings: first_antenna second_antenna
channel_num (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Channel Number (not_set)	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
code_chip_count (Chunked Dataset)	UINT_8_LE (24, :)	CDPDR Chip Count (not_set)	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
code_chip_fract (Chunked Dataset)	FLOAT (24, :)	CDPDR Fractional Chip Count (not_set)	counts ATL01/sc3/gpsr/code_phase converted	Code Phase Data Record (CdPDR) - Fractional Portion of Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
constell_id (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Constellation ID (not_set)	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation ID invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subsecond 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 (1998-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
deter_f (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Deterioration Flag (not_set)	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Deterioration Flag. 0 = Carrier Loop Lock Steady 1 = Carrier Loop Lock Unsteady. Note: Valid data records (num_valid_slots) will only be included for SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. flag_values: 0, 1 flag_meanings: steady unsteady
ds_24_slots (Contiguous Dataset)	INTEGER_1 (24)	DS for 24 slots (not_set)	1 not_set	Dimension scale representing each of the 24 slots.
num_valid_slots (Chunked Dataset)	INTEGER_1 (:)	Number of slots filled (not_set)	counts STE_STOHx ??	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled. 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.

				remaining unused data fields within the arrays will be zero-filled.
signal_type (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR GPS Signal Type (not_set)	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal pr channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields v packet will be zero-filled. flag_values: 0, 1, 2, 3, 4, 5, 6 flag_meanings : gps_l1a_ca gps_l1_p gps_l2_ca gps_l2_p gps_l2_cm gps_l2_cl no_signal_proc
smooth_flg (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Smoothing Flag (not_set)	1 ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Smoothing Flag. 0 = Smoothing Not Applied 1 = Carrier phase applied for the reported code phase. Note: Valid data records (num_valid_slots) will only be include SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data f packet will be zero-filled. flag_values: 0, 1 flag_meanings : not_applied applied
sv_id (Chunked Dataset)	INTEGER_1 (24, :)	CDPDR Space Vehicle ID (not_set)	counts ATL01/sc3/gpsr/code_phase	Code Phase Data Record (CdPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SI the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary filled.
Group: /gpsr/hk				
Description	(Attribute)	Contains parameters related to GPSR housekeeping.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
clock_source (Chunked Dataset)	INTEGER_1 (:)	HK Clock Source (not_set)	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Clock Source flag_values: 0, 1 flag_meanings : internal_clock value_invalid
cpu_processor_load (Chunked Dataset)	UINT_2_LE (:)	HK CPU Processor Load (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - CPU Load of most recent PPS interval
dc_data_error (Chunked Dataset)	UINT_1_LE (:)	HK Data Cache Data Error Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Data Cache Data Error Counter
dc_tag_error (Chunked Dataset)	UINT_1_LE (:)	HK Data Cache Tag Error Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Data Cache Tag Error Counter
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (198 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
discarded_tc_packets (Chunked Dataset)	UINT_1_LE (:)	HK Discarded TC Packet Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TC packets discarded since start of GPSR (wa
discarded_tm_packets (Chunked Dataset)	UINT_1_LE (:)	HK Discarded TM Packet Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TM packets discarded since start of GPSR (wa
edac_double_bit_error (Chunked Dataset)	INTEGER_1 (:)	HK MilBus I/F EDAC Double Bit Error (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Double Bit Error
edac_single_bit_error (Chunked Dataset)	UINT_1_LE (:)	HK MilBus I/F EDAC Single Bit Error (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Single Bit Error
front_end_t (Chunked Dataset)	UINT_1_LE (:)	DFH Front End Temperature (not_set)	counts GPSR_DFH	GPSR Data Field Header - R/F Front End Temperature (raw counts; not EU-converted)
ic_data_error (Chunked Dataset)	UINT_1_LE (:)	HK Instr Cache Data Error Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Instr Cache Data Error Counter
ic_tag_error (Chunked Dataset)	UINT_1_LE (:)	HK Instr Cache Tag Error Counter (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Instr Cache Tag Error Counter
memory_dump_status (Chunked Dataset)	UINT_2_LE (:)	HK Memory Dump Status (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of TM packets to be generated until the current M
n_sv_w_all (Chunked Dataset)	INTEGER_1 (:)	HK Number of Tracked SVs w All Components in Tracking State (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with all signal components i the most recent PPS
n_svs_acquired (Chunked Dataset)	INTEGER_1 (:)	HK Number of SVs Being Acquired (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being acquired at the most recent PPS, i.e Frequency Tracking state 2...4
n_svs_used (Chunked Dataset)	INTEGER_1 (:)	HK Number of SVs Used for PVT (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being used for PVT at the PPS before the
n_svs_wo_all (Chunked Dataset)	INTEGER_1 (:)	HK Number of Tracked SVs w/o All Components in Tracking State (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with not all signal componer state at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 5...10 (L1 C/A & P(Tracking state 5...7 (L1 C/A & L2 CM)
nsm (Chunked Dataset)	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM) (not_set)	1 ATL01/sc4/gpsr/hk	GPSR - Navigation Solution Method. 1 = Propagated; 2 = Cold Start - First Nav Fix; 3 = Cold Start - w/ no GDOP Optimization; 4 = Least Squares Method w/ all Visible SVs; 5 = Kalman Filter Method Invalid Navigation Solution. All other values are invalid. flag_values: 0, 1, 2, 3, 4, 5, 7 flag_meanings : unknown propagated cold_first_nav cold_lsq_no_gdop lsqm_w_svs normal_kalma
prom_edac_status (Chunked Dataset)	INTEGER_1 (:)	HK PROM EDAC Status (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - PROM EDAC Single bit or uncorrectable error flag_values: 0, 1 flag_meanings : no_error_detected error_detected
protocol_selection_f (Chunked Dataset)	INTEGER_1 (:)	HK MilBus Protocol Selection Flag (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus Protocol Selection Flag
register_file_errors (Chunked Dataset)	INTEGER_1 (:)	HK Corrected Register File Errors (not_set)	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Corrected Register File Errors flag_values: 0, 1 flag_meanings : no_error_detected error_detected
sram_edac_status (Chunked Dataset)	INTEGER_1 (:)	HK SRAM EDAC Status (not_set)	1 ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - SRAM EDAC Single bit error flag_values: 0, 1 flag_meanings : no_error_detected error_detected
transient_protocol_errors (Chunked Dataset)	UINT_2_LE (:)	HK MilBus Transient Protocol Error Count (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - MilBus Transient Protocol Error Count

transmit_buffer_occupancy (Chunked Dataset)	UINT_2_LE (:)	HK Transmit Buffer Occupancy (not_set)	counts ATL01/sc4/gpsr/hk	Housekeeping Parameter Report (HK) - Number of bytes buffered for transmission
Group: /gpsr/navigation				
Description	(Attribute)	Contains parameters related to navigation solution.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
clock_freq_error (Chunked Dataset)	INTEGER_4 (:)	NAV Receiver Clock Frequency Error (not_set)	seconds ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Receiver Clock Frequency Error
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (19J 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gdop (Chunked Dataset)	FLOAT (:)	NAV Geometric Dilution of Precision (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Geometric Dilution of Precision (Values greater than 655.: 655.34 m.)
gnss_time_error (Chunked Dataset)	FLOAT (:)	NAV GNSS System Time Error (not_set)	seconds ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - GNSS System Time Error
gps_time_sec (Chunked Dataset)	UINT_4_LE (:)	TCDR GPS Time (Seconds) (not_set)	seconds ATL01/sc4/gpsr/navigation	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization time seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT)
gps_time_subsec (Chunked Dataset)	UINT_4_LE (:)	TCDR GPS Time (Subseconds) (not_set)	1/4294967296 seconds ATL01/sc4/gpsr/navigation	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting that is provided to ATLAS in RT)
h_ell (Chunked Dataset)	DOUBLE (:)	NAV Height Above Reference Ellipsoid (WGS84) (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Height Above Reference Ellipsoid (WGS84)
latitude (Chunked Dataset)	DOUBLE (:)	NAV Latitude (WGS84) (not_set)	degrees_north ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Latitude (WGS84)
longitude (Chunked Dataset)	DOUBLE (:)	NAV Longitude (WGS84) (not_set)	degrees_east ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Longitude (WGS84)
max_curve_fit (Chunked Dataset)	INTEGER_1 (:)	NAV Maximum Curve Fit (not_set)	1 ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Maximum Curve Fit interval taken from all SVs used in current flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 15 flag_meanings: 4h 6h 8h 14h 26h 50h 74h 98h 122h 146h no_curve_fit
max_ura (Chunked Dataset)	INTEGER_1 (:)	NAV Maximum User Range Accuracy (URA) (not_set)	counts ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Maximum User Range Accuracy (-16 means that no URA computation, i.e. SVs for which code and carrier phase measurements and Ephemeris data were available)
n_sv (Chunked Dataset)	INTEGER_1 (:)	NAV Number of SVs in Solution (not_set)	counts ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - The number of SVs the receiver was able to use for the N computation, i.e. SVs for which code and carrier phase measurements and Ephemeris data were available
nsm (Chunked Dataset)	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM) (not_set)	1 ATL01/sc4/gpsr/navigation	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - 1 w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (if Invalid Navigation Solution All other values invalid flag_values: 1, 2, 3, 4, 5, 7 flag_meanings: propagated cold_lsq_no_gdop lsqm_w_sv normal_kalman invalid_solution
pdop (Chunked Dataset)	FLOAT (:)	NAV Position Dilution of Precision (not_set)	counts ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Time Dilution of Precision. Values greater than 655.34 are Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available.
position_error_x (Chunked Dataset)	FLOAT (:)	NAV Position Error X (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X position error
position_error_y (Chunked Dataset)	FLOAT (:)	NAV Position Error Y (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y position error
position_error_z (Chunked Dataset)	FLOAT (:)	NAV Position Error Z (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z position error
position_qa (Chunked Dataset)	INTEGER_2 (:)	NAV Time Quality Index (not_set)	seconds ATL01/sc4/gpsr/navigation	Navigation Solution Data Record (NAV) - Time Quality Index; Values greater than 4095 ns are saturated
position_x (Chunked Dataset)	DOUBLE (:)	NAV Position X (WGS84) (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X position of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
position_y (Chunked Dataset)	DOUBLE (:)	NAV Position Y (WGS84) (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y position of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
position_z (Chunked Dataset)	DOUBLE (:)	NAV Position Z (WGS84) (not_set)	meters ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z position of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
tdop (Chunked Dataset)	FLOAT (:)	GPSR Time Dilution of Precision (not_set)	1 ATL01/sc4/gpsr/navigation converted	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available.
velocity_error_x (Chunked Dataset)	FLOAT (:)	NAV Velocity Error X (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X velocity error
velocity_error_y (Chunked Dataset)	FLOAT (:)	NAV Velocity Error Y (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y velocity error
velocity_error_z (Chunked Dataset)	FLOAT (:)	NAV Velocity Error Z (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z velocity error
velocity_x (Chunked Dataset)	DOUBLE (:)	NAV Velocity X (WGS84) (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated X velocity of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
velocity_y (Chunked Dataset)	DOUBLE (:)	NAV Velocity Y (WGS84) (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Y velocity of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
velocity_z (Chunked Dataset)	DOUBLE (:)	NAV Velocity Z (WGS84) (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Estimated Z velocity of the platform reference point according to Solution Method (NSM) at the point in time of GPST (WGS84)
vertical_speed (Chunked Dataset)	DOUBLE (:)	NAV Vertical Speed (not_set)	meters/second ATL01/sc4/gpsr/navigation converted	Navigation Solution Data Record (NAV) - Vertical Speed
Group: /gpsr/noise_histogram				
Description	(Attribute)	Contains parameters related to the GPS Noise Histogram Data Record (NHDR).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
chain_index (Chunked Dataset)	INTEGER_1 (2. :)	NHDR Chain Index - Chain 1-2 (not_set)	1 ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Chain Index - Down Conversion Chain Identifier 1-2 flag_values: 0, 1 flag_meanings : antenna1_1carrier antenna1_2carrier
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (19 th 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_chain (Contiguous Dataset)	INTEGER_1 (2)	DS for each chain (not_set)	1 not_set	Dimension scale representing each of the 2 chains.
noise_power (Chunked Dataset)	FLOAT (2. :)	NHDR Noise Power - Chain 1-2 (not_set)	dB ATL01/sc3/gpsr/noise_histogram converted	Noise Histogram Data Record (NHDR) - Noise Power as seen at the input of the variable gain IF ar Conversion Chain Identifier 1-2
norm_neg_in_phase_m1 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Negative In-Phase Counts M1 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-Down Conversion Chain Identifier 1-2
norm_neg_in_phase_m3 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Negative In-Phase Counts M3 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-Down Conversion Chain Identifier 1-2
norm_neg_quad_phase_m1 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Negative Quadrature-Phase Counts M1 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Qu samples (M1) - Down Conversion Chain Identifier 1-2
norm_neg_quad_phase_m3 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Negative Quadrature-Phase Counts M3 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Qu samples (M3) - Down Conversion Chain Identifier 1-2
norm_pos_in_phase_p1 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Positive In-Phase Counts P1 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-p Down Conversion Chain Identifier 1-2
norm_pos_in_phase_p3 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Positive In-Phase Counts P3 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-p Down Conversion Chain Identifier 1-2
norm_pos_quad_phase_p1 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Positive Quadrature-Phase Counts P1 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Qu (P1) - Down Conversion Chain Identifier 1-2
norm_pos_quad_phase_p3 (Chunked Dataset)	UINT_2_LE (2. :)	NHDR Normalized Positive Quadrature-Phase Counts P3 - Chain 1-2 (not_set)	counts ATL01/sc3/gpsr/noise_histogram	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Qu (P3) - Down Conversion Chain Identifier 1-2

Group: /gpsr/time_correlation

Description	(Attribute)	Contains parameters related to GPSR time correlation data record (TCDR).
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subse 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 (19 th 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
gps_time_sec (Chunked Dataset)	UINT_4_LE (:)	TCDR GPS Time (Seconds) (not_set)	seconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization ti seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provid
gps_time_subsec (Chunked Dataset)	UINT_4_LE (:)	TCDR GPS Time (Subseconds) (not_set)	1/4294967296 seconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representat synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) startin that is provided to ATLAS in RT)
imt (Chunked Dataset)	DOUBLE (:)	TCDR Instrument Measurement Time (not_set)	seconds ATL01/sc4/gpsr/time_correlation converted	Time Correlation Data Record (TCDR) - Time Correlation Data Record (TCDR) - Instrument Measu representation of the synchronization time stamp. IMT precisely describes how the GPSR clock osc for internal and maintenance use only.
nsm (Chunked Dataset)	INTEGER_1 (:)	GPSR Navigation Solution Method (NSM) (not_set)	1 ATL01/sc4/gpsr/time_correlation	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - l w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (t Invalid Navigation Solution All other values invalid flag_values: 1, 2, 3, 4, 5, 7 flag_meanings : propagated cold_lsqm_no_gdop lsqm_w_svsv normal_kalman invalid_solution
tdop (Chunked Dataset)	FLOAT (:)	GPSR Time Dilution of Precision (not_set)	seconds ATL01/sc4/gpsr/time_correlation converted	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to or in the case NSM = 5 with fewer than 4 SVs available.
time_qa (Chunked Dataset)	INTEGER_2 (:)	TCDR Time Quality Index (not_set)	nanoseconds ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - Time Quality Index. Nanoseconds; Values greater than 40 th 4095 ns.
utc_days (Chunked Dataset)	UINT_2_LE (:)	TCDR TCDCR UTC Time - Days (not_set)	days ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp; 1st January 2000, 00:00:00 starting with 0.
utc_msec (Chunked Dataset)	UINT_4_LE (:)	TCDR TCDCR UTC Time - Milliseconds (not_set)	msec ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp; milliseconds of current day.
utc_usec (Chunked Dataset)	UINT_2_LE (:)	TCDR TCDCR UTC Time - Microseconds (not_set)	usec ATL01/sc4/gpsr/time_correlation	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp; microseconds of current day.

Group: /lrs

Description	(Attribute)	Group contains the Laser Reference System (LRS) packet decommutated data
data_rate	(Attribute)	Data within this group are stored at the nominal rate of the corresponding LRS APIDs (varies per APID).

Group: /lrs/hk_1120

Description	(Attribute)	Contains parameters relating to the Application Housekeeping Packet (LRStmHK)(APID 1120). The (Application Mode) Housekeeping Packet provides all LRS health and s reported and stored at a 1 Hz rate.
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Housekeeping Data (nominally once per second).

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
chkstat_e_ad (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Application Text Checksum (not_set)	1 LRS_HK	EEPROM Application Data (AD) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_e_at (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Application Text Checksum (not_set)	1 LRS_HK	EEPROM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_e_bc (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Boot Configuration Checksum (not_set)	1 LRS_HK	EEPROM Boot Configuration (BC) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_e_ld_df (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Laser Detector Dark Frame Checksum (not_set)	1 LRS_HK	EEPROM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_e_sd_df (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - EEPROM Stellar Detector Dark Frame Checksum (not_set)	1 LRS_HK	EEPROM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_s_at (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - SRAM Application Text Checksum (not_set)	1 LRS_HK	SRAM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_s_ld_df (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - SRAM Laser Detector Dark Frame Checksum (not_set)	1 LRS_HK	SRAM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
chkstat_s_sd_df (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Checksum Status Register - SRAM Stellar Detector Dark Frame Checksum (not_set)	1 LRS_HK	SRAM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) flag_values: 0, 1 flag_meanings: passed failed
cmdcnt (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Valid User Command Counter (not_set)	counts LRS_HK	The Valid User Command Counter is a 16-bit counter that increments each time that the Failsafe Mode command of the corresponding command type. A valid command is defined as a command that passes the verification/processing error tests. The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
cmderrcnt (Chunked Dataset)	UINT_2_LE (:)	LRS_HK User Command Error Counter (not_set)	counts LRS_HK	The 16-bit User Command Error Counter is incremented every time the Failsafe Mode has one or more 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 when there is at least one verification/processing error for that command. CMDERRCODE will indicate the command type. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
cmderrcode (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Unique Code for User Command Errors (not_set)	counts LRS_HK	The 16-bit Command Error Unique Code indicates the last type of command error that occurred in Failsafe Mode. The code will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The code is defined in Table 19: Command Validation Error Codes in the LRS command and data ICD.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) within ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within the delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
dmpmemcnt (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Number of memory words dumped (not_set)	counts LRS_HK	This 32-bit counter records the total number of memory words dumped during Failsafe Mode process Memory Command (LRSfscmDPMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it reaches 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
dmppktleft (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Remaining number of dump packets to go (not_set)	counts LRS_HK	This 16-bit counter indicates the remaining number of dump packets to send during Failsafe Mode process Dump Memory Command (LRSfscmDPMEM). It is 0x0000 whenever no dump command is active.
ground1_v (Chunked Dataset)	FLOAT (:)	LRS_HK Ground 1 Voltage (not_set)	volts LRS_HK	Voltage of Ground 1 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V
ground2_v (Chunked Dataset)	FLOAT (:)	LRS_HK Ground 2 Voltage (not_set)	volts LRS_HK	Voltage of Ground 2 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V
laser_barrel1_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #1 (Laser Side Barrel #1 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #1 (Laser Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
laser_barrel2_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #2 (Laser Side Barrel #2 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #2 (Laser Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
laser_barrel3_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #3 (Laser Side Barrel #3 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #3 (Laser Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
ldbkgnd (Chunked Dataset)	UINT_2_LE (:)	LRS_HK LD background (not_set)	counts LRS_HK	The 16-bit values are measures of the measured detector background for the laser side after subtracting the dark frame. Each is a scaled average of the background levels from all tracking windows on that detector in the preceding one (1) second. Because the search and imaging windows move around, these values are expected to fluctuate significantly; however, they are an indication of how well the predicted dark frame background (stray light) levels. If they are occasionally very large, there is probably a stray light problem. If they are consistently very large, there is probably error in the dark frame calibration.
ldc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Laser Detector Card Temperature (not_set)	degreesC LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling]
ldmemcnt (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Number of memory words loaded (not_set)	counts LRS_HK	This 32-bit counter records the total number of memory words loaded during Failsafe Mode process Memory Command (LRSfscmLMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it reaches 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
ldmemconflict (Chunked Dataset)	UINT_2_LE (:)	LRS_HK LD Memory Conflicts (not_set)	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still accessing Laser-Side data when the LRS cycle starts. This conflict is an error, which indicates that shared memory access did not complete within the allocated time and may have caused stale or invalid laser centroids. This counter starts at 0x0000.

				when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by Counters Command (LRScmRSTCNT).
ldoverrun (Chunked Dataset)	UINT_2_LE (:)	LRS_HK LD Processing Overruns (not_set)	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still processing Laser-Side data cycle starts. This overrun condition is a warning, which indicates that some processor activity did not allocated time and may delay reporting of the next laser data packets. This counter starts at 0x0000 and increments from 0xFFFF. This counter will be reset at Application Mode initialization and by Counters Command (LRScmRSTCNT).
m12v_cmon_a (Chunked Dataset)	FLOAT (:)	LRS_HK -12VDC Current Monitor (not_set)	amps LRS_HK	Amperage of -12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A
m12v_ldc_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK -12VDC LDC Monitor (not_set)	volts LRS_HK	Voltage of -12VDC LDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF
m12v_sdc_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK -12VDC SDC Monitor (not_set)	volts LRS_HK	Voltage of -12VDC SDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF
m12v_supp_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK -12VDC Supply Monitor (not_set)	volts LRS_HK	Voltage of 12VDC Supply Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFF
meter_bar1_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #4 (Metering Bars #1 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #4 (Metering Bars #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF open [see thermistor scaling section later for temperature scaling]
meter_bar2_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #5 (Metering Bars #2 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #5 (Metering Bars #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF open [see thermistor scaling section later for temperature scaling]
meter_bar3_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #6 (Metering Bars #3 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #6 (Metering Bars #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF open [see thermistor scaling section later for temperature scaling]
p12v_ana_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +12VDC Analog Monitor (not_set)	volts LRS_HK	Voltage of +12VDC Analog Monitor - 0x0000 = 0.000 V; 0xC000 = +12.000 V (nominal value); 0xFF
p12v_cmon_a (Chunked Dataset)	FLOAT (:)	LRS_HK +12VDC Current Monitor (not_set)	amps LRS_HK	Amperage of +12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A
p1_5v_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +1.5VDC Monitor (not_set)	volts LRS_HK	Voltage of +1.5VDC Monitor - 0x0000 = 0.000 V; 0x6000 = +1.500 V (nominal value); 0xFFFF = +4.
p1_8v_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +1.8VDC Monitor Voltage (not_set)	volts LRS_HK	Voltage of +1.8VDC Monitor - 0x0000 = 0.000 V; 0x7332 = 1.800 V (nominal); 0xFFFF = +4.000 V
p3_3v_cmon_a (Chunked Dataset)	FLOAT (:)	LRS_HK +3.3VDC Current Monitor (not_set)	amps LRS_HK	Amperage of +3.3VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +4.000 A
p3_3v_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +3.3VDC Monitor (not_set)	volts LRS_HK	Voltage of +3.3VDC Monitor - 0x0000 = 0.000 V; 0xD333 = +3.300 V (nominal value); 0xFFFF = +4
p5v_ana_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +5VDC Analog Monitor (not_set)	volts LRS_HK	Voltage of +5VDC Analog Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF
p5v_cmon_a (Chunked Dataset)	FLOAT (:)	LRS_HK +5VDC Current Monitor (not_set)	amps LRS_HK	Amperage of +5VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A
p5v_ldc_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +5VDC LDC Monitor (not_set)	volts LRS_HK	Voltage of +5VDC LDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF =
p5v_sdc_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +5VDC SDC Monitor (not_set)	volts LRS_HK	Voltage of +5VDC SDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF =
p5v_supp_mon_v (Chunked Dataset)	FLOAT (:)	LRS_HK +5VDC Supply Monitor (not_set)	volts LRS_HK	Voltage of +5VDC Supply Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF
pc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Processor Card Thermistor (not_set)	degreesC LRS_HK	Temperature of Processor Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal) scaling section later for temperature scaling]
pcc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Power Converter Card Temperature (not_set)	degreesC LRS_HK	Temperature of Power Converter Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal) thermistor scaling section later for temperature scaling]
ppscount (Chunked Dataset)	UINT_4_LE (:)	LRS_HK 1PPS sync counter (not_set)	counts LRS_HK	A 32-bit count of sync pulses registered by the LRS FPGA. The value of the pulse counter starts at over to 0x00000000 when it increments from 0xFFFFFFFF.
ppsoffset_ms (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Oscillator Offset (not_set)	ms LRS_HK	Oscillator Offset (milliseconds) for TOD (time of day) correction.
ppsoffset_ticks (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Oscillator Offset Ticks (not_set)	counts LRS_HK	Oscillator Offset (ticks) for TOD (time of day) correction.
ppsoval (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Latched oscillator value at 1PPS sync (not_set)	counts LRS_HK	The 32-bit count of internal 27 MHz oscillator ticks at the time when the last 1 PPS sync pulse was FPGA.
reference_v (Chunked Dataset)	FLOAT (:)	LRS_HK Reference Voltage (not_set)	counts LRS_HK	Reference Voltage - 0x0000 = 0.000 V; 0x8000 = +2.000 V (nominal value); 0xFFFF = +4.000 V
sdbbackground (Chunked Dataset)	UINT_2_LE (:)	LRS_HK SD background (not_set)	counts LRS_HK	The 16-bit values are measures of the measured detector background of the stellar side after subtracting dark frame. Each is a scaled average of the background levels from all tracking windows on that detector measurements in the preceding one (1) second. Because the search and imaging windows move a detector should be expected to fluctuate significantly; however, they are an indication of how well the predicted background (stray light) levels. If they are occasionally very large, there is probably a stray light consistently very large, there is probably error in the dark frame calibration.
sdc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Detector Card Temperature (not_set)	counts LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal) thermistor scaling section later for temperature scaling]

sdmemconflict (Chunked Dataset)	UINT_2_LE (:)	LRS_HK SD Memory Conflicts (not_set)	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still accessing Stellar-Side when a new LRS cycle starts that includes new Stellar-Side data collection. This conflict is an error, which if memory access did not complete in the allocated time and may have caused stale or invalid stellar data. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at power on and by an Application Reset Counters Command (LRScmRSTCNT).
sdoerrun (Chunked Dataset)	UINT_2_LE (:)	LRS_HK SD Processing Overruns (not_set)	counts LRS_HK	This 16-bit counter is incremented each time the Application Mode is still processing Stellar-Side data when a new LRS cycle starts that should include new Stellar-Side data collection. This overrun condition is a warning that some processor activity did not complete in the allocated time and may delay reporting of the next cycle. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at power on and by an Application Reset Counters Command (LRScmRSTCNT).
spwdiscarbkup (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Spacewire telemetry packets dropped due to buffer not being empty (not_set)	counts LRS_HK	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe M when the transmission buffer is empty (an abnormal condition). It starts at 0x00000000, and rolls over to 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRScmRSTCNT).
spwdiscardcmd (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Spacewire command words dropped due to timeout waiting for full CCSDS packet (not_set)	counts LRS_HK	This 32-bit counter is incremented each time a spacewire command word is dropped by Failsafe M while waiting for a full CCSDS packet (an abnormal condition). It starts at 0x00000000, and rolls over to 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRScmRSTCNT).
spwdiscardlink (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Spacewire telemetry packets dropped due to link not available (not_set)	counts LRS_HK	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe M when a valid spacewire link between the LRS and MEB (an abnormal condition). It starts at 0x00000000, and rolls over to 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRScmRSTCNT).
spwoutofsync (Chunked Dataset)	UINT_4_LE (:)	LRS_HK Spacewire command words skipped to find sync (not_set)	counts LRS_HK	This 32-bit counter is incremented each time a spacewire command word is skipped by Failsafe M when waiting for a packet sync (an abnormal condition). It starts at 0x00000000, and rolls over to 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRScmRSTCNT).
spwstat_ll_err (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Last Link Error (not_set)	1 LRS_HK	This is the Last Link Error Code portion of the LRS spacewire interface register. flag_values: 0, 1, 2, 3 flag_meanings: disconnected parity_err esc_rec credit_err
spwstat_lp_err (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Last Packet Error (not_set)	1 LRS_HK	This is the Last Packet Error Code portion of the LRS spacewire interface register. flag_values: 0, 1, 2, 3 flag_meanings: no_error eep_rec incomplete_sw invalid
spwstat_pec (Chunked Dataset)	UINT_1_LE (:)	LRS_HK Spacewire Status Register - Packet Error Counter (not_set)	counts LRS_HK	This is the 6-bit Packet Error Counter portion of the LRS spacewire interface status register
spwstat_st_f (Chunked Dataset)	INTEGER_1 (:)	LRS_HK Spacewire Status Register - Status (not_set)	1 LRS_HK	This is the status flag portion of the LRS spacewire interface status register. flag_values: 0, 1 flag_meanings: not_running running
srata_x (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Pattern Rate X (not_set)	pixels/sec LRS_HK	X component (tip/tilt) of the stellar rate pattern estimate.
srata_y (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Pattern Rate Y (not_set)	pixels/second LRS_HK	Y component (tip/tilt) of the stellar rate pattern estimate
srata_z (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Pattern Rate Z (not_set)	radians/second LRS_HK	Z (rotation) component of the stellar rate pattern estimate
stellar_barrel1_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #7 (Stellar Side Barrel #1 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #7 (Stellar Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0x00000000 (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_barrel2_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #8 (Stellar Side Barrel #2 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #8 (Stellar Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0x00000000 (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_barrel3_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #9 (Stellar Side Barrel #3 Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #9 (Stellar Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0x00000000 (nominal open) [see thermistor scaling section later for temperature scaling]
stellar_shroud_t (Chunked Dataset)	FLOAT (:)	LRS_HK Optics Thermistor #10 (Stellar Side Shroud Temperature) (not_set)	degreesC LRS_HK	Temperature of Optics Thermistor #10 (Stellar Side Shroud) - 0x0000 = 0.000 V (nominal short); 0x00000000 (nominal open) [see thermistor scaling section later for temperature scaling]
sysstat_ac_en (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - Analog Converter Status (not_set)	1 LRS_HK	The current status of the LRS FPGA Analog Converter. (0 = DISABLED (abnormal condition); 1 = Enabled (normal operating condition)) flag_values: 0, 1 flag_meanings: disabled enabled
sysstat_hk (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register HK Working (not_set)	1 LRS_HK	The current status of the Housekeeping working (0 = Finished Execution; 1 = Executing). Note: The values are based on what logic is executing, so they may show up as 0 or 1 based on when the packet is received. flag_values: 0, 1 flag_meanings: finished executing
sysstat_j1 (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - Jumper 1 (not_set)	1 LRS_HK	Jumper 1 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition); 1 = CONNECTED (normal operating condition) flag_values: 0, 1 flag_meanings: disconnected connected
sysstat_j2 (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - Jumper 2 (not_set)	1 LRS_HK	Jumper 2 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition); 1 = CONNECTED (normal operating condition) flag_values: 0, 1 flag_meanings: disconnected connected
sysstat_ldc (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - LDC Status (not_set)	1 LRS_HK	The current status of the Laser Detector Card (LDC) working (0 = Finished Execution; 1 = Executing). Note: The values are based on what logic is executing, so they may show up as 0 or 1 based on when the packet is received. flag_values: 0, 1 flag_meanings: finished executing
sysstat_ldc_en (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - LDC Power and Signals Enable Status (not_set)	1 LRS_HK	The current status of the LRS FPGA LDC (Laser Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) flag_values: 0, 1 flag_meanings: disabled enabled
sysstat_ldca_cable (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - LDC Analog Cable Status (not_set)	1 LRS_HK	The current status of the LRS FPGA LDC (Laser Detector Card Analog) Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) flag_values: 0, 1 flag_meanings: disconnected connected
sysstat_ldcd_cable	INTEGER_1	LRS_HK System	1	The current status of the LRS FPGA LDC (Laser Detector Card Digital) Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition))

(Chunked Dataset)	(:)	Status Register - LDC Digital Cable Status (not_set)	LRS_HK	condition); 1 = CONNECTED (normal operating condition) flag_values: 0, 1 flag_meanings : disconnected connected
sysstat_ismc (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - Laser Sync validity Status (not_set)	1 LRS_HK	The current validity of the Laser Sync (0 = INVALID (abnormal condition); 1 = VALID (normal operating condition)) flag_values: 0, 1 flag_meanings : invalid valid
sysstat_sdc (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - SDC Status (not_set)	1 LRS_HK	The current status of the Stellar Detector Card (SDC) working (0 = Finished Execution; 1 = Executing) flag_values: 0, 1 flag_meanings : finished executing
sysstat_sdc_en (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - SDC Power and Signals Enable Status (not_set)	1 LRS_HK	The current status of the LRS FPGA SDC (Stellar Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) flag_values: 0, 1 flag_meanings : disabled enabled
sysstat_sdca_cable (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - SDC Analog Cable Status (not_set)	1 LRS_HK	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) flag_values: 0, 1 flag_meanings : disconnected connected
sysstat_sdc_digital_cable (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - SDC Digital Cable Status (not_set)	1 LRS_HK	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) flag_values: 0, 1 flag_meanings : disconnected connected
sysstat_sw (Chunked Dataset)	INTEGER_1 (:)	LRS_HK System Status Register - Spacewire Module Status (not_set)	1 LRS_HK	The current status of the Spacewire Module (0 = NOT RUNNING (abnormal condition); 1 = RUNNING (normal operating condition)) flag_values: 0, 1 flag_meanings : not_running running
therm_gnd_ref_v (Chunked Dataset)	FLOAT (:)	LRS_HK Thermistor Reference (ground) (not_set)	counts LRS_HK	Voltage of Thermistor Reference (ground) - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V
therm_open_ref_v (Chunked Dataset)	FLOAT (:)	LRS_HK Thermistor Reference (open) (not_set)	counts LRS_HK	Voltage of Thermistor Reference (open) - 0x0000 = 0.000 V; 0xFFFF = +4.000 V (nominal value)
timecnt (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Valid Time Sync Command Counter (not_set)	counts LRS_HK	The Valid Time Sync Command Counter is a 16-bit counter that increments each time that the Valid Time Sync Command is received. A valid command is defined as a command that passes the counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
timeerrcnt (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Time Sync Command Error Counter (not_set)	counts LRS_HK	The 16-bit Time Sync Command error Counter is incremented every time the Failsafe Mode has on 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 when there is at least one verification/processing error for that command. TIMEERRCODE will indicate the error code. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT).
timeerrcode (Chunked Dataset)	UINT_2_LE (:)	LRS_HK Time Sync Command Error Code (not_set)	counts LRS_HK	The 16-bit Time Sync Error Code indicates the last type of time sync error that occurred in Failsafe Mode. The error code is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The error code is one of the following: 0 = Command Validation Error Codes.

Group: /lrs/laser_centroid

Description	(Attribute)	Contains parameters relating to the Application Laser Centroid (LCENT) Data. The (Application Mode) Laser Centroid Data Packet contains reported Laser-Side Centroids, and 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, etc) onboard to the spacecraft ACS.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Application Laser Centroid Data (nominally fifty per second).		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cent_h (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid H (not_set)	pixels LRS_LCENT	The centroid H value. The centroids are the Transmit Laser Centroids and TAMS Centroids.
cent_mag (Chunked Dataset)	INTEGER_2 (:)	LRS_LCENT centroid magnitude (not_set)	counts LRS_LCENT	The 12-bit centroid magnitude. The centroids are the Transmit Laser Centroids and TAMS Centroids.
cent_v (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid V (not_set)	pixels LRS_LCENT	The centroid V value. The centroids are the Transmit Laser Centroids and TAMS Centroids.
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many seconds of offset should be applied between the secondary header timestamp and the center_of_integration base. This time offset assumes that the secondary header timestamp represents an exact millisecond accurate beyond the precision expressed in the timestamp. The offset is based on the LRS internal clock (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 microsecond resolution. Under normal operating conditions, the offset should never exceed 20 milliseconds (about 16875 counts). The offset should be adequate for coarse geo-location, but not precision geo-location as expected for science (individual centroid offsets are required for that purpose).
coi_offset (Chunked Dataset)	INTEGER_2 (:)	Center of integration offset (not_set)	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time values retrieved from the CCSDS header timestamps, relative to the ATLAS SDP GPS Epoch Data Products (SDP) epoch offset is defined within ancillary_data/atlas_sdp_gps_epoch as the number of seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By default, the time in atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch.
quality_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Centroid quality (not_set)	1 LRS_LCENT	Flag indicates centroids pass basic validity checks in the LRS software. 0 = valid centroids; 1 = the centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid centroid). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the actual tams/laser spots is not guaranteed. flag_values: 0, 1 flag_meanings : valid questionable
trackstat_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Tracking status (not_set)	1 LRS_LCENT	Flag indicates tracking status for centroid; 1 = valid tracking of that centroid window; 0 = the centroid is not being tracked or acquiring state (that is, the corresponding centroid should not be considered to report a valid centroid). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the actual tams/laser spots is not guaranteed. flag_values: 0, 1 flag_meanings : acq_state track_state
win (Chunked Dataset)	INTEGER_1 (:)	Window (not_set)	1 LRS_LCENT	Indicates the window corresponding to each component of the centmagtime and corresponding flag correspond to TAMS windows; values of 5-10 correspond to laser windows. Assignment of a window to a centroid is not guaranteed. flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 flag_meanings : none tams0 tams1 tams2 tams3 laser1 laser2 laser3 laser4 laser5 laser6

Group: /lrs/laser_image

Description	(Attribute)	The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command and is used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. (This packet is dumped only when commanded.)		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many seconds of offset should be applied between the secondary header timestamp and the center_of_integration reported. This time offset assumes that the secondary header timestamp represents an exact millisecond accurate beyond the precision expressed in the timestamp. The offset is based on the LRS internal clock (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 microsecond resolution. Under normal operating conditions, the offset should never exceed 20 milliseconds (about 16875 counts). Time tags offset with this value alone should be adequate for coarse geo-location, but not precision (as expected for science (individual centroid offsets are required for that purpose).
datatype (Chunked Dataset)	UINT_2_LE (:)	LRS_xIMG Type of pixel data (not_set)	1 LRS_SIMG	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The codes as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Correction for both Dark Frame and Local Dark flag_values: 0, 4369, 8738 flag_meanings: raw dark adj
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	The base age of the centroids in GPS seconds relative to the ATLAS SDP GPS Epoch. The ATLAS SDP epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch is computed.
ldc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Laser Detector Card Temperature (not_set)	degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal thermistor scaling section later for temperature scaling)
nread (Chunked Dataset)	UINT_2_LE (:)	LRSxLIMG Window read count (not_set)	counts LRS_xIMG	This 16-bit value is the number of reads performed on the window. This value will count up to the number of reads on successive packets. The detector has a settling behavior when read on successive cycles necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windowing.
Group: /lrs/laser_image/window_nn				
Description	(Attribute)	This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally used for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_pixel_64_index (Contiguous Dataset)	INTEGER_1 (64)	Pixel Index for 64 pixel arrays (not_set)	1 not_set	Dimension scale for 64-pixel arrays.
hloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LIMG Horizontal location of window (not_set)	pixels LRS_LIMG	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contain the TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each direction.
pixeldata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_LIMG pixel data (not_set)	counts LRS_LIMG	Pixel data for window- The array 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+1, VLOC], then [HLOC+1, VLOC+1], then [HLOC+2, VLOC], then [HLOC+2, VLOC+1], and ending with [HLOC+7, VLOC+1]).
vloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LIMG Vertical location of window (not_set)	pixels LRS_LIMG	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each direction.
Group: /lrs/laser_window				
Description	(Attribute)	The (Application Mode) Transmit Laser Window Data Packet (LRStmLWIN) contains measured pixel data from a Transmit Laser (Laser-Side) centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Transmit Laser Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata (Chunked Dataset)	UINT_2_LE (25, :)	LRS_LWIN Adjusted Pixel data for window (not_set)	counts LRS_LWIN	Adjusted Pixel data for window - The array contains the 25 pixels of the window containing the pixel data 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+1, VLOC], then [HLOC+1, VLOC+1], then [HLOC+2, VLOC], then [HLOC+2, VLOC+1], and ending with [HLOC+7, VLOC+1]).
cent_h (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid H (not_set)	pixels LRS_LCENT	The centroid H value (in 256ths of a pixel).
cent_mag (Chunked Dataset)	INTEGER_2 (:)	LRS_LCENT centroid magnitude (not_set)	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4.
cent_v (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid V (not_set)	pixels LRS_LCENT	The centroid V value (in 256ths of a pixel).
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many seconds of offset should be applied between the secondary header timestamp and the center_of_integration reported. This time offset assumes that the secondary header timestamp represents an exact millisecond accurate beyond the precision expressed in the timestamp. The offset is based on the LRS internal clock (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 microsecond resolution. Under normal operating conditions, the offset should never exceed 20 milliseconds (about 16875 counts). Time tags offset with this value alone should be adequate for coarse geo-location, but not precision (as expected for science (individual centroid offsets are required for that purpose).
coi_offset (Chunked Dataset)	INTEGER_2 (:)	Center of integration offset (not_set)	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata (Chunked Dataset)	UINT_2_LE (25, :)	LRS_LWIN Dark pixel data for window (not_set)	counts LRS_LWIN	Dark pixel data for window- The array contains the 25 pixels of the window containing the pixel data 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+1, VLOC+1], then [HLOC+2, VLOC], then [HLOC+2, VLOC+1], and ending with [HLOC+7, VLOC+1]).
darkfactor (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Dark Factor (not_set)	counts LRS_TWING	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame.
darkoff_next (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset (not_set)	counts LRS_TWING	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroids in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Packet epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch is computed.
ds_pixel_25_index (Contiguous Dataset)	INTEGER_1 (25)	Pixel Index for 25 pixel arrays (not_set)	1 not_set	Dimension scale for 25-pixel arrays.
hdo_avg (Chunked Dataset)	FLOAT (:)	LRS_xWIN Average Horizontal Velocity (not_set)	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23.8 ft/sec.
hloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LWIN Horizontal location of window (not_set)	pixels LRS_LWIN	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contain the Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater in each direction.
ldc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Laser Detector Card (not_set)	degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal thermistor scaling section later for temperature scaling)

		Temperature (not_set)		
localdark (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Local Dark (not_set)	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window residual dark frame bias.
max_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.
min_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Centroid quality (not_set)	1 LRS_LCENT	This 16-bit value contains a single bit for the quality of this image only. flag_values: 0, 1 flag_meanings: valid questionable
rawdata (Chunked Dataset)	UINT_2_LE (25, :)	LRS_LWIN Raw pixel data for window (not_set)	counts LRS_LWIN	Raw pixel data for window- The array contains the 25 pixels of the window contain the ADC reading onboard corrections. The values are transmitted in raster scan order, starting with the minimum row (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+7, VLOC+7]).
status_f (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Target status (not_set)	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Im Acquire1, 2 Acquire2, 3 Tracking flag_values: 0, 1, 2, 3, 65532, 65534, 65535 flag_meanings: empty acq1 acq2 track not_allowed collided violated
tickatime (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value (not_set)	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz osci time tick.
tickfirst (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator the window was read. They can be used to confirm the calculation of the center of integration offset
ticklast (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator the window was read. They can be used to confirm the calculation of the center of integration offset
use_f (Chunked Dataset)	INTEGER_1 (:)	LRS_xWIN Window Use Flag (not_set)	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the search algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Searching, 3 = Tracking flag_values: 0, 1, 2, 3 flag_meanings: inactive image_gen search track
vdot_avg (Chunked Dataset)	FLOAT (:)	LRS_LWIN Average Vertical Velocity (not_set)	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23.8 fixed
vloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LWIN Vertical location of window (not_set)	pixels LRS_LWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater
windex (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Window Index (not_set)	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.

Group: /lrs/stellar_centroid

Description	(Attribute)	The (Application Mode) Stellar Centroid Data Packet contains reported Stellar-Side Centroids, which are part of the core LRS data output. This packet is normally reported at nominally 10 Hz rate with a variable number of stars reported and is available through all data channels (SSR, real time telemetry, and onboard to the spacecraft ACS).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Centroid Data Packet. (nominally 10 per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cent_h (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid H (not_set)	pixels LRS_LCENT	The centroid H value.
cent_mag (Chunked Dataset)	INTEGER_2 (:)	LRS_LCENT centroid magnitude (not_set)	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4
cent_v (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid V (not_set)	pixels LRS_LCENT	The centroid V value.
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many of offset should be applied between the secondary header timestamp and the center_of_integration reported. This time offset assumes that the secondary header timestamp represents an exact milli-accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 c timetags offset with this value alone should be adequate for coarse geo-location, but not precision c as expected for science (individual centroid offsets are required for that purpose).
coi_offset (Chunked Dataset)	INTEGER_2 (:)	Center of integration offset (not_set)	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Retrieved times from the CCSDS header timestamps, in seconds relative to the ATLAS SDP GPS Epoch Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to be computed.
quality_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Centroid quality (not_set)	1 LRS_LCENT	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 corresponding centroid is considered questionable (that is, the corresponding centroid should not be valid target with full accuracy). flag_values: 0, 1 flag_meanings: valid questionable
trackstat_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Tracking status (not_set)	1 LRS_LCENT	Flag indicates tracking status for centroid. 1 indicate valid tracking of that centroid window; 0 indicate window is in a searching or acquiring state (that is, the corresponding centroid should not be consistent target). flag_values: 0, 1 flag_meanings: acq_state track_state

Group: /lrs/stellar_image

Description	(Attribute)	The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command 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 1024 image. During the image dump, no spots are tracked (the LCENT packets are not telemetered to ground while dumping the image).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Laser Image Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many of offset should be applied between the secondary header timestamp and the center_of_integration reported. This time offset assumes that the secondary header timestamp represents an exact milli-accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal

				(divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 c timetags offset with this value alone should be adequate for coarse geo-location, but not precision c as expected for science (individual centroid offsets are required for that purpose).
cycle (Chunked Dataset)	UINT_2_LE (:)	cycle (LRS_SIMG Cycle)	counts LRS_SIMG	This 16-bit value is the number (0 to 4 are valid) of the cycle within the 100 millisecond integration r packet was generated. The actual window used for the pixel data will be window (6*CYCLE + n).
datatype (Chunked Dataset)	UINT_2_LE (:)	LRS_xIMG Type of pixel data (not_set)	1 LRS_SIMG	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Correc Corrected for both Dark Frame and Local Dark flag_values: 0, 4369, 8738 flag_meanings : raw dark adj
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time computed from the base age of the centroids, in seconds since the ATLAS SDP GPS Epoch. Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the nu between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adc within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS computed.
nread (Chunked Dataset)	UINT_2_LE (:)	LRSxLIMG Window read count (not_set)	counts LRS_xIMG	This 16-bit value is the number of reads performed on the window. This value will count up to the re reads on successive packets. The detector has a settling behavior when read on successive cycles necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windo
sd_c_1 (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Detector Card Temperature (not_set)	Degrees LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nom thermistor scaling section later for temperature scaling)

Group: /lrs/stellar_image/window_nn

Description	(Attribute)	This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally 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 pixel step 48 verticals, the next image starts at vertical 57.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Image Data Packet. This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_pixel_64_index (Contiguous Dataset)	INTEGER_1 (64)	Pixel Index for 64 pixel arrays (not_set)	1 not_set	Dimension scale for 64-pixel arrays.
hloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LIMG Horizontal location of window (not_set)	pixels LRS_LIMG	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contain All windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixe
pixeldata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_LIMG pixel data (not_set)	counts LRS_LIMG	Pixel data for window- The arrays contains the 64 pixels of a TAMS window. The values are transm order, starting with the minimum row and column values (that is, the first transmitted 16-bit word wil [VLOC], then [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], and ending with [HL
vloc (Chunked Dataset)	UINT_2_LE (:)	LRS_LIMG Vertical location of window (not_set)	pixels LRS_LIMG	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained wit windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixels g

Group: /lrs/stellar_window

Description	(Attribute)	The (Application Mode) Stellar Window Data Packet contains measured pixel data from a Stellar-Side centroid window. This SSR packet is only reported when requested by normally used only for diagnostic purposes.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS Stellar Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_SWIN Adjusted Pixel data for window (not_set)	counts LRS_SWIN	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixe corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted starting with the minimum row and column values (that is, the first transmitted 16-bit word will be frc [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VL
cent_h (Chunked Dataset)	FLOAT (:)	LRS_SWIN centroid H (not_set)	pixels LRS_SWIN	The centroid H value (in 256ths of a pixel).
cent_mag (Chunked Dataset)	INTEGER_2 (:)	LRS_SWIN centroid magnitude (not_set)	counts LRS_SWIN	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4. This is a copy of the word that shc (Application mode) Stellar Centroid Data Packet for the window reported here.
cent_v (Chunked Dataset)	FLOAT (:)	LRS_SWIN centroid V (not_set)	pixels LRS_SWIN	The centroid V value (in 256ths of a pixel).
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how man of offset should be applied between the secondary header timestamp and the center_of_integratio reported. This time offset assumes that the secondary header timestamp represents an exact milli- accurate beyond the precision expressed in the timestamp). The offset is based on the LRS interna (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 c timetags offset with this value alone should be adequate for coarse geo-location, but not precision c as expected for science (individual centroid offsets are required for that purpose).
coi_offset (Chunked Dataset)	INTEGER_2 (:)	Center of integration offset (not_set)	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_SWIN Dark pixel data for window (not_set)	counts LRS_SWIN	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel reading corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
darkfactor (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Dark Factor (not_set)	counts LRS_TWAIN	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dr
darkoff_next (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset (not_set)	counts LRS_TWAIN	This 16-bit value contains the dark offset value that will be used for processing this window in the n
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Pro offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds betwee (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained v atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
ds_pixel_64_index (Contiguous Dataset)	INTEGER_1 (64)	Pixel Index for 64 pixel arrays (not_set)	1 not_set	Dimension scale for 64-pixel arrays.
hdo_avg (Chunked Dataset)	FLOAT (:)	LRS_xWIN Average Horizontal Velocity (not_set)	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23.8 fi
hloc (Chunked Dataset)	UINT_2_LE (:)	LRS_SWIN Horizontal location of window (not_set)	pixels LRS_SWIN	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contain The Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in ex
localdark (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Local Dark (not_set)	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window readir residual dark frame bias.
max_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.

min_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f (Chunked Dataset)	INTEGER_1 (:)	LRS_SWIN Centroid quality flag (not_set)	1 LRS_SWIN	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 corresponding centroid is considered questionable (that is, the corresponding centroid should not be valid target with full accuracy). flag_values: 0, 1 flag_meanings: valid questionable
rawdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_SWIN Raw pixel data for window (not_set)	counts LRS_SWIN	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC reading onboard corrections. The values are transmitted in raster scan order, starting with the minimum row (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
sd_c_1 (Chunked Dataset)	FLOAT (:)	LRS_HK Stellar Detector Card Temperature (not_set)	degrees LRS_HK	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal thermistor scaling section later for temperature scaling)
status_f (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Target status (not_set)	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently Rate, 65532 Collided with Another Window, 65533 Violated Minimum Area Limit, 65535 Violated Im Acquire1, 2 Acquire2, 3 Tracking flag_values: 0, 1, 2, 3, 65532, 65534, 65535 flag_meanings: empty acq1 acq2 track not_allowed collided violated
tickatime (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value (not_set)	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator time tick.
tickfirst (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the window was read. They can be used to confirm the calculation of the center of integration offset
ticklast (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the window was read. They can be used to confirm the calculation of the center of integration offset
tickoverlap (Chunked Dataset)	UINT_4_LE (:)	LRS_SWIN Oscillator ticks when last pixel is read (not_set)	counts LRS_SWIN	Oscillator ticks at the start or end of a pixel row overlap. The 32-bit value reading from the internal 27 MHz oscillator when the overlap started/ended. They can be used to confirm the calculation of the center of integration offset
use_f (Chunked Dataset)	INTEGER_1 (:)	LRS_xWIN Window Use Flag (not_set)	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the search algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Searching, 3 = Tracking flag_values: 0, 1, 2, 3 flag_meanings: inactive image_gen search track
vdot_avg (Chunked Dataset)	FLOAT (:)	LRS_LWIN Average Vertical Velocity (not_set)	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed
vloc (Chunked Dataset)	UINT_2_LE (:)	LRS_SWIN Vertical location of window (not_set)	pixels LRS_SWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each direction
windex (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Window Index (not_set)	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.
Group: /lrs/tams_window				
Description	(Attribute)	The (Application Mode) TAMS Window Data Packet contains measured pixel data from a TAMS (Laser-Side) centroid window. This SSR packet is only reported when requested.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source LRS TAMS Window Data Packet. (This packet is dumped only when commanded.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
adjdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_TWIN Adjusted Pixel data for window (not_set)	counts LRS_TWIN	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixel corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
cent_h (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid H (not_set)	pixels LRS_LCENT	The centroid H value (in 256ths of a pixel).
cent_mag (Chunked Dataset)	INTEGER_2 (:)	LRS_LCENT centroid magnitude (not_set)	counts LRS_LCENT	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4
cent_v (Chunked Dataset)	FLOAT (:)	LRS_LCENT centroid V (not_set)	pixels LRS_LCENT	The centroid V value (in 256ths of a pixel).
centofintbase (Chunked Dataset)	UINT_4_LE (:)	Center of integration base (not_set)	counts LRS	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many seconds of offset should be applied between the secondary header timestamp and the center of integration reported. This time offset assumes that the secondary header timestamp represents an exact millisecond accurate beyond the precision expressed in the timestamp. The offset is based on the LRS internal time (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 microsecond resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). This value alone should be adequate for coarse geo-location, but not precision location as expected for science (individual centroid offsets are required for that purpose).
coi_offset (Chunked Dataset)	INTEGER_2 (:)	Center of integration offset (not_set)	counts LRS	The signed 16-bit center of integration offset for this specific centroid.
darkdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_TWIN Dark pixel data for window (not_set)	counts LRS_TWIN	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel reading 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], , and ending with [HLOC+7, VLOC+7]).
darkfactor (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Dark Factor (not_set)	counts LRS_TWIN	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame.
darkoff_next (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Next Frame Dark Offset (not_set)	counts LRS_TWIN	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Product is defined within ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between (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 is obtained.
ds_pixel_64_index (Contiguous Dataset)	INTEGER_1 (64)	Pixel Index for 64 pixel arrays (not_set)	1 not_set	Dimension scale for 64-pixel arrays.
hdot_avg (Chunked Dataset)	FLOAT (:)	LRS_xWIN Average Horizontal Velocity (not_set)	pixels/second LRS_xWIN	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed

hloc (Chunked Dataset)	UINT_2_LE (:)	LRS_TWIN Horizontal location of window (not_set)	pixels LRS_TWIN	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contain The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in ea
ldc_t (Chunked Dataset)	FLOAT (:)	LRS_HK Laser Detector Card Temperature (not_set)	Degrees LRS_HK	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nomi thermistor scaling section later for temperature scaling)
localdark (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Local Dark (not_set)	counts LRS_xWIN	Local Dark - This 16-bit value is the local dark correction applied when correcting the window readir residual dark frame bias.
max_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Maximum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the maximum magnitude value for the target.
min_mag (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Minimum Magnitude (not_set)	counts LRS_xWIN	This 16-bit value contains the minimum magnitude value for the target.
quality_f (Chunked Dataset)	INTEGER_1 (:)	LRS_LCENT Centroid quality (not_set)	1 LRS_LCENT	This 16-bit value contains a single bit for the quality of this image only. flag_values: 0, 1 flag_meanings : valid questionable
rawdata (Chunked Dataset)	UINT_2_LE (64, :)	LRS_TWIN Raw pixel data for window (not_set)	counts LRS_TWIN	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC reading onboard corrections. The values are transmitted in raster scan order, starting with the minimum row (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]).
status_f (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Target status (not_set)	1 LRS_xWIN	Target status-This 16-bit value contains a code indicating the target status applicable to the window The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Im Acquire1, 2 Acquire2, 3 Tracking flag_values: 0, 1, 2, 3, 65532, 65534, 65535 flag_meanings : empty acq1 acq2 track not_allowed collided violated
tickatime (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator Tick Value (not_set)	counts LRS_xWIN	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz osci time tick.
tickfirst (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when first pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator the window was read. They can be used to confirm the calculation of the center of integration offset
ticklast (Chunked Dataset)	UINT_4_LE (:)	LRS_xWIN Oscillator ticks when last pixel is read (not_set)	counts LRS_xWIN	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator the window was read. They can be used to confirm the calculation of the center of integration offset
use_f (Chunked Dataset)	INTEGER_1 (:)	LRS_xWIN Window Use Flag (not_set)	1 LRS_xWIN	Window Use - This 16-bit value reports the way that the window is currently being used by the sear algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Searching, 3 = Tracking flag_values: 0, 1, 2, 3 flag_meanings : inactive image_gen search track
vdot_avg (Chunked Dataset)	FLOAT (:)	LRS_LWIN Average Vertical Velocity (not_set)	pixels/second LRS_LWIN	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixer
vloc (Chunked Dataset)	UINT_2_LE (:)	LRS_TWIN Vertical location of window (not_set)	pixels LRS_TWIN	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained with TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each a
windex (Chunked Dataset)	UINT_2_LE (:)	LRS_xWIN Window Index (not_set)	counts LRSxTWIN	Window Index- The 16-bit value contains the window index reported in this packet.

Group: /orbit_info

Description	(Attribute)	Contains orbit information.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cycle_number (Chunked Dataset)	INTEGER_1 (:)	Cycle Number (not_set)	1 Operations	A count of the number of exact repeats of this reference orbit.
delta_time (Chunked Dataset)	DOUBLE (:)	Granule Start Time (time)	seconds since 2018-01-01 Operations	Number of GPS seconds since the ATLAS SDP epoch at the start of the granule. At the time of ATL equator crossing time is not precisely known.. The ATLAS Standard Data Products (SDP) epoch off /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (198 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
orbit_number (Chunked Dataset)	UINT_2_LE (:)	Orbit Number (not_set)	1 Operations	Unique identifying number for each planned ICESat-2 orbit.
rgt (Chunked Dataset)	INTEGER_2 (:)	Reference Ground track (not_set)	1 Operations	The reference ground track (RGT) is the track on the earth at which a specified unit vector within th pointed. Under nominal operating conditions, there will be no data collected along the RGT, as the I and GT4. During slews or off-pointing, it is possible that ground tracks may intersect the RGT. The I 1387 RGTs.

Group: /quality_assessment

Description	(Attribute)	Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_statistics (Contiguous Dataset)	INTEGER_1 (5)	Dimension scale for QA statistics (not_set)	1 Derived (QA)	QA statistics array index flag_values: 1, 2, 3, 4, 5 flag_meanings : number_of_points minimum maximum average standard_deviation
qa_granule_fail_reason (Compact Dataset)	INTEGER_4 (1)	Granule Failure Reason (not_set)	1 Operations	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=insufficient output data w Failure; 4=TBD_Failure; 5=other failure. flag_values: 0, 1, 2, 3, 4, 5 flag_meanings : no_failure PROCESS_ERROR INSUFFICIENT_OUTPUT failure_3 failure_4 OTHI
qa_granule_pass_fail (Compact Dataset)	INTEGER_4 (1)	Granule Pass Flag (not_set)	1 Operations	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. flag_values: 0, 1 flag_meanings : PASS FAIL

Group: /quality_assessment/along_track

Description	(Attribute)	Along-track statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time_end (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standar epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
delta_time_start (Chunked Dataset)	DOUBLE (:)	Elapsed UTC seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Stand epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch

Group: /quality_assessment/along_track/pcex				
Description	(Attribute)	Along-track statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_at_n_dupe (Chunked Dataset)	INTEGER_4 (:)	Number of duplicates (not_set)	counts Derived (QA)	The number of duplicate Rx events detected in the along-track interval.
qa_at_n_rx_s (Chunked Dataset)	INTEGER_4 (:)	Number of Strong Rx Events (not_set)	counts Derived (QA)	The number of Strong Rx events in the along-track interval.
qa_at_n_rx_w (Chunked Dataset)	INTEGER_4 (:)	Number of Weak Rx Events (not_set)	counts Derived (QA)	The number of Weak Rx events in the along-track interval.
qa_at_n_tep (Chunked Dataset)	INTEGER_4 (:)	Number of TEPs (not_set)	counts Derived (QA)	The number of TEP events detected in the along-track interval.
qa_at_n_tx (Chunked Dataset)	INTEGER_4 (:)	Number of Tx Pulses (not_set)	counts Derived (QA)	The number of Tx Pulses in the along-track interval.
qa_at_tx_ll_stat (Chunked Dataset)	DOUBLE (5, .)	QA Tx LL Stat (not_set)	counts Derived (QA)	Along-track statistic of Transmit Leading Lower time of flight. Values are in the order number_of_po maximum, average, standard_deviation.
qa_at_tx_other_stat (Chunked Dataset)	DOUBLE (5, .)	QA Tx Other Stat (not_set)	counts Derived (QA)	Along-track statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Lc time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Values are in the order number_of_points, minimum, maximum, average, standard_deviation.

Group: /quality_assessment/record_counts				
Description	(Attribute)	Packet count statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time_end (Compact Dataset)	DOUBLE (1)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the interval. The ATLAS Standard D epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
delta_time_start (Compact Dataset)	DOUBLE (1)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Standard epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
qa_n_a_hkt_a (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_A inputs. (not_set)	counts Derived (QA)	The number of A_HKT_A inputs processed.
qa_n_a_hkt_b (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_B inputs. (not_set)	counts Derived (QA)	The number of A_HKT_B inputs processed.
qa_n_a_hkt_c (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_C inputs. (not_set)	counts Derived (QA)	The number of A_HKT_C inputs processed.
qa_n_a_hkt_d (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_D inputs. (not_set)	counts Derived (QA)	The number of A_HKT_D inputs processed.
qa_n_a_hkt_e (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_E inputs. (not_set)	counts Derived (QA)	The number of A_HKT_E inputs processed.
qa_n_a_hkt_status (Compact Dataset)	INTEGER_4 (1)	Number of A_HKT_STATUS inputs. (not_set)	counts Derived (QA)	The number of A_HKT_STATUS inputs processed.
qa_n_a_mce_pos (Compact Dataset)	INTEGER_4 (1)	Number of A_MCE_POS inputs. (not_set)	counts Derived (QA)	The number of A_MCE_POS inputs processed.
qa_n_a_sc_pon (Compact Dataset)	INTEGER_4 (1)	Number of A_SC_PON inputs. (not_set)	counts Derived (QA)	The number of A_SC_PON inputs processed.
qa_n_a_sc_pos (Compact Dataset)	INTEGER_4 (1)	Number of A_SC_POS inputs. (not_set)	counts Derived (QA)	The number of A_SC_POS inputs processed.
qa_n_a_sc_tat (Compact Dataset)	INTEGER_4 (1)	Number of A_SC_TAT inputs. (not_set)	counts Derived (QA)	The number of A_SC_TAT inputs processed.
qa_n_a_sla_hk (Compact Dataset)	INTEGER_4 (1)	Number of A_SLA_HK inputs. (not_set)	counts Derived (QA)	The number of A_SLA_HK inputs processed.
qa_n_lrs_hk (Compact Dataset)	INTEGER_4 (1)	Number of LRS HK inputs. (not_set)	counts Derived (QA)	The number of LRS HK inputs processed.
qa_n_lrs_laser_cent (Compact Dataset)	INTEGER_4 (1)	Number of LRS Laser Centroid inputs. (not_set)	counts Derived (QA)	The number of LRS Laser Centroid inputs processed.
qa_n_lrs_laser_image (Compact Dataset)	INTEGER_4 (1)	Number of LRS Laser Image inputs. (not_set)	counts Derived (QA)	The number of LRS Laser Image inputs processed.
qa_n_lrs_laser_window (Compact Dataset)	INTEGER_4 (1)	Number of LRS Laser Window inputs. (not_set)	counts Derived (QA)	The number of LRS Laser Window inputs processed.
qa_n_lrs_stellar_cent (Compact Dataset)	INTEGER_4 (1)	Number of LRS Stellar Centroid inputs. (not_set)	counts Derived (QA)	The number of LRS Stellar Centroid inputs processed.
qa_n_lrs_stellar_image (Compact Dataset)	INTEGER_4 (1)	Number of LRS Stellar Image inputs. (not_set)	counts Derived (QA)	The number of LRS Stellar Image inputs processed.
qa_n_lrs_stellar_window (Compact Dataset)	INTEGER_4 (1)	Number of LRS Stellar Window inputs. (not_set)	counts Derived (QA)	The number of LRS Stellar Window inputs processed.
qa_n_lrs_tams_window (Compact Dataset)	INTEGER_4 (1)	Number of LRS TAMS Window inputs. (not_set)	counts Derived (QA)	The number of LRS TAMS Window inputs processed.
qa_n_sc1 (Compact Dataset)	INTEGER_4 (1)	Number of SC1 inputs. (not_set)	counts Derived (QA)	The number of SC1 inputs processed.
qa_n_sc2 (Compact Dataset)	INTEGER_4 (1)	Number of SC2 inputs. (not_set)	counts Derived (QA)	The number of SC2 inputs processed.

qa_n_sc3 (Compact Dataset)	INTEGER_4 (1)	Number of SC3 inputs. (not_set)	counts Derived (QA)	The number of SC3 inputs processed.
qa_n_sc4 (Compact Dataset)	INTEGER_4 (1)	Number of SC4 inputs. (not_set)	counts Derived (QA)	The number of SC4 inputs processed.
qa_n_sim_hk (Compact Dataset)	INTEGER_4 (1)	Number of SIM_HK inputs. (not_set)	counts Derived (QA)	The number of SIM_HK inputs processed.

Group: /quality_assessment/record_counts/pcex

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_n_a_dfc_hk (Compact Dataset)	INTEGER_4 (1)	Number of DFC HK Inputs (not_set)	counts Derived (QA)	The number of A_DFC_HK inputs processed.
qa_n_alt_mframe (Compact Dataset)	INTEGER_4 (1)	Number of major frame inputs. (not_set)	counts Derived (QA)	The number of major frame inputs processed.
qa_n_atm_hist_s (Compact Dataset)	INTEGER_4 (1)	Number of ATM Strong inputs. (not_set)	counts Derived (QA)	The number of ATM strong inputs processed.
qa_n_atm_hist_w (Compact Dataset)	INTEGER_4 (1)	Number of ATM weak inputs. (not_set)	counts Derived (QA)	The number of ATM weak inputs processed.
qa_n_pmf_algorithm_science (Compact Dataset)	INTEGER_4 (1)	Number of PMF Algorithm Science inputs. (not_set)	counts Derived (QA)	The number of PMF Algorithm Science inputs processed.
qa_n_pmf_timekeeping (Compact Dataset)	INTEGER_4 (1)	Number of PMF Timekeeping inputs. (not_set)	counts Derived (QA)	The number of PMF Timekeeping inputs processed.

Group: /quality_assessment/summary

Description	(Attribute)	Summary statistics		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time_end (Compact Dataset)	DOUBLE (1)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
delta_time_start (Compact Dataset)	DOUBLE (1)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) 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_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
qa_s_tod_a_sla_hk (Compact Dataset)	DOUBLE (5,1)	QA for a_sla_hk TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/time_of_day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_gpsr (Compact Dataset)	DOUBLE (5,1)	QA for gpsr TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /gpsr time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_laser_energy (Compact Dataset)	DOUBLE (5,1)	QA for hk_laser_energy TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/laser_energy time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_meb (Compact Dataset)	DOUBLE (5,1)	QA for hk_pdu TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/meb time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_pdu (Compact Dataset)	DOUBLE (5,1)	QA for hk_pdu TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/pdu time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_pointing (Compact Dataset)	DOUBLE (5,1)	QA for hk_pointing TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/pointing time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_pos_vel (Compact Dataset)	DOUBLE (5,1)	QA for hk_pos_vel TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/position_velocity time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_tat (Compact Dataset)	DOUBLE (5,1)	QA for hk_tat TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/time_at_the_tone time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_hk_thermal (Compact Dataset)	DOUBLE (5,1)	QA for hk_therm TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/hk_thermal time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_mce_position (Compact Dataset)	DOUBLE (5,1)	QA for mce_position TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/housekeeping/mce_position time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_acs (Compact Dataset)	DOUBLE (5,1)	QA for acs TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/attitude_control_system time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_ephemeris (Compact Dataset)	DOUBLE (5,1)	QA for sc_ephemeris TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/ephemeris time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_hk (Compact Dataset)	DOUBLE (5,1)	QA for sc_hk TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/hk time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_imu (Compact Dataset)	DOUBLE (5,1)	QA for sc_imu TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/inertial_measurement_unit time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_st (Compact Dataset)	DOUBLE (5,1)	QA for sc_star_tracker TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_stoh1 (Compact Dataset)	DOUBLE (5,1)	QA for sc_star_tracker_oh1 TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker/optical_head1 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_sc_stoh2 (Compact Dataset)	DOUBLE (5,1)	QA for sc_star_tracker_oh2 TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /sc/star_tracker/optical_head2 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.

Group: /quality_assessment/summary/pcex

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_s_alt_cal_fall (Compact Dataset)	DOUBLE (5,1)	QA alt_cal_fall (not_set)	counts Derived (QA)	Summary statistic of the full-rate (before interpolation) alt_cal_fall computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_alt_cal_rise (Compact Dataset)	DOUBLE (5,1)	QA alt_cal_rise (not_set)	counts Derived (QA)	Summary statistic of the full-rate (before interpolation) alt_cal_rise computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_n_1pps_skip (Compact Dataset)	INTEGER_4 (1)	QA 1PPS missed (not_set)	counts Derived via L1B ATBD	Number of times 1 pps was not consecutive.

qa_s_n_dupe (Compact Dataset)	INTEGER_4 (1)	Number of duplicates (not_set)	counts Derived (QA)	The number of duplicate Rx events detected in the granule.
qa_s_n_mf_skip (Compact Dataset)	INTEGER_4 (1)	QA 1P MF missed (not_set)	counts Derived via L1B ATBD	The number of times major frame counter was not consecutive.
qa_s_n_rx_s (Compact Dataset)	INTEGER_8 (1)	Number of Strong Rx Events (not_set)	counts Derived (QA)	The number of Strong Rx events in the granule.
qa_s_n_rx_w (Compact Dataset)	INTEGER_8 (1)	Number of Weak Rx Events (not_set)	counts Derived (QA)	The number of Weak Rx events in the granule.
qa_s_n_tep (Compact Dataset)	INTEGER_4 (1)	Number of TEPs (not_set)	counts Derived (QA)	The number of TEP events detected in the granule.
qa_s_n_tx (Compact Dataset)	INTEGER_8 (1)	Number of Tx Pulses (not_set)	counts Derived (QA)	The number of Tx Pulses in the granule.
qa_s_n_tx_oob (Compact Dataset)	INTEGER_4 (1)	QA number of instances TX out of bounds (not_set)	counts Derived via L1B ATBD	The number of times the Tx count is out of bounds (oob); i.e.: 199 to 201 TX pulses were not report
qa_s_tod_alt (Compact Dataset)	DOUBLE (5,1)	QA for pce_x_alt TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pce_x/altimetry time of day values. number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_atm_hist_s (Compact Dataset)	DOUBLE (5,1)	QA for atm_hist_st TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pce_x/atmosphere_strong time of d in the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_atm_hist_w (Compact Dataset)	DOUBLE (5,1)	QA for atm_hist_w TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pce_x/atmosphere_weak time of de the order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_background (Compact Dataset)	DOUBLE (5,1)	QA for pce_x_background TOD (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between successive /atlas/pce_x/background time of day valu order number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tod_method (Compact Dataset)	DOUBLE (5,1)	QA from TOD Methods (not_set)	counts Derived via L1B ATBD	Summary statistics on the differences between Time_T0_Method1 and Time_T0_Method2. Values number_of_points, minimum, maximum, average, standard_deviation.
qa_s_tx_ll_stat (Compact Dataset)	DOUBLE (5,1)	QA Tx LL Stat (not_set)	counts Derived (QA)	Summary statistic of Transmit Leading Lower time of flight. Values are in the order number_of_poin average, standard_deviation.
qa_s_tx_other_stat (Compact Dataset)	DOUBLE (5,1)	QA Tx Other Stat (not_set)	counts Derived (QA)	Summary statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Lea time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Values are in the order number_of_points, minimum, maximum, average, standard_deviation.

Group: /sc

Description	(Attribute)	Group contains the Spacecraft (SC) Ancillary Science packet #1 decommutated data		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
acs_time_sec (Chunked Dataset)	UINT_4_LE (:)	ACS time (sec) (not_set)	seconds ATL01/sc	SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan-1980 00:00:00) (Same tin Attitude/Rate message to ATLAS in RT at 1Hz)
acs_time_subsec (Chunked Dataset)	UINT_4_LE (:)	ACS time (subsec) (not_set)	100 nanoseconds ATL01/sc	Subsecond portion of the SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan- time provided within the Attitude/Rate message to ATLAS in RT at 1Hz)
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (198 06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch. By adding atlas_ delta time parameters, the time in gps_seconds relative to the GPS epoch time can be computed.
sc_time_1pps_sec (Chunked Dataset)	UINT_4_LE (:)	SC time at 1 pps (sec) (not_set)	seconds ATL01/sc	SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1
sc_time_1pps_subsec (Chunked Dataset)	UINT_4_LE (:)	SC time at 1 pps (subsec) (not_set)	100 nanoseconds ATL01/sc	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds Jan-1980 00:00:00)

Group: /sc/attitude_control_system

Description	(Attribute)	Contains parameters related to spacecraft ACS (attitude control system) software.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
acs_mode (Chunked Dataset)	UINT_1_LE (:)	ACS Software Mode (not_set)	counts ATL01/sc1/attitude_control_system	ACS Active ACS Software Mode 0 = Idle 1 = Rate Capture 2 = Sun Acquisition 3 = (Reserved - N/A 5 = Inertial Sun Point 6 = Earth Pointing 7 = ACS Calibration 8 = Inertial Pointing 9 = Reference Gr Roll Off-Point (ROP) 11 = Instrument Calibration (ICAL) 12 = DV Wheel Standby 13 = DV Thruster flag_values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 flag_meanings: idle rate_capture sun_acquisition reserved slew inertial_sun_point earth_pointing e inertial_pointing reference_ground_track roll_off_point instrument_ca
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	The time tag of the data computed from raw_acs_time_sec and subseconds in the L1A Attitude_co 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 (198 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_ delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sc_body_rate_x (Chunked Dataset)	DOUBLE (:)	SC Body Rate (X) (not_set)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body X axis. (Same data provided to ATLAS in RT at 1Hz)
sc_body_rate_y (Chunked Dataset)	DOUBLE (:)	SC Body Rate (Y) (not_set)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body Y axis. (Same data provided to ATLAS in RT at 1Hz)
sc_body_rate_z (Chunked Dataset)	DOUBLE (:)	SC Body Rate (Z) (not_set)	radians/second ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Fine Rate Estimate - SC Body Z axis. (Same data provided to ATLAS in RT at 1Hz)
sc_to_lrs_quat_1 (Chunked Dataset)	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 1 (not_set)	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion1. (Sa ATLAS in RT at 1Hz).
sc_to_lrs_quat_2 (Chunked Dataset)	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 2 (not_set)	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 2. (Sa ATLAS in RT at 1Hz).
sc_to_lrs_quat_3 (Chunked Dataset)	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 3 (not_set)	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 3. (Sa ATLAS in RT at 1Hz).
sc_to_lrs_quat_4 (Chunked Dataset)	DOUBLE (:)	SC Inertial to LRS Frame Quaternions 4 (not_set)	counts ATL01/sc1/attitude_control_system and L1B ATBD conversion	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion4. (Sa ATLAS in RT at 1Hz).

Group: /sc/ephemeris

Description	(Attribute)	Contains parameters related to spacecraft Ephemeris Propagator.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	The time tag of the data by using raw_prop_time_sec and subsecs in the L1A ephemeris group, rel 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 (199 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
eci_position_res_x (Chunked Dataset)	FLOAT (:)	SC ECI Position residual X (not_set)	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of X frame residual.
eci_position_res_y (Chunked Dataset)	FLOAT (:)	SC ECI Position residual Y (not_set)	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of Y frame residual.
eci_position_res_z (Chunked Dataset)	FLOAT (:)	SC ECI Position residual Z (not_set)	meters ATL01/sc1/ephemeris	ACS Orbit Determination Filter position of Z frame residual.
eci_position_x (Chunked Dataset)	DOUBLE (:)	SC ECI Position X (not_set)	meters ATL01/sc1/ephemeris converted	ACS SC X position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_position_y (Chunked Dataset)	DOUBLE (:)	SC ECI Position Y (not_set)	meters ATL01/sc1/ephemeris converted	ACS SC Y position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_position_z (Chunked Dataset)	DOUBLE (:)	SC ECI Position Z (not_set)	meters ATL01/sc1/ephemeris converted	ACS SC Z position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_res_x (Chunked Dataset)	FLOAT (:)	SC ECI velocity residual X (not_set)	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of X frame residual.
eci_velocity_res_y (Chunked Dataset)	FLOAT (:)	SC ECI velocity residual Y (not_set)	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of Y frame residual.
eci_velocity_res_z (Chunked Dataset)	FLOAT (:)	SC ECI velocity residual Z (not_set)	meters/second ATL01/sc1/ephemeris	ACS Orbit Determination Filter velocity of Z frame residual.
eci_velocity_x (Chunked Dataset)	DOUBLE (:)	SC ECI Velocity X (not_set)	meters/second ATL01/sc1/ephemeris converted	ACS SC X velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_y (Chunked Dataset)	DOUBLE (:)	SC ECI Velocity Y (not_set)	meters/second ATL01/sc1/ephemeris converted	ACS SC Y velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
eci_velocity_z (Chunked Dataset)	DOUBLE (:)	SC ECI Velocity Z (not_set)	meters/second ATL01/sc1/ephemeris converted	ACS SC Z velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT)
Group: /sc/hk				
Description	(Attribute)	Contains parameters related to spacecraft housekeeping data.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
at_det_p (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - Detector Power (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Detector power feed current measured by the SC PDU (7.5A; Sides A, B)
at_det_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Detector (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Detector power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_heater_1_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - Survival Heater 1 (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 1 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_1_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Survival Heater 1 (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Survival Heater 1 power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_heater_2_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - Survival Heater 2 (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 2 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_2_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Survival Heater 2 (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Survival Heater 2 power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_heater_3_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - Survival Heater 3 (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 3 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_3_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Survival Heater 3 (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Survival Heater 3 power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_heater_4_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - Survival Heater 4 (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Survival Heater 4 power feed current measured by the SC PDU (10A; Sides A, B)
at_heater_4_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Survival Heater 4 (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Survival Heater 4 power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_laser_a_c (Chunked Dataset)	FLOAT (:)	ATLAS Currents - Laser A (not_set)	amps ATL01/sc1/hk converted	ATLAS Laser A power feed current measured by the SC PDU (20A)
at_laser_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Laser (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Laser power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_lhp_sdtr_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - LHP Shutdown HTR (Sides A, B) (not_set)	amps ATL01/sc1/hk converted	ATLAS Loop Heat Pipe Shutdown power feed current measured by the SC PDU (7.5A; Sides A, B)
at_lhp_sdtr_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - LHP Shutdown HTR (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS LHP Shutdown Heater power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_main_c (Chunked Dataset)	FLOAT (2, :)	ATLAS Currents - ATLAS Main (Sides A,	amps ATL01/sc1/hk converted	ATLAS Main power feed current measured by the SC PDU (20A; Sides A, B)

		B) (not_set)		
at_main_sw (Chunked Dataset)	INTEGER_1 (2, :)	ATLAS Switch Status - Main (Sides A, B) (not_set)	1 ATL01/sc1/hk	ATLAS Main power feed status measured by the SC PDU (Sides A, B) flag_values: 0, 1 flag_meanings: on off
at_t (Chunked Dataset)	FLOAT (15, :)	ATLAS Temperatures (1-15) (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored ATLAS Temperatures (1 to 15)
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	The derived time tag of the data, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Dat epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset cont atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch
ds_ab_index (Contiguous Dataset)	INTEGER_1 (2)	Dimension scale for Side A or B (not_set)	1 not_set	Dimension scale for Side A or B flag_values: 1, 2 flag_meanings: side_a side_b
ds_flexure_index (Contiguous Dataset)	INTEGER_1 (3)	Dimension scale for flexure thermistors (not_set)	1 not_set	Dimension scale for flexure thermistor temperatures.
ds_temp_index (Contiguous Dataset)	INTEGER_1 (15)	Dimension scale for ATLAS Temperatures (not_set)	1 not_set	Dimension scale for ATLAS temperatures.
sa_1_in_bk_t (Chunked Dataset)	FLOAT (:)	Solar Array Panel 1 (Inboard) Back-Side Temperature (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Back-Side of Solar Panel 1 (Inboard Panel)
sa_1_in_cell_t (Chunked Dataset)	FLOAT (:)	Solar Array Panel 1 (Inboard) Cell-Side Temp (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Cell-Side of Solar Panel 1 (Inboard Panel)
sa_4_ot_bk_t (Chunked Dataset)	FLOAT (:)	Solar Array Panel 4 (Outboard) Back- Side Temperature (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Back-Side of Solar Panel 4 (Outboard Panel)
sa_4_ot_cell_t (Chunked Dataset)	FLOAT (:)	Solar Array Panel 4 (Outboard) Cell- Side Temperature (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of the Cell-Side of Solar Panel 4 (Outboard Panel)
sc_at_flex_t (Chunked Dataset)	FLOAT (3, :)	SC-to-ATLAS Flexure Temperature (not_set)	degreesC ATL01/sc1/hk converted	SC Monitored Temperature of Mechanical I/F Flexure 1, 2 and 3
sc_e_bus_v (Chunked Dataset)	FLOAT (2, :)	SC Essential Bus Voltage (Sides A, B) (not_set)	volts ATL01/sc1/hk converted	SC Essential Bus Voltage measured by the SC PDU. (Sides A, B)

Group: /sc/inertial_measurement_unit

Description	(Attribute)	Contains parameters related to spacecraft IMU (Inertial Measurement Unit).		
data_rate	(Attribute)	Data within this main group are stored at the data rate of the source IMU within the Spacecraft Ancillary Science Data Packet. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	IMU delta time tag at the end of the IDL frame over which the integrated gyro angle data was collected 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_delta_time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
sync_event_ttag (Chunked Dataset)	DOUBLE (:)	IMU Sync Event Time Tag (not_set)	seconds ATL01/sc1/inertial_measurement_unit/hi_rate converted	IMU Time remaining on the countdown timer which triggers the IDL interrupt (between the event str the next IDL data packet). IMU time at the reception of the last IMU time sync pulse. This word cont that is recorded when the Event Strobe input to the SSIRU transitions to the active (low) state.

Group: /sc/inertial_measurement_unit/gyro_abcd

Description	(Attribute)	Contains parameters related to spacecraft IMU (Inertial Measurement Unit) gyros.		
data_rate	(Attribute)	Data within this main group are stored at the data rate of the source IMU high_rate data within the Spacecraft Ancillary Science Data Packet. (nominally fifty per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
gyro_angle (Chunked Dataset)	FLOAT (:)	IMU Gyro Integrated Angle Counter (Gyros A, B, C, D) (not_set)	degrees ATL01/sc1/inertial_measurement_unit/hi_rate converted	IMU integrated angle sensed by the SSIRU Gyro. The data word shall increment from 0 to full scale to zero for positive input rates about the Gyro input axis. The data word shall decrement from full scale to zero for negative input rates about the Gyro input axis.
gyro_rate_f (Chunked Dataset)	INTEGER_1 (:)	IMU Gyro Rate Valid (Gyros A, B, C, D) (not_set)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro Integrated Angular Rate data validity status. 0=invalid, 1=valid. flag_values: 0, 1 flag_meanings: invalid valid
gyro_sat_f (Chunked Dataset)	INTEGER_1 (:)	IMU Gyro Saturation Bit (Gyros A, B, C, D) (not_set)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro saturation mode: Force to Rebalance (FTR) Mode (The gyro operates in this mode during Whole Angle Saturation (WAS) Mode (The gyro operates in this mode during high inertial rates). flag_values: 0, 1 flag_meanings: ftr_mode was_mode
gyro_sca_f (Chunked Dataset)	INTEGER_1 (:)	IMU Gyro Scaling Factor (Gyros A, B, C, D) (not_set)	1 ATL01/sc1/inertial_measurement_unit/hi_rate	IMU Gyro scale factor mode: low scaling factor mode with the corresponding Integrated Angle word sec/LSB or high scaling factor with the corresponding Integrated Angle word being 1.6 arc-sec/LSB flag_values: 0, 1 flag_meanings: low_scale_factor high_scale_factor

Group: /sc/solar_array

Description	(Attribute)	Contains parameters related to solar array driver assembly.		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
azimuth_est (Chunked Dataset)	FLOAT (:)	SADA Azimuth Estimated Position (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth position used for ACS control
azimuth_meas_1 (Chunked Dataset)	FLOAT (:)	SADA Azimuth Measured Position (Pot 1) (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 1 (as reported)
azimuth_meas_2 (Chunked Dataset)	FLOAT (:)	SADA Azimuth Measured Position (Pot 2) (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 2 (as reported)
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	SC time at the initiation of the ACS task, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch

elev_est (Chunked Dataset)	FLOAT (:)	SADA Elevation Estimated Position (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation position used for ACS control
elev_meas_1 (Chunked Dataset)	FLOAT (:)	SADA Elevation Measured Position (Pot 1) (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 1 (as repr
elev_meas_2 (Chunked Dataset)	FLOAT (:)	SADA Elevation Measured Position (Pot 2) (not_set)	degrees ATL01/sc1/solar_array	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 2 (as repr
Group: /sc/star_tracker				
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etrcounter (Chunked Dataset)	UINT_2_BE (:)	ATM ETR Counter (not_set)	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) delay determine measurement time of reported ATM TLM with respect to SC-provided sync pulse; Addic measurement time in ticks of 20 usec from ETR.
atm_framecounter (Chunked Dataset)	UINT_2_BE (:)	ATM Frame Counter (not_set)	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) coun measurement time of reported ATM TLM with respect to SC-provided sync pulse; This item increm of the SC-provided sync pulse.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Time of the Star track subaddress 1 data, relative to the ATLAS SDP GPS Epoch and computed from raw_ace_time_sec/subseconds and etr_delay_tm1. The ATLAS Standard Data Products (SDP) epoch within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
etr_counter (Chunked Dataset)	UINT_2_BE (:)	STE Star Tracker ETR Counter (not_set)	counts ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - External Time Referenc to determine measurement time of reported STE/OH mode status with respect to SC-provided sync increments upon the reception of the SC-provided sync pulse - Sample 1-10
mode_status (Chunked Dataset)	UINT_2_BE (:)	STE Star Tracker Mode Status (not_set)	1 ATL01/sc2/star_tracker	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - Mode Status - Represe the STE software. 0 = Initialization 1 = Standby 2 = Memory Read 3 = Memory Write 4 = Self Test ! Rate 10 = Attitude Acquisition 11 = Attitude Tracking 14 = AOM/Attitude Acquisition Phase 15 = AO Phase All other values invalid flag_values: 0, 1, 2, 3, 4, 5, 9, 10, 11, 14, 15 flag_meanings: init sbty mem_read mem_write self_test photon angular_rate att_acq att_track aon
Group: /sc/star_tracker/optical_head_1				
Description	(Attribute)	Contains parameters related to spacecraft Star Tracker Optical Head 1 (STOH1).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etrcounter (Chunked Dataset)	UINT_2_LE (:)	ATM ETR Counter (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - External Time Reference (ETR) determine measurement time of reported quaternions with respect to SC- provided sync pulse; This the reception of the SC-provided sync pulse.
atm_framecounter (Chunked Dataset)	UINT_2_LE (:)	STOH1 ATM Frame Counter (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - Frame Counter
att_qa_x (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (X) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X)
att_qa_y (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (Y) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y)
att_qa_z (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (Z) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_1 converted	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z)
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Elapsed GPS seconds since the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and s_atm_etrcounter_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 (198 06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
n_stars (Chunked Dataset)	INTEGER_1 (:)	STOHx Number of Coherent Stars (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in ST
quaternion1 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion1 (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH refe Centered Inertial (ECI) reference frame
quaternion2 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion2 (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH refe Centered Inertial (ECI) reference frame
quaternion3 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion3 (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH refe Centered Inertial (ECI) reference frame
quaternion4 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion4 (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH refe Centered Inertial (ECI) reference frame
seq_mode_st (Chunked Dataset)	INTEGER_1 (:)	Sequencing Mode Status (not_set)	counts ATL01/sc2/star_tracker/optical_head_1	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) flag_values: 0, 1, 2, 3, 4, 5, 6, 7 flag_meanings: off standby photo acquire track autotest win_acq powered
Group: /sc/star_tracker/optical_head_2				
Description	(Attribute)	Contains parameters related to spacecraft Star Tracker Optical Head 2 (STOH2).		
data_rate	(Attribute)	Data within this group are stored at the data rate of the source Star Tracker data within the Spacecraft Ancillary Science Data Packets. (nominally ten per second.)		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_etrcounter (Chunked Dataset)	UINT_2_LE (:)	ATM ETR Counter (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - External Time Reference (ETR) determine measurement time of reported quaternions with respect to SC- provided sync pulse; This the reception of the SC-provided sync pulse
atm_framecounter (Chunked Dataset)	UINT_2_LE (:)	STOH2 ATM Frame Counter (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - Frame Counter
att_qa_x (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (X) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X)
att_qa_y (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (Y) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y)
att_qa_z (Chunked Dataset)	FLOAT (:)	STOH Attitude Quality (Z) (not_set)	arcsec ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z)
delta_time	DOUBLE	Elapsed GPS seconds	seconds since 2018-01-01	Elapsed GPS seconds from the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and s

(Chunked Dataset)	(:)	(time)	Derived via Time Tagging	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 (1998-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_delta_time_parameters, the time in gps_seconds relative to the GPS epoch can be computed.
n_stars (Chunked Dataset)	INTEGER_1 (:)	STOHx Number of Coherent Stars (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in ST
quaternion1 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion1 (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference Centered Inertial (ECI) reference frame
quaternion2 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion2 (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference Centered Inertial (ECI) reference frame
quaternion3 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion3 (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference Centered Inertial (ECI) reference frame
quaternion4 (Chunked Dataset)	DOUBLE (:)	STOH1 Quaternion4 (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference Centered Inertial (ECI) reference frame
seq_mode_st (Chunked Dataset)	INTEGER_1 (:)	Sequencing Mode Status (not_set)	counts ATL01/sc2/star_tracker/optical_head_2	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) indicates that the data could not be filled from the vc5 packets. flag_values: 0, 1, 2, 3, 4, 5, 6, 7 flag_meanings : off standby photo acquire track autotest win_acq powered