1.0 DATA DICTIONARY

The following subsections list the data content of ATL02. Each subsection corresponds to a HDF5 group on the data product. The ATLAS Standard Data Products are designed to be self-documenting and contain additional descriptive information not presented here. The descriptive information within the data dictionary is limited to preserve readability.

1.1.1 Attributes

short_name	ATL02
title	SET_BY_META
level	L1B
description	Science unit converted time ordered telemetry calibrated for instrument effects. All photon events per channel per transmit pulse. Includes Atmosphere raw profiles. Contains s/c location data.
Conventions	CF-1.6
citation	SET_BY_META
contributor_name	Thomas A 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	Instrument Engineer, Investigator, Principle Investigator, Data Producer, Data Producer
creator_name	SET_BY_META
data_rate	Data within this group pertain to the granule in its entirety.
date_created	SET_BY_PGE
date_type	UTC
featureType	trajectory
geospatial_lat_max	0.0
geospatial_lat_min	0.0
geospatial_lat_units	degrees_north
geospatial_lon_max	0.0

geospatial_lon_min	0.0
geospatial_lon_units	degrees_east
granule_type	ATL02
hdfversion	SET_BY_PGE
history	SET_BY_PGE
identifier_file_uuid	SET_BY_PGE
identifier_product_doi	10.5067/ATLAS/ATL02.001
identifier_product_doi_authority	http://dx.doi.org
identifier_product_format_version	SET_BY_PGE
identifier_product_type	ATL02
institution	SET_BY_META
instrument	SET_BY_META
keywords	SET_BY_META
keywords_vocabulary	SET_BY_META
license	Data may not be reproduced or distributed without including the citation for this product included in this metadata. Data may not be distributed in an altered form without the written permission of the ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	http://dx.doi.org
platform	SET_BY_META
processing_level	L1B
project	SET_BY_META
publisher_email	SET_BY_META
publisher_name	SET_BY_META
publisher_url	SET_BY_META
references	SET_BY_META
source	SET_BY_META
spatial_coverage_type	Horizontal

standard_name_vocabulary	CF-1.6
summary	SET_BY_META
time_coverage_duration	SET_BY_PGE
time_coverage_end	SET_BY_PGE
time_coverage_start	SET_BY_PGE
time_type	CCSDS UTC-A

1.2 Group: /ancillary_data

Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.

1.2.1 Attributes

data_rate	Data within this group pertain to the granule in its entirety.

1.2.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
atlas_sdp_gps_epoch	DOUBLE(1) -	seconds since 1980-01-06T00:00:00.000000Z	Number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch (2018-01-01:T00.00.00.000000 UTC). Add this value to delta time parameters to compute full gps_seconds (relative to the GPS epoch) for each data point. Source: Operations
control	STRING(1) -	1	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds. Source: Operations
data_end_utc	STRING(1) -	1	UTC (in CCSDS-A format) of the last data point within the granule. Source: Derived
data_start_utc	STRING(1) -	1	UTC (in CCSDS-A format) of the first data point within the granule. Source: Derived
end_cycle	INTEGER(1) -	1	The ending cycle number associated with the data contained within this granule. The cycle number is the counter of the number

Name Standard Name	Type(Dims) FillValue	Units	Description
			of 91-day repeat cycles completed by the mission. Source: Derived
end_delta_time time	DOUBLE(1) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch at the last data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: Derived
end_geoseg	INTEGER(1) -	1	The ending geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation. Source: Derived
end_gpssow	DOUBLE(1) -	seconds	GPS seconds-of-week of the last data point in the granule. Source: Derived
end_gpsweek	INTEGER(1) -	weeks from 1980-01-06	GPS week number of the last data point in the granule. Source: Derived
end_orbit	INTEGER(1) -	1	The ending orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth. Source: Derived
end_region	INTEGER(1) -	1	The ending product-specific region number associated with the data contained within this granule. ICESat-2 data products are

Name Standard Name	Type(Dims) FillValue	Units	Description
			separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent. Source: Derived
end_rgt	INTEGER(1) -	1	The ending reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle. Source: Derived
granule_end_utc	STRING(1) -	1	Requested end time (in UTC CCSDS-A) of this granule. Source: Derived
granule_start_utc	STRING(1) -	1	Requested start time (in UTC CCSDS-A) of this granule. Source: Derived
qa_at_interval	DOUBLE(1) -	1	Statistics time interval for along-track QA data. Source: control
release	STRING(1) -	1	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed. Source: Operations
start_cycle	INTEGER(1) -	1	The starting cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission. Source: Derived
start_delta_time time	DOUBLE(1) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch at the first data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in

Name Standard Name	Type(Dims) FillValue	Units	Description
			gps_seconds relative to the GPS epoch can be computed. Source: Derived
start_geoseg	INTEGER(1) -	1	The starting geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation. Source: Derived
start_gpssow	DOUBLE(1) -	seconds	GPS seconds-of-week of the first data point in the granule. Source: Derived
start_gpsweek	INTEGER(1) -	weeks from 1980-01-06	GPS week number of the first data point in the granule. Source: Derived
start_orbit	INTEGER(1) -	1	The starting orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth. Source: Derived
start_region	INTEGER(1) -	1	The starting product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent. Source: Derived
start_rgt	INTEGER(1) -	1	The starting reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack

Name Standard Name	Type(Dims) FillValue	Units	Description
			increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle. Source: Derived
version	STRING(1) -	1	Version number of this granule within the release. It is a sequential number corresponding to the number of times the granule has been reprocessed for the current release. Source: Operations

1.3 Group: /ancillary_data/calibrations

This group contains calibrations derived from the ATLAS CAL products.

1.3.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
ds_channel	INTEGER_1(20) -	1	Dimension scale for ATLAS PCE channels (1-16=strong, 17-20=weak) Source: Dimension Scale
ds_fine_counts	INTEGER_1(75) -	1	Dimension scale for ATLAS Time-of-flight fine counts. Source: Dimension Scale

1.4 Group: /ancillary_data/calibrations/dead_time

CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/shot, channel-to-channel basis.

1.4.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal42_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL42
side	INTEGER(1) -	1	A or B side of the detector bank Source: CAL42 Flags: 1()=A, 2()=B

Name Standard Name	Type(Dims) FillValue	Units	Description
temperature	FLOAT(1) -	degreesC	Temperature for which calibrations are provided. Source: CAL42

1.5 Group: /ancillary_data/calibrations/dead_time/pcex

CAL42 - Dead-time. Estimates dead time for each ATLAS receiver channel accompanied by an estimated standard deviation for that measurement. photoelectrons/spot/shot, channel-to-channel basis.

1.5.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
dead_time	DOUBLE(20) -	seconds	Dead Time (channel) Source: CAL42
sigma	DOUBLE(20) -	seconds	Sigma (channel) Source: CAL42

1.6 Group: /ancillary_data/calibrations/dead_time_radiometric_signal_loss

CAL34 - Dead-time Radiometric Signal Loss. Contains a table of radiometric corrections versus apparent return strength and width for several dead-time values. Correction is to be multiplied by raw return strength to get corrected return strength

1.6.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal34_product	STRING(:) -	1	Name of ATLAS CAL Products containing the calibration data Source: CAL34
dead_time	FLOAT(:) -	ns	Dead time value Source: CAL34
max_valid_stren_strong	DOUBLE(:, :) -	events/shot	Maximum valid strength (strong beam) for each apparent width. Source: CAL34
rad_corr	DOUBLE(:, :, :) -	1	Radiometric Correction (width, strength, deadtime) Source: CAL34

Name Standard Name	Type(Dims) FillValue	Units	Description
strength_strong	DOUBLE(:, :) -	events/shot	Strong spot strength in events/shot (strength, deadtime) Source: CAL34
strength_weak	DOUBLE(:, :) -	events/shot	Weak spot strength in events/shot (strength, deadtime) Source: CAL34
width	DOUBLE(:, :) -	ns	Apparent width (width, deadtime) Source: CAL34

1.7 Group: /ancillary_data/calibrations/effective_cell_delay

CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, and event edge (rising, falling).

1.7.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal17_product	STRING(:) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL17

1.8 Group: /ancillary_data/calibrations/effective_cell_delay/pcex

CAL17 - PCE Effective Cell Delay. Calibration product for PCE Unit Cell Delay -- a matrix of effective fine counts as a function of temperature, voltage, PCE card, channel, and event edge (rising, falling).

1.8.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal_fall	FLOAT(:) -	1	Cal_fall value which calibrations are provided (indexed by raw_cal_fall/256) Source: CAL17
cal_rise	FLOAT(:) -	1	Cal_rise value which calibrations are provided (index to raw_cal_rise/256) Source: CAL17
efc_fall	FLOAT(:, :, :) -	counts	Effective Rx falling fine cell count (cell, channel, temp) Source: CAL17

Name Standard Name	Type(Dims) FillValue	Units	Description
efc_ll	FLOAT(:, :) -	counts	Effective Tx fine cell count for leading lower (cell, temp) Source: CAL17
efc_ot	FLOAT(:, :) -	counts	Effective Tx fine cell count for other (cell, temp) Source: CAL17
efc_rise	FLOAT(:, :, :) -	counts	Effective rising Rx fine cell count (cell, channel, temp) Source: CAL17
temperature	FLOAT(:) -	degreesC	Temperature for which calibrations are provided. Source: CAL17

1.9 Group: /ancillary_data/calibrations/first_photon_bias

CAL19 -First Photon Bias. Provides a correction for first photon bias.

1.9.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal19_product	STRING(:) -	1	Name of ATLAS CAL Products containing the calibration data Source: Derived
dead_time	FLOAT(:) -	ns	Dead time value Source: Derived
ffb_corr	DOUBLE(:, :, :) -	1	First Photon Bias Correction (width, strength, deadtime) Source: Derived
max_valid_stren_strong	DOUBLE(:, :) -	ns	The maximum valid strength (strong beam) for each apparent width. Source: Derived
strength_strong	DOUBLE(:, :) -	events/shot	Strong spot strength in events/shot (strength, deadtime) Source: Derived
strength_weak	DOUBLE(:, :) -	events/shot	Weak spot strength in events/shot (strength, deadtime) Source: Derived
width	DOUBLE(:, :) -	ns	Apparent width (width, deadtime) Source: Derived

1.10 Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity

CAL46 - Relationship describing detector responsivity as the PMT high voltage deviates from nominal high voltage setting (V0).

1.10.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal46_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL46
side	INTEGER(1) -	1	A or B side of the detector bank Source: CAL46 Flags: 1()=A, 2()=B

1.11 Group: /ancillary_data/calibrations/hv_bias_receiver_radiometric_sensitivity/pcex

CAL46 - Per-PCE.

1.11.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
b_strong	FLOAT(1) -	1/v	Strong spot coefficient b Source: CAL46
b_weak	FLOAT(1) -	1/v	Weak spot coefficient b Source: CAL46
c_strong	FLOAT(1) -	1/v^2	Strong spot coefficient c Source: CAL46
c_weak	FLOAT(1) -	1/v^2	Weak spot coefficient c Source: CAL46
npoints_strong	FLOAT(1) -	1	Strong spot number of points Source: CAL46
npoints_weak	FLOAT(1) -	1	Weak spot number of points Source: CAL46
rnom_strong	FLOAT(1) -	1	Strong spot Rnom Source: CAL46
rnom_weak	FLOAT(1) -	1	Weak spot Rnom Source: CAL46

Name Standard Name	Type(Dims) FillValue	Units	Description
sigma_b_strong	FLOAT(1) -	1/v	Strong spot sigma of coefficient b Source: CAL46
sigma_b_weak	FLOAT(1) -	1/v	Weak spot sigma of coefficient b Source: CAL46
sigma_c_strong	FLOAT(1) -	1/v^2	Strong spot sigma of coefficient c Source: CAL46
sigma_c_weak	FLOAT(1) -	1/v^2	Weak spot sigma of coefficient c Source: CAL46
sigma_fit_strong	FLOAT(1) -	1	Strong spot sigma of fit Source: CAL46
sigma_fit_weak	FLOAT(1) -	1	Weak spot sigma of fit Source: CAL46
vnom_strong	FLOAT(1) -	v	Strong spot nominal voltage Source: CAL46
vnom_weak	FLOAT(1) -	v	Weak spot nominal voltage Source: CAL46

1.12 Group: /ancillary_data/calibrations/laser_energy_conversion

Contains CAL54 - absolute, energy monitor

1.12.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
base_temp	FLOAT(1) -	degC	Base temperature coefficient. Source: CAL54
cal54_product	STRING(1) -	1	Name of source file containing the calibration data Source: CAL54
internal	DOUBLE(8) -	1	Internal laser monitor coefficients (a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals) Source: CAL54
lrs	DOUBLE(8) -	1	LRS coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals Source: CAL54

Name Standard Name	Type(Dims) FillValue	Units	Description
spd	DOUBLE(8) -	1	SPD laser monitor coefficients a_(J),b0_(J/count),b1_(J/degC_count),c0_(J/count^2),c1_(J/degC_count^2),d_(J/count^3),e_(J/count^4),std_of_residuals Source: CAL54

1.13 Group: /ancillary_data/calibrations/laser_energy_fraction

Contains CAL45 data - Transmit Energy Fraction per Beam

1.13.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal45_product	STRING(1) -	1	Name of source file containing the calibration data Source: CAL45
energy_fract	FLOAT(6) -	1	Energy Fraction, Per Spot Source: CAL45
optics_throughput	FLOAT(3) -	1	Optics Throughput, Per PCE Source: CAL45

1.14 Group: /ancillary_data/calibrations/low_link_impulse_response

CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.

1.14.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
bin_width	FLOAT(1) -	seconds	Histogram bin width Source: CAL20
cal20_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL20
hist_x	DOUBLE(2000) -	1	Histogram bin x-values Source: CAL20
laser	INTEGER(1) -	1	Laser Number Source: CAL20

Name Standard Name	Type(Dims) FillValue	Units	Description
mode	INTEGER(1) -	1	Laser Power Setting Source: CAL20
num_bins	INTEGER(1) -	1	Number of bins in the histogram Source: CAL20
return_source	INTEGER(1) -	1	Source of the events from which the data are derived. Source: CAL20 Flags: 0()=none, 1()=tep, 2()=maat, 3()=echo
side	INTEGER(1) -	1	A or B Side Component Source: CAL20 Flags: 1()=A, 2()=B
temperature	FLOAT(1) -	degreesC	Temperature for which calibrations are provided. Source: CAL20

1.15 Group: /ancillary_data/calibrations/low_link_impulse_response/pcex

CAL20 - System low link impulse response. Calibrates receiver impulse response, including optical and electrically introduced reflections.

1.15.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
hist	DOUBLE(2000, 20) -	1	Per-Channel Histogram Source: CAL20
total_events	INTEGER_8(20) -	1	Number of events used in constructing the per-channel histogram Source: CAL20

1.16 Group: /ancillary_data/calibrations/nominal_rx_sensitivity

CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.

1.16.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal30_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL30

Name Standard Name	Type(Dims) FillValue	Units	Description
side	INTEGER(1) -	1	A or B side of the detector bank Source: CAL30 Flags: 1()=A, 2()=B

1.17 Group: /ancillary_data/calibrations/nominal_rx_sensitivity/pcex

CAL30 - Nominal Rx Sensitivity. Receiver radiometric sensitivity, in an absolute measurement, with all variables (temperature, bias, alignment) set to nominal values.

1.17.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
rms_resid_strong	DOUBLE(1) -	1	Strong spot RMS Residual fraction Source: CAL30
rms_resid_weak	DOUBLE(1) -	1	Weak spot RMS Residual fraction Source: CAL30
sdev_strong	DOUBLE(1) -	counts/s/pW	Strong spot standard deviation Source: CAL30
sdev_weak	DOUBLE(1) -	counts/s/pW	Weak spot standard deviation Source: CAL30
slope_strong	DOUBLE(1) -	counts/s/pW	Strong spot Slope Source: CAL30
slope_weak	DOUBLE(1) -	counts/s/pW	Weak spot Slope Source: CAL30

1.18 Group: /ancillary_data/calibrations/receiver_channel_skews

CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.

1.19 Group: /ancillary_data/calibrations/receiver_channel_skews/pcex

CAL49 - Receiver Channel Skews. Timing skews for every rising/fall channel on ATLAS.

1.19.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal49_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL49

Name Standard Name	Type(Dims) FillValue	Units	Description
side	INTEGER(1) -	1	Primary or Redundant Component Source: CAL49 Flags: 1()=PRIM, 2()=REDU
skew_fall	FLOAT(20) -	seconds	Per-channel skew (Fall) Source: CAL49
skew_fall_stderr	FLOAT(20) -	seconds	Standard error of the calculated skew (Fall) Source: CAL49
skew_rise	FLOAT(20) -	seconds	Per-channel skew (Rise) Source: CAL49
skew_rise_stderr	FLOAT(20) -	seconds	Standard error of the calculated skew (Rise) Source: CAL49
temperature	FLOAT(1) -	degreesC	Temperature for which calibrations are retrieved. Source: CAL49

1.20 Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment

CAL47 - Provides a calibration for Receiver Sensitivity as a function of Transmit-to-Receiver Beam Misalignment.

1.20.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal47_product	STRING(6) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL47_IMG
grid_spacing	FLOAT(1) -	microradians	GridSpacing Source: CAL47_IMG
temperature	FLOAT(1) -	degC	Reference temperature within the CAL47 product. Source: CAL47_IMG
x	DOUBLE(:) -	microradians	X Source: CAL47_IMG
x_grid_range	FLOAT(2) -	microradians	X Grid Range Source: CAL47_IMG
y	DOUBLE(:) -	microradians	Y Source: CAL47_IMG
y_grid_range	FLOAT(2) -	microradians	Y Grid Range Source: CAL47_IMG

1.21 Group: /ancillary_data/calibrations/rx_sensitivity_to_misalignment/pcex

CAL47 - Rx Sensitivity as a function of TX-to-IFOV Misalignments. Correlates the residual misalignment of the total 6 beams (given the single BSM AZ/El mirror) interspersed among AMCS calibrations, to apparent shifts in signal gain.

1.21.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
rel_intensity_strong	DOUBLE(:, :) -	1	Strong spot relative intensity Source: CAL47_IMG
rel_intensity_weak	DOUBLE(:, :) -	1	Weak spot relative intensity Source: CAL47_IMG

1.22 Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom

CAL61 - Rx Sensitivity vs. WTOM Ratio. Provides parameter values, for each spot, for the fit of Relative Sensitivity based on the reported WTEM through a quadratic curve.

1.22.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal61_product	STRING(1) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL61
laser	INTEGER(1) -	1	Laser Number Source: CAL61
mode	INTEGER(1) -	1	Laser Power Setting Source: CAL61
side	INTEGER(1) -	1	A or B side of the detector bank Source: CAL61 Flags: 1()=A, 2()=B
temperature	FLOAT(1) -	degreesC	Temperature for which calibrations are provided. Source: CAL61

1.23 Group: /ancillary_data/calibrations/rx_sensitivity_vs_wtom/pcex

CAL61 - Rx Sensitivity vs. WTOM Ratio. Calibration of receiver throughput as a function of the WTOM/WTEM diode signals (D1, D2) to indicate quality of the spectral tuning of the OFMs (etalons) for each receiver IFOV.

1.23.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
h_strong	DOUBLE(1) -	1	h_strong; used in Eqn 5-17. Source: CAL61
h_weak	DOUBLE(1) -	1	h_weak; used in Eqn 5-17. Source: CAL61
rms_of_fit_strong	DOUBLE(1) -	1	rms_of_fit_strong Source: CAL61
rms_of_fit_weak	DOUBLE(1) -	1	rms_of_fit_weak Source: CAL61
sdev_h_strong	DOUBLE(1) -	1	sdev_h_strong Source: CAL61
sdev_h_weak	DOUBLE(1) -	1	sdev_h_weak Source: CAL61
sdev_xpeak_strong	DOUBLE(1) -	1	sdev_xpeak_strong Source: CAL61
sdev_xpeak_weak	DOUBLE(1) -	1	sdev_xpeak_weak Source: CAL61
sdev_ypeak_strong	DOUBLE(1) -	counts/s	sdev_ypeak_strong Source: CAL61
sdev_ypeak_weak	DOUBLE(1) -	counts/s	sdev_ypeak_weak Source: CAL61
xpeak_strong	DOUBLE(1) -	1	xpeak_strong; used in Eqn 5-17. Source: CAL61
xpeak_weak	DOUBLE(1) -	1	xpeak_weak; used in Eqn 5-17. Source: CAL61
ypeak_strong	DOUBLE(1) -	counts/s	ypeak_strong Source: CAL61
ypeak_weak	DOUBLE(1) -	counts/s	ypeak_weak Source: CAL61

1.24 Group: /ancillary_data/calibrations/start_timing_skews

CAL44 - Start Timing Skews. Produces START pulse timing skews within & among PCEs to properly align all start pulse timing channels.

1.24.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal44_product	STRING(:) -	1	Name of ATLAS CAL Product containing the calibration data Source: CAL44
ll1	FLOAT(:) -	seconds	Leading Lower Skew, PCE1 Source: CAL44
ll2_ll1	FLOAT(:) -	seconds	LL2-LL1 Source: CAL44
ll3_ll1	FLOAT(:) -	seconds	LL3-LL1 Source: CAL44
lu_ll1	FLOAT(:) -	seconds	LU-LL1 Source: CAL44
side	INTEGER(1) -	1	A or B side of the Start Pulse Detector Source: CAL44 Flags: 1()=A, 2()=B
spd_temp	FLOAT(:) -	degreesC	SPD Temperature Source: CAL44
tl_ll3	FLOAT(:) -	seconds	TL-LL3 Source: CAL44
tu_ll2	FLOAT(:) -	seconds	TU-LL2 Source: CAL44

1.25 Group: /ancillary_data/housekeeping

Constants and calibrations related to ATLAS housekeeping data.

1.25.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
det_ab_flag	INTEGER(1) -	1	Indicates if the active detector (DET) is side A (1) or side B (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b
hvpc_ab_flag	INTEGER(1) -	1	Indicates if the active High Voltage Power Converter (HVPC) is side A (1) or side B (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b

Name Standard Name	Type(Dims) FillValue	Units	Description
laser_12_flag	INTEGER(1) -	1	Indicates if the active Laser is laser 1 or laser 2. Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=1, 2()=2
lrs_ab_flag	INTEGER(1) -	1	Indicates if the active LRS is side A (1) or side B (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b
pdu_ab_flag	INTEGER(1) -	1	Indicates if the active PDU is side a (1) or side b (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b
spd_ab_flag	INTEGER(1) -	1	Indicates if the active Start Pulse Detector (SPD) is side a (1) or side b (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b
tams_ab_flag	INTEGER(1) -	1	Indicates if the active TAMS is side a (1) or side b (2). Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 1()=a, 2()=b

1.26 Group: /ancillary_data/isf

Constants and calibrations provided by the ICESat-2 Instrument Support Facility (via ANC27)

1.26.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
bias_correct_x	DOUBLE(2) -	microradians	Correction to the center of BSM range: (x,y)=(8000,8000). Used to interpolate CAL 47 for return and background sensitivity calculations. Source: ANC27 (ATL02 ATBD - Small-signal Receiver Sensitivity)
bias_correct_y	DOUBLE(2) -	microradians	Correction to the center of BSM range: (x,y)=(8000,8000). Used to interpolate CAL 47 for return and background sensitivity calculations. Source: ANC27 (ATL02 ATBD - Small-signal Receiver Sensitivity)

Name Standard Name	Type(Dims) FillValue	Units	Description
bias_rate	DOUBLE(1) -	microradians/undefined_time	Currently a placeholder, not used in calculations. Source: ANC27 (ATL02 ATBD - Small-signal Receiver Sensitivity)
bias_time	DOUBLE(2) -	seconds since 2018-01-01	Times of surrounding AMCS bias corrections Source: ANC27 (ATL02 ATBD - Small-signal Receiver Sensitivity)
cal46_aging	DOUBLE(1) -	1	CAL46 Aging correction factor Source: ANC27 (ATL02 ATBD - Small-signal Receiver Sensitivity)
start_time_coeff	DOUBLE(4, 8) -	ns	Start time coefficients for TOF center correction (coefficent x scenario) Source: ANC27 (ATL02 ATBD - Calculation of Precise Start Time)
uso_freq_dev	DOUBLE(1) -	hz	USO frequency deviation; Used in Eqn 2-4. Source: ANC27 (ATL02 ATBD - Establishing the USO Ruler Clock)
wtom_alt_tune_corr	DOUBLE(1) -	1	W" in Eqn 5-15. Used only for alternate tuning; method for calculating not defined. Source: ANC27 (ATL02 ATBD - Return Sensitivity)
wtom_lambda_off	DOUBLE(1) -	1	WTOM Wavelength Offset. Currently zero. An "off-tuning" value to be used with alternate tuning; method for calculating not defined. Source: ANC27 (ATL02 ATBD - Return Sensitivity)
wtom_tune_flag	INTEGER(1) -	1	WTOM Tuning Flag (1=standard method, 2=alternate method) Source: ANC27 (ATL02 ATBD - Return Sensitivity) Flags: 1()=std, 2()=alt

1.27 Group: /ancillary_data/sc

Contains SC processing options.

1.27.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
ignore_gpsr_data_valid_f	INTEGER(1) -	1	Flag indicating that the GPSR data_valid_f should be ignored and all GPSR data retained. Source: Operations Flags: 0()=do_not_ignore, 1()=ignore
use_rel6_gyro	INTEGER(1) -	1	Flag indicating that the Release 006 gyro timetagging algorithm should be used. This algorithm does not use data from the prior ATL01 and does not attempt to handle data gaps. Source: Operations Flags: 0()=do_not_use, 1()=use

1.28 Group: /ancillary_data/tep

Contains ancillary values related to TEP detection.

1.28.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
tep_check_pce1	INTEGER(1) -	1	Flag indicating that the PCE1 strong channels should be checked for TEP events. Default value is 1 (indicating that TEP is possible on PCE1). A value of 0 indicates that PCE1 data are not examined for TEP. Source: ATL02 ATBD - Transmitter Echo Path Flags: 0()=do_not_check, 1()=check
tep_check_pce2	INTEGER(1) -	1	Flag indicating that the PCE2 strong channels should be checked for TEP events. Default value is 1 (indicating that TEP is possible on PCE2). A value of 0 indicates that PCE2 data are not examined for TEP. Source: ATL02 ATBD - Transmitter Echo Path Flags: 0()=do_not_check, 1()=check
tep_check_pce3	INTEGER(1) -	1	Flag indicating that the PCE3 strong channels should be checked for TEP events. Default value is 0 (indicating that TEP is not possible on PCE3). A value of 1 indicates that PCE3 data are examined for TEP (even though the hardware does not support this possibility). Source: ATL02 ATBD - Transmitter Echo Path Flags: 0()=do_not_check, 1()=check
thres_tep_max	DOUBLE(1) -	seconds	Maximum value used to classify TEP photons. Default value per ATBD is 100ns. (100e-9 sec) Source: ATL02 ATBD - Transmitter Echo Path

Name Standard Name	Type(Dims) FillValue	Units	Description
thres_tep_min	DOUBLE(1) -	seconds	Minimum value used to classify TEP photons. Default value per ATBD is 0ns. (0e-9 sec) Source: ATL02 ATBD - Transmitter Echo Path

1.29 Group: /ancillary_data/tod_tof

Contains ancillary parameters related to Time-of-Flight and/or Time-of-Day calculations.

1.29.1 Attributes

data_rate	Data within this group pertain to the granule in its entirety.

1.29.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal_risefall_box_int	DOUBLE(1) -	counts	Boxcar averaging interval for cal_risefall averaging, in major-frame counts. Boxcar averages are using to generate 1D spline coefficients. The spline coefficients are used to create smoothed, interpolated cal_risefall values at the full data rate. Source: ATL02 ATBD - Calculation of Transmit Event Fine Time
cal_uso_scale	DOUBLE(1) -	1	Calibration value for the Ultra Stable Oscillator (USO). Computed using the number of coarse clock ticks measurement generated by the USO between sequential 1PPS time stamps from the on-orbit GPS to estimate the coarse clock ruler scale factor. Source: ATL02 ATBD - Establishing the USO Ruler Clock
corr_rx_coarse_pce1	INTEGER(20) -	counts	Correction for the PCE1 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1. Source: ATL02 ATBD - Calculation of Receive Coarse Time
corr_rx_coarse_pce2	INTEGER(20) -	counts	Correction for the PCE2 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1.

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Calculation of Receive Coarse Time
corr_rx_coarse_pce3	INTEGER(20) -	counts	Correction for the PCE3 Receive coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles (for each channel). Default value is -1. Source: ATL02 ATBD - Calculation of Receive Coarse Time
corr_tx_coarse_pce1	INTEGER(1) -	counts	Correction for the PCE1 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1. Source: ATL02 ATBD - Calculation of Leading Lower Start Event Coarse Time
corr_tx_coarse_pce2	INTEGER(1) -	counts	Correction for the PCE2 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1. Source: ATL02 ATBD - Calculation of Leading Lower Start Event Coarse Time
corr_tx_coarse_pce3	INTEGER(1) -	counts	Correction for the PCE3 Transmit coarse clock offset. This corrects for the offset between the actual number of coarse clock cycles and the reported number of coarse clock cycles. Default value is -1. Source: ATL02 ATBD - Calculation of Leading Lower Start Event Coarse Time
discard_short_mframes	INTEGER(1) -	1	If TRUE, discard the photons associated with major frames containing less than 199 Tx. Source: ATL02 ATBD - Calculation of Event Time of Day
dt_imet	DOUBLE(1) -	seconds/count	IMET clock tick. Source: ATL02 ATBD - Clocks and Timing Relationship
dt_t0	DOUBLE(1) -	seconds/count	T0 clock tick. Source: ATL02 ATBD - Clocks and Timing Relationship
dt_uso	DOUBLE(1) -	seconds/count	The AMET clock tick Source: ATL02 ATBD - Clocks and Timing Relationship
dupe_fc_tol	FLOAT(1) -	counts	Tolerance used when comparing fine counts within duplicate detection

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Identification of Duplicate Return-event Time Tags
lrs_clock	DOUBLE(1) -	seconds/count	The nominal rate of the LRS internal 27 MHz oscillator (divided by 32). Source: ATL02 ATBD - Assignment of delta_time for Non-Altimetric Science Data
min_conf	INTEGER(1) -	1	Minimum TxRx histogram confidence level to fail a granule. Source: ATL02 ATBD - Dealing with transmit/receiver slips
repair_txrx_slip	INTEGER(1) -	1	If TRUE, attempt to repair any detected TXRX slip. Source: ATL02 ATBD - Dealing with transmit/receiver slips
tof_bin_size	DOUBLE(1) -	seconds	Binsize of peak-aligned, windowed TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receiver slips
tof_extracted_s	DOUBLE(1) -	seconds	Duration of peak-aligned, windowed TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receiver slips
tof_lower_win_ctr	DOUBLE(1) -	seconds	Center of the lower TxRx slip detection window within the peak-aligned, windowed TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receiver slips
tof_upper_win_ctr	DOUBLE(1) -	seconds	Center of the upper TxRx slip detection window within the peak-aligned, windowed TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receiver slips
tof_win_size	DOUBLE(1) -	seconds	Size of the TxRx slip detection windows within the peak-aligned, windowed TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receiver slips
use_tep_math	INTEGER(1) -	1	If TRUE, the TEP groups contain all photons computed with TEP math. This is a special debug mode for ATLAS calibration use. Source: Operations

1.30 Group: /atlas

Group contains the ATLAS EU-converted data

1.30.1 Attributes

data_rate	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).

1.31 Group: /atlas/housekeeping

Group contains the ATLAS EU-converted housekeeping data

1.31.1 Attributes

data_rate	Data within this group are stored at the nominal rate of the corresponding ATLAS APIDs (varies per APID).

1.32 Group: /atlas/housekeeping/laser_energy_internal

Internal laser energy from APID 1032 SLA_HK. Packet Frequency is 1 Hertz.

1.32.1 Attributes

data_rate	Data within this group are provided at the packet rate of 1hz.

1.32.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections) Source: ATL02 ATBD - Transmitted Energy
e_tx	FLOAT(:) -	joules	Total laser energy derived from the internal laser energy monitor (APID 1032). Source: ATL02 ATBD - Transmitted Energy
e_tx_pce1_s	FLOAT(:) -	joules	Laser energy for the PCE1 strong spot, derived from the internal laser energy monitor and split by calibration. Source: ATL02 ATBD - Transmitted Energy

Name Standard Name	Type(Dims) FillValue	Units	Description
e_tx_pce1_w	FLOAT(:) -	joules	Laser energy for the PCE1 weak spot, derived from the internal laser energy monitor and split by calibration. Source: ICESat-2 L1B ATBD, Section 5.2, Transmitted Energy
e_tx_pce2_s	FLOAT(:) -	joules	Laser energy for the PCE2 strong spot, derived from the internal laser energy monitor and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce2_w	FLOAT(:) -	joules	Laser energy for the PCE2 weak spot, derived from the internal laser energy monitor and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_s	FLOAT(:) -	joules	Laser energy for the PCE3 strong spot, derived from the internal laser energy monitor and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_w	FLOAT(:) -	joules	Laser energy for the PCE3 weak spot, derived from the internal laser energy monitor and split by calibration. Source: ATL02 ATBD - Transmitted Energy
laser_mode	INTEGER_1(:) -	1	Laser Mode setting reported in A_SLA_HK (APID 1032). Source: ATL02 ATBD - Transmitted Energy
laser_temp	FLOAT(:) -	degreesC	Laser Temperature. From SLA_HK Telemetry packet (APID 1032, Laser Cmd Code 0xFE LAS-14, raw_lem_temp). Source: ATL02 ATBD - Transmitted Energy

1.33 Group: /atlas/housekeeping/laser_energy_lrs

Laser energy derived from LRS Centroid Magnitudes. Packet Frequency is 50 Hertz.

1.33.1 Attributes

data_rate	Data within this group are provided at the packet rate of 50hz.

1.33.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within

Name Standard Name	Type(Dims) FillValue	Units	Description
		2018-01-01	/ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections) Source: ATL02 ATBD - Transmitted Energy
e_tx	FLOAT(:) INVALID_R4B	joules	Total laser energy from derived from LRS laser centroid magnitudes. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce1_s	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE1 strong spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce1_w	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE1 weak spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce2_s	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE2 strong spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce2_w	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE2 weak spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_s	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE3 strong spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_w	FLOAT(:) INVALID_R4B	joules	Laser energy for the PCE3 weak spot, derived from LRS laser centroids and split by calibration. Source: ATL02 ATBD - Transmitted Energy
lrs_temp	FLOAT(:) INVALID_R4B	degreesC	LRS Temperature. From A_HKT_C Telemetry packet Source: ATL02 ATBD - Transmitted Energy

1.34 Group: /atlas/housekeeping/laser_energy_spd

Laser energy from APID 1063 Analog HK Telemetry. Packet Frequency is 1 Hertz.

1.34.1 Attributes

data_rate	Data within this group are provided at the packet rate of 1hz.

1.34.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections) Source: ATL02 ATBD - Transmitted Energy
ds_10	INTEGER_1(10) -	1	Dimension scale for10 measurements. Source: Dimension Scale
e_tx	FLOAT(:, :) -	joules	Total laser energy from Analog HK Telemetry packet E (APID 1063). Source: ATL02 ATBD - Transmitted Energy
e_tx_pce1_s	FLOAT(:, :) -	joules	Laser energy for the PCE1 strong spot, derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce1_w	FLOAT(:, :) -	joules	Laser energy for the PCE1 weak spot derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce2_s	FLOAT(:, :) -	joules	Laser energy for the PCE2 strong spot, derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce2_w	FLOAT(:, :) -	joules	Laser energy for the PCE2 weak spot, derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_s	FLOAT(:, :) -	joules	Laser energy for the PCE3 strong spot, derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy
e_tx_pce3_w	FLOAT(:, :) -	joules	Laser energy for the PCE3 weak spot, derived from the analog HK telemetry and split by calibration. Source: ATL02 ATBD - Transmitted Energy

Name Standard Name	Type(Dims) FillValue	Units	Description
edge_xmtnc	FLOAT(:) -	mV	edge_xmtnc. From Analog HK Telemetry packet E (APID 1063). Source: ATL02 ATBD - Transmitted Energy
laser_temp	FLOAT(:) -	degreesC	Laser Temperature. From A_HKT_C PRIMARY SPD THERMISTOR MED_34 chan[74] or REDUNDANT SPD THERMISTOR MED_35 chan[81] Source: ATL02 ATBD - Transmitted Energy
peak_xmtnc	FLOAT(:) -	mV	peak_xmtnc. From Analog HK Telemetry packet E (APID 1063). Source: ATL02 ATBD - Transmitted Energy
thrhi_rdbk	FLOAT(:) -	volts	Start Pulse Detector (SPD) upper threshold readback value. Reported as an analog voltage whose nominal setting puts the threshold at 80% of full laser energy. From Analog HK Telemetry packet E (APID 1063). Source: ATL02 ATBD - Transmitted Energy
thrlo_rdbk	FLOAT(:) -	volts	Start Pulse Detector (SPD) lower threshold readback value. Reported as an analog voltage whose nominal setting puts the threshold at 20% of full laser energy. From Analog HK Telemetry packet E (APID 1063). Source: ATL02 ATBD - Transmitted Energy

1.35 Group: /atlas/housekeeping/mce_position

MCE Position A/D Packet. Packet Frequency is 200 in Hertz.

1.35.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID. (Nominally 200HZ).

1.35.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds

Name Standard Name	Type(Dims) FillValue	Units	Description
			relative to the GPS epoch can be computed. Source: ATL02 ATBD MCE HKT Data
ds_50	INTEGER_1(50) -	1	Dimension scale for 50 measurements. Source: Dimension Scale
mce_az	FLOAT(:, :) -	microradians	MCE azimuth values. Source: ATL02 ATBD MCE HKT Data
mce_el	FLOAT(:, :) -	microradians	MCE elevation values. Source: ATL02 ATBD MCE HKT Data
mce_total_cycles	UINT_4_LE(:) -	counts	MCE reported total number of cycles Source: ATL02 ATBD MCE HKT Data

1.36 Group: /atlas/housekeeping/meb

Data from APID 1062 Analog HK Telemetry. Packet Frequency is 1 in Hertz. Voltage and current data

1.36.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).

1.36.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ground_check	FLOAT(:) -	counts	Ground check - A_HKT_D.chan[30] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5v_asc_v	FLOAT(:) -	volts	1P5VTLM-ASC - A_HKT_D.chan[22] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_meb_1p5v_mon_v	FLOAT(:) -	volts	HKT 1.5V Monitor - A_HKT_D.chan[5] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5va_pce1_v	FLOAT(:) -	volts	1P5VATLM-PCE1 - A_HKT_D.chan[23] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5va_pce2_v	FLOAT(:) -	volts	1P5VATLM-PCE2 - A_HKT_D.chan[16] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5va_pce3_v	FLOAT(:) -	volts	1P5VATLM-PCE3 - A_HKT_D.chan[17] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5vb_pce1_v	FLOAT(:) -	volts	1P5VBTLM-PCE1 - A_HKT_D.chan[24] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5vb_pce2_v	FLOAT(:) -	volts	1P5VBTLM-PCE2 - A_HKT_D.chan[25] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_1p5vb_pce3_v	FLOAT(:) -	volts	1P5VBTLM-PCE3 - A_HKT_D.chan[18] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_2p5v_pce1_v	FLOAT(:) -	volts	2P5VTLM-PCE1 - A_HKT_D.chan[19] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_2p5v_pce2_v	FLOAT(:) -	volts	2P5VTLM-PCE2 - A_HKT_D.chan[26] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_2p5v_pce3_v	FLOAT(:) -	volts	2P5VTLM-PCE3 - A_HKT_D.chan[27] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_3p3i_lvpc_i	FLOAT(:) -	amps	3P3ITLM-LVPC - A_HKT_D.chan[12] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_3p3v_mon_v	FLOAT(:) -	volts	3.3V Monitor - A_HKT_D.chan[6] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_5p0i_lvpc_i	FLOAT(:) -	amps	5P0ITLM-LVPC - A_HKT_D.chan[13] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_5p0i_sbc_i	FLOAT(:) -	amps	5P0I_SBC_TLM - A_HKT_D.chan[28] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_meb_5p0v_sbc_v	FLOAT(:) -	volts	5P0V_SBC_TLM - A_HKT_D.chan[29] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_cal_n35p9_t	FLOAT(:) -	degreesC	CAL -35.9 - A_HKT_D.chan[3] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_cal_n62p5_t	FLOAT(:) -	degreesC	CAL -62.5 - A_HKT_D.chan[4] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_cal_n6p6_t	FLOAT(:) -	degreesC	CAL -6.6 - A_HKT_D.chan[2] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_cal_p25_t	FLOAT(:) -	degreesC	CAL +25 - A_HKT_D.chan[1] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_cal_p65p3_t	FLOAT(:) -	degreesC	CAL +65.3 - A_HKT_D.chan[0] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_i_uso_i	FLOAT(:) -	amps	ITLM-USO - A_HKT_D.chan[15] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_n15p0i_lvpc_i	FLOAT(:) -	amps	15P0I_NEG_TLM-LVPC - A_HKT_D.chan[21] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_n15v_mon_v	FLOAT(:) -	volts	-15V Monitor - A_HKT_D.chan[10] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_n5a_mon_v	FLOAT(:) -	volts	HKT -5A Monitor - A_HKT_D.chan[11] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_p15p0i_lvpc_i	FLOAT(:) -	amps	15P0I_POS_TLM-LVPC - A_HKT_D.chan[20] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_p15v_mon_v	FLOAT(:) -	volts	+15V Monitor - A_HKT_D.chan[9] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_p5a_mon_v	FLOAT(:) -	volts	HKT +5A Monitor - A_HKT_D.chan[8] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_p5d_mon_v	FLOAT(:) -	volts	+5D Monitor - A_HKT_D.chan[7] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_meb_v_uso_v	FLOAT(:) -	volts	VTLM-USO - A_HKT_D.chan[14] Source: ATL02 ATBD - Thermal & Electrical HKT Data

1.37 Group: /atlas/housekeeping/pdu

PDU Analog HK Telemetry. The PDU analog telemetry digitized by the HKT card and collected by the SBC Thermal Control Task. Packet Frequency is 1 in Hertz. Data is from the APID 1059 (Primary) or APID 1060 (Redundant) HK packets.

1.37.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).

1.37.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP GPS Epoch. This is computed based on the housekeeping design to sample a measurement every 0.003125 seconds from the internal ASC 1PPS . The time for this packet is set as the time of the lowest software channel number in this telemetry packet. If the specific time is needed add to it the difference of its actual ATLAS hardware channel number from the lowest software channel number times the 0.003125 seconds. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_mod_1	FLOAT(:) -	volts	HVPC Module 1 - A_HKT.chan[70] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_mod_2	FLOAT(:) -	volts	HVPC Module 2 - A_HKT.chan[71] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hvpc_mod_3	FLOAT(:) -	volts	HVPC Module 3 - A_HKT.chan[72] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_mod_4	FLOAT(:) -	volts	HVPC Module 4 - A_HKT.chan[73] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_mod_5	FLOAT(:) -	volts	HVPC Module 5 - A_HKT.chan[74] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_mod_6	FLOAT(:) -	volts	HVPC Module 6 - A_HKT.chan[75] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_tlm_6	FLOAT(:) -	volts	HVPC TLM 6 - A_HKT.chan[76] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpc_tlm_7	FLOAT(:) -	volts	HVPC TLM 7 - A_HKT.chan[77] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_daa_opts_htr_i	FLOAT(:) -	amps	PDU DAA OPTS HTR I - A_HKT.chan[46] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_det_i	FLOAT(:) -	amps	PDU DET I - A_HKT.chan[23] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_det_v	FLOAT(:) -	volts	PDU DET V - A_HKT.chan[17] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_hvpc_i	FLOAT(:) -	amps	PDU HVPC I - A_HKT.chan[24] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_laser_1_i	FLOAT(:) -	amps	PDU LASER 1 I - A_HKT.chan[21] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_laser_1_v	FLOAT(:) -	volts	PDU LASER 1 V - A_HKT.chan[14] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_laser_2_i	FLOAT(:) -	amps	PDU LASER 2 I - A_HKT.chan[22] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_laser_2_v	FLOAT(:) -	volts	PDU LASER 2 V - A_HKT.chan[15] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdu_lhp1_i	FLOAT(:) -	amps	PDU LHP1 I - A_HKT.chan[43] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_lhp2_i	FLOAT(:) -	amps	PDU LHP2 I - A_HKT.chan[44] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_lhp_startup_htr_i	FLOAT(:) -	amps	PDU LHP STARTUP HTR I - A_HKT.chan[42] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_lrs_i	FLOAT(:) -	amps	PDU LRS I - A_HKT.chan[25] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_lrs_opts_heater_i	FLOAT(:) -	amps	PDU LRS OPTS HEATER I - A_HKT.chan[45] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_meb_lvpc_i	FLOAT(:) -	amps	PDU MEB LVPC I - A_HKT.chan[26] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_meb_lvpc_v	FLOAT(:) -	volts	PDU MEB LVPC V - A_HKT.chan[16] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem1_i	FLOAT(:) -	amps	PDU N3V DEM1 I - A_HKT.chan[52] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem1_v	FLOAT(:) -	volts	PDU N3V DEM1 V - A_HKT.chan[2] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem2_i	FLOAT(:) -	amps	PDU N3V DEM2 I - A_HKT.chan[63] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem2_v	FLOAT(:) -	volts	PDU N3V DEM2 V - A_HKT.chan[5] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem3_i	FLOAT(:) -	amps	PDU N3V DEM3 I - A_HKT.chan[55] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem3_v	FLOAT(:) -	volts	PDU N3V DEM3 V - A_HKT.chan[8] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem4_i	FLOAT(:) -	amps	PDU N3V DEM4 I - A_HKT.chan[66] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdu_n3v_dem5_i	FLOAT(:) -	amps	PDU N3V DEM5 I - A_HKT.chan[58] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem5_v	FLOAT(:) -	volts	PDU N3V DEM5 V - A_HKT.chan[11] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_n3v_dem6_i	FLOAT(:) -	amps	PDU N3V DEM6 I - A_HKT.chan[69] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_ofa_n12v_v	FLOAT(:) -	volts	PDU OFA N12V V - A_HKT.chan[13] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_ofa_p12v_i	FLOAT(:) -	amps	PDU OFA P12V I - A_HKT.chan[59] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_ofa_p12v_v	FLOAT(:) -	volts	PDU OFA P12V V - A_HKT.chan[12] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem1_i	FLOAT(:) -	amps	PDU P3P3V DEM1 I - A_HKT.chan[51] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem1_v	FLOAT(:) -	volts	PDU P3P3V DEM1 V - A_HKT.chan[1] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem2_i	FLOAT(:) -	amps	PDU P3P3V DEM2 I - A_HKT.chan[62] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem2_v	FLOAT(:) -	volts	PDU P3P3V DEM2 V - A_HKT.chan[4] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem3_i	FLOAT(:) -	amps	PDU P3P3V DEM3 I - A_HKT.chan[54] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem3_v	FLOAT(:) -	volts	PDU P3P3V DEM3 V - A_HKT.chan[7] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem4_i	FLOAT(:) -	amps	PDU P3P3V DEM4 I - A_HKT.chan[65] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem5_i	FLOAT(:) -	amps	PDU P3P3V DEM5 I - A_HKT.chan[57] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdu_p3p3v_dem5_v	FLOAT(:) -	volts	PDU P3P3V DEM5 V - A_HKT.chan[10] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p3p3v_dem6_i	FLOAT(:) -	amps	PDU P3P3V DEM6 I - A_HKT.chan[68] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem1_i	FLOAT(:) -	amps	PDU P5V DEM1 I - A_HKT.chan[50] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem1_v	FLOAT(:) -	volts	PDU P5V DEM1 V - A_HKT.chan[0] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem2_i	FLOAT(:) -	amps	PDU P5V DEM2 I - A_HKT.chan[61] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem2_v	FLOAT(:) -	volts	PDU P5V DEM2 V - A_HKT.chan[3] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem3_i	FLOAT(:) -	amps	PDU P5V DEM3 I - A_HKT.chan[53] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem3_v	FLOAT(:) -	volts	PDU P5V DEM3 V - A_HKT.chan[6] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem4_i	FLOAT(:) -	amps	PDU P5V DEM4 I - A_HKT.chan[64] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem5_i	FLOAT(:) -	amps	PDU P5V DEM5 I - A_HKT.chan[56] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem5_v	FLOAT(:) -	volts	PDU P5V DEM5 V - A_HKT.chan[9] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_p5v_dem6_i	FLOAT(:) -	amps	PDU P5V DEM6 I - A_HKT.chan[67] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_pwm_tlsp_pri_i	FLOAT(:) -	amps	PDU PWM TLSP PRI I - A_HKT.chan[39] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_pwm_tlsp_sec_i	FLOAT(:) -	amps	PDU PWM TLSP SEC I - A_HKT.chan[40] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdu_pwm_tlsp_tower_i	FLOAT(:) -	amps	PDU PWM TLSP TOWER I - A_HKT.chan[41] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spare_1_v	FLOAT(:) -	volts	PDU SPARE 1 V - A_HKT.chan[27] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spare_2_v	FLOAT(:) -	volts	PDU SPARE 2 V - A_HKT.chan[28] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spare_3_v	FLOAT(:) -	volts	PDU SPARE 3 V - A_HKT.chan[29] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spare_4_v	FLOAT(:) -	volts	PDU SPARE 4 V - A_HKT.chan[30] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spare_5_v	FLOAT(:) -	counts	A_PDU_SPARE_5_V - HKT.chan[60] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_n5v_i	FLOAT(:) -	amps	PDU SPD N5V I - A_HKT.chan[48] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_n5v_v	FLOAT(:) -	volts	PDU SPD N5V V - A_HKT.chan[19] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_p3p3v_i	FLOAT(:) -	amps	PDU SPD P3P3V I - A_HKT.chan[49] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_p3p3v_v	FLOAT(:) -	volts	PDU SPD P3P3V V - A_HKT.chan[20] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_p5v_i	FLOAT(:) -	amps	PDU SPD P5V I - A_HKT.chan[47] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_spd_p5v_v	FLOAT(:) -	volts	PDU SPD P5V V - A_HKT.chan[18] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tams_i	FLOAT(:) -	amps	PDU TAMS I - A_HKT.chan[31] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr1_i	FLOAT(:) -	amps	PDU TCS OFA HTR1 I - A_HKT.chan[32] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdu_tcs_ofa_htr2_i	FLOAT(:) -	amps	PDU TCS OFA HTR2 I - A_HKT.chan[33] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr3_i	FLOAT(:) -	amps	PDU TCS OFA HTR3 I - A_HKT.chan[34] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr4_i	FLOAT(:) -	amps	PDU TCS OFA HTR4 I - A_HKT.chan[35] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr5_i	FLOAT(:) -	amps	PDU TCS OFA HTR5 I - A_HKT.chan[36] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr6_i	FLOAT(:) -	amps	PDU TCS OFA HTR6 I - A_HKT.chan[37] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdu_tcs_ofa_htr7_i	FLOAT(:) -	amps	PDU TCS OFA HTR7 I - A_HKT.chan[38] Source: ATL02 ATBD - Thermal & Electrical HKT Data

1.38 Group: /atlas/housekeeping/pointing

APID 1138 ATLAS Pointing Message- Spacecraft Attitude and Rates Packet - Relayed to SSR. Packet Frequency is by command.

1.38.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).

1.38.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
q_sc_i2b_1	DOUBLE(:) -	1	SC Inertial to ATLAS Body Frame quaternion 1 Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
q_sc_i2b_2	DOUBLE(:) -	1	SC Inertial to ATLAS Body Frame quaternion 2 Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
q_sc_i2b_3	DOUBLE(:) -	1	SC Inertial to ATLAS Body Frame quaternion 3 Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
q_sc_i2b_4	DOUBLE(:) -	1	SC Inertial to ATLAS Body Frame quaternion 4 Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
sc_solution_sec	UINT_4_LE(:) -	seconds	Recorded time of the pointing solution in seconds from the spacecraft epoch Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
sc_solution_subsec	UINT_4_LE(:) -	subseconds	Spacecraft recorded time counts - 24 bits, 100 ns per count Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
x_sc_body_rate	DOUBLE(:) -	radians/second	SC body rate as measured about the X axis in the ATLAS frame Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
y_sc_body_rate	DOUBLE(:) -	radians/second	SC body rate as measured about the Y axis in the ATLAS frame Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
z_sc_body_rate	DOUBLE(:) -	radians/second	SC body rate as measured about the Z axis in the ATLAS frame Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data

1.39 Group: /atlas/housekeeping/position_velocity

APID 1137 ATLAS Position Message-Spacecraft Position and Velocity Packet - Relayed to SSR. Packet Frequency is in Hertz.

1.39.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).

1.39.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
sc_solution_sec	UINT_4_LE(:) -	seconds	Recorded time of the position/velocity solution in seconds from the spacecraft epoch Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
sc_solution_subsec	UINT_4_LE(:) -	seconds	Spacecraft recorded time counts - 24 bits, 100 ns per count Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
x_sc_eci_pos	DOUBLE(:) -	meters	Spacecraft Earth-Centered-Inertial Position: X axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
x_sc_eci_vel	DOUBLE(:) -	meters/second	Spacecraft Earth-Centered-Inertial Velocity: X axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
y_sc_eci_pos	DOUBLE(:) -	meters	Spacecraft Earth-Centered-Inertial Position: Y axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
y_sc_eci_vel	DOUBLE(:) -	meters/second	Spacecraft Earth-Centered-Inertial Velocity: Y axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
z_sc_eci_pos	DOUBLE(:) -	meters	Spacecraft Earth-Centered-Inertial Position: Z axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data
z_sc_eci_vel	DOUBLE(:) -	meters/second	Spacecraft Earth-Centered-Inertial Velocity: Z axis Source: ATL02 ATBD - Pointing, Position, & Velocity HKT Data

1.40 Group: /atlas/housekeeping/radiometry

The radiometry group contains background and receiver sensitivity

1.40.1 Attributes

data_rate	Data within this group are stored at the data rate of one hertz.

1.40.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
bg_sensitivity_pce1_s	FLOAT(:) -	events/s/Watt	PCE1, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
bg_sensitivity_pce1_w	FLOAT(:) -	events/s/Watt	PCE1, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
bg_sensitivity_pce2_s	FLOAT(:) -	events/s/Watt	PCE2, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
bg_sensitivity_pce2_w	FLOAT(:) -	events/s/Watt	PCE2, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
bg_sensitivity_pce3_s	FLOAT(:) -	events/s/Watt	PCE3, Strong spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
bg_sensitivity_pce3_w	FLOAT(:) -	events/s/Watt	PCE3, Weak spot - receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects. Source: ATL02 ATBD - Background Sensitivity
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the

Name Standard Name	Type(Dims) FillValue	Units	Description
			offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. The timestamp is computed based on the housekeeping design to sample laser near the asc 1pps internal pulse. (See the L1B ATBD section 5 Radiometric Corrections) Source: ATL02 ATBD - Small-signal Receiver Sensitivity
ret_sensitivity_pce1_s	FLOAT(:) -	events/s/Watt	PCE1, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity
ret_sensitivity_pce1_w	FLOAT(:) -	events/s/Watt	PCE1, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity
ret_sensitivity_pce2_s	FLOAT(:) -	events/s/Watt	PCE2, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity
ret_sensitivity_pce2_w	FLOAT(:) -	events/s/Watt	PCE2, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity
ret_sensitivity_pce3_s	FLOAT(:) -	events/s/Watt	PCE3, Strong spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity
ret_sensitivity_pce3_w	FLOAT(:) -	events/s/Watt	PCE3, Weak spot - receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. Source: ATL02 ATBD - Return Sensitivity

1.41 Group: /atlas/housekeeping/status

Flags parsed from HKT Status Registers Housekeeping Packet. Packet Frequency is 1 in Hertz.

1.41.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).

1.41.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Status HKT Data
pdua_daa_opt	INTEGER_1(:) -	counts	PDUA_DAA_OPT status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_det_ps	INTEGER_1(:) -	counts	PDUA_DET_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_hvpc	INTEGER_1(:) -	counts	PDUA_HVPC status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_laser_1	INTEGER_1(:) -	counts	PDUA_LASER_1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_laser_2	INTEGER_1(:) -	counts	PDUA_LASER_2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_lhp1	INTEGER_1(:) -	counts	PDUA_LHP1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_lhp2	INTEGER_1(:) -	counts	PDUA_LHP2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_lhp_startup	INTEGER_1(:) -	counts	PDUA_LHP_STARTUP status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_lrs	INTEGER_1(:) -	counts	PDUA_LRS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_lrs_opt	INTEGER_1(:) -	counts	PDUA_LRS_OPT status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off

Name Standard Name	Type(Dims) FillValue	Units	Description
pdua_ofa1	INTEGER_1(:) -	counts	PDUA_OFA1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa2	INTEGER_1(:) -	counts	PDUA_OFA2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa3	INTEGER_1(:) -	counts	PDUA_OFA3 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa4	INTEGER_1(:) -	counts	PDUA_OFA4 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa5	INTEGER_1(:) -	counts	PDUA_OFA5 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa6	INTEGER_1(:) -	counts	PDUA_OFA6 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa7	INTEGER_1(:) -	counts	PDUA_OFA7 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_ofa_ps	INTEGER_1(:) -	counts	PDUA_OFA_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_pri_mir	INTEGER_1(:) -	counts	PDUA_PRI_MIR status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_sec_mir	INTEGER_1(:) -	counts	PDUA_SEC_MIR status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_spare_sig	INTEGER_1(:) -	counts	PDUA_SPARE_SIG status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_spd_ps	INTEGER_1(:) -	counts	PDUA_SPD_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_tams_ls	INTEGER_1(:) -	counts	PDUA_TAMS_LS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdua_tower	INTEGER_1(:) -	counts	PDUA_TOWER status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off

Name Standard Name	Type(Dims) FillValue	Units	Description
pdub_daa_opt	INTEGER_1(:) -	1	PDUB_DAA_OPT status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_det_ps	INTEGER_1(:) -	1	PDUB_DET_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_hvpc	INTEGER_1(:) -	1	PDUB_HVPC status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_laser_1	INTEGER_1(:) -	1	PDUB_LASER_1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_laser_2	INTEGER_1(:) -	1	PDUB_LASER_2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_lhp1	INTEGER_1(:) -	1	PDUB_LHP1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_lhp2	INTEGER_1(:) -	1	PDUB_LHP2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_lhp_startup	INTEGER_1(:) -	1	PDUB_LHP_STARTUP status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_lrs	INTEGER_1(:) -	1	PDUB_LRS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_lrs_opt	INTEGER_1(:) -	1	PDUB_LRS_OPT status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa1	INTEGER_1(:) -	1	PDUB_OFA1 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa2	INTEGER_1(:) -	1	PDUB_OFA2 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa3	INTEGER_1(:) -	1	PDUB_OFA3 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa4	INTEGER_1(:) -	1	PDUB_OFA4 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off

Name Standard Name	Type(Dims) FillValue	Units	Description
pdub_ofa5	INTEGER_1(:) -	1	PDUB_OFA5 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa6	INTEGER_1(:) -	1	PDUB_OFA6 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa7	INTEGER_1(:) -	1	PDUB_OFA7 status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_ofa_ps	INTEGER_1(:) -	1	PDUB_OFA_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_pri_mir	INTEGER_1(:) -	1	PDUB_PRI_MIR status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_sec_mir	INTEGER_1(:) -	1	PDUB_SEC_MIR status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_spare_sig	INTEGER_1(:) -	1	PDUB_SPARE_SIG status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_spd_ps	INTEGER_1(:) -	1	PDUB_SPD_PS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_tams_ls	INTEGER_1(:) -	1	PDUB_TAMS_LS status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off
pdub_tower	INTEGER_1(:) -	1	PDUB_TOWER status flag. 0=ON, 1=OFF Source: ATL02 ATBD - Status HKT Data Flags: 0()=on, 1()=off

1.42 Group: /atlas/housekeeping/thermal

Thermal data from APID 1061 Analog HK Telemetry. Packet Frequency is 1 in Hertz.

1.42.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID. (Nominally 1HZ).

1.42.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. This is computed based on the housekeeping design to sample a measurement every 0.003125 seconds from the internal ASC 1PPS . The time for this packet is set as the time of the lowest channel number in this telemetry packet.. If the specific time is needed use the channel number from the lowest channel in packet. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_a_beam_px_t	FLOAT(:) -	degreesC	A_HKT_BEAMX_PX_T A_HKT_C.chan[62] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_beamx_t	FLOAT(:) -	degreesC	Beam Expander I/F mTTCS-21 or 30 A_HKT_C.chan[82] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_bsm_t	FLOAT(:) -	degreesC	HKT BSM I/F T TCS-20 - A_HKT_C.chan[33] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_cchp_adiab_t	FLOAT(:) -	degreesC	Laser CCHP Adiabatic Section T TCS-12 A_HKT_C.chan[55] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_cchp_las1_t	FLOAT(:) -	degreesC	Laser 1 I/F T TCS-14 A_HKT_C.chan[59] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem1_t1_eb_t	FLOAT(:) -	degreesC	HKT A/D Ch 74 - DEM1_TH_B-MEB-37 External Bottom t A_HKT_C.chan[38] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem1_t2_it_t	FLOAT(:) -	degreesC	HKT A/D Ch 76 - DEM1_TH_D-MEB-39 Internal Top T A_HKT_C.chan[40] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_dem1_t3_ib_t	FLOAT(:) -	degreesC	HKT A/D Ch 75 - DEM1_TH_C-MEB-38 Internal Bottom T A_HKT_C.chan[39] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem1_t4_et_t	FLOAT(:) -	degreesC	HKT A/D Ch 73 - DEM1_TH_A-MEB-36 External Top T A_HKT_C.chan[37] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem2_t	FLOAT(:) -	degreesC	HKT A/D Ch 77 - DEM2_TH_A-MEB-40 External Bottom T A_HKT_C.chan[41] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem3_t1_eb_t	FLOAT(:) -	degreesC	HKT A/D Ch 79 - DEM3_TH_B-MEB-42 External Bottom T A_HKT_C.chan[43] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem3_t2_it_t	FLOAT(:) -	degreesC	HKT A/D Ch 81 - DEM3_TH_D-MEB-44 Internal Top T A_HKT_C.chan[45] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem3_t3_ib_t	FLOAT(:) -	degreesC	HKT A/D Ch 80 - DEM3_TH_C-MEB-43 Internal Bottom T A_HKT_C.chan[44] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem3_t4_et_t	FLOAT(:) -	degreesC	HKT A/D Ch 78 - DEM3_TH_A-MEB-41 External Top T A_HKT_C.chan[42] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem4_t	FLOAT(:) -	degreesC	HKT A/D Ch 82 - DEM4_TH_A-MEB-45 External Bottom T A_HKT_C.chan[46] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem5_t1_eb_t	FLOAT(:) -	degreesC	HKT A/D Ch 84 - DEM5_TH_B-MEB-47 External Bottom T A_HKT_C.chan[48] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem5_t2_it_t	FLOAT(:) -	degreesC	HKT A/D Ch 86 - DEM5_TH_D-MEB-49 Internal Top T A_HKT_C.chan[50] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem5_t3_ib_t	FLOAT(:) -	degreesC	HKT A/D Ch 85 - DEM5_TH_C-MEB-48 Internal Bottom T A_HKT_C.chan[49] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_dem5_t4_et_t	FLOAT(:) -	degreesC	HKT A/D Ch 83 - DEM5_TH_A-MEB-46 External Top T A_HKT_C.chan[47] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dem6_t	FLOAT(:) -	degreesC	HKT A/D Ch 87 - DEM6_TH_A-MEB-50 External Bottom T A_HKT_C.chan[51] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dom_rad1_t	FLOAT(:) -	degreesC	HKT DAA DOM Radiator T (Pri) TCS-47 - A_HKT_C.chan[36] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_dom_rad2_t	FLOAT(:) -	degreesC	HKT DAA DOM Radiator T (Red) TCS-48 - A_HKT_C.chan[34] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_foldm_t	FLOAT(:) -	degreesC	Fold Mirror I/F I TCS-22 A_HKT_C.chan[83] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_imsc_myflex_t	FLOAT(:) -	degreesC	IMSC Flexure 1 T TCS-28 A_HKT_C.chan[88] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_imsc_mzflex_t	FLOAT(:) -	degreesC	IMSC Flexure 2 T TCS-29 A_HKT_C.chan[89] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lasrad_t	FLOAT(:) -	degreesC	Laser LHP Radiator T TCS_54 A_HKT_C.chan[61] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lhp_evap_t	FLOAT(:) -	degreesC	LHP Evaporator T TCS-15 A_HKT_C.chan[54] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lhp_liqline_t	FLOAT(:) -	degreesC	LHP Liquid Line T TCS-16 A_HKT_C.chan[60] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lhp_res1_t	FLOAT(:) -	degreesC	LHP Compensation Chamber T (Pri) TCS-10 A_HKT_C.chan[52] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lhp_res2_t	FLOAT(:) -	degreesC	LHP Compensation Chamber T (Red) TCS-11 A_HKT_C.chan[53] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_lhp_vapline_t	FLOAT(:) -	degreesC	A_HKT_LHP_VAPLINE_T TCS-17 A_HKT_C.chan[90] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lrs_orad1_t	FLOAT(:) -	degreesC	LRS Optics RadiatorT (Pri) TCS-08 A_HKT_C.chan[56] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lrs_orad2_t	FLOAT(:) -	degreesC	LRS Optics Radiator T (Red) TCS-09 A_HKT_C.chan[57] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_lrs_ss_t	FLOAT(:) -	degreesC	LRS Sunshade I/F T TCS-13 A_HKT_C.chan[58] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ltr_tams_t	FLOAT(:) -	degreesC	TAMS LTR T TCS-18 A_HKT_C.chan[94] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ltr_trans_t	FLOAT(:) -	degreesC	Transmitter LTR T TCS_19 A_HKT_C.chan[102] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_asc1_t	FLOAT(:) -	degreesC	HKT MEB ASC1 T MEB-01F - A_HKT_C.chan[0] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_asc2_t	FLOAT(:) -	degreesC	HKT MEB ASC2 T MEB-02 - A_HKT_C.chan[1] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_hkt_t	FLOAT(:) -	degreesC	HKT MEB HKT T MEB-21 - A_HKT_C.chan[2] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_lvpc1_t	FLOAT(:) -	degreesC	HKT MEB LVPC1 T MEB-03 - A_HKT_C.chan[3] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_lvpc2_t	FLOAT(:) -	degreesC	HKT MEB LVPC2 T MEB-04 - A_HKT_C.chan[4] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_mce1_t	FLOAT(:) -	degreesC	HKT MEB MCE1 T MEB-07 - A_HKT_C.chan[5] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_mce2_t	FLOAT(:) -	degreesC	HKT MEB MCE2 T MEB-08 - A_HKT_C.chan[6] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_meb_mce3_t	FLOAT(:) -	degreesC	HKT MEB MCE3 T MEB-09 - A_HKT_C.chan[7] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_mce4_t	FLOAT(:) -	degreesC	HKT MEB MCE4 T MEB-10 - A_HKT_C.chan[8] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce1_1_t	FLOAT(:) -	degreesC	HKT MEB PCE1 1 T MEB-11 - A_HKT_C.chan[9] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce1_2_t	FLOAT(:) -	degreesC	HKT MEB PCE1 2 T MEB-12 - A_HKT_C.chan[10] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce2_1_t	FLOAT(:) -	degreesC	HKT MEB PCE2 1 T MEB-13 - A_HKT_C.chan[11] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce2_2_t	FLOAT(:) -	degreesC	HKT MEB PCE2 2 T MEB-14 - A_HKT_C.chan[12] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce3_1_t	FLOAT(:) -	degreesC	HKT MEB PCE3 1 T MEB-15 - A_HKT_C.chan[13] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_pce3_2_t	FLOAT(:) -	degreesC	HKT MEB PCE3 2 T MEB-16 - A_HKT_C.chan[14] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_sbc1_t	FLOAT(:) -	degreesC	HKT MEB SBC1 T MEB-17 - A_HKT_C.chan[15] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_sbc2_t	FLOAT(:) -	degreesC	HKT MEB SBC2 T MEB-18 - A_HKT_C.chan[16] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_uso1_t	FLOAT(:) -	degreesC	HKT MEB USO1 T MEB-19 - A_HKT_C.chan[17] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_meb_uso2_t	FLOAT(:) -	degreesC	HKT MEB USO2 T MEB-20 - A_HKT_C.chan[18] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_ob_mz1_t	FLOAT(:) -	degreesC	Optical Bench, -Z Side T TCS-23 A_HKT_C.chan[65] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_mz2_t	FLOAT(:) -	degreesC	Optical Bench, -Z Side T TCS-24 A_HKT_C.chan[66] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_mz3_t	FLOAT(:) -	degreesC	Optical Bench, -Z Side T TCS-25 A_HKT_C.chan[67] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_pz1_t	FLOAT(:) -	degreesC	Optical Bench, +Z Side T TCS-26 A_HKT_C.chan[63] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_pz2_t	FLOAT(:) -	degreesC	Optical Bench, +Z Side T TCS-27 A_HKT_C.chan[64] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_pz3_t	FLOAT(:) -	degreesC	Optical Bench +z3 T TCS_31 A_HKT_C.chan[103] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ob_pz4_t	FLOAT(:) -	degreesC	Optical Bench +z4 T TCS_32 A_HKT_C.chan[105] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa1_et_t	FLOAT(:) -	degreesC	OFA1 ETALON T TCS_58 A_HKT_C.chan[104] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa1_pri_t	FLOAT(:) -	degreesC	HKT TCS-33 OFA1 PRI T - A_HKT_C.chan[19] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa1_red_t	FLOAT(:) -	degreesC	HKT TCS-34 OFA1 RED T - A_HKT_C.chan[26] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa2_pri_t	FLOAT(:) -	degreesC	HKT TCS-35 OFA2 PRI T - A_HKT_C.chan[20] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa2_red_t	FLOAT(:) -	degreesC	HKT TCS-36 OFA2 RED T - A_HKT_C.chan[27] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_ofa3_pri_t	FLOAT(:) -	degreesC	HKT TCS-37 OFA3 PRI T - A_HKT_C.chan[21] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa3_red_t	FLOAT(:) -	degreesC	HKT TCS-38 OFA3 RED T - A_HKT_C.chan[28] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa4_pri_t	FLOAT(:) -	degreesC	HKT TCS-39 OFA4 PRI T - A_HKT_C.chan[22] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa4_red_t	FLOAT(:) -	degreesC	HKT TCS-40 OFA4 RED T - A_HKT_C.chan[29] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa5_pri_t	FLOAT(:) -	degreesC	HKT TCS-41 OFA5 PRI T - A_HKT_C.chan[23] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa5_red_t	FLOAT(:) -	degreesC	HKT TCS-42 OFA5 RED T - A_HKT_C.chan[30] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa6_pri_t	FLOAT(:) -	degreesC	HKT TCS-43 OFA6 PRI T - A_HKT_C.chan[24] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa6_red_t	FLOAT(:) -	degreesC	HKT TCS-44 OFA6 RED T - A_HKT_C.chan[31] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa7_et_t	FLOAT(:) -	degreesC	OFA7 ETALON T TCS_59 A_HKT_C.chan[106] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa7_pri_t	FLOAT(:) -	degreesC	HKT TCS-45 OFA7 PRI T - A_HKT_C.chan[25] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_ofa7_red_t	FLOAT(:) -	degreesC	HKT TCS-46 OFA7 RED T - A_HKT_C.chan[32] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_scif_myflex_t	FLOAT(:) -	degreesC	-Y S/C Flexure T A_HKT_C.chan[93] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_scif_pxflex_t	FLOAT(:) -	degreesC	+X S/C Flexure T TCS-51 A_HKT_C.chan[87] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_scif_pyflex_t	FLOAT(:) -	degreesC	-+Y S/C Flexure T TCS-53 A_HKT_C.chan[101] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hkt_spd_t	FLOAT(:) -	degreesC	SPD I/F T TCS-50 A_HKT_C.chan[85] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_struc_my_t	FLOAT(:) -	degreesC	Structure Y Panel T TCS_55 A_HKT_C.chan[91] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_struc_mz_t	FLOAT(:) -	degreesC	Structure Z Panel T TCS_57 A_HKT_C.chan[92] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_sunshade_t	FLOAT(:) -	degreesC	Structure +Z Panel T A_HKT_C.chan[86] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_pri1_t	FLOAT(:) -	degreesC	Telescope, Primary Mirror T (Pri) TCS-05 A_HKT_C.chan[95] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_pri2_t	FLOAT(:) -	degreesC	Telescope, Primary Mirror T (Red) TCS-06 A_HKT_C.chan[96] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_pri3_t	FLOAT(:) -	degreesC	HKT Telescope, Primary Mirror T TCS-07 - A_HKT_C.chan[35] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_sec1_t	FLOAT(:) -	degreesC	Telescope, Secondary Mirror T (Pri) TCS-01 A_HKT_C.chan[97] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_sec2_t	FLOAT(:) -	degreesC	Telescope, Secondary Mirror T (Red) TCS-02 A_HKT_C.chan[98] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_tow1_t	FLOAT(:) -	degreesC	Telescope, Tower T (Pri) TCS-03 A_HKT_C.chan[99] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_tel_tow2_t	FLOAT(:) -	degreesC	Telescope, Tower T (Red) TCS-04 A_HKT_C.chan[100] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hkt_wtem_t	FLOAT(:) -	degreesC	OFA WTEM I/F T TCS-49 A_HKT_C.chan[84] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
hvpca_therm_a_t	FLOAT(:) -	degreesC	PRIMARY HVPC THERMISTOR A MEB-30 A_HKT_C.chan[68] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpca_therm_b_t	FLOAT(:) -	degreesC	PRIMARY HVPC THERMISTOR B MEB-32 A_HKT_C.chan[69] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpcb_therm_a_t	FLOAT(:) -	degreesC	REDUNDANT HVPC THERMISTOR A MEB-31 A_HKT_C.chan[75] Source: ATL02 ATBD - Thermal & Electrical HKT Data
hvpcb_therm_b_t	FLOAT(:) -	degreesC	REDUNDANT HVPC THERMISTOR B MEB-33 A_HKT_C.chan[76] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdua_therm_ct_t	FLOAT(:) -	degreesC	PDU CT BOARD A T-MEB-24 A_HKT_C.chan[70] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdua_therm_dlv_a_t	FLOAT(:) -	degreesC	PDU LOW VOLTAGE 1A T-MEB-26 A_HKT_C.chan[71] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdua_therm_dlv_b_t	FLOAT(:) -	degreesC	PDU LOW VOLTAGE 2A T -MEB-28 A_HKT_C.chan[72] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdua_therm_mi_t	FLOAT(:) -	degreesC	PDU MAIN PWR BOARD A T-MEB_22 A_HKT_C.chan[73] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdub_therm_ct_t	FLOAT(:) -	degreesC	PDU CT BOARD B T -MEB-25 A_HKT_C.chan[77] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdub_therm_dlv_a_t	FLOAT(:) -	degreesC	PDU LOW VOLTAGE 1B T -MEB-27 A_HKT_C.chan[78] Source: ATL02 ATBD - Thermal & Electrical HKT Data
pdub_therm_dlv_b_t	FLOAT(:) -	degreesC	PDU LOW VOLTAGE 2B T -MEB-29 A_HKT_C.chan[79] Source: ATL02 ATBD - Thermal & Electrical HKT Data

Name Standard Name	Type(Dims) FillValue	Units	Description
pdub_therm_mi_t	FLOAT(:) -	degreesC	PDU MAIN PWR BOARD B T -MEB_23 A_HKT_C.chan[80] Source: ATL02 ATBD - Thermal & Electrical HKT Data
spda_therm_t	FLOAT(:) -	degreesC	PRIMARY SPD THERMISTOR MEB-34 A_HKT_C.chan[74] Source: ATL02 ATBD - Thermal & Electrical HKT Data
spdb_therm_t	FLOAT(:) -	degreesC	REDUNDANT SPD THERMISTOR MEB-35 A_HKT_C.chan[81] Source: ATL02 ATBD - Thermal & Electrical HKT Data

1.43 Group: /atlas/housekeeping/time_at_the_tone

APID 1136 Spacecraft Time at the Tone Packet - Relayed to SSR. Packet Frequency is by command. ATLAS Time-At-The-Tone-Was Message

1.43.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APIDs. (only downlinked on command).

1.43.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Time at the Tone
gps_1pps_sec	UINT_4_LE(:) -	seconds since January 6, 1980	GPS reported seconds. Source: ATL02 ATBD - Time at the Tone
gps_1pps_subsec	UINT_4_LE(:) -	milliseconds	GPS reported subseconds Source: ATL02 ATBD - Time at the Tone

Name Standard Name	Type(Dims) FillValue	Units	Description
sc_time_1pps_sec	UINT_4_LE(:) -	seconds since January 6, 1980	SC time at the reception of the last 1PPS signal from the GPSR. Source: ATL02 ATBD - Time at the Tone
sc_time_1pps_subsec	UINT_4_LE(:) -	100 nanoseconds	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00) Source: ATL02 ATBD - Time at the Tone

1.44 Group: /atlas/pcex

Group contains the Photon Counting Electronics x (PCEx) packet decommutated data

1.44.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Data Packets. (nominally fifty per second.)

1.45 Group: /atlas/pcex/algorithm_science

The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.

1.45.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.45.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_band_channel_mask	UINT_4_BE(:, :) -	counts	ATLAS flight software Band Channel Mask. (Bands 1-4) Source: ATL02 ATBD - Algorithm Science Data
alt_band_mask	UINT_1_BE(:, :) -	counts	ATLAS flight software Band Mask. Each byte corresponds to a single Band, in the order of 1-4. Source: ATL02 ATBD - Algorithm Science Data
alt_nbands	UINT_1_BE(:) -	counts	ATLAS flight software Number of bands. Source: ATL02 ATBD - Algorithm Science Data
amet_time	DOUBLE(:) -	seconds	AMET seconds at the Major Frame Source: ATL02 ATBD - Algorithm Science Data

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Algorithm Science Data
ds_2samples	INTEGER_1(2) -	1	Dimension scale for an array of 2 samples. Source: Dimension Scale
ds_4bytes	INTEGER_1(4) -	1	Dimension scale for an array of 4 bytes. Source: Dimension Scale
gps_time	DOUBLE(:) -	seconds	GPS seconds at the Major Frame Source: ATL02 ATBD - Algorithm Science Data
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. Source: ATL02 ATBD - Algorithm Science Data
useflag	UINT_1_LE(:) -	counts	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Source: ATL02 ATBD - Algorithm Science Data Flags: 0()=stby, 1()=science, 2()=test, 3()=manual, 4()=radio, 5()=unknown, 6()=unused, 7()=unused, 8()=unused, 9()=unused, 10()=stby_alt_amcs, 11()=science_alt_amcs, 12()=test_alt_amcs, 13()=manual_alt_amcs, 14()=radio_alt_amcs, 15()=unknown_alt_amcs

1.46 Group: /atlas/pcex/algorithm_science/s_w

The PCE PMF Algorithm Science data group. Contains outputs from the onboard receiver algorithm software.

1.46.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.46.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_error_flags	UINT_1_BE(:, :) -	counts	FSW error flags Source: ATL02 ATBD - Algorithm Science Data
daynight_flag	UINT_1_LE(:) -	counts	ATLAS flight software Day/Night Flag associated with the major frame. 0= day, 1 =night. Based on an algorithm determination of the background rate, not on the actual position of the sun. Source: ATL02 ATBD - Algorithm Science Data Flags: 0()=day, 1()=night
decisionflags	UINT_1_LE(:, :) -	counts	ATLAS flight s/w Decision Flags associated with the major frame. indication if there was an error or if no science data is sent and why Source: ATL02 ATBD - Algorithm Science Data
flywheel	UINT_1_LE(:) -	counts	ATLAS flight software Flywheel associated with the major frame. Source: ATL02 ATBD - Algorithm Science Data
signalflags	UINT_1_LE(:) -	counts	ATLAS flight s/w signal event flags associated with the major frame. Source: ATL02 ATBD - Algorithm Science Data

1.47 Group: /atlas/pcex/altimetry

The PCE Altimetry Science Packet data common to both beams (PCEx_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICESat-2-MEB-SPEC-0875, section 5.12, Spacewire: Major Frame Packet Data Format

1.47.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.47.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cal_fall_sm	FLOAT(:) -	seconds/cell	The smoothed, calibrated value for the falling edge used to convert cell counts to units of time. time per cell count based on USO for each PCE. Source: ATL02 ATBD - Calculation of Precise Start Event Times
cal_rise_sm	FLOAT(:) -	seconds/cell	The smoothed, calibrated value for the rising edge used to convert cell counts to units of

Name Standard Name	Type(Dims) FillValue	Units	Description
			time. time per cell count based on USO for each PCE. Source: ATL02 ATBD - Calculation of Precise Start Event Times
ch_mask_s	INTEGER_1(:, :) -	counts	Channel Mask for DLBOs. The 16 flags are a logical OR of the two band offset masks for strong beam Source: ATL02 ATBD - Determining Downlink Band Offset
ch_mask_w	INTEGER_1(:, :) -	counts	Channel Mask for DLBOs. The 4 flags are a logical OR of the two band offset masks for weak beam Source: ATL02 ATBD - Determining Downlink Band Offset
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Time of Day Calculation
ds_hist	FLOAT(199) -	seconds	Relative bin values of windowed, peak-centered TOF histograms. Peak value = 0 Source: Dimension Scale
ds_strong_channel_index	INTEGER_1(16) -	1	Dimension scale for strong channels. Source: Dimension Scale
ds_weak_channel_index	INTEGER_1(4) -	1	Dimension scale for weak channels. Source: Dimension Scale
n_bands	INTEGER_1(:) -	counts	Number of bands (in addition to the nominal 1 band) selected for downlink. Source: ATL02 ATBD - Determining Downlink Band Offset
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID Source: ATL02 ATBD - Description of Relevant Hardware Interactions

Name Standard Name	Type(Dims) FillValue	Units	Description
useflag	UINT_1_LE(:) -	counts	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 0()=stby, 1()=science, 2()=test, 3()=manual, 4()=radio, 5()=unknown, 6()=unused, 7()=unused, 8()=unused, 9()=unused, 10()=stby_alt_amcs, 11()=science_alt_amcs, 12()=test_alt_amcs, 13()=manual_alt_amcs, 14()=radio_alt_amcs, 15()=unknown_alt_amcs

1.48 Group: /atlas/pcex/altimetry/s_w

The PCE Altimetry Science Packet specific to a beam (PCEx_ALT_SCI_TLM_MID in APID 1254, 1264, 1274 sequence flag 01 (once per major frame). (see ICESat-2-MEB-SPEC-0875, section 5.12, Spacewire: Major Frame Packet Data Format

1.48.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.48.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_rw_start	FLOAT(:) -	seconds	The number of seconds between the transmit pulse and the start of the altimetric range window for the beam Source: ATL02 ATBD - Calculation of Range Window Start Time
alt_rw_width	FLOAT(:) -	seconds	The number of seconds from the range window start and range window stop Source: ATL02 ATBD - Calculation of Range Window Width in Units of Time
band1_offset	FLOAT(:) -	seconds	Downlink band offset (DLBO) for band1. Source: ATL02 ATBD - Calculation of Downlink Band Start Time
band1_width	FLOAT(:) -	seconds	Width of downlink band1. Source: ATL02 ATBD - Calculation of Downlink Band Width in Units of Time

Name Standard Name	Type(Dims) FillValue	Units	Description
band2_offset	FLOAT(:) -	seconds	Downlink band offset (DLBO) for band2. Source: ATL02 ATBD - Calculation of Downlink Band Start Time
band2_width	FLOAT(:) -	seconds	Width of downlink band2. Source: ATL02 ATBD - Calculation of Downlink Band Width in Units of Time
hist	INTEGER(:, :) -	counts	Per-major frame, peak-aligned, windowed time-of-flight histograms. Source: ATL02 ATBD - Dealing with transmit/receive slips
n_mf_ph	INTEGER(:) -	counts	Number of photons within each major frame. Source: Derived
ph_ndx_beg	INTEGER_8(:) -	counts	Index (1-based) within the photon-rate data of the first photon within each major frame. Source: Derived

1.49 Group: /atlas/pcex/altimetry/s_w/photons

Group contains the PCE Altimetric received photon event (ph) decommutated data and its matching Transmit time tag data. Note the Transmit time tag data are repeated for each received photon event. Data is from Altimetry Science Packet (alt_sci_tlm) APID 1254, 1264, 1274 with Sequence Flag = 0 or 2. See ICESat-2-MEB-SPEC-0875, section 5.12, SPACEWIRE: TIME TAG SCIENCE DATA FORMAT

1.49.1 Attributes

data_rate	Data within this group are stored at the data rate of the source photon events. (varies by detection; nominal value is sixty thousand per second, derived from laser_rate * photons_per_shot * beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)

1.49.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The Time of Day for the specific Transmit (TX) pulse associated with the Received (RX) event. (see L1B ATBD section 5 time of flight), relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the

Name Standard Name	Type(Dims) FillValue	Units	Description
			ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Time of Day Calculation
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID Source: ATL02 ATBD - Description of Relevant Hardware Interactions
ph_id_channel	UINT_1_LE(:) -	1	Channel number assigned for each received photon event. This is part of the photon ID. Values range from 1 to 120 to span all channels and rise/fall edges. Values 1 to 60 are for falling edge; PCE1 (1 to 20), PCE 2 (21 to 40) and PCE3 (41 to 60). Values 61 to 120 are for rising edge; PCE1 (61 to 80), PCE 2 (81 to 100) and PC3 (101 to 120). Source: ATL02 ATBD - Construction of Unique Photon Identifiers
ph_id_count	UINT_1_LE(:) -	counts	photon event counter is part of photon ID and will count from 1 for each channel until reset by laser pulse counter. If ph_id_count is 0, then there was a transmit pulse without any received photons. In this case, the transmit portion of the alt_science packet is valid, but the receive portion is all 0s and should not be used. Source: ATL02 ATBD - Construction of Unique Photon Identifiers
ph_id_pulse	UINT_1_LE(:) -	counts	laser pulse counter is part of photon ID and will count from 1 to 200 and reset for each new major frame (major_fram_id). If the corresponding ph_id_count is 0, then there was a transmit pulse without any received photons. Source: ATL02 ATBD - Construction of Unique Photon Identifiers
ph_tof	DOUBLE(:) -	seconds	Time of flight (TOF); the round trip time in seconds of the received photon relative to the beam's zero range point (ZRP). Computed from the Transmit (Tx) and Receive (Rx) Time-of-flight components and then calibrated to the centroid of the transmit pulse. Source: ATL02 ATBD - TOF-related Parameters
rx_band_id	INTEGER_1(:) -	counts	Flag to indicate downlink band id associated with the received rx_tof (received photon event). A value of 0 indicates the photon corresponds to band1; A value of 1 indicates the photon

Name Standard Name	Type(Dims) FillValue	Units	Description
			corresponds to band2. Corresponding parameters are band_width, band_offset and band_eventcount. Source: ATL02 ATBD - TOF-related Parameters Flags: 0()=band1, 1()=band2
tof_flag	INTEGER_1(:) -	counts	Time Of Flight center correction flag. Values indicate what components were used to adjust the TOF to the centroid of the Tx pulse, based on the alignment of Tx components across all 3 PCEs. 1=LL_LU_TU_TL; 2=LL_TU_TL; 3=LL_LU_TL; 4=LL_LU_TU; 5=LL_TL; 6=LL_TU; 7=LL_LU; 8=LL. Values greater than 10 indicate the same sequence of conditions indicated for a potential TEP photon. Source: ATL02 ATBD - TOF-related Parameters Flags: 1()=LL_LU_TU_TL, 2()=LL_TU_TL, 3()=LL_LU_TL, 4()=LL_LU_TU, 5()=LL_TL, 6()=LL_TU, 7()=LL_LU, 8()=LL, 11()=TEP_LL_LU_TU_TL, 12()=TEP_LL_TU_TL, 13()=TEP_LL_LU_TL, 14()=TEP_LL_LU_TU, 15()=TEP_LL_TL, 16()=TEP_LL_TU, 17()=TEP_LL_LU, 18()=TEP_LL
tx_ll_tof	FLOAT(:) -	seconds	Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip time in seconds from the detected lower leading edge of the transmit pulse relative to the ATLAS T0. Includes all calibrations of coarse and fine counts. Source: ATL02 ATBD - TOF-related Parameters
tx_other_tof	FLOAT(:) -	seconds	Time of flight from the PCE-specific leading-lower (LL) threshold (tx_ll_tof) to the detected other transmit pulse edge. For PCE1, this is the time from the PCE1 LL to the Transmit Leading Upper edge (LU) threshold; for PCE2, this is the time from the PCE2 LL to the Transmit Trailing Upper edge (TU) threshold; and for PCE3, this is the time from the PCE3 LL to the Transmit Trailing Lower edge (TL) threshold. Source: ATL02 ATBD - Calculation of Precise Start Time

1.50 Group: /atlas/pcex/atmosphere_sw

Contains parameters relating to the PCE Atmospheric Data Histograms. Normally 25 hz. (APID 1255, 1259, 1265, 1269, 1275, 1279). P1 S,P1 W, P2 S, P2 W, P3 S, P3 W.

1.50.1 Attributes

data_rate	Data in this group is stored at a 25hz (25 per second) rate.

1.50.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
atm_bins	UINT_2_LE(:, :) -	counts	The histogram bins for the Atmospheric beam.Once every 400 shots (laser pulses). Bin 1 (clouds) is nearest to spacecraft .Bin 467 is under ground. Source: ATL02 ATBD - Atmospheric Histograms
atm_rw_start	FLOAT(:) -	seconds	The number of seconds between the transmit pulse and the start of the Atmospheric range window Source: ATL02 ATBD - Atmospheric Histograms
atm_rw_width	FLOAT(:) -	seconds	The number of seconds from the Atmospheric range window start and range window stop. Source: ATL02 ATBD - Atmospheric Histograms
atm_shift_amount	INTEGER_2(:) -	counts	The number of bins the range window start of one of the histograms was shifted to align them before they are added together. Source: ATL02 ATBD - Atmospheric Histograms
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time of the first TX pulse in major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Time of Day Calculation
ds_hist_bin_index	INTEGER_2(467) -	1	Dimension scale for atmosphere histogram bins. Source: Dimension Scale
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame Counter - The major frame counter is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID Source: ATL02 ATBD - Description of Relevant Hardware Interactions
useflag	UINT_1_LE(:) -	counts	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 0()=stby, 1()=science, 2()=test, 3()=manual, 4()=radio, 5()=unknown, 6()=unused,

Name Standard Name	Type(Dims) FillValue	Units	Description
			7()=unused, 8()=unused, 9()=unused, 10()=stby_alt_amcs, 11()=science_alt_amcs, 12()=test_alt_amcs, 13()=manual_alt_amcs, 14()=radio_alt_amcs, 15()=unknown_alt_amcs

1.51 Group: /atlas/pcex/background

The background data is specific to each beam and reported at a 50-shot rate.

1.51.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.51.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
bg_cnt_50shot_s	UINT_2_LE(:) -	counts	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) during the range windows associated with a set of 50 laser pulses of the major frame. Source: ATL02 ATBD - PCE Background Data
bg_cnt_50shot_w	UINT_2_LE(:) -	counts	ATLAS flight s/w indicates for the beam the # of counted time tags (BackgroundCounts_50Shot) during the range windows associated with a set of 50 laser pulses of the major frame. Source: ATL02 ATBD - PCE Background Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time of the first TX pulse in the 50 laser pulses used for background, in seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - PCE Background Data
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part

Name Standard Name	Type(Dims) FillValue	Units	Description
			of the photon ID Source: ATL02 ATBD - PCE Background Data
useflag	UINT_1_LE(:) -	counts	Science Mode Flag. Used by ATL03 to discard non-science mode data. 0=stby, 1=science_mode, 2=test, 3=manual, 4=radio, 5=unknown, > 10=amcs_not_normal Source: ATL02 ATBD - Knowledge of Instrument Configuration Flags: 0()=stby, 1()=science, 2()=test, 3()=manual, 4()=radio, 5()=unknown, 6()=unused, 7()=unused, 8()=unused, 9()=unused, 10()=stby_alt_amcs, 11()=science_alt_amcs, 12()=test_alt_amcs, 13()=manual_alt_amcs, 14()=radio_alt_amcs, 15()=unknown_alt_amcs

1.52 Group: /atlas/pcex/dfc_hk

This DFCx_hk is a diagnostic packet (APID 1072, 1088, 1104) that contains some of the parameters normally part of APID 1254, 1264, 1274 (as sequence flag 01). Also know as the PCE Altimetric Science Data Major Frame described in ICESat-2-MEB-SPEC-0875, section 5.13 Table 19. The data in the group are neither calibrated nor EU-converted, but preserved from ATL01 in order provided diagnostics for TOF processing.

1.52.1 Attributes

data_rate	Data within this group are stored at the data rate of the source APID (nominally 50 Hz).

1.52.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_1pps_count	UINT_4_BE(:) -	counts	ATLAS flight s/w 1PPS counter (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_cal_fall	UINT_2_BE(:) -	counts	The PCE latest calibration value for the falling edge. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_cal_interval	UINT_1_BE(:) -	counts	Calibration request interval from TDC (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_cal_rise	UINT_2_BE(:) -	counts	The PCE latest calibration value for the rising edge (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_cmd_count	UINT_2_BE(:) -	counts	Command Counter; Indicates the number of good commands received by the DFC prior to the Major Frame Packet being transmitted (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_config	UINT_1_BE(:) -	counts	Configuration bits (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_debug_reg	UINT_1_BE(:, :) -	counts	Debug Control Register (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_debug_status	UINT_1_BE(:, :) -	counts	Debug Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_dfc_hk_status	UINT_1_BE(:, :) -	counts	DFC Housekeeping Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_dfc_status	UINT_1_BE(:) -	counts	DFC Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_dupe_margin	UINT_2_BE(:) -	counts	Duplicate time tag removal ; initialization Value (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_edac_status	UINT_1_BE(:, :) -	counts	EDAC Status Bits. Defined in ATLAS MEB PCE DFC FPGA Specification, ICESat-2-MEB-SPEC-0875, section 5.12 (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_gp_reg	UINT_1_BE(:, :) -	counts	General Purpose Register (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_imet_at_1pps	INTEGER_8(:) -	counts	ATLAS flight s/w 25 MHz IMET counter value when 1PPS is received (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_imet_at_first_t0	INTEGER_8(:) -	counts	ATLAS flight s/w 25 MHz IMET counter value when 1PPS is received (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_last_opcode	UINT_1_BE(:) -	counts	Indicates the last good opcode received prior to the Major Frame Packet being transmitted; 0xFF indicates an error condition of either protocol ID mismatch, invalid opcode, or invalid length (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_last_seq_count	UINT_2_BE(:) -	counts	CCSDS Packet Sequence Count value of the last downlink packet prior to the major frame. This should be the last packet associated with the previous major frame. That packet should contain the last Tx/RX data for the last shot of the previous major frame. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_mframe_freq	UINT_1_BE(:) -	counts	The number of shots per major frame. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_rw_start_reg_s	UINT_4_BE(:) -	counts	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the altimetric range window for the strong spot (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_rw_start_reg_w	UINT_4_BE(:) -	counts	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the altimetric range window for the weak spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_rw_width_reg_s	UINT_2_BE(:) -	counts	Value of register set in initialization command for the number of 10ns ticks between the range window start and range window stop for the strong spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_rw_width_reg_w	UINT_2_BE(:) -	counts	Value of register set in initialization command for the number of 10ns ticks between the range window start and range window stop for the weak spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_sci_addr	UINT_1_BE(:) -	counts	Logical address for science data transmit ; initialization Value (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_sci_seg_limit	UINT_2_BE(:) -	counts	Science Data Segment Limit Size ; initialization Value (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_spot_tag_cnts_s	UINT_2_BE(:, :) -	counts	The number of events received by the DFC on channels 1 through 16 summed over 50 range window openings. The four elements of the array correspond to dividing the major frame up into 50 shots. The last element of the array can be 49 or 51 shots depending on the alignment of the range windows with respect to the major frame. Note that these counts are time tag counts and are subject to all the limitations and behaviors associated with time tags (duplicates, FIFO overflows, etc.). (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_spot_tag_cnts_w	UINT_2_BE(:, :) -	counts	The number of events received by the DFC on channels 17 through 20 summed over 50 range window openings. The four elements of the array correspond to dividing the major frame up into 50 shots. The last element of the array can be 49 or 51 shots depending on the alignment of the range windows with respect to the major frame. Note that these counts are time tag counts and are subject to all the limitations and behaviors associated with time tags (duplicates, FIFO overflows, etc.). (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_spw_not_ready_cnt	UINT_2_BE(:) -	counts	Counts each time SpW causes DFC to wait to transmit data to back-end (Status Only) (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_t0_cnt	UINT_2_BE(:) -	counts	ATLAS flight s/w T0 counter that clears with 1PPS (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_wait_watchdog	UINT_1_BE(:) -	counts	Tag wait watchdog value ; initialization Value (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
alt_write_watchdog	UINT_2_BE(:) -	counts	Tag write watchdog value ; initialization Value (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
atm_rw_start_reg_s	UINT_4_BE(:) -	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the Atmospheric range window for the strong spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
atm_rw_start_reg_w	UINT_4_BE(:) -	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the transmit pulse and the start of the Atmospheric range window for the weak spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
atm_rw_width_reg_s	UINT_2_BE(:) -	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the Atmospheric range window start and range window stop for the strong spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
atm_rw_width_reg_w	UINT_2_BE(:) -	clock cycles	Value of register set in initialization command for the number of 10ns ticks between the Atmospheric range window start and range window stop for the weak spot. (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Algorithm Science Data
pce_mframe_cnt	UINT_4_BE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID Source: ATL02 ATBD - Algorithm Science Data
tx_leading_cell	UINT_1_BE(:) -	counts	Latest Leading Start Time Tag-acquired leading start time tag value (paired with trailing start time time tag value) cell counts (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
tx_leading_coarse	INTEGER_2(:) -	counts	Latest Leading Start Time Tag-acquired leading start time tag value (paired with trailing start time time tag value) coarse time in counts (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
tx_trailing_cell	UINT_1_BE(:) -	counts	Latest trailing Start Time Tag-acquired trailing start time tag value (paired with trailing start time time tag value) cell counts (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data
tx_trailing_coarse	INTEGER_2(:) -	counts	Latest trailing Start Time Tag-acquired trailing start time tag value (paired with trailing start time time tag value) coarse time in counts (not EU-converted) Source: ATL02 ATBD - Algorithm Science Data

1.53 Group: /atlas/pcex/pmf_hk

PCE Diagnostic Telemetry Packet from one of the following APIDs : 1073, 1089, 1105 (each APID is associated with a specific PCE). Packet Frequency is 1 Hertz.

1.53.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
activeknobstable	UINT_1_BE(:) -	counts	The active knobs table. Source: ATL02 ATBD - Algorithm Science Data
autorestartdfccount	UINT_2_BE(:) -	counts	Number of DFC Auto Restarts Source: ATL02 ATBD - Algorithm Science Data
cmd_err_cntr	UINT_1_BE(:) -	counts	Command error counter Source: ATL02 ATBD - Algorithm Science Data
cmd_suc_cntr	UINT_1_BE(:) -	counts	Command success counter. Source: ATL02 ATBD - Algorithm Science Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Algorithm Science Data
mode	UINT_1_BE(:) -	counts	PCE Mode. 0=STBY; 1=Science; 2=Test; 3=Manual; 4=Radio; 5=Unknown Source: ATL02 ATBD - Algorithm Science Data Flags: 0()=STBY, 1()=Science, 2()=Test, 3()=Manual, 4()=Radio, 5()=Test

1.54 Group: /atlas/pcex/sxp_ssr_sw

SBC Extrapolation Task telemetry containing Flight Science Receiver Algorithm team requested telemetry for the first set of PCE extrapolation data for a major frame.: lat, long, range, nadir angle, etc. (from APIDs 1152 thru 1157)

1.54.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cosb	DOUBLE(:, :) -	counts	Cosine of the off-nadir angle as calculated onboard from the spacecraft information Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time of the first TX pulse in the major frame, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within

Name Standard Name	Type(Dims) FillValue	Units	Description
			/ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
ds_50samples	INTEGER_1(50) -	1	Dimension scale for an array of 50 samples. Source: Dimension Scale
latitude	DOUBLE(:, :) -	degrees	Latitude Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
longitude	DOUBLE(:, :) -	degrees	Longitude Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
mf_cosz	DOUBLE(:) -	counts	Cosine of the solar zenith angle Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
pce_mframe_cnt	UINT_4_LE(:) -	counts	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. Source: ATL02 ATBD - SBC Extrapolation Task Telemetry
srm	UINT_1_BE(:, :) -	1	Surface type, vegetation and coastline information from the SRM. (bit 0-1 = surface type (0=ocean, 1=land, 2=sea ice, 3=land ice). Bit 2 = vegetation present, Bit 3 = coastline present) Source: ATL02 ATBD - SBC Extrapolation Task Telemetry

1.55 Group: /atlas/pcex/tep

Group contains the PCE TEP (transmit Echo Path) Data.

1.55.1 Attributes

data_rate	Data within this group are stored at the data rate of the source photon events. (varies by detection; nominal value is sixty thousand per second, derived from laser_rate * photons_per_shot * beams_per_pce; where laser_rate=10000, photons_per_shot=3, beams_per_pce=2.)

1.55.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The Time of Day associated with the Transmit (TX) pulse, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Transmitter Echo Path
pce_mframe_cnt	UINT_4_LE(:) -	counts	The major frame counter is read from the digital flow controller in a given PCE card. The counter identifies individual major frames across diag and science packets. Used as part of the photon ID. Source: ATL02 ATBD - Transmitter Echo Path
ph_id_channel	UINT_1_LE(:) -	1	Channel number assigned for each received photon event. This is part of the photon ID. Values range from 1 to 120 to span all channels and rise/fall edges. Values 1 to 60 are for falling edge; PCE1 (1 to 20), PCE 2 (21 to 40) and PCE3 (41 to 60). Values 61 to 120 are for rising edge; PCE1 (61 to 80), PCE 2 (81 to 100) and PC3 (101 to 120). Source: ATL02 ATBD - Transmitter Echo Path
ph_id_count	INTEGER_1(:) -	counts	The photon event counter is part of photon ID and counts from 1 for each channel until reset by laser pulse counter. Source: ATL02 ATBD - Transmitter Echo Path
ph_id_pulse	UINT_1_LE(:) -	counts	The laser pulse counter is part of photon ID and counts from 1 to 200 and is reset for each new major frame. Source: ATL02 ATBD - Transmitter Echo Path
rx_band_id	UINT_1_LE(:) -	counts	Flag to indicate downlink band id associated with the received time tag. Note that in order to reconstruct the event time tag, the 10-bit offset even coarse value must be added to the specified downlink band offset relating to that time tag. Source: ATL02 ATBD - Transmitter Echo Path
rx_channel_id	UINT_1_LE(:) -	counts	channel number that Received photon event (as from Telemetry) Source: ATL02 ATBD - Transmitter Echo Path
tep_pulse_num	UINT_1_LE(:) -	counts	The number of laser pulses from the TEP laser pulse to the laser pulse for which ATLAS is

Name Standard Name	Type(Dims) FillValue	Units	Description
			currently receiving non-TEP photons. Source: ATL02 ATBD - Transmitter Echo Path
tof_tep	DOUBLE(:) -	seconds	Transmit Echo Pulse (TEP) Time of flight (TOF); the round trip time in seconds of the TEP photon relative to the beam's zero range point (ZRP., Computed from the Transmit (Tx) pulse of the TEP and Receive (Rx) Time-of-flight components; then calibrated to the centroid of the transmit pulse. Source: ATL02 ATBD - Transmitter Echo Path
tx_ll_tof_tep	FLOAT(:) -	seconds	Transmit Echo Pulse (TEP) Transmit (Tx) Leading Lower (LL) time of flight (TOF); the round trip time in seconds of the detected lower leading edge of the TEP transmit pulse relative to the ATLAS T0; includes all calibrations of coarse and fine counts. Associated with the pulse from which the TEP originates (offset identified by tep_pulse_num.) Source: ATL02 ATBD - Transmitter Echo Path
tx_other_tof_tep	FLOAT(:) -	seconds	Transmit Echo Pulse (TEP) time of flight from the PCE-specific leading-lower (LL) threshold (tep_ll_tof) to the detected other transmit pulse edge. For PCE1, this is the time from the PCE1 LL to the Transmit Leading Upper edge (LU) threshold; for PCE2, this is the time from the PCE2 LL to the Transmit Trailing Upper edge (TU) threshold. Source: ATL02 ATBD - Transmitter Echo Path

1.56 Group: /atlas/tx_pulse_width

Contains parameters to characterize the ATLAS pulse shape, derived from the Start Pulse Detector data.

1.56.1 Attributes

data_rate	Parameters in this group are stored at the ATLAS shot rate.

1.56.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Elapsed seconds since the ATLAS SDP GPS Epoch, associated with the transmit time where data from all 3 PCEs are present and aligned. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch

Name Standard Name	Type(Dims) FillValue	Units	Description
			(1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - TOF-related Parameters
tx_pulse_skew_est	FLOAT(:) INVALID_R4B	seconds	The difference between the averages of the lower and upper threshold crossing times. This is an estimate of the transmit pulse skew. Source: ATL02 ATBD - TOF-related Parameters
tx_pulse_width_lower	FLOAT(:) INVALID_R4B	seconds	The distance between the lower threshold crossing times measured by the Start Pulse Detector. Only present when data from all 3 PCEs are available and aligned. Source: ATL02 ATBD - TOF-related Parameters
tx_pulse_width_upper	FLOAT(:) INVALID_R4B	seconds	The distance between the upper threshold crossing times measured by the Start Pulse Detector. Only present when data from all 3 PCEs are available and aligned. Source: ATL02 ATBD - TOF-related Parameters

1.57 Group: /gpsr

Contains parameters related to the GPS Receiver.

1.57.1 Attributes

data_rate	Data within this group are stored at the data rate of the source GPS Receiver Data Packets. (nominally one per second.)

1.58 Group: /gpsr/carrier_amplitude

Contains parameters related to Carrier Amplitude Data Record (CADR).

1.58.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.58.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
antenna_id	INTEGER_1(:, :) -	1	Carrier Amplitude Data Record (CADR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=first_antenna, 1()=second_antenna
carrier_amp	FLOAT(:, :) -	dB	Carrier Amplitude Data Record (CADR) - Carrier Amplitude - Multiple Frequency Processing. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
channel_num	INTEGER_1(:, :) -	counts	Carrier Amplitude Data Record (CADR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
constell_id	INTEGER_1(:, :) -	counts	Carrier Amplitude Data Record (CADR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
ds_16_slots	INTEGER_1(16) -	1	Dimension scale representing each of the 16 slots. Source: Dimension Scale
noise_ratio	FLOAT(:, :) -	dBHz	Carrier Amplitude Data Record (CADR) - Carrier to Noise Power Density Ratio. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
num_valid_slots	INTEGER_1(:) -	counts	Number of the 16 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 16, then the remaining unused data fields within the arrays will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
signal_type	INTEGER_1(:, :) -	1	Carrier Amplitude Data Record (CADR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=gps_l1a_ca, 1()=gps_l1_p, 2()=gps_l2_ca, 3()=gps_l2_p, 4()=gps_l2_cm, 5()=gps_l2_cl, 6()=no_signal_processing
sv_id	INTEGER_1(:, :) -	counts	Carrier Amplitude Data Record (CADR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data

1.59 Group: /gpsr/carrier_phase

Contains parameters related to the GPSR Carrier Phase Data Record (CrPDR).

1.59.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.59.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
antenna_id	INTEGER_1(:, :) -	1	Carrier Phase Data Record (CrPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=first_antenna, 1()=second_antenna
carrier_c_fract	FLOAT(:, :) -	degrees	Carrier Phase Data Record (CrPDR) - Carrier Cycle Fraction - Fraction corresponding to 360 degrees divided by 4096. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
carrier_c_int	INTEGER_8(:, :) -	counts	Carrier Phase Data Record (CrPDR) - Integer Carrier Cycle Counter - Note: At the beginning of each track the integer carrier cycle count starts with 0. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
channel_num	INTEGER_1(:, :) -	counts	Carrier Phase Data Record (CrPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
constell_id	INTEGER_1(:, :) -	counts	Carrier Phase Data Record (CrPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records

Name Standard Name	Type(Dims) FillValue	Units	Description
			(num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
delta_range	DOUBLE(:, :) -	meters/second	Carrier Phase Data Record (CrPDR) - Delta Range. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
deter_f	INTEGER_1(:, :) -	1	Carrier Phase Data Record (CrPDR) - Deterioration Flag. 0= Carrier Loop Lock Steady 1 = Carrier Loop Lock Unsteady (Measurement data may be deteriorated). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=steady, 1()=unsteady
ds_24_slots	INTEGER_1(24) -	1	Dimension scale representing each of the 24 slots. Source: Dimension Scale
num_valid_slots	INTEGER_1(:) -	counts	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled. Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
signal_type	INTEGER_1(:, :) -	1	Carrier Phase Data Record (CrPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=gps_l1a_ca, 1()=gps_l1_p, 2()=gps_l2_ca, 3()=gps_l2_p, 4()=gps_l2_cm, 5()=gps_l2_cl, 6()=no_signal_processing
sv_id	INTEGER_1(:, :) -	counts	Carrier Phase Data Record (CrPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data

1.60 Group: /gpsr/channel_status

Contains parameters related to Channel Status record (CSR).

1.60.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.60.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
antenna_id	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=first_antenna, 1()=second_antenna

Name Standard Name	Type(Dims) FillValue	Units	Description
carrier_loop_bw	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Index of actual carrier loop bandwidth setting - Single Frequency Channel 1-24 Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
carrier_loop_bw_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Bandwidth (CrLB) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop bandwidth not final, 1 = Final carrier bandwidth time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
carrier_loop_disc_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Discriminator (CrLD) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop discriminator not final, 1 = Final carrier loop discriminator applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
carrier_loop_int_t	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Index of actual carrier loop integration time setting - Single Frequency Channel 1-24. Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
carrier_loop_int_t_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Int Time (CrLIT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop integration time not final, 1 = Final carrier loop integration time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
carrier_loop_lock	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Lock (CrLL) - Single Frequency Channel 1-24. 0 = Not locked, 1 = Locked. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_locked, 1()=locked
carrier_loop_mode	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Mode) - Single Frequency Channel 1-24. 0 = No carrier loop activities; 1 = Carrier acquisition ongoing; 2 = Carrier tracking ongoing; 3 = Carrier acquisition error. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_activities, 1()=acquisition, 2()=tracking, 3()=acq_error
carrier_loop_thres_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Loop Threshold (CrLT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Carrier loop threshold not final, 1 = Final carrier loop threshold applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
carrier_ph_deter	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Carrier Phase Deterioration; 0 = No deterioration, 1 = Measurement quality deterioration. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_deterioration, 1()=deterioration
channel_num	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Channel Number. 0 to 23; All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
code_loop_bw	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Index of actual code loop bandwidth setting - Single Frequency Channel 1-24, Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid Source: ATL02 ATBD - Spacecraft Data
code_loop_bw_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Bandwidth (CdLB) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop bandwidth not final, 1 = Final code bandwidth time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied

Name Standard Name	Type(Dims) FillValue	Units	Description
code_loop_corr_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Correlator Spacing (CdLCS) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop correlator not final, 1 = Final code loop correlator applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
code_loop_int_t	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Index of actual code loop integration time setting - Single Frequency Channel 1-24. Value = 0; Multiple Settings are not applicable for this parameter type. All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
code_loop_int_t_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Int Time Final (CdLIT) Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop integration time not final, 1 = Final code loop integration time applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
code_loop_lock	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Lock (CdLL) - Single Frequency Channel 1-24. 0 = Not locked, 1 = Locked. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_locked, 1()=locked
code_loop_mode	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Mode - Single Frequency Channel 1-24. 0 = No code loop activities, 1 = Code acquisition ongoing, 2 = Code tracking ongoing, 3 = Code acquisition error. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_activities, 1()=acquisition, 2()=tracking, 3()=acq_error
code_loop_thres_ff	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Loop Threshold (CdLT) Final Flag (FF) - Single Frequency Channel 1-24. 0 = Code loop threshold not final, 1 = Final code loop threshold applied. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled.

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_final, 1()=applied
code_phase_deter	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Code Phase Deterioration (CdPD) - Single Frequency Channel 1-24. 0 = No deterioration, 1 = Measurement quality deterioration. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_deterioration, 1()=deterioration
constell_id	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
ds_24_slots	INTEGER_1(24) -	1	Dimension scale representing each of the 24 slots. Source: Dimension Scale
logical_track_state	UINT_1_LE(:, :) -	counts	Channel Status Record (CSR) - Logical Tracking State - Single Frequency Channel 1-24. See Appendix C within DN-ICESAT2-SYS-024 for enumerated values. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data
nav_d_sync	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - Navigation Data Sync Status - Single Frequency Channel 1-24. 0 = Nav Data Not Synchronized, 1 = Nav Data Synchronized, Data Stream Not Inverted, 3 = Nav Data Synchronized, Data Stream Inverted. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
			Flags: 0()=not_synced, 1()=synced_not_inverted, 3()=synced_inverted
num_valid_slots	INTEGER_1(:) -	counts	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
signal_type	INTEGER_1(:, :) -	1	Channel Status Record (CSR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=gps_l1a_ca, 1()=gps_l1_p, 2()=gps_l2_ca, 3()=gps_l2_p, 4()=gps_l2_cm, 5()=gps_l2_cl, 6()=no_signal_processing
sv_id	INTEGER_1(:, :) -	counts	Channel Status Record (CSR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: num_valid_slots indicate the number of channel that actual valid to use. the remaining unused data fields are zero-filled. Source: ATL02 ATBD - Spacecraft Data

1.61 Group: /gpsr/code_phase

Contains parameters related to Code Phase Data Record (CdPDR).

1.61.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.61.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
antenna_id	INTEGER_1(:, :) -	1	Code Phase Data Record (CdPDR) - Antenna Identifier. 0 = First Antenna 1 = Second Antenna (invalid for present receiver) All other values

Name Standard Name	Type(Dims) FillValue	Units	Description
			invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=first_antenna, 1()=second_antenna
channel_num	INTEGER_1(:, :) -	counts	Code Phase Data Record (CdPDR) - Channel Number. 0 to 23; All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
code_chip_count	UINT_8_LE(:, :) -	counts	Code Phase Data Record (CdPDR) - Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
code_chip_fract	FLOAT(:, :) -	counts	Code Phase Data Record (CdPDR) - Fractional Portion of Number of Code Chips Since Start of GPS Week. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
constell_id	INTEGER_1(:, :) -	counts	Code Phase Data Record (CdPDR) - Constellation ID - Single Frequency Channel 1-24 (0 = GPS Constellation; All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative

Name Standard Name	Type(Dims) FillValue	Units	Description
			to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
deter_f	INTEGER_1(:, :) -	1	Code Phase Data Record (CdPDR) - Deterioration Flag. 0= Carrier Loop Lock Steady 1 = Carrier Loop Lock Unsteady (Measurement data may be deteriorated). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=steady, 1()=unsteady
ds_24_slots	INTEGER_1(24) -	1	Dimension scale representing each of the 24 slots. Source: Dimension Scale
num_valid_slots	INTEGER_1(:) -	counts	Number of the 24 available slots filled by telemetry. Data values after the number of valid slots are filled with 0. Note: Valid data records will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused data fields within the arrays will be zero-filled. Source: ATL02 ATBD - Spacecraft Data
signal_type	INTEGER_1(:, :) -	1	Code Phase Data Record (CdPDR) - GPS Signal Type. 0 = GPS L1 C/A 1 = GPS L1 P 2 = GPS L2 C/A (N/A for present receiver) 3 = GPS L2 P 4 = GPS L2 CM 5 = GPS L2 CL (N/A for present receiver) 6 = No signal processing on this channel All other values invalid. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=gps_l1a_ca, 1()=gps_l1_p, 2()=gps_l2_ca, 3()=gps_l2_p, 4()=gps_l2_cm, 5()=gps_l2_cl, 6()=no_signal_processing
smooth_flg	INTEGER_1(:, :) -	1	Code Phase Data Record (CdPDR) - Smoothing Flag. 0 = Smoothing Not Applied 1 = Carrier phase-based smoothing applied for the reported code phase. Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=not_applied, 1()=applied

Name Standard Name	Type(Dims) FillValue	Units	Description
sv_id	INTEGER_1(:, :) -	counts	Code Phase Data Record (CdPDR) - Space Vehicle ID. (0 = No signal acquisition or tracking; 1-32 = GPS SVs. All other values invalid). Note: Valid data records (num_valid_slots) will only be included for the amount of SFCs being tracked by the GPSR. If the tracked SFCs < 24, then the remaining unused CSR data fields within the ancillary packet will be zero-filled. Source: ATL02 ATBD - Spacecraft Data

1.62 Group: /gpsr/hk

Contains parameters related to GPSR housekeeping.

1.62.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.62.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
clock_source	INTEGER_1(:) -	1	Housekeeping Parameter Report (HK) - Clock Source Source: ATL02 ATBD - Spacecraft Data Flags: 0()=internal_clock, 1()=value_invalid
cpu_processor_load	UINT_2_LE(:) -	counts	Housekeeping Parameter Report (HK) - CPU Load of most recent PPS interval Source: ATL02 ATBD - Spacecraft Data
dc_data_error	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Data Cache Data Error Counter Source: ATL02 ATBD - Spacecraft Data
dc_tag_error	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Data Cache Tag Error Counter Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta

Name Standard Name	Type(Dims) FillValue	Units	Description
			time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
discarded_tc_packets	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Number of TC packets discarded since start of GPSR (wrapping counter). Source: ATL02 ATBD - Spacecraft Data
discarded_tm_packets	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Number of TM packets discarded since start of GPSR (wrapping counter). Source: ATL02 ATBD - Spacecraft Data
edac_double_bit_error	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Double Bit Error Source: ATL02 ATBD - Spacecraft Data
edac_single_bit_error	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - MilBus I/F EDAC Single Bit Error Source: ATL02 ATBD - Spacecraft Data
front_end_t	UINT_1_LE(:) -	counts	GPSR Data Field Header - R/F Front End Temperature (raw counts; not EU-converted) Source: ATL02 ATBD - Spacecraft Data
ic_data_error	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Instr Cache Data Error Counter Source: ATL02 ATBD - Spacecraft Data
ic_tag_error	UINT_1_LE(:) -	counts	Housekeeping Parameter Report (HK) - Instr Cache Tag Error Counter Source: ATL02 ATBD - Spacecraft Data
memory_dump_status	UINT_2_LE(:) -	counts	Housekeeping Parameter Report (HK) - Number of TM packets to be generated until the current Memory Dump is finished Source: ATL02 ATBD - Spacecraft Data
n_sv_w_all	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with all signal components in final tracking state at the most recent PPS Source: ATL02 ATBD - Spacecraft Data
n_svs_acquired	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - GNSS satellites being acquired at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 2...4 Source: ATL02 ATBD - Spacecraft Data
n_svs_used	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - GNSS satellites being used for PVT at the PPS before the most recent PPS Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
n_svs_wo_all	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - GNSS satellites being tracked with not all signal components in a final tracking state at the most recent PPS, i.e. channels with Multi-Frequency Tracking state 5...10 (L1 C/A & P(Y)) or Multi-Frequency Tracking state 5...7 (L1 C/A & L2 CM) Source: ATL02 ATBD - Spacecraft Data
nsm	INTEGER_1(:) -	1	GPSR - Navigation Solution Method. 1 = Propagated; 2 = Cold Start - First Nav Fix; 3 = Cold Start - Least Squares Method w/ no GDOP Optimization; 4 = Least Squares Method w/ all Visible SVs; 5 = Kalman Filter Method (Normal Operation); 7 = Invalid Navigation Solution. All other values are invalid. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=unknown, 1()=propagated, 2()=cold_first_nav, 3()=cold_lsq_no_gdop, 4()=lsqm_w_svs, 5()=normal_kalman, 7()=invalid_solution
prom_edac_status	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - PROM EDAC Single bit or uncorrectable error Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_error_detected, 1()=error_detected
protocol_selection_f	INTEGER_1(:) -	counts	Housekeeping Parameter Report (HK) - MilBus Protocol Selection Flag Source: ATL02 ATBD - Spacecraft Data
register_file_errors	INTEGER_1(:) -	1	Housekeeping Parameter Report (HK) - Corrected Register File Errors Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_error_detected, 1()=error_detected
sram_edac_status	INTEGER_1(:) -	1	Housekeeping Parameter Report (HK) - SRAM EDAC Single bit error Source: ATL02 ATBD - Spacecraft Data Flags: 0()=no_error_detected, 1()=error_detected
transient_protocol_errors	UINT_2_LE(:) -	counts	Housekeeping Parameter Report (HK) - MilBus Transient Protocol Error Count Source: ATL02 ATBD - Spacecraft Data
transmit_buffer_occupancy	UINT_2_LE(:) -	counts	Housekeeping Parameter Report (HK) - Number of bytes buffered for transmission Source: ATL02 ATBD - Spacecraft Data

1.63 Group: /gpsr/navigation

Contains parameters related to navigation solution.

1.63.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.63.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
clock_freq_error	INTEGER(:) -	seconds	Navigation Solution Data Record (NAV) - Receiver Clock Frequency Error Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
gdop	FLOAT(:) -	meters	Navigation Solution Data Record (NAV) - Geometric Dilution of Precision (Values greater than 655.34 m are saturated to 655.34 m.) Source: ATL02 ATBD - Spacecraft Data
gnss_time_error	FLOAT(:) -	seconds	Navigation Solution Data Record (NAV) - GNSS System Time Error Source: ATL02 ATBD - Spacecraft Data
gps_time_sec	UINT_4_LE(:) -	seconds	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
gps_time_subsec	UINT_4_LE(:) -	1/4294967296 seconds	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
h_ell	DOUBLE(:) -	meters	Navigation Solution Data Record (NAV) - Height Above Reference Ellipsoid (WGS84) Source: ATL02 ATBD - Spacecraft Data
latitude	DOUBLE(:) -	degrees_north	Navigation Solution Data Record (NAV) - Latitude (WGS84) Source: ATL02 ATBD - Spacecraft Data
longitude	DOUBLE(:) -	degrees_east	Navigation Solution Data Record (NAV) - Longitude (WGS84) Source: ATL02 ATBD - Spacecraft Data
max_curve_fit	INTEGER_1(:) -	1	Navigation Solution Data Record (NAV) - Maximum Curve Fit interval taken from all SVs used in current navigation solution Source: ATL02 ATBD - Spacecraft Data Flags: 0()=4h, 1()=6h, 2()=8h, 3()=14h, 4()=26h, 5()=50h, 6()=74h, 7()=98h, 8()=122h, 9()=146h, 15()=no_curve_fit
max_ura	INTEGER_1(:) -	counts	Navigation Solution Data Record (NAV) - Maximum User Range Accuracy (-16 means that no URA is available) Source: ATL02 ATBD - Spacecraft Data
n_svs	INTEGER_1(:) -	counts	Navigation Solution Data Record (NAV) - The number of SVs the receiver was able to use for the Navigation Solution computation, i.e. SVs for which code and carrier phase measurements and Ephemeris data were available Source: ATL02 ATBD - Spacecraft Data
nsm	INTEGER_1(:) -	1	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - Least Squares Method w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (Normal Operation) 7 = Invalid Navigation Solution All other values invalid Source: ATL02 ATBD - Spacecraft Data Flags: 1()=propagated, 2()=cold_lsq_no_gdop, 3()=lsqm_w_svs, 4()=normal_lsqm, 5()=normal_kalman, 6()=unused, 7()=invalid_solution
pdop	FLOAT(:) -	counts	Navigation Solution Data Record (NAV) - Position Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available. Source: ATL02 ATBD - Spacecraft Data
position_error_x	FLOAT(:) -	meters	Navigation Solution Data Record (NAV) - Estimated X position error Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
position_error_y	FLOAT(:) -	meters	Navigation Solution Data Record (NAV) - Estimated Y position error Source: ATL02 ATBD - Spacecraft Data
position_error_z	FLOAT(:) -	meters	Navigation Solution Data Record (NAV) - Estimated Z position error Source: ATL02 ATBD - Spacecraft Data
position_qa	INTEGER_2(:) -	seconds	Navigation Solution Data Record (NAV) - Time Quality Index; Values greater than 4095 ns are saturated to 4095 ns. Source: ATL02 ATBD - Spacecraft Data
position_x	DOUBLE(:) -	meters	Navigation Solution Data Record (NAV) - Estimated X position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84) Source: ATL02 ATBD - Spacecraft Data
position_y	DOUBLE(:) -	meters	Navigation Solution Data Record (NAV) - Estimated Y position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84) Source: ATL02 ATBD - Spacecraft Data
position_z	DOUBLE(:) -	meters	Navigation Solution Data Record (NAV) - Estimated Z position of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84) Source: ATL02 ATBD - Spacecraft Data
tdop	FLOAT(:) -	meters	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available. Source: ATL02 ATBD - Spacecraft Data
velocity_error_x	FLOAT(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated X velocity error Source: ATL02 ATBD - Spacecraft Data
velocity_error_y	FLOAT(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated Y velocity error Source: ATL02 ATBD - Spacecraft Data
velocity_error_z	FLOAT(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated Z velocity error Source: ATL02 ATBD - Spacecraft Data
velocity_x	DOUBLE(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated X velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST

Name Standard Name	Type(Dims) FillValue	Units	Description
			(WGS84) Source: ATL02 ATBD - Spacecraft Data
velocity_y	DOUBLE(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated Y velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84) Source: ATL02 ATBD - Spacecraft Data
velocity_z	DOUBLE(:) -	meters/second	Navigation Solution Data Record (NAV) - Estimated Z velocity of the platform reference point according to the Navigation Solution Method (NSM) at the point in time of GPST (WGS84) Source: ATL02 ATBD - Spacecraft Data
vertical_speed	DOUBLE(:) -	meters/second	Navigation Solution Data Record (NAV) - Vertical Speed Source: ATL02 ATBD - Spacecraft Data

1.64 Group: /gpsr/noise_histogram

Contains parameters related to the GPS Noise Histogram Data Record (NHDR).

1.64.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.64.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
chain_index	INTEGER_1(:, :) -	1	Noise Histogram Data Record (NHDR) - Chain Index - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data Flags: 0()=antenna1_l1carrier, 1()=antenna1_l2carrier
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta

Name Standard Name	Type(Dims) FillValue	Units	Description
			time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
ds_chain	INTEGER_1(2) -	1	Dimension scale representing each of the 2 chains. Source: Dimension Scale
noise_power	FLOAT(:, :) -	dB	Noise Histogram Data Record (NHDR) - Noise Power as seen at the input of the variable gain IF amplifier - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_neg_in_phase_m1	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M1) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_neg_in_phase_m3	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative In-phase samples (M3) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_neg_quad_phase_m1	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M1) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_neg_quad_phase_m3	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the negative Quadrature-phase samples (M3) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_pos_in_phase_p1	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P1) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_pos_in_phase_p3	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive In-phase samples (P3) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data
norm_pos_quad_phase_p1	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P1) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
norm_pos_quad_phase_p3	UINT_2_LE(:, :) -	counts	Noise Histogram Data Record (NHDR) - Normalized signal level detector counts of the positive Quadrature-phase samples (P3) - Down Conversion Chain Identifier 1-2 Source: ATL02 ATBD - Spacecraft Data

1.65 Group: /gpsr/time_correlation

Contains parameters related to GPSR time correlation data record (TCDR).

1.65.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.65.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time, in seconds since the ATLAS SDP GPS Epoch, computed from raw_gps_time_sec and subseconds in the time correlation group. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
gps_time_sec	UINT_4_LE(:) -	seconds	Time Correlation Data Record (TCDR) - GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
gps_time_subsec	UINT_4_LE(:) -	1/4294967296 seconds	Time Correlation Data Record (TCDR) - Subseconds portion of the GPS Time (GPST) representation of the synchronization time stamp. Total seconds elapsed since GPS epoch (6-Jan-1980 00:00:00) starting with 0. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
imt	UINT_8_LE(:) -	counts	Time Correlation Data Record (TCDR) - Time Correlation Data Record (TCDR) - Instrument Measurement Time (IMT) representation of the synchronization time stamp. IMT precisely describes how the GPSR clock oscillator behaves, and is for internal and maintenance use only. This field contains the raw 64-bit IMT value. (Be aware of possible precision loss possible when converting to seconds.) Source: ATL02 ATBD - Spacecraft Data
nsm	INTEGER_1(:) -	1	GPSR - Navigation Solution Method. 1 = Propagated 2 = Cold Start - First Nav Fix 3 = Cold Start - Least Squares Method w/ no GDOP Optimization 4 = Least Squares Method w/ all Visible SVs 5 = Kalman Filter Method (Normal Operation) 7 = Invalid Navigation Solution All other values invalid Source: ATL02 ATBD - Spacecraft Data Flags: 1()=propagated, 2()=cold_lsq_no_gdop, 3()=lsqm_w_svs, 4()=normal_lsqm, 5()=normal_kalman, 6()=unused, 7()=invalid_solution
tdop	FLOAT(:) -	meters	GPSR - Time Dilution of Precision. Values greater than 655.34 are saturated to 655.34; Value set to 655.35 when NSM = 1 or in the case NSM = 5 with fewer than 4 SVs available. Source: ATL02 ATBD - Spacecraft Data
time_qa	INTEGER_2(:) -	nanoseconds	Time Correlation Data Record (TCDR) - Time Quality Index. Nanoseconds; Values greater than 4095 ns are saturated to 4095 ns. Source: ATL02 ATBD - Spacecraft Data
utc_days	UINT_2_LE(:) -	days	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of days since 1st January 2000, 00:00:00 starting with 0. Source: ATL02 ATBD - Spacecraft Data
utc_msec	UINT_4_LE(:) -	msec	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of milliseconds of current day. Source: ATL02 ATBD - Spacecraft Data
utc_usec	UINT_2_LE(:) -	usec	Time Correlation Data Record (TCDR) - UTC time representation of the synchronization time stamp. Number of microseconds of current day. Source: ATL02 ATBD - Spacecraft Data

1.66 Group: /lrs

Group contains the Laser Reference System (LRS) packet decommutated data

1.66.1 Attributes

data_rate	Data within this group are stored at the nominal rate of the corresponding LRS APIDs (varies per APID).

1.67 Group: /lrs/hk_1120

Contains parameters relating to the Application Housekeeping Packet (LRStmHK)(APID 1120). The (Application Mode) Housekeeping Packet provides all LRS health and safety data. It is normally reported and stored at a 1 Hz rate.

1.67.1 Attributes

data_rate	Data within this group are stored at the data rate of the source LRS Housekeeping Data (nominally once per second).

1.67.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
chkstat_e_ad	INTEGER_1(:) -	1	EEPROM Application Data (AD) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_e_at	INTEGER_1(:) -	1	EEPROM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_e_bc	INTEGER_1(:) -	1	EEPROM Boot Configuration (BC) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_e_ld_df	INTEGER_1(:) -	1	EEPROM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_e_sd_df	INTEGER_1(:) -	1	EEPROM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_s_at	INTEGER_1(:) -	1	SRAM Application Text (AT) checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition))

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_s_ld_df	INTEGER_1(:) -	1	SRAM Laser Detector (LD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
chkstat_s_sd_df	INTEGER_1(:) -	1	SRAM Stellar Detector (SD) Dark Frame data checksum (0=PASSED (normal operating condition) 1=FAILED (abnormal condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=passed, 1()=failed
cmdcnt	UINT_2_LE(:) -	counts	The Valid User Command Counter is a 16-bit counter that increments each time that the Failsafe Mode processes a valid command of the corresponding command type. A valid command is defined as a command that passes all verification tests. The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
cmderrcnt	UINT_2_LE(:) -	counts	The 16-bit User Command Error Counter is incremented every time the Failsafe Mode has one or more command verification or processing errors with the corresponding command type (abnormal conditions). The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter increments only once per command when there is at least one verification/processing error for that command. CMDERRCODE will indicate the type of error. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
cmderrcode	UINT_2_LE(:) -	counts	The 16-bit Command Error Unique Code indicates the last type of command error that occurred in Failsafe Mode. This code will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The error codes are defined in Table 19: Command Validation Error Codes in the LRS command and data ICD. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the

Name Standard Name	Type(Dims) FillValue	Units	Description
			number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
dmpmemcnt	UINT_4_LE(:) -	counts	This 32-bit counter records the total number of memory words dumped during Failsafe Mode processing of Failsafe Dump Memory Command (LRSfscmDPMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
dmppktleft	UINT_2_LE(:) -	counts	This 16-bit counter indicates the remaining number of dump packets to send during Failsafe Mode processing of a Failsafe Dump Memory Command (LRSfscmDPMEM). It is 0x0000 whenever no dump command is active. Source: ATL02 ATBD - LRS Data
ground1_v	FLOAT(:) -	volts	Voltage of Ground 1 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[0] Source: ATL02 ATBD - LRS Data
ground2_v	FLOAT(:) -	volts	Voltage of Ground 2 - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[1] Source: ATL02 ATBD - LRS Data
laser_barrel1_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #1 (Laser Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
laser_barrel2_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #2 (Laser Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
laser_barrel3_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #3 (Laser Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for

Name Standard Name	Type(Dims) FillValue	Units	Description
			temperature scaling] Source: ATL02 ATBD - LRS Data
ldbackground	UINT_2_LE(:) -	counts	The 16-bit values are measures of the measured detector background for the laser side after subtracting the predicted dark frame. Each is a scaled average of the background levels from all tracking windows on that detector, for all measurements in the preceding one (1) second. Because the search and imaging windows move around, these values should be expected to fluctuate significantly; however, they are an indication of how well the predicted dark frame matches the background (stray light) levels. If they are occasionally very large, there is probably a stray light problem. If they are consistently very large, there is probably error in the dark frame calibration. Source: ATL02 ATBD - LRS Data
ldc_t	FLOAT(:) -	degreesC	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
ldmemcnt	UINT_4_LE(:) -	counts	This 32-bit counter records the total number of memory words loaded during Failsafe Mode processing of Failsafe Load Memory Command (LRSfscmLDMEM). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT) Source: ATL02 ATBD - LRS Data
ldmemconflict	UINT_2_LE(:) -	counts	This 16-bit counter is incremented each time the Application Mode is still accessing Laser-Side shared memory when a new LRS cycle starts. This conflict is an error, which indicates that shared memory access did not complete in the allocated time and may have caused stale or invalid laser centroids. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT). Source: ATL02 ATBD - LRS Data
ldoverrun	UINT_2_LE(:) -	counts	This 16-bit counter is incremented each time the Application Mode is still processing Laser-Side data when a new LRS cycle starts. This overrun condition is a warning, which indicates that some processor activity did not complete in the allocated time and may delay reporting

Name Standard Name	Type(Dims) FillValue	Units	Description
			of the next laser data packets. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT). Source: ATL02 ATBD - LRS Data
m12v_cmon_a	FLOAT(:) -	amps	Amperage of -12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[6] Source: ATL02 ATBD - LRS Data
m12v_ldc_mon_v	FLOAT(:) -	volts	Voltage of -12VDC LDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[11] Source: ATL02 ATBD - LRS Data
m12v_sdc_mon_v	FLOAT(:) -	volts	Voltage of -12VDC SDC Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[10] Source: ATL02 ATBD - LRS Data
m12v_supp_mon_v	FLOAT(:) -	volts	Voltage of 112VDC Supply Monitor - 0x0000 = 0.000 V; 0xBF9D = -12.000 V (nominal value); 0xFFFF = -16.000 V : A_LRS_HK.ANALOGHK[14] Source: ATL02 ATBD - LRS Data
meter_bar1_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #4 (Metering Bars #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
meter_bar2_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #5 (Metering Bars #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
meter_bar3_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #6 (Metering Bars #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
p12v_ana_mon_v	FLOAT(:) -	volts	Voltage of +12VDC Analog Monitor - 0x0000 = 0.000 V; 0xC000 = +12.000 V (nominal value); 0xFFFF = +16.000 V :

Name Standard Name	Type(Dims) FillValue	Units	Description
			A_LRS_HK.ANALOGHK[15] Source: ATL02 ATBD - LRS Data
p12v_cmon_a	FLOAT(:) -	amps	Amperage of +12VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[7] Source: ATL02 ATBD - LRS Data
p1_5v_mon_v	FLOAT(:) -	volts	Voltage of +1.5VDC Monitor - 0x0000 = 0.000 V; 0x6000 = +1.500 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[3] Source: ATL02 ATBD - LRS Data
p1_8v_mon_v	FLOAT(:) -	volts	Volage of +1.8VDC Monitor - 0x0000 = 0.000 V; 0x7332 = 1.800 V (nominal); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[19] Source: ATL02 ATBD - LRS Data
p3_3v_cmon_a	FLOAT(:) -	amps	Amperage of +3.3VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +4.000 A : A_LRS_HK.ANALOGHK[9] Source: ATL02 ATBD - LRS Data
p3_3v_mon_v	FLOAT(:) -	volts	Voltage of +3.3VDC Monitor - 0x0000 = 0.000 V; 0xD333 = +3.300 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[18] Source: ATL02 ATBD - LRS Data
p5v_ana_mon_v	FLOAT(:) -	volts	Voltage of +5VDC Analog Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[16] Source: ATL02 ATBD - LRS Data
p5v_cmon_a	FLOAT(:) -	amps	Amperage of +5VDC Current Monitor - 0x0000 = 0.000 A; 0xFFFF = +0.400 A : A_LRS_HK.ANALOGHK[8] Source: ATL02 ATBD - LRS Data
p5v_ldc_mon_v	FLOAT(:) -	volts	Voltage of +5VDC LDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[12] Source: ATL02 ATBD - LRS Data
p5v_sdc_mon_v	FLOAT(:) -	volts	Voltage of +5VDC SDC Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V : A_LRS_HK.ANALOGHK[13] Source: ATL02 ATBD - LRS Data
p5v_supp_mon_v	FLOAT(:) -	volts	Voltage of +5VDC Supply Monitor - 0x0000 = 0.000 V; 0xA000 = +5.000 V (nominal value); 0xFFFF = +8.000 V :

Name Standard Name	Type(Dims) FillValue	Units	Description
			A_LRS_HK.ANALOGHK[16] Source: ATL02 ATBD - LRS Data
pc_t	FLOAT(:) -	degreesC	Temperature of Processor Card - 0x0000 = 0.000 V (nominal short;) 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
pcc_t	FLOAT(:) -	degreesC	Temperature of Power Converter Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
ppscount	UINT_4_LE(:) -	counts	A 32-bit count of sync pulses registered by the LRS FPGA. The value of the pulse counter starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. Source: ATL02 ATBD - LRS Data
ppsoffset_ms	UINT_4_LE(:) -	ms	Oscillator Offset (milliseconds) for TOD (time of day) correction. Source: ATL02 ATBD - LRS Data
ppsoffset_ticks	UINT_4_LE(:) -	counts	Oscillator Offset (ticks) for TOD (time of day) correction. Source: ATL02 ATBD - LRS DataK
ppsoscval	UINT_4_LE(:) -	counts	The 32-bit count of internal 27 MHz oscillator ticks at the time when the last 1 PPS sync pulse was registered by the LRS FPGA. Source: ATL02 ATBD - LRS Data
reference_v	FLOAT(:) -	volts	Reference Voltage - 0x0000 = 0.000 V; 0x8000 = +2.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[2] Source: ATL02 ATBD - LRS Data
sdbackground	UINT_2_LE(:) -	counts	The 16-bit values are measures of the measured detector background of the stellar side after subtracting the predicted dark frame. Each is a scaled average of the background levels from all tracking windows on that detector, for all measurements in the preceding one (1) second. Because the search and imaging windows move around, these values should be expected to fluctuate significantly; however, they are an indication of how well the predicted dark frame matches the background (stray light) levels. If they are occasionally very large, there is probably a stray light problem. If they are consistently very large, there is probably error in the dark

Name Standard Name	Type(Dims) FillValue	Units	Description
			frame calibration. Source: ATL02 ATBD - LRS Data
sdc_t	FLOAT(:) -	counts	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
sdmemconflict	UINT_2_LE(:) -	counts	This 16-bit counter is incremented each time the Application Mode is still accessing Stellar-Side shared memory when a new LRS cycle starts that includes new Stellar-Side data collection. This conflict is an error, which indicates that shared memory access did not complete in the allocated time and may have caused stale or invalid stellar centroids. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT). Source: ATL02 ATBD - LRS Data
sdoverrun	UINT_2_LE(:) -	counts	This 16-bit counter is incremented each time the Application Mode is still processing Stellar-Side data when a new LRS cycle starts that should include new Stellar-Side data collection. This overrun condition is a warning, which indicates that some processor activity did not complete in the allocated time and may delay reporting of the next stellar data packets. This counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. This counter will be reset at Application Mode initialization and by an Application Reset Counters Command (LRScmRSTCNT). Source: ATL02 ATBD - LRS Data
spwdiscardbkup	UINT_4_LE(:) -	counts	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe Mode while waiting for the transmission buffer to empty (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
spwdiscardcmd	UINT_4_LE(:) -	counts	This 32-bit counter is incremented each time a spacewire command word is dropped by Failsafe Mode due to a timeout while waiting for a full CCSDS packet (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters

Name Standard Name	Type(Dims) FillValue	Units	Description
			Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
spwdiscardlink	UINT_4_LE(:) -	counts	This 32-bit counter is incremented every time a spacewire telemetry packet is dropped by Failsafe Mode while waiting for a valid spacewire link between the LRS and MEB (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
spwoutofsync	UINT_4_LE(:) -	counts	This 32-bit counter is incremented each time a spacewire command word is skipped by Failsafe Mode to reach a valid packet sync (an abnormal condition). It starts at 0x00000000, and rolls over to 0x00000000 when it increments from 0xFFFFFFFF. This counter will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
spwstat_ll_err	INTEGER_1(:) -	1	This is the Last Link Error Code portion of the LRS spacewire interface register. Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=parity_err, 2()=esc_rec, 3()=credit_err
spwstat_lp_err	INTEGER_1(:) -	1	This is the Last Packet Error Code portion of the LRS spacewire interface register. Source: ATL02 ATBD - LRS Data Flags: 0()=no_error, 1()=eep_rec, 2()=incomplete_sw, 3()=invalid
spwstat_pec	UINT_1_LE(:) -	counts	This is the 6-bit Packet Error Counter portion of the LRS spacewire interface status register Source: ATL02 ATBD - LRS Data
spwstat_st_f	INTEGER_1(:) -	1	This is the status flag portion of the LRS spacewire interface status register. Source: ATL02 ATBD - LRS Data Flags: 0()=not_running, 1()=running
srate_x	FLOAT(:) -	pixels/sec	X component (tip/tilt) of the stellar rate pattern estimate. Source: ATL02 ATBD - LRS Data
srate_y	FLOAT(:) -	pixels/second	Y component (tip/tilt) of the stellar rate pattern estimate Source: ATL02 ATBD - LRS Data

Name Standard Name	Type(Dims) FillValue	Units	Description
srate_z	FLOAT(:) -	radians/second	Z (rotation) component of the stellar rate pattern estimate Source: ATL02 ATBD - LRS Data
stellar_barrel1_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #7 (Stellar Side Barrel #1) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
stellar_barrel2_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #8 (Stellar Side Barrel #2) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
stellar_barrel3_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #9 (Stellar Side Barrel #3) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
stellar_shroud_t	FLOAT(:) -	degreesC	Temperature of Optics Thermistor #10 (Stellar Side Shroud) - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
sysstat_ac_en	INTEGER_1(:) -	1	The current status of the LRS FPGA Analog Converter. (0 =DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disabled, 1()=enabled
sysstat_hk	INTEGER_1(:) -	1	The current status of the Housekeeping working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Source: ATL02 ATBD - LRS Data Flags: 0()=finished, 1()=executing
sysstat_j1	INTEGER_1(:) -	1	Jumper 1 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal operating condition Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_j2	INTEGER_1(:) -	1	Jumper 2 status (no planned use on ATLAS). 0 = Jumper is DISCONNECTED (normal

Name Standard Name	Type(Dims) FillValue	Units	Description
			operating condition) Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_ldc	INTEGER_1(:) -	1	The current status of the Laser Detector Card (LDC) working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Source: ATL02 ATBD - LRS Data Flags: 0()=finished, 1()=executing
sysstat_ldc_en	INTEGER_1(:) -	1	The current status of the LRS FPGA LDC (Laser Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disabled, 1()=enabled
sysstat_ldca_cable	INTEGER_1(:) -	1	The current status of the LRS FPGA LDCA (Laser Detector Card Analog) Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_ldcd_cable	INTEGER_1(:) -	1	The current status of the LRS FPGA LDCD (Laser Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_lsync	INTEGER_1(:) -	1	The current validity of the Laser Sync (0 = INVALID (abnormal condition); 1 = VALID (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=invalid, 1()=valid
sysstat_sdc	INTEGER_1(:) -	1	The current status of the Stellar Detector Card (SDC) working (0 = Finished Execution; 1 = Executing). Note: The FPGA toggles these values based on what logic is executing, so they may show up as 0 or 1 based on when the packet is generated Source: ATL02 ATBD - LRS Data Flags: 0()=finished, 1()=executing
sysstat_sdc_en	INTEGER_1(:) -	1	The current status of the LRS FPGA SDC (Stellar Detector Card) Power and Signals. (0 = DISABLED (abnormal condition); 1 = ENABLED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disabled, 1()=enabled

Name Standard Name	Type(Dims) FillValue	Units	Description
sysstat_sdca_cable	INTEGER_1(:) -	1	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_sdcd_cable	INTEGER_1(:) -	1	The current status of the LRS FPGA SDCD (Stellar Detector Card Digital Cable. (0 = DISCONNECTED (abnormal condition); 1 = CONNECTED (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=disconnected, 1()=connected
sysstat_sw	INTEGER_1(:) -	1	The current status of the Spacewire Module (0 = NOT RUNNING (abnormal condition); 1 = RUNNING (normal operating condition)) Source: ATL02 ATBD - LRS Data Flags: 0()=not_running, 1()=running
therm_gnd_ref_v	FLOAT(:) -	volts	Voltage of Thermistor Reference (ground) - 0x0000 = 0.000 V (nominal value); 0xFFFF = +4.000 V : A_LRS_HK.ANALOGHK[20] Source: ATL02 ATBD - LRS Data
therm_open_ref_v	FLOAT(:) -	volts	Voltage of Thermistor Reference (open) - 0x0000 = 0.000 V; 0xFFFF = +4.000 V (nominal value) : A_LRS_HK.ANALOGHK[21] Source: ATL02 ATBD - LRS Data
timecnt	UINT_2_LE(:) -	counts	The Valid Time Sync Command Counter is a 16-bit counter that increments each time that the Failsafe Mode processes a valid command of the corresponding command type. A valid command is defined as a command that passes all verification tests. The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter is reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
timeerrcnt	UINT_2_LE(:) -	counts	The 16-bit Time Sync Command error Counter is incremented every time the Failsafe Mode has one or more command verification or processing errors with the corresponding command type (abnormal conditions). The counter starts at 0x0000, and rolls over to 0x0000 when it increments from 0xFFFF. The counter increments only once per command when there is at least one verification/processing error for that command. TIMEERRCODE will indicate the type of error. The counter is reset at power on and by a Failsafe Reset Counters Command

Name Standard Name	Type(Dims) FillValue	Units	Description
			(LRSfscmRSTCNT). Source: ATL02 ATBD - LRS Data
timeerrcode	UINT_2_LE(:) -	counts	The 16-bit Time Sync Error Code indicates the last type of time sync error that occurred in Failsafe Mode. This code will be reset at power on and by a Failsafe Reset Counters Command (LRSfscmRSTCNT). The error codes are defined in Table 19: Command Validation Error Codes. Source: ATL02 ATBD - LRS Data

1.68 Group: /lrs/laser_centroid

Contains parameters relating to the Application Laser Centroid (LCENT) Data. The (Application Mode) Laser Centroid Data Packet contains reported Laser-Side Centroids, which are part of the core LRS data output. This packet normally will contain 10 valid centroids, reported and stored at a nominally 50 Hz rate and is available through all data channels (SSR, real time telemetry, and onboard to the spacecraft ACS).

1.68.1 Attributes

data_rate	Data within this group are stored at the data rate of the source LRS Application Laser Centroid Data (nominally fifty per second).

1.68.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cent_h	FLOAT(:) -	pixels	The centroid H value. The centroids are the Transmit Laser Centroids and TAMS Centroids. Source: ATL02 ATBD - LRS Data
cent_mag	INTEGER_2(:) -	counts	The 12-bit centroid magnitude. The centroids are the Transmit Laser Centroids and TAMS Centroids. Source: ATL02 ATBD - LRS Data
cent_v	FLOAT(:) -	pixels	The centroid V value. The centroids are the Transmit Laser Centroids and TAMS Centroids. Source: ATL02 ATBD - LRS Data
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an

Name Standard Name	Type(Dims) FillValue	Units	Description
			exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
coi_offset	INTEGER_2(:) -	counts	The signed 16-bit center of integration offset for this specific centroid. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time values retrieved from the CCSDS header timestamps, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
quality_f	INTEGER_1(:) -	1	Flag indicates centroids pass basic validity checks in the LRS software. 0 = valid centroids; 1 = the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the windows to the actual tams/laser spots is not guaranteed. Source: ATL02 ATBD - LRS Data Flags: 0()=valid, 1()=questionable
trackstat_f	INTEGER_1(:) -	1	Flag indicates tracking status for centroid; 1 = valid tracking of that centroid window; 0 = the corresponding window is in a searching or acquiring state (that is, the corresponding centroid should not be considered to report a valid target). The win parameter within this group correlates the flags to tams/laser windows. However, the correlation of the windows to the actual tams/laser spots is not guaranteed. Source: ATL02 ATBD - LRS Data Flags: 0()=acq_state, 1()=track_state
win	INTEGER_1(:) -	1	Indicates the window corresponding to each component of the centmagtime and corresponding flags. Values of 1-4 correspond to TAMS windows;

Name Standard Name	Type(Dims) FillValue	Units	Description
			values of 5-10 correspond to laser windows. Assignment of a window to a particular spot is not guaranteed. Source: ATL02 ATBD - LRS Data Flags: 0()=none, 1()=tams0, 2()=tams1, 3()=tams2, 4()=tams3, 5()=laser1, 6()=laser2, 7()=laser3, 8()=laser4, 9()=laser5, 10()=laser6

1.69 Group: /lrs/laser_image

The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.

1.69.1 Attributes

data_rate	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.)

1.69.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
datatype	UINT_2_LE(:) -	1	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The valid codes are defined as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Corrected Data, 8738 Data Corrected for both Dark Frame and

Name Standard Name	Type(Dims) FillValue	Units	Description
			Local Dark Source: ATL02 ATBD - LRS Data Flags: 0()=raw, 4369()=dark, 8738()=adj
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The base age of the centroids in GPS seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
ldc_t	FLOAT(:) -	degrees	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
nread	UINT_2_LE(:) -	counts	This 16-bit value is the number of reads performed on the window. This value will count up to the requested number of reads on successive packets. The detector has a settling behavior when read on successive cycles, so it may be necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windows are tracked. Source: ATL02 ATBD - LRS Data

1.70 Group: /lrs/laser_image/window_nn

This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.

1.70.1 Attributes

data_rate	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.)

1.70.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
ds_pixel_64_index	INTEGER_1(64) -	1	Dimension scale for 64-pixel arrays. Source: Dimension Scale
hloc	UINT_2_LE(:) -	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
pixeldata	UINT_2_LE(:, :) -	counts	Pixel data for window- The arrays contains the 64 pixels of a TAMS window. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
vloc	UINT_2_LE(:) -	pixels	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data

1.71 Group: /lrs/laser_window

The (Application Mode) Transmit Laser Window Data Packet (LRStmLWIN) contains measured pixel data from a Transmit Laser (Laser-Side) centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.

1.71.1 Attributes

data_rate	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.)

1.71.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
adjdata	UINT_2_LE(:, :) -	counts	Adjusted Pixel data for window - The array contains 25 pixels of the window corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum

Name Standard Name	Type(Dims) FillValue	Units	Description
			row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]). Source: ATL02 ATBD - LRS Data
cent_h	FLOAT(:) -	pixels	The centroid H value (in 256ths of a pixel) Source: ATL02 ATBD - LRS Data
cent_mag	INTEGER_2(:) -	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 Source: ATL02 ATBD - LRS Data
cent_v	FLOAT(:) -	pixels	The centroid V value (in 256ths of a pixel). Source: ATL02 ATBD - LRS Data
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
coi_offset	INTEGER_2(:) -	counts	The signed 16-bit center of integration offset for this specific centroid. Source: ATL02 ATBD - LRS Data
darkdata	UINT_2_LE(:, :) -	counts	Dark pixel data for window- The array contains 25 pixels corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]). Source: ATL02 ATBD - LRS Data
darkfactor	UINT_2_LE(:) -	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window

Name Standard Name	Type(Dims) FillValue	Units	Description
			reading for dark frame. Source: ATL02 ATBD - LRS Data
darkoff_next	UINT_2_LE(:) -	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time of the centroids in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
ds_pixel_25_index	INTEGER_1(25) -	1	Dimension scale for 25-pixel arrays. Source: Dimension Scale
hdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
hloc	UINT_2_LE(:) -	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
ldc_t	FLOAT(:) -	Degrees	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
localdark	UINT_2_LE(:) -	counts	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias. Source: ATL02 ATBD - LRS Data
max_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the maximum magnitude value for the target. Source: ATL02 ATBD - LRS Data
min_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the minimum magnitude value for the target. Source: ATL02 ATBD - LRS Data

Name Standard Name	Type(Dims) FillValue	Units	Description
quality_f	INTEGER_1(:) -	1	This 16-bit value contains a single bit for the quality of this image only. Source: ATL02 ATBD - LRS Data Flags: 0()=valid, 1()=questionable
rawdata	UINT_2_LE(:, :) -	counts	Raw pixel data for window- The array contains 25 uncorrected pixel values. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+4, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+4, VLOC+4]). Source: ATL02 ATBD - LRS Data
status_f	UINT_2_LE(:) -	1	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Source: ATL02 ATBD - LRS Data Flags: 0()=empty, 1()=acq1, 2()=acq2, 3()=track, 65532()=not_allowed, 65534()=collided, 65535()=violated
tickattime	UINT_4_LE(:) -	counts	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick. Source: ATL02 ATBD - LRS Data
tickfirst	UINT_4_LE(:) -	counts	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
ticklast	UINT_4_LE(:) -	counts	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
use_f	INTEGER_1(:) -	1	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Source: ATL02 ATBD - LRS Data

Name Standard Name	Type(Dims) FillValue	Units	Description
			Flags: 0()=inactive, 1()=image_gen, 2()=search, 3()=track
vdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
vloc	UINT_2_LE(:) -	pixels	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The Transmit Laser window uses 5 x 5 pixels, so the coordinates of the center will be 2.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
windex	UINT_2_LE(:) -	counts	Window Index- The 16-bit value contains the window index reported in this packet. Source: ATL02 ATBD - LRS Data

1.72 Group: /lrs/stellar_centroid

The (Application Mode) Stellar Centroid Data Packet contains reported Stellar-Side Centroids, which are part of the core LRS data output. This packet is normally reported and stored at a nominally 10 Hz rate with a variable number of stars reported and is available through all data channels (SSR, real time telemetry, and onboard to the spacecraft ACS).

1.72.1 Attributes

data_rate	Data within this group are stored at the data rate of the source LRS Stellar Centroid Data Packet. (nominally 10 per second.)

1.72.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cent_h	FLOAT(:) -	pixels	The centroid H value. Source: ATL02 ATBD - LRS Data
cent_mag	INTEGER_2(:) -	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 Source: ATL02 ATBD - LRS Data
cent_v	FLOAT(:) -	pixels	The centroid V value. Source: ATL02 ATBD - LRS Data
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp

Name Standard Name	Type(Dims) FillValue	Units	Description
			and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
coi_offset	INTEGER_2(:) -	counts	The signed 16-bit center of integration offset for this specific centroid. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Retrieved times from the CCSDS header timestamps, in seconds relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
quality_f	INTEGER_1(:) -	1	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 indicate the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy). Source: ATL02 ATBD - LRS Data Flags: 0()=valid, 1()=questionable
trackstat_f	INTEGER_1(:) -	1	Flag indicates tracking status for centroid. 1 indicate valid tracking of that centroid window; 0 indicate the corresponding window is in a searching or acquiring state (that is, the corresponding centroid should not be considered to report a valid target). Source: ATL02 ATBD - LRS Data Flags: 0()=acq_state, 1()=track_state

1.73 Group: /lrs/stellar_image

The (Application Mode) Laser Image Data Packet contains measured pixel data from a Laser-Side image dump. This SSR packet is only reported when requested by command, and is

normally used only for diagnostic purposes. Packets contain pixel data in the form of 6 8x8 windows. Each 'pixeldata' array contains 64 pixels of an image. All 6 images are put together to make a 1024 by 1024 image. During the image dump, no spots are tracked (the LCENT packets are not telemetered to ground while dumping the image).

1.73.1 Attributes

data_rate	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.)

1.73.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
cycle	UINT_2_LE(:) -	counts	This 16-bit value is the number (0 to 4 are valid) of the cycle within the 100 millisecond integration period on which this packet was generated. The actual window used for the pixel data will be window (6*CYCLE + n). Source: ATL02 ATBD - LRS Data
datatype	UINT_2_LE(:) -	1	This 16-bit value contains a code indicating the type of pixel data being reported in the packet. The valid codes are defined as follows (other codes are invalid): 0 Raw Pixel Data (no compensation), 4369 Dark Frame Corrected Data, 8738 Data Corrected for both Dark Frame and Local Dark Source: ATL02 ATBD - LRS Data Flags: 0()=raw, 4369()=dark, 8738()=adj
delta_time time	DOUBLE(:) -	seconds since	Time computed from the base age of the centroids, in seconds since the ATLAS SDP GPS

Name Standard Name	Type(Dims) FillValue	Units	Description
		2018-01-01	Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
nread	UINT_2_LE(:) -	counts	This 16-bit value is the number of reads performed on the window. This value will count up to the requested number of reads on successive packets. The detector has a settling behavior when read on successive cycles, so it may be necessary to perform multiple back-to-back reads to mimic the behavior that will occur when windows are tracked. Source: ATL02 ATBD - LRS Data
sdc_t	FLOAT(:) -	Degrees	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data

1.74 Group: /lrs/stellar_image/window_nn

This group contains five of the laser image windows reported within the LRStmLIMG packet. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes. Window 0 is a vertical slice of 8 pixels starting at 1, windows step 48 verticals, the next image starts at vertical 49, Window 1 is a vertical slice of 8 pixels starting at 9, windows step 48 verticals, the next image starts at vertical 57,

1.74.1 Attributes

data_rate	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.)

1.74.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
ds_pixel_64_index	INTEGER_1(64) -	1	Dimension scale for 64-pixel arrays. Source: Dimension Scale

Name Standard Name	Type(Dims) FillValue	Units	Description
hloc	UINT_2_LE(:) -	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. All windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixels greater in each axis. Source: LRS_LIMG
pixeldata	UINT_2_LE(:, :) -	counts	Pixel data for window- The arrays contains the 64 pixels of a TAMS window. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], then [HLOC+7, VLOC], then [HLOC, VLOC+1], and ending with [HLOC+7, VLOC+7]). Source: LRS_LIMG
vloc	UINT_2_LE(:) -	pixels	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. All windows are 8 x 8 pixels (same size as TAMS), so the coordinates of the center will be 3.5 pixels greater in each axis. Source: LRS_LIMG

1.75 Group: /lrs/stellar_window

The (Application Mode) Stellar Window Data Packet contains measured pixel data from a Stellar-Side centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.

1.75.1 Attributes

data_rate	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.)

1.75.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
adjdata	UINT_2_LE(:, :) -	counts	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixel readings after they are corrected for both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and

Name Standard Name	Type(Dims) FillValue	Units	Description
			ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
cent_h	FLOAT(:) -	pixels	The centroid H value (in 256ths of a pixel). Source: ATL02 ATBD - LRS Data
cent_mag	INTEGER_2(:) -	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4. This is a copy of the word that should be reported in the (Application mode) Stellar Centroid Data Packet for the window reported here. Source: ATL02 ATBD - LRS Data
cent_v	FLOAT(:) -	pixels	The centroid V value (in 256ths of a pixel). Source: ATL02 ATBD - LRS Data
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
coi_offset	INTEGER_2(:) -	counts	The signed 16-bit center of integration offset for this specific centroid. Source: ATL02 ATBD - LRS Data
darkdata	UINT_2_LE(:, :) -	counts	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel readings after they are corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
darkfactor	UINT_2_LE(:) -	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window

Name Standard Name	Type(Dims) FillValue	Units	Description
			reading for dark frame. Source: ATL02 ATBD - LRS Data
darkoff_next	UINT_2_LE(:) -	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
ds_pixel_64_index	INTEGER_1(64) -	1	Dimension scale for 64-pixel arrays. Source: Dimension Scale
hdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
hloc	UINT_2_LE(:) -	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
localdark	UINT_2_LE(:) -	counts	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias. Source: ATL02 ATBD - LRS Data
max_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the maximum magnitude value for the target. Source: ATL02 ATBD - LRS Data
min_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the minimum magnitude value for the target. Source: ATL02 ATBD - LRS Data
quality_f	INTEGER_1(:) -	1	Flag indicates centroids pass basic validity checks in the LRS software. 0 indicate valid centroids; 1 indicate the corresponding centroid is considered questionable (that is, the corresponding centroid should not be expected to report a valid target with full accuracy).

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - LRS Data Flags: 0()=valid, 1()=questionable
rawdata	UINT_2_LE(:, :) -	counts	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC readings for the pixels without onboard corrections. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
sdc_t	FLOAT(:) -	degrees	Temperature of Stellar Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
status_f	UINT_2_LE(:) -	1	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Source: ATL02 ATBD - LRS Data Flags: 0()=empty, 1()=acq1, 2()=acq2, 3()=track, 65532()=not_allowed, 65534()=collided, 65535()=violated
tickattime	UINT_4_LE(:) -	counts	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick. Source: ATL02 ATBD - LRS Data
tickfirst	UINT_4_LE(:) -	counts	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
ticklast	UINT_4_LE(:) -	counts	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
tickoverlap	UINT_4_LE(:) -	counts	Oscillator ticks at the start or end of a pixel row overlap. The 32-bit value reading from the internal 27 MHz oscillator when the overlap

Name Standard Name	Type(Dims) FillValue	Units	Description
			started/ended. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
use_f	INTEGER_1(:) -	1	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Source: ATL02 ATBD - LRS Data Flags: 0()=inactive, 1()=image_gen, 2()=search, 3()=track
vdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
vloc	UINT_2_LE(:) -	pixels	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The Stellar window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
windex	UINT_2_LE(:) -	counts	Window Index- The 16-bit value contains the window index reported in this packet. Source: ATL02 ATBD - LRS Data

1.76 Group: /lrs/tams_window

The (Application Mode) TAMS Window Data Packet contains measured pixel data from a TAMS (Laser-Side) centroid window. This SSR packet is only reported when requested by command, and is normally used only for diagnostic purposes.

1.76.1 Attributes

data_rate	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.)

1.76.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
adjdata	UINT_2_LE(:, :) -	counts	Adjusted Pixel data for window - The array contains the 64 pixels of the window containing the pixel readings after they are corrected for

Name Standard Name	Type(Dims) FillValue	Units	Description
			both the predicted dark frame and the LOCALDARK bias. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
cent_h	FLOAT(:) -	pixels	The centroid H value (in 256ths of a pixel). Source: ATL02 ATBD - LRS Data
cent_mag	INTEGER_2(:) -	counts	The 12-bit centroid magnitude. From Word 2, bits 15 (MSB) to 4 Source: ATL02 ATBD - LRS Data
cent_v	FLOAT(:) -	pixels	The centroid V value (in 256ths of a pixel). Source: ATL02 ATBD - LRS Data
centofintbase	UINT_4_LE(:) -	counts	Base age of centroids relative to secondary header timestamp. This 32-bit value indicates how many 843.75 kHz time ticks of offset should be applied between the secondary header timestamp and the center_of_integration for the laser centroids reported. This time offset assumes that the secondary header timestamp represents an exact milli-second (that is, is accurate beyond the precision expressed in the timestamp). The offset is based on the LRS internal 27 MHz oscillator (divided by 32), and it can express offset from zero to more than 84 minutes with about 1.185 micro second resolution. Under normal operating conditions, the offset should never exceed 20 milli seconds (about 16875 counts). Centroid timetags offset with this value alone should be adequate for coarse geo-location, but not precision geo-location knowledge as expected for science (individual centroid offsets are required for that purpose). Source: ATL02 ATBD - LRS Data
coi_offset	INTEGER_2(:) -	counts	The signed 16-bit center of integration offset for this specific centroid. Source: ATL02 ATBD - LRS Data
darkdata	UINT_2_LE(:, :) -	counts	Dark pixel data for window- The array contains the 64 pixels of the window contain the pixel readings after they are corrected for the predicted dark frame. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and

Name Standard Name	Type(Dims) FillValue	Units	Description
			ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
darkfactor	UINT_2_LE(:) -	counts	Dark Factor - This 16-bit value is the scale factor applied when correcting the window reading for dark frame. Source: ATL02 ATBD - LRS Data
darkoff_next	UINT_2_LE(:) -	counts	This 16-bit value contains the dark offset value that will be used for processing this window in the next frame. Source: ATL02 ATBD - LRS Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time of the centroid, in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - LRS Data
ds_pixel_64_index	INTEGER_1(64) -	1	Dimension scale for 64-pixel arrays. Source: Dimension Scale
hdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average horizontal velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
hloc	UINT_2_LE(:) -	pixels	Horizontal location of window. The 16-bit values for the coordinates of the minimum column contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
ldc_t	FLOAT(:) -	Degrees	Temperature of Laser Detector Card - 0x0000 = 0.000 V (nominal short); 0xFFFF = +4.000 V (nominal open) [see thermistor scaling section later for temperature scaling] Source: ATL02 ATBD - LRS Data
localdark	UINT_2_LE(:) -	counts	Local Dark - This 16-bit value is the local dark correction applied when correcting the window reading for stray light and/or residual dark frame bias. Source: ATL02 ATBD - LRS Data
max_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the maximum magnitude value for the target. Source: ATL02 ATBD - LRS Data

Name Standard Name	Type(Dims) FillValue	Units	Description
min_mag	UINT_2_LE(:) -	counts	This 16-bit value contains the minimum magnitude value for the target. Source: ATL02 ATBD - LRS Data
quality_f	INTEGER_1(:) -	1	This 16-bit value contains a single bit for the quality of this image only. Source: ATL02 ATBD - LRS Data Flags: 0()=valid, 1()=questionable
rawdata	UINT_2_LE(:, :) -	counts	Raw pixel data for window- The array contains the 64 pixels of the window contain the ADC readings for the pixels without onboard corrections. The values are transmitted in raster scan order, starting with the minimum row and column values (that is, the first transmitted 16-bit word will be from [HLOC, VLOC], then [HLOC+1, VLOC], , then [HLOC+7, VLOC], then [HLOC, VLOC+1], , and ending with [HLOC+7, VLOC+7]). Source: ATL02 ATBD - LRS Data
status_f	UINT_2_LE(:) -	1	Target status-This 16-bit value contains a code indicating the target status applicable to the window reported in this packet. The valid codes are defined as follows (other codes are invalid): 65531 Dimmest Spot (not currently used), 65532 Invalid Rate, 65533 Collided with Another Window, 65534 Violated Minimum Area Limit, 65535 Violated Image Bound, 0 Empty, 1 Acquire1, 2 Acquire2, 3 Tracking Source: ATL02 ATBD - LRS Data Flags: 0()=empty, 1()=acq1, 2()=acq2, 3()=track, 65532()=not_allowed, 65534()=collided, 65535()=violated
tickattime	UINT_4_LE(:) -	counts	Oscillator tick value at last time pulse. This 32-bit value is the reading from the internal 27 MHz oscillator at the last 1 PPS time tick. Source: ATL02 ATBD - LRS Data
tickfirst	UINT_4_LE(:) -	counts	Oscillator ticks when first pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the first pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
ticklast	UINT_4_LE(:) -	counts	Oscillator ticks when last pixel is read. The 32-bit value reading from the internal 27 MHz oscillator when the last pixel of the window was read. They can be used to confirm the calculation of the center of integration offsets. Source: ATL02 ATBD - LRS Data
use_f	INTEGER_1(:) -	1	Window Use - This 16-bit value reports the way that the window is currently being used by the search and tracking algorithms. The valid

Name Standard Name	Type(Dims) FillValue	Units	Description
			codes are defined as follows (other codes are invalid): 0 = Inactive, 1= Image Generation, 2 = Searching, 3 = Tracking Source: ATL02 ATBD - LRS Data Flags: 0()=inactive, 1()=image_gen, 2()=search, 3()=track
vdot_avg	FLOAT(:) -	pixels/second	This 32-bit value contains the average vertical velocity for the target in pixels per frame, 1:23:8 fixed point format. Source: ATL02 ATBD - LRS Data
vloc	UINT_2_LE(:) -	pixels	Vertical location of window. The 16-bit values for the coordinates of the minimum row contained within the window. The TAMS window uses 8 x 8 pixels, so the coordinates of the center will be 3.5 pixels greater in each axis. Source: ATL02 ATBD - LRS Data
windex	UINT_2_LE(:) -	counts	Window Index- The 16-bit value contains the window index reported in this packet. Source: ATL02 ATBD - LRS Data

1.77 Group: /orbit_info

Contains orbit information.

1.77.1 Attributes

data_rate	Data within this group are stored at the data rate of the source PCE Altimetric Data Packets. (nominally fifty per second.)

1.77.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
cycle_number	INTEGER_1(:) -	1	A count of the number of exact repeats of this reference orbit. Source: Operations
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch at the start of the granule. At the time of ATL02 creation, the equator crossing time is not precisely known.. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta

Name Standard Name	Type(Dims) FillValue	Units	Description
			time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: Operations
orbit_number	UINT_2_LE(:) -	1	Unique identifying number for each planned ICESat-2 orbit. Source: Operations
rgt	INTEGER_2(:) -	1	The reference ground track (RGT) is the track on the earth at which a specified unit vector within the observatory is pointed. Under nominal operating conditions, there will be no data collected along the RGT, as the RGT is spanned by GT3 and GT4. During slews or off-pointing, it is possible that ground tracks may intersect the RGT. The ICESat-2 mission has 1387 RGTs. Source: Operations

1.78 Group: /quality_assessment

Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.

1.78.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
ds_statistics	INTEGER_1(5) -	1	QA statistics array index Source: Dimension Scale Flags: 1()=number_of_points, 2()=minimum, 3()=maximum, 4()=average, 5()=standard_deviation
qa_granule_fail_reason	INTEGER(1) -	1	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=An uncorrected TxRx slip condition was detected; 4=TBD_Failure; 5=other failure. Source: Operations Flags: 0()=no_failure, 1()=NO_SIM_HK, 2()=NO_PMF_TIME, 3()=TIME_OF_DAY_FAILURE, 4()=TIME_OF_FLIGHT_FAILURE, 5()=OTHER_FAILURE
qa_granule_pass_fail	INTEGER(1) -	1	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. Source: Operations Flags: 0()=PASS, 1()=FAIL

1.79 Group: /quality_assessment/along_track

Along-track statistics

1.79.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time_end time	DOUBLE(:) -	seconds since 2018-01-01	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment
delta_time_start time	DOUBLE(:) -	seconds since 2018-01-01	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment

1.80 Group: /quality_assessment/along_track/pcex

Along-track statistics

1.80.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_at_n_dupe	INTEGER(:) -	counts	The number of duplicate Rx events detected in the along-track interval. Source: ATL02 ATBD - Quality Assesment
qa_at_n_rx_s	INTEGER(:) -	counts	The number of Strong Rx events in the along-track interval. Source: ATL02 ATBD - Quality Assesment
qa_at_n_rx_w	INTEGER(:) -	counts	The number of Weak Rx events in the along-track interval. Source: ATL02 ATBD - Quality Assesment
qa_at_n_tep	INTEGER(:) -	counts	The number of TEP events detected in the along-track interval. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_at_n_tx	INTEGER(:) -	counts	The number of Tx Pulses in the along-track interval. Source: ATL02 ATBD - Quality Assesment
qa_at_tx_ll_stat	DOUBLE(:, :) -	counts	Along-track statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_at_tx_other_stat	DOUBLE(:, :) -	counts	Along-track statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Leading Upper edge (LU) time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Lower edge (TL) time. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment

1.81 Group: /quality_assessment/event_counts

Event count statistics

1.82 Group: /quality_assessment/event_counts/pcex

Per-PCE event count statistics

1.82.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
activeknobstable	INTEGER(1) -	1	Number of changes in the activeknobstable Source: ATL02 ATBD - Quality Assesment
alt_cal_interval	INTEGER(1) -	1	Number of changes in the alt_cal_interval Source: ATL02 ATBD - Quality Assesment
alt_cmd_cnt	INTEGER(1) -	1	Number of increments in the alt_cmd_cnt Source: ATL02 ATBD - Quality Assesment
alt_config	INTEGER(1) -	1	Number of changes in the alt_config Source: ATL02 ATBD - Quality Assesment
alt_debug_reg	INTEGER(1) -	1	Number of changes in the alt_debug_reg Source: ATL02 ATBD - Quality Assesment
alt_dupe_margin	INTEGER(1) -	1	Number of changes in the alt_dupe_margin Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
alt_gp_reg	INTEGER(1) -	1	Number of changes in the alt_gp_reg Source: ATL02 ATBD - Quality Assesment
alt_last_opcode	INTEGER(1) -	1	Number of changes in the alt_last_opcode Source: ATL02 ATBD - Quality Assesment
alt_mframe_freq	INTEGER(1) -	1	Number of changes in the alt_mframe_freq Source: ATL02 ATBD - Quality Assesment
alt_sci_addr	INTEGER(1) -	1	Number of changes in the alt_sci_addr Source: ATL02 ATBD - Quality Assesment
alt_sci_seg_limit	INTEGER(1) -	1	Number of changes in the alt_sci_seg_limit Source: ATL02 ATBD - Quality Assesment
alt_t0_cnt	INTEGER(1) -	1	Number of instances where the alt_t0_cnt increment is not 200. Source: ATL02 ATBD - Quality Assesment
alt_wait_watchdog	INTEGER(1) -	1	Number of changes in the alt_wait_watchdog Source: ATL02 ATBD - Quality Assesment
alt_write_watchdog	INTEGER(1) -	1	Number of changes in the alt_write_watchdog Source: ATL02 ATBD - Quality Assesment
autorestartdfccount	INTEGER(1) -	1	Number of changes in the autorestartdfccount Source: ATL02 ATBD - Quality Assesment
burst_fifo_empty	INTEGER(1) -	1	Number of changes in the Burst_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
burst_fifo_went_full	INTEGER(1) -	1	Number of changes in the Burst_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
card_data_not_finished_err	INTEGER(1) -	1	Number of changes in the CardDataNotFinished_Err bit Source: ATL02 ATBD - Quality Assesment
cmd_err_cntr	INTEGER(1) -	1	Number of changes in the cmd_err_cntr Source: ATL02 ATBD - Quality Assesment
cmd_suc_cntr	INTEGER(1) -	1	Number of changes in the cmd_suc_cntr Source: ATL02 ATBD - Quality Assesment
current_read_sdram_buffer	INTEGER(1) -	1	Number of changes in the CurrentReadSDRAMBuffer bit Source: ATL02 ATBD - Quality Assesment
did_not_finish_transfer_err	INTEGER(1) -	1	Number of changes in the DidNotFinishTransfer_Err bit Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
did_not_finish_writing_data_err	INTEGER(1) -	1	Number of changes in the DidNotFinishWritingData_Err bit Source: ATL02 ATBD - Quality Assesment
edac_burst_fifo_dbe	INTEGER(1) -	1	Number of changes in the EDACBurstFIFO_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_burst_fifo_sbe	INTEGER(1) -	1	Number of changes in the EDACBurstFIFO_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_card_creation_ram_dbe	INTEGER(1) -	1	Number of changes in the EDACCardCreationRAM_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_card_creation_ram_sbe	INTEGER(1) -	1	Number of changes in the EDACCardCreationRAM_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_card_flag_ram_sbe	INTEGER(1) -	1	Number of changes in the EDACCardFlagRAM_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_card_readout_ram_dbe	INTEGER(1) -	1	Number of changes in the EDACCardReadoutRAM_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_card_readout_ram_sbe	INTEGER(1) -	1	Number of changes in the EDACCardReadoutRAM_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_eventtag_fifo_dbe	INTEGER(1) -	1	Number of changes in the EDACEventTagFIFO_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_eventtag_fifo_sbe	INTEGER(1) -	1	Number of changes in the EDACEventTagFIFO_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_mf_number_dbe	INTEGER(1) -	1	Number of changes in the EDACMFNumber_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_mf_number_sbe	INTEGER(1) -	1	Number of changes in the EDACMFNumber_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_packet_fifo_a_dbe	INTEGER(1) -	1	Number of changes in the EDACPacketFIFO_A_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_packet_fifo_a_sbe	INTEGER(1) -	1	Number of changes in the EDACPacketFIFO_A_SBE bit Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
edac_packet_fifo_b_dbe	INTEGER(1) -	1	Number of changes in the EDACPacketFIFO_B_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_packet_fifo_b_sbe	INTEGER(1) -	1	Number of changes in the EDACPacketFIFO_B_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_sdram_a_dbe	INTEGER(1) -	1	Number of changes in the EDACSDRAM_A_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_sdram_a_sbe	INTEGER(1) -	1	Number of changes in the EDACSDRAM_A_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_sdram_b_dbe	INTEGER(1) -	1	Number of changes in the EDACSDRAM_B_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_sdram_b_sbe	INTEGER(1) -	1	Number of changes in the EDACSDRAM_B_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_singlebit_error_cnt	INTEGER(1) -	1	Number of changes in the EDACSingleBitErrorCnt byte Source: ATL02 ATBD - Quality Assesment
edac_start_tag_fifo_dbe	INTEGER(1) -	1	Number of changes in the EDACStartTagFIFO_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_start_tag_fifo_sbe	INTEGER(1) -	1	Number of changes in the EDACStartTagFIFO_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_start_tracking_fifo_dbe	INTEGER(1) -	1	Number of changes in the EDACStartTrackingFIFO_DBE bit Source: ATL02 ATBD - Quality Assesment
edac_start_tracking_fifo_sbe	INTEGER(1) -	1	Number of changes in the EDACStartTrackingFIFO_SBE bit Source: ATL02 ATBD - Quality Assesment
edac_starttag_fifo_dbe	INTEGER(1) -	1	Number of changes in the EDACStartTagFIFO_DBE bit Source: ATL02 ATBD - Quality Assesment
eventtag_fifo_empty	INTEGER(1) -	1	Number of changes in the EventTag_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
eventtag_fifo_went_full	INTEGER(1) -	1	Number of changes in the EventTag_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
mframe_gap	INTEGER(1) -	1	Number of instances where there is a gap in the major_frame counter values. Source: ATL02 ATBD - Quality Assesment
mode	INTEGER(1) -	1	Number of changes in the mode Source: ATL02 ATBD - Quality Assesment
nested_exit	INTEGER(1) -	1	Number of instances where a nested_exit condition is possible. Source: ATL02 ATBD - Quality Assesment
packetizer_a_fifo_empty	INTEGER(1) -	1	Number of changes in the PacketizerA_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
packetizer_a_fifo_went_full	INTEGER(1) -	1	Number of changes in the PacketizerA_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
packetizer_b_fifo_empty	INTEGER(1) -	1	Number of changes in the PacketizerB_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
packetizer_b_fifo_went_full	INTEGER(1) -	1	Number of changes in the PacketizerB_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
range_window_dropout_err	INTEGER(1) -	1	Number of changes in the RangeWindowDropout_Err bit Source: ATL02 ATBD - Quality Assesment
sdram_mismatch_err	INTEGER(1) -	1	Number of changes in the SDRAMMismatch_Err bit Source: ATL02 ATBD - Quality Assesment
spw_debug_mux_out	INTEGER(1) -	1	Number of changes in the SpWDebugMuxOut bit Source: ATL02 ATBD - Quality Assesment
spw_disconnect_err_cnt	INTEGER(1) -	1	Number of changes in the SpWDisconnectErrorCount bit Source: ATL02 ATBD - Quality Assesment
spw_not_ready_cnt	INTEGER(1) -	1	Number of changes in spw_not_ready_cnt Source: ATL02 ATBD - Quality Assesment
spw_parity_err_cnt	INTEGER(1) -	1	Number of changes in the SpWParityErrorCount bit Source: ATL02 ATBD - Quality Assesment
spw_rx_eep_err	INTEGER(1) -	1	Number of changes in the SpwRxEEP_Err bit Source: ATL02 ATBD - Quality Assesment
spw_rx_invalid_length_err	INTEGER(1) -	1	Number of changes in the SpwRxInvalidLength_Err bit Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
spw_rx_invalid_opcode_err	INTEGER(1) -	1	Number of changes in the SpwRxInvalidOpcode_Err bit Source: ATL02 ATBD - Quality Assesment
start_data_collection	INTEGER(1) -	1	Number of changes in the StartDataCollection bit Source: ATL02 ATBD - Quality Assesment
starttag_fifo_empty	INTEGER(1) -	1	Number of changes in the StartTag_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
starttag_fifo_went_full	INTEGER(1) -	1	Number of changes in the StartTag_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
tdc_fifo_empty	INTEGER(1) -	1	Number of changes in the TDC_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
tdc_fifo_half_full	INTEGER(1) -	1	Number of changes in the TDC_FIFOHalfFull bit Source: ATL02 ATBD - Quality Assesment
tdc_fifo_went_full	INTEGER(1) -	1	Number of changes in the TDC_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
tdc_strong_path_err	INTEGER(1) -	1	Number of changes in the TDC_StrongPath_Err bit Source: ATL02 ATBD - Quality Assesment
tdc_weak_path_err	INTEGER(1) -	1	Number of changes in the TDC_WeakPath_Err bit Source: ATL02 ATBD - Quality Assesment
tracking_fifo_empty	INTEGER(1) -	1	Number of changes in the Tracking_FIFOEmpty bit Source: ATL02 ATBD - Quality Assesment
tracking_fifo_went_full	INTEGER(1) -	1	Number of changes in the Tracking_FIFOWentFull bit Source: ATL02 ATBD - Quality Assesment
tx_pulses_in_majorframe	INTEGER(1) -	1	Number of changes in the TxPulsesInMajorFrame bit Source: ATL02 ATBD - Quality Assesment

1.83 Group: /quality_assessment/record_counts

Packet count statistics

1.83.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time_end time	DOUBLE(1) -	seconds since 2018-01-01	Number of seconds since the ATLAS SDP epoch at the end of the interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment
delta_time_start time	DOUBLE(1) -	seconds since 2018-01-01	Number of seconds since the ATLAS SDP epoch at the start of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_a	INTEGER(1) -	counts	The number of A_HKT_A inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_b	INTEGER(1) -	counts	The number of A_HKT_B inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_c	INTEGER(1) -	counts	The number of A_HKT_C inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_d	INTEGER(1) -	counts	The number of A_HKT_D inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_e	INTEGER(1) -	counts	The number of A_HKT_E inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_hkt_status	INTEGER(1) -	counts	The number of A_HKT_STATUS inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_mce_pos	INTEGER(1) -	counts	The number of A_MCE_POS inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_sc_pon	INTEGER(1) -	counts	The number of A_SC_PON inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_sc_pos	INTEGER(1) -	counts	The number of A_SC_POS inputs processed. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_n_a_sc_tat	INTEGER(1) -	counts	The number of A_SC_TAT inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_a_sla_hk	INTEGER(1) -	counts	The number of A_SLA_HK inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_hk	INTEGER(1) -	counts	The number of LRS HK inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_laser_cent	INTEGER(1) -	counts	The number of LRS Laser Centroid inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_laser_image	INTEGER(1) -	counts	The number of LRS Laser Image inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_laser_window	INTEGER(1) -	counts	The number of LRS Laser Window inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_stellar_cent	INTEGER(1) -	counts	The number of LRS Stellar Centroid inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_stellar_image	INTEGER(1) -	counts	The number of LRS Stellar Image inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_stellar_window	INTEGER(1) -	counts	The number of LRS Stellar Window inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_lrs_tams_window	INTEGER(1) -	counts	The number of LRS TAMS Window inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sc1	INTEGER(1) -	counts	The number of SC1 inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sc2	INTEGER(1) -	counts	The number of SC2 inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sc3	INTEGER(1) -	counts	The number of SC3 inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sc4	INTEGER(1) -	counts	The number of SC4 inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sim_hk	INTEGER(1) -	counts	The number of SIM_HK inputs processed. Source: ATL02 ATBD - Quality Assesment

1.84 Group: /quality_assessment/record_counts/pcex

PCE-specific packet count statistics.

1.84.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_n_a_dfc_hk	INTEGER(1) -	counts	The number of A_DFC_HK inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_alt_mframe	INTEGER(1) -	counts	The number of major frame inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_atm_hist_s	INTEGER(1) -	counts	The number of ATM strong inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_atm_hist_w	INTEGER(1) -	counts	The number of ATM weak inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_pmf_algorithm_science	INTEGER(1) -	counts	The number of PMF Algorithm Science inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_pmf_timekeeping	INTEGER(1) -	counts	The number of PMF TImekeeping inputs processed. Source: ATL02 ATBD - Quality Assesment
qa_n_sxp_ssr	INTEGER(1) -	counts	The number of SXP_SSR processed. Source: ATL02 ATBD - Quality Assesment

1.85 Group: /quality_assessment/summary

Summary statistics

1.85.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time_end time	DOUBLE(1) -	seconds since 2018-01-01	Number of seconds since the ATLAS SDP epoch at the end of the QA interval. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time_start time	DOUBLE(1) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Quality Assesment
qa_amet_r1	INTEGER(1) -	counts	Number of instances where the difference between external AMET counter and the GPS 1PPS exceeds the limit of 1.0. Source: ATL02 ATBD - Data Screening Mechanisms
qa_amet_r2	INTEGER(1) -	counts	Number of instances where the difference between internal AMET at 1PPS and GPS 1PPS exceed the limit of 100.e6. Source: ATL02 ATBD - Data Screening Mechanisms
qa_bias_correct_x	INTEGER(1) -	counts	Number of instances where the bias correct X value is outside the limit of -70 to 70 microradians. Source: ATL02 ATBD - Data Screening Mechanisms
qa_bias_correct_y	INTEGER(1) -	counts	Number of instances where the bias correct Y value is outside the limit of -70 to 70 microradians. Source: ATL02 ATBD - Data Screening Mechanisms
qa_cal47_temp	INTEGER(1) -	counts	Number of instances where the CAL-47 temperature is outside the limit of -20 to 50 degC. Source: ATL02 ATBD - Data Screening Mechanisms
qa_fw_flag	INTEGER(1) -	counts	Number of instances where the freewheel flag is non-zero. Source: ATL02 ATBD - Data Screening Mechanisms
qa_hvpc_mod_1	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod1 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_hvpc_mod_2	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod2 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_hvpc_mod_3	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod3 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_hvpc_mod_4	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod4 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_hvpc_mod_5	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod5 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_hvpc_mod_6	INTEGER(1) -	counts	Number of instances where the HVPC Bias Mod6 value is outside the limit of -2000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_int_e_tx	INTEGER(1) -	counts	Number of instances where the computed total internal laser energy is outside the limit of 130 to 2700 microjoules. Source: ATL02 ATBD - Data Screening Mechanisms
qa_internal_energy	INTEGER(1) -	counts	Number of instances where input internal laser energy values exceed the limit of 0 to 200 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_internal_temp	INTEGER(1) -	counts	Number of instances where input laser temperature values exceed the limit of 20 to 40 degC. Source: ATL02 ATBD - Data Screening Mechanisms
qa_lrs_e_tx	INTEGER(1) -	counts	Number of instances where the computed total LRS laser energy is outside the limit of 130 to 2700 microjoules. Source: ATL02 ATBD - Data Screening Mechanisms
qa_lrs_inv_mag	INTEGER(6, 1) -	counts	Number of instances where an LRS laser magnitude is outside the limit of 0-500. Source: ATL02 ATBD - Data Screening Mechanisms
qa_lrs_inv_spot	INTEGER(1) -	counts	Number of instances where not all 6 laser spots are valid when computing LRS laser energy. Source: ATL02 ATBD - Data Screening Mechanisms
qa_lrs_inv_sum	INTEGER(1) -	counts	Number of instances where the sum of the 6 LRS laser spots is outside the limit of 0 to 2000.

Name Standard Name	Type(Dims) FillValue	Units	Description
			Source: ATL02 ATBD - Data Screening Mechanisms
qa_lrs_temp	INTEGER(1) -	counts	Number of instances where the LRS temperature is outside the limit of -20 to 50 degC. Source: ATL02 ATBD - Data Screening Mechanisms
qa_s_tod_a_sla_hk	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive A_SLA_HK time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_gpsr	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /gpsr time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_laser_energy	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/laser_energy time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_meb	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/meb time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_pdu	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/pdu time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_pointing	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/pointing time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_pos_vel	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/position_velocity time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_s_tod_hk_tat	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/time_at_the_tone time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_hk_thermal	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/hk_thermal time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_mce_position	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/housekeeping/mce_position time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_acs	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/attitude_control_system time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_ephemeris	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/ephemeris time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_hk	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/hk time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_imu	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/intertial_measurement_unit time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_st	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/star_tracker time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_s_tod_sc_stoh1	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/star_tracker/optical_head1 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_sc_stoh2	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /sc/star_tracker/optical_head2 time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_spd_e_tx	INTEGER(1) -	counts	Number of instances where the computed total SPD laser energy is outside the limit of 130 to 2700 microjoules. Source: ATL02 ATBD - Data Screening Mechanisms
qa_spd_energy	INTEGER(1) -	counts	Number of instances where input SPD laser energy values exceed the limit of -30000 to 0 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_spd_temp	INTEGER(1) -	counts	Number of instances where SPD temperature values exceed the limit of -20 to 50 degC. Source: ATL02 ATBD - Data Screening Mechanisms
qa_time_corr	INTEGER(1) -	counts	Where the ratio of unaligned shots/aligned shots exceeds the limit of 0.9; 0=Does Not Exceed Limit, 1=Exceeds Limit Source: ATL02 ATBD - Data Screening Mechanisms

1.86 Group: /quality_assessment/summary/pcex

PCE-specific summary statistics.

1.86.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_bg_sens_s	INTEGER(1) -	counts	Number of instances where the computed strong background sensitivity value is outside the limit of 5e17 to 2e18. Source: ATL02 ATBD - Data Screening Mechanisms

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_bg_sens_w	INTEGER(1) -	counts	Number of instances where the computed weak background sensitivity value is outside the limit of 5e17 to 2e18. Source: ATL02 ATBD - Data Screening Mechanisms
qa_dupe_percent	INTEGER(20, 1) -	counts	Number of instances where the per-channel number of duplicates is greater than 10% of the total number of per-channel events. Source: ATL02 ATBD - Data Screening Mechanisms
qa_ph_tx_ll	INTEGER(1) -	counts	Where the maximum minus minimum Tx leading lower exceeds the limit of 39 ns. Source: ATL02 ATBD - Data Screening Mechanisms
qa_ret_sens_s	INTEGER(1) -	counts	Number of instances where the computed strong return sensitivity value is outside the limit of 0 to 2e18. Source: ATL02 ATBD - Data Screening Mechanisms
qa_ret_sens_w	INTEGER(1) -	counts	Number of instances where the computed weak return sensitivity value is outside the limit of 0 to 2e18. Source: ATL02 ATBD - Data Screening Mechanisms
qa_rx_channel_id	INTEGER(1) -	counts	Number of instances where the Rx channel ID contains an unexpected value. Source: ATL02 ATBD - Data Screening Mechanisms
qa_rx_coarse_count	INTEGER(1) -	counts	Number of instances where the Rx coarse count value exceeds the limit of 10000 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_rx_fine_count	INTEGER(1) -	counts	Number of instances where the Rx fine count value exceeds the limit of 75 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_s_alt_cal_fall	DOUBLE(5, 1) -	counts	Summary statistic of the full-rate (before interpolation) alt_cal_fall computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_alt_cal_rise	DOUBLE(5, 1) -	counts	Summary statistic of the full-rate (before interpolation) alt_cal_rise computation. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment

Name Standard Name	Type(Dims) FillValue	Units	Description
qa_s_n_1pps_skip	INTEGER(1) -	counts	Number of times 1 pps was not consecutive. Source: ATL02 ATBD - Quality Assesment
qa_s_n_dupe	INTEGER(1) -	counts	The number of duplicate Rx events detected in the granule. Source: ATL02 ATBD - Quality Assesment
qa_s_n_mf_skip	INTEGER(1) -	counts	The number of times major frame counter was not consecutive. Source: ATL02 ATBD - Quality Assesment
qa_s_n_missed_thres	INTEGER_8(1) -	counts	The number of Tx pulses in which a missed threshold crossing was detected. The condition occurs if the Tx leading and trailing fine raw counts are the exact same value. Source: ATL02 ATBD - Quality Assesment
qa_s_n_rx_s	INTEGER_8(1) -	counts	The number of Strong Rx events in the granule. Source: ATL02 ATBD - Quality Assesment
qa_s_n_rx_w	INTEGER_8(1) -	counts	The number of Weak Rx events in the granule. Source: ATL02 ATBD - Quality Assesment
qa_s_n_swapped_txfine	INTEGER_8(1) -	counts	The number of Tx pulses for which a PCE anomaly forced the Tx fine count values to be swapped. Source: ATL02 ATBD - Quality Assesment
qa_s_n_tep	INTEGER(1) -	counts	The number of TEP events detected in the granule. Source: ATL02 ATBD - Quality Assesment
qa_s_n_tx	INTEGER_8(1) -	counts	The number of Tx Pulses in the granule. Source: ATL02 ATBD - Quality Assesment
qa_s_n_tx_oob	INTEGER(1) -	counts	The number of times the Tx count is out of bounds (oob); i.e.: 199 to 201 TX pulses were not reported in a major frame. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_alt	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/pcex/altimetry time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_atm_hist_s	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/pcex/atmosphere_strong time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_atm_hist_w	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/pcex/atmosphere_weak time of day values. Values are in the order number_of_points, minimum, maximum, average,

Name Standard Name	Type(Dims) FillValue	Units	Description
			standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_background	DOUBLE(5, 1) -	counts	Summary statistics on the differences between successive /atlas/pcex/background time of day values. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tod_method	DOUBLE(5, 1) -	counts	Summary statistics on the differences between Time_T0_Method1 and Time _T0_Method2. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tx_ll_stat	DOUBLE(5, 1) -	counts	Summary statistic of Transmit Leading Lower time of flight. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_s_tx_other_stat	DOUBLE(5, 1) -	counts	Summary statistic of the Other Transmit time of flight measurement. For PCE1, this is Transmit Leading Upper edge (LU) time; for PCE2 this is Transmit Trailing Upper edge (TU) time; and for PCE3 this is Transmit Trailing Lower edge (TL) time. Values are in the order number_of_points, minimum, maximum, average, standard_deviation. Source: ATL02 ATBD - Quality Assesment
qa_tep_tof	INTEGER(1) -	counts	Number of instances where TEP TOF values exceed the limit of 0 to 110ns. Source: ATL02 ATBD - Data Screening Mechanisms
qa_tx_coarse_count	INTEGER(1) -	counts	Number of instances where the Tx coarse count value exceeds the limit of 10000 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_tx_leading_fine	INTEGER(1) -	counts	Number of instances where the Tx leading fine count value exceeds the limit of 75 counts. Source: ATL02 ATBD - Data Screening Mechanisms
qa_tx_trailing_fine	INTEGER(1) -	counts	Number of instances where the Tx trailing fine count value exceeds the limit of 75 counts. Source: ATL02 ATBD - Data Screening Mechanisms

1.87 Group: /quality_assessment/tof

Contains statistics and flags related to TOF QA.

1.87.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
txrx_discard_count	INTEGER(1) -	counts	The number of Tx discarded because of data gaps when attempting to repair a TxRx slip. Source: ATL02 ATBD - Dealing with transmit/receive slips
txrx_repair_count	INTEGER(1) -	counts	The number of Tx misalignments repaired for the PCE indicated in txrx_slip_repair. (0=no repair attempted) Source: ATL02 ATBD - Dealing with transmit/receive slips
txrx_slip_repair	INTEGER(1) -	1	Indicates the PCE for which a txrx slip repair was attempted. (0=no repair attempted) Source: ATL02 ATBD - Dealing with transmit/receive slips Flags: 0()=not_attempted, 1()=pce1, 2()=pce2, 3()=pce3

1.88 Group: /quality_assessment/tof/pcex

Per-PCE TOF flags and statistics

1.88.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
beg_mframe_cnt	UINT_4_LE(1) -	counts	Major frame count at the start of a Tx misalignment. Source: ATL02 ATBD - Dealing with transmit/receive slips
end_mframe_cnt	UINT_4_LE(1) -	counts	Major frame count at the end of a Tx misalignment. Source: ATL02 ATBD - Dealing with transmit/receive slips
hist_conf	INTEGER(1) -	1	Confidence level set by analysis of TOF histograms. Source: ATL02 ATBD - Dealing with transmit/receive slips
n_dnf	INTEGER(1) -	1	The number of major frames containing a DNF flag, which indicates that the major frame was truncated. By default, these partial major frames are removed from processing. Source: ATL02 ATBD - Dealing with transmit/receive slips

Name Standard Name	Type(Dims) FillValue	Units	Description
ne_conf	INTEGER(1) -	1	Confidence level set by nested-exit checks. Source: ATL02 ATBD - Dealing with transmit/receive slips
ne_delta_time	DOUBLE(4) INVALID_R8B	seconds since 2018-01-01	Times of up to 4 NestedExit instances. Units are the number of seconds since the ATLAS SDP epoch. Source: ATL02 ATBD - Dealing with transmit/receive slips
slip_magnitude	FLOAT(1) -	seconds	Average magnitude (and direction) of Tx sawtooth misalignment. Source: ATL02 ATBD - Dealing with transmit/receive slips
st_conf	INTEGER(1) -	1	Confidence level set by Tx alignment (sawtooth) checks. Source: ATL02 ATBD - Dealing with transmit/receive slips
st_period	FLOAT(1) -	1/frequency	Period of the Tx sawtooth. Source: ATL02 ATBD - Dealing with transmit/receive slips
too_few_tx	INTEGER(1) -	1	The number of major frames with less than 199 Tx. The photons associated with these major frames have been discarded from processing. Source: ATL02 ATBD - Data Screening Mechanisms
txrx_slip_flag	INTEGER(1) -	1	Flag indicating if a TxRx slip condition was detected. Source: ATL02 ATBD - Dealing with transmit/receive slips Flags: 0()=not_detected, 1()=detected

1.89 Group: /sc

Group contains the Spacecraft (SC) Ancillary Science packet #1 decommutated data

1.89.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.89.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
acs_time_sec	UINT_4_LE(:) -	seconds	SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan-1980 00:00:00) (Same time provided within the Attitude/Rate message to ATLAS in RT at 1Hz) Source: ATL02 ATBD - Spacecraft Data
acs_time_subsec	UINT_4_LE(:) -	100 nanoseconds	Subsecond portion of the SC time at the initiation of the ACS task (seconds since SC epoch: 6-Jan-1980 00:00:00) (Same time provided within the Attitude/Rate message to ATLAS in RT at 1Hz) Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch. By adding atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch time can be computed. Source: ATL02 ATBD - Spacecraft Data
sc_time_1pps_sec	UINT_4_LE(:) -	seconds	SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00) Source: ATL02 ATBD - Spacecraft Data
sc_time_1pps_subsec	UINT_4_LE(:) -	100 nanoseconds	Subsecond portion of the SC time at the reception of the last 1PPS signal from the GPSR (seconds since SC epoch: 6-Jan-1980 00:00:00) Source: ATL02 ATBD - Spacecraft Data

1.90 Group: /sc/attitude_control_system

Contains parameters related to spacecraft ACS (attitude control system) software.

1.90.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.90.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
acs_mode	UINT_1_LE(:) -	counts	ACS Active ACS Software Mode 0 = Idle 1 = Rate Capture 2 = Sun Acquisition 3 = (Reserved - N/A for ICESat-2) 4 = Slew 5 = Inertial Sun Point 6 = Earth Pointing 7 = ACS Calibration 8 = Inertial Pointing 9 = Reference Ground Track (RGT) 10 = Roll Off-Point (ROP) 11 = Instrument Calibration (ICAL) 12 = DV Wheel Standby 13 = DV Thruster Standby 14 = DV Burn Source: ATL02 ATBD - Spacecraft Data Flags: 0()=idle, 1()=rate_capture, 2()=sun_acquisition, 3()=reserved, 4()=slew, 5()=inertial_sun_point, 6()=earth_pointing, 7()=acs_calibration, 8()=inertial_pointing, 9()=reference_ground_track, 10()=roll_off_point, 11()=instrument_calibration, 12()=dv_wheel_standby, 13()=dv_thruster_standby, 14()=dv_burn
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time tag of the data computed from raw_acs_time_sec and subseconds in the L1A Attitude_control_ group, relative to the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
sc_body_rate_x	DOUBLE(:) -	radians/second	ACS Fine Rate Estimate - SC Body X axis. (Same data provided to ATLAS in RT at 1Hz) Source: ATL02 ATBD - Spacecraft Data
sc_body_rate_y	DOUBLE(:) -	radians/second	ACS Fine Rate Estimate - SC Body Y axis. (Same data provided to ATLAS in RT at 1Hz) Source: ATL02 ATBD - Spacecraft Data
sc_body_rate_z	DOUBLE(:) -	radians/second	ACS Fine Rate Estimate - SC Body Z axis. (Same data provided to ATLAS in RT at 1Hz) Source: ATL02 ATBD - Spacecraft Data
sc_to_lrs_quat_1	DOUBLE(:) -	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion1. (Same data provided to ATLAS in RT at 1Hz). Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
sc_to_lrs_quat_2	DOUBLE(:) -	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 2. (Same data provided to ATLAS in RT at 1Hz). Source: ATL02 ATBD - Spacecraft Data
sc_to_lrs_quat_3	DOUBLE(:) -	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion 3. (Same data provided to ATLAS in RT at 1Hz). Source: ATL02 ATBD - Spacecraft Data
sc_to_lrs_quat_4	DOUBLE(:) -	counts	ACS Spacecraft Inertial frame to Laser Reference System (LRS) reference frame quaternion4. (Same data provided to ATLAS in RT at 1Hz). Source: ATL02 ATBD - Spacecraft Data

1.91 Group: /sc/ephemeris

Contains parameters related to spacecraft Ephemeris Propagator.

1.91.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.91.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The time tag of the data by using raw_prop_time_sec and subsecs in the L1A ephemeris group, relative to the ATLAS SDP GSP epoch. The ATLAS Standard Data Products (SDP) GPS epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
eci_position_res_x	FLOAT(:) -	meters	ACS Orbit Determination Filter position of X frame residual. Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
eci_position_res_y	FLOAT(:) -	meters	ACS Orbit Determination Filter position of Y frame residual. Source: ATL02 ATBD - Spacecraft Data
eci_position_res_z	FLOAT(:) -	meters	ACS Orbit Determination Filter position of Z frame residual. Source: ATL02 ATBD - Spacecraft Data
eci_position_x	DOUBLE(:) -	meters	ACS SC X position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
eci_position_y	DOUBLE(:) -	meters	ACS SC Y position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
eci_position_z	DOUBLE(:) -	meters	ACS SC Z position in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
eci_velocity_res_x	FLOAT(:) -	meters/second	ACS Orbit Determination Filter velocity of X frame residual. Source: ATL02 ATBD - Spacecraft Data
eci_velocity_res_y	FLOAT(:) -	meters/second	ACS Orbit Determination Filter velocity of Y frame residual. Source: ATL02 ATBD - Spacecraft Data
eci_velocity_res_z	FLOAT(:) -	meters/second	ACS Orbit Determination Filter velocity of Z frame residual. Source: ATL02 ATBD - Spacecraft Data
eci_velocity_x	DOUBLE(:) -	meters/second	ACS SC X velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
eci_velocity_y	DOUBLE(:) -	meters/second	ACS SCY velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data
eci_velocity_z	DOUBLE(:) -	meters/second	ACS SC Z velocity in the ECI coordinate frame. (Same data that is provided to ATLAS in RT) Source: ATL02 ATBD - Spacecraft Data

1.92 Group: /sc/hk

Contains parameters related to spacecraft housekeeping data.

1.92.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.92.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
at_det_p	FLOAT(:, :) -	amps	ATLAS Detector power feed current measured by the SC PDU (7.5A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_det_sw	INTEGER_1(:, :) -	1	ATLAS Detector power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_heater_1_c	FLOAT(:, :) -	amps	ATLAS Survival Heater 1 power feed current measured by the SC PDU (10A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_heater_1_sw	INTEGER_1(:, :) -	1	ATLAS Survival Heater 1 power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_heater_2_c	FLOAT(:, :) -	amps	ATLAS Survival Heater 2 power feed current measured by the SC PDU (10A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_heater_2_sw	INTEGER_1(:, :) -	1	ATLAS Survival Heater 2 power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_heater_3_c	FLOAT(:, :) -	amps	ATLAS Survival Heater 3 power feed current measured by the SC PDU (10A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_heater_3_sw	INTEGER_1(:, :) -	1	ATLAS Survival Heater 3 power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_heater_4_c	FLOAT(:, :) -	amps	ATLAS Survival Heater 4 power feed current measured by the SC PDU (10A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_heater_4_sw	INTEGER_1(:, :) -	1	ATLAS Survival Heater 4 power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off

Name Standard Name	Type(Dims) FillValue	Units	Description
at_laser_a_c	FLOAT(:) -	amps	ATLAS Laser A power feed current measured by the SC PDU (20A) Source: ATL02 ATBD - Spacecraft Data
at_laser_sw	INTEGER_1(:, :) -	1	ATLAS Laser power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_lhp_sdhtr_c	FLOAT(:, :) -	amps	ATLAS Loop Heat Pipe Shutdown power feed current measured by the SC PDU (7.5A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_lhp_sdhtr_sw	INTEGER_1(:, :) -	1	ATLAS LHP Shutdown Heater power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_main_c	FLOAT(:, :) -	amps	ATLAS Main power feed current measured by the SC PDU (20A; Sides A, B) Source: ATL02 ATBD - Spacecraft Data
at_main_sw	INTEGER_1(:, :) -	1	ATLAS Main power feed status measured by the SC PDU (Sides A, B) Source: ATL02 ATBD - Spacecraft Data Flags: 0()=on, 1()=off
at_t	FLOAT(:, :) -	degreesC	SC Monitored ATLAS Temperatures (1 to 15) Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	The derived time tag of the data, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
ds_ab_index	INTEGER_1(2) -	1	Dimension scale for Side A or B Source: Dimension Scale Flags: 1()=side_a, 2()=side_b
ds_flexure_index	INTEGER_1(3) -	1	Dimension scale for flexure thermistor temperatures. Source: Dimension Scale
ds_temp_index	INTEGER_1(15) -	1	Dimension scale for ATLAS temperatures. Source: Dimension Scale

Name Standard Name	Type(Dims) FillValue	Units	Description
sa_1_in_bk_t	FLOAT(:) -	degreesC	SC Monitored Temperature of the Back-Side of Solar Panel 1 (Inboard Panel) Source: ATL02 ATBD - Spacecraft Data
sa_1_in_cell_t	FLOAT(:) -	degreesC	SC Monitored Temperature of the Cell-Side of Solar Panel 1 (Inboard Panel) Source: ATL02 ATBD - Spacecraft Data
sa_4_ot_bk_t	FLOAT(:) -	degreesC	SC Monitored Temperature of the Back-Side of Solar Panel 4 (Outboard Panel) Source: ATL02 ATBD - Spacecraft Data
sa_4_ot_cell_t	FLOAT(:) -	degreesC	SC Monitored Temperature of the Cell-Side of Solar Panel 4 (Outboard Panel) Source: ATL02 ATBD - Spacecraft Data
sc_at_flex_t	FLOAT(:, :) -	degreesC	SC Monitored Temperature of Mechanical I/F Flexure 1, 2 and 3 Source: ATL02 ATBD - Spacecraft Data
sc_e_bus_v	FLOAT(:, :) -	volts	SC Essential Bus Voltage measured by the SC PDU. (Sides A, B) Source: ATL02 ATBD - Spacecraft Data

1.93 Group: /sc/inertial_measurement_unit

Contains parameters related to spacecraft IMU (Inertial Measurement Unit).

1.93.1 Attributes

data_rate	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.)

1.93.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
data_ttag	DOUBLE(:) -	seconds	Time tag counter at the end of the IDL frame over which the integrated gyro angle data was collected. The recorded value is corrected for multiple rollovers that occur between occurrences of a sync_event_ttag update. Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	IMU delta time tag at the end of the IDL frame over which the integrated gyro angle data was collected, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within

Name Standard Name	Type(Dims) FillValue	Units	Description
			/ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
sync_event_ttag	DOUBLE(:) -	seconds	IMU Time remaining on the countdown timer which triggers the IDL interrupt (between the event strobe and the timetag of the next IDL data packet). IMU time at the reception of the last IMU time sync pulse. This word contains the time stamp that is recorded when the Event Strobe input to the SSIRU transitions to the active (low) state. Source: ATL02 ATBD - Spacecraft Data

1.94 Group: /sc/inertial_measurement_unit/gyro_abcd

Contains parameters related to spacecraft IMU (Inertial Measurement Unit) gyros.

1.94.1 Attributes

data_rate	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.)

1.94.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
gyro_angle	FLOAT(:) -	arcseconds	IMU integrated angle sensed by the SSIRU Gyro. The data word shall increment from 0 to full scale (0xFFFF) and roll over to zero for positive input rates about the Gyro input axis. The data word shall decrement from full scale to 0 and roll over to 0xFFFF for negative input rates about the Gyro input axis. Source: ATL02 ATBD - Spacecraft Data
gyro_rate_f	INTEGER_1(:) -	1	IMU Gyro Integrated Angular Rate data validity status. 0=invalid, 1=valid. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=invalid, 1()=valid
gyro_sat_f	INTEGER_1(:) -	1	IMU Gyro saturation mode: Force to Rebalance (FTR) Mode (The gyro operates in this mode during low inertial rates) or Whole Angle Saturation (WAS) Mode (The gyro operates in

Name Standard Name	Type(Dims) FillValue	Units	Description
			this mode during high inertial rates). Source: ATL02 ATBD - Spacecraft Data Flags: 0()=ftr_mode, 1()=was_mode
gyro_scal_f	INTEGER_1(:) -	1	IMU Gyro scale factor mode: low scaling factor mode with the corresponding Integrated Angle word being 0.05 arc-sec/LSB or high scaling factor with the corresponding Integrated Angle word being 1.6 arc-sec/LSB. A value >= 10 indicates the timestamps may be affected by a prior data gap. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=low_scale_factor, 1()=high_scale_factor, 10()=low_scale_factor_data_gap, 11()=high_scale_factor_data_gap

1.95 Group: /sc/solar_array

Contains parameters related to solar array driver assembly.

1.95.1 Attributes

data_rate	Data within this group are stored at the data rate of the source Spacecraft Ancillary Science Data Packets. (nominally one per second.)

1.95.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
azimuth_est	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth position used for ACS control Source: ATL02 ATBD - Spacecraft Data
azimuth_meas_1	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 1 (as reported by ACS software). Source: ATL02 ATBD - Spacecraft Data
azimuth_meas_2	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Azimuth angle based on Potentiometer 2 (as reported by ACS software). Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	SC time at the initiation of the ACS task, relative to the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch

Name Standard Name	Type(Dims) FillValue	Units	Description
			(1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
elev_est	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation position used for ACS control Source: ATL02 ATBD - Spacecraft Data
elev_meas_1	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 1 (as reported by ACS software). Source: ATL02 ATBD - Spacecraft Data
elev_meas_2	FLOAT(:) -	degrees	Solar Array Drive Assembly (SADA) - Estimated Elevation angle based on Potentiometer 2 (as reported by ACS software). Source: ATL02 ATBD - Spacecraft Data

1.96 Group: /sc/star_tracker

Contains parameters related to the star trackers.

1.96.1 Attributes

data_rate	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.)

1.96.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
atm_etr_counter	UINT_2_BE(:) -	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) delay ticks - Used to determine measurement time of reported ATM TLM with respect to SC-provided sync pulse; Additional delay of quaternion measurement time in ticks of 20 usec from ETR. Source: ATL02 ATBD - Spacecraft Data
atm_frame_counter	UINT_2_BE(:) -	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - External Time Reference (ETR) counter - Used to determine measurement time of reported ATM TLM with respect to SC-provided sync pulse; This item increments upon the reception of the SC-provided sync pulse. Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Time of the Star track subaddress 1 data, relative to the ATLAS SDP GPS Epoch and computed from raw_ace_time_sec/subseconds and etr_delay_tm1. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
etr_counter	UINT_2_BE(:) -	counts	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - External Time Reference (ETR) counter - Used to determine measurement time of reported STE/OH mode status with respect to SC-provided sync pulse; This item increments upon the reception of the SC-provided sync pulse - Sample 1-10 Source: ATL02 ATBD - Spacecraft Data
mode_status	UINT_2_BE(:) -	1	Star Tracker Electronics (STE) [Star Tracker Status TM#1: Subaddress 1] - Mode Status - Represents the current mode of the STE software . 0 = Initialization 1 = Standby 2 = Memory Read 3 = Memory Write 4 = Self Test 5 = Photo 9 = Angular Rate 10 = Attitude Acquisition 11 = Attitude Tracking 14 = AOM/Attitude Acquisition Phase 15 = AOM/Attitude Tracking Phase All other values invalid Source: ATL02 ATBD - Spacecraft Data Flags: 0()=init, 1()=stby, 2()=mem_read, 3()=mem_write, 4()=self_test, 5()=photon, 9()=angular_rate, 10()=att_acq, 11()=att_track, 14()=aom_acq, 15()=aom_track

1.97 Group: /sc/star_tracker/optical_head_1

Contains parameters related to spacecraft Star Tracker Optical Head 1 (STOH1).

1.97.1 Attributes

data_rate	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.)

1.97.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
atm_etr_counter	UINT_2_LE(:) -	counts	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - External Time Reference (ETR) counter - Used to determine measurement time of reported quaternions with respect to SC- provided sync pulse; This item increments upon the reception of the SC-provided sync pulse. Source: ATL02 ATBD - Spacecraft Data
atm_frame_counter	UINT_2_LE(:) -	counts	Star Tracker Optical Head (STOH) 1 [ATM TM#7: Subaddress 19] - Frame Counter Source: ATL02 ATBD - Spacecraft Data
att_qa_x	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X) Source: ATL02 ATBD - Spacecraft Data
att_qa_y	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y) Source: ATL02 ATBD - Spacecraft Data
att_qa_z	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z) Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Elapsed GPS seconds since the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and subseconds and atm_etr_delay_tm7. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
n_stars	INTEGER_1(:) INVALID_I1B	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation. Source: ATL02 ATBD - Spacecraft Data
quaternion1	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion2	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI)

Name Standard Name	Type(Dims) FillValue	Units	Description
			reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion3	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion4	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
seq_mode_st	INTEGER_1(:) INVALID_I1B	counts	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) Status Source: ATL02 ATBD - Spacecraft Data Flags: 0()=off, 1()=standby, 2()=photo, 3()=acquire, 4()=track, 5()=autotest, 6()=win_acq, 7()=powered

1.98 Group: /sc/star_tracker/optical_head_2

Contains parameters related to spacecraft Star Tracker Optical Head 2 (STOH2).

1.98.1 Attributes

data_rate	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.)

1.98.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units	Description
atm_etr_counter	UINT_2_LE(:) -	counts	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - External Time Reference (ETR) counter - Used to determine measurement time of reported quaternions with respect to SC- provided sync pulse; This item increments upon the reception of the SC-provided sync pulse Source: ATL02 ATBD - Spacecraft Data
atm_frame_counter	UINT_2_LE(:) -	counts	Star Tracker Optical Head (STOH) 2 [ATM TM#8: Subaddress 20] - Frame Counter Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
att_qa_x	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (X) Source: ATL02 ATBD - Spacecraft Data
att_qa_y	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Y) Source: ATL02 ATBD - Spacecraft Data
att_qa_z	FLOAT(:) -	arcsec	Star Tracker Optical Head (STOH) Quality measurement of STOH computed quaternion (Z) Source: ATL02 ATBD - Spacecraft Data
delta_time time	DOUBLE(:) -	seconds since 2018-01-01	Elapsed GPS seconds from the ATLAS SDP GPS Epoch, computed from raw_ace_time_sec and subseconds and atm_etr_delay_tm8. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed. Source: ATL02 ATBD - Spacecraft Data
n_stars	INTEGER_1(:) INVALID_I1B	counts	Star Tracker Electronics (STE) [ATM TM#1: Subaddress 13] - Number of coherent stars used in STOH attitude calculation Source: ATL02 ATBD - Spacecraft Data
quaternion1	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 1 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion2	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 2 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion3	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 3 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data
quaternion4	DOUBLE(:) -	counts	Star Tracker Optical Head (STOH) [ATM TM#7: Subaddress 19] - Attitude quaternion 4 - STOH reference frame to Earth-Centered Inertial (ECI) reference frame Source: ATL02 ATBD - Spacecraft Data

Name Standard Name	Type(Dims) FillValue	Units	Description
seq_mode_st	INTEGER_1(:) INVALID_I1B	counts	Star Tracker Optical Head (STOH) [Star Tracker Status TM#1: Subaddress 1] - Sequencing (Mode) Status. A value of 127 indicates that the data could not be filled from the vc5 packets. Source: ATL02 ATBD - Spacecraft Data Flags: 0()=off, 1()=standby, 2()=photo, 3()=acquire, 4()=track, 5()=autotest, 6()=win_acq, 7()=powered