

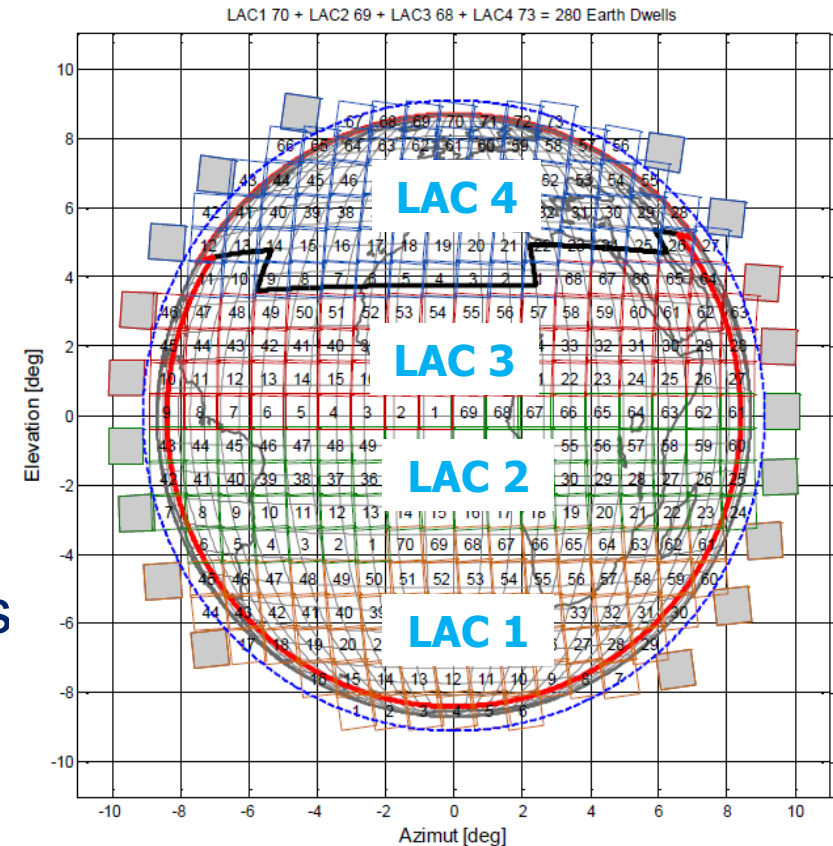
IRS L1 PRODUCT FORMAT SPECIFICATION

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- The IRS L1b data are generated as uncompressed spectra and as compressed Principal Components (PC) scores
- The uncompressed spectra are sent to the L2 processor, the PC scores are directly disseminated to users
- Two different formats are currently foreseen, NetCDF-4 and BUFR
- The NetCDF-4 format is used for the majority of datasets, i.e. for both the uncompressed spectra and the standard disseminated PCs (via EUMETcast satellite)
- The BUFR format use is restricted to the dissemination of PC scores via GTS/RMDCN
- This presentation focuses on the IRS L1 NetCDF format

- Three levels of periodicity:
 - Repeat Sequence
 - LAC (or Repeat Cycle)
 - Dwell
- The Earth disk is split in four LACs
- Each LAC is 15min long and contains about 80 dwells
- Each dwell is collected over 10s
- A repeat sequence is a specific sequence pattern of 24 repeating LACs and lasts 6 hours



- Main advantages of netCDF coding:
 - Ability to handle large data sizes (up to 95 Mbytes per dwell needed)
 - Subsetting capability by grouping
 - Datasets are self describing

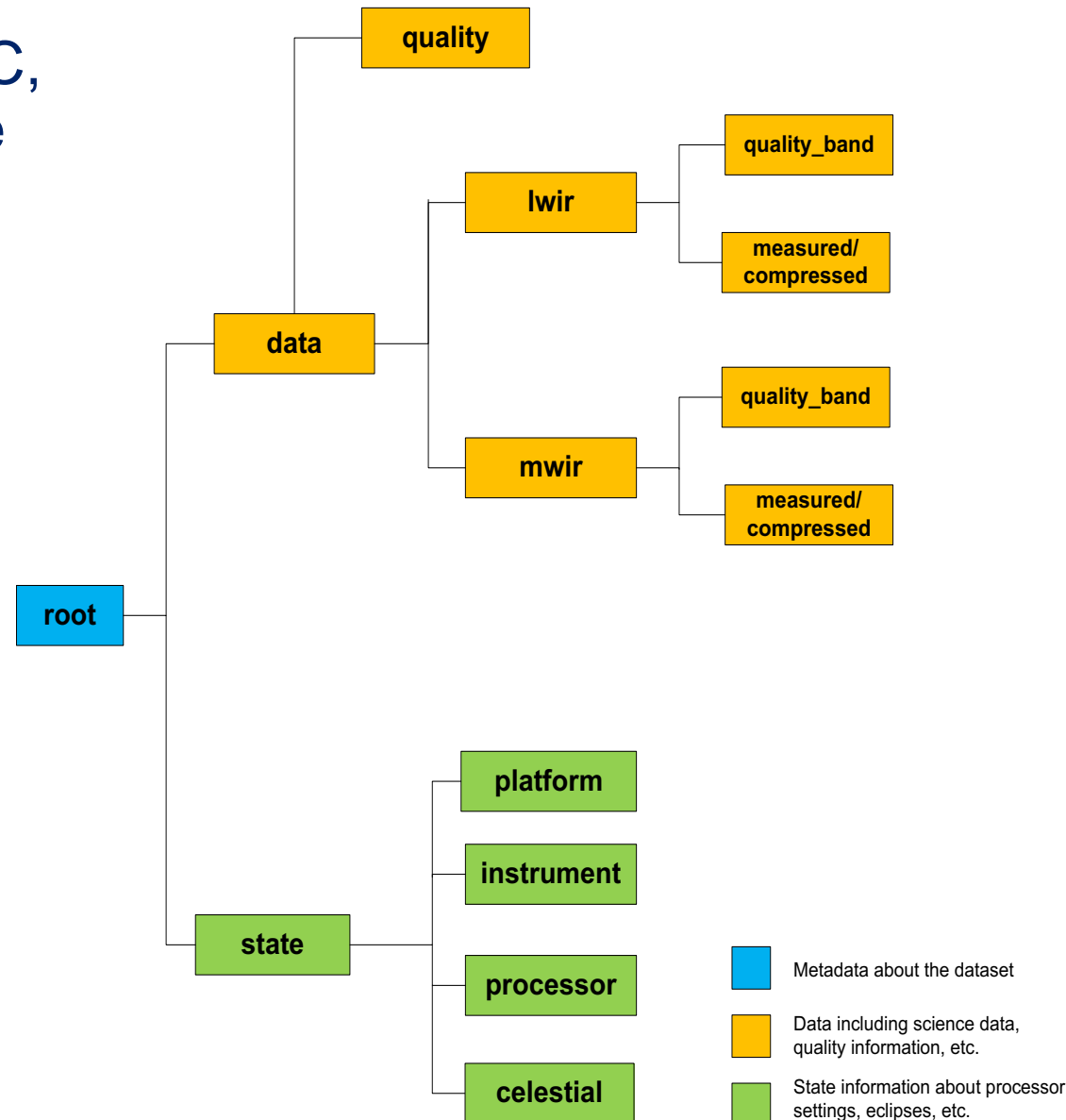
- Two dataset types for IRS L1:
 - Spectral Sounding Samples (SSS)
 - Principal Components (PC)

<i>Destination</i>	<i>Dataset type</i>
L2 Processor (L2PF)	SSS
Archive	SSS
EUMETCast satellite	PC
EUMETCast terrestrial	SSS

- Two file types per dataset:
 - Body dataset: contains data for a single dwell
 - Trailer dataset: generated at the end of a LAC, contains all data which only have meaning at LAC level

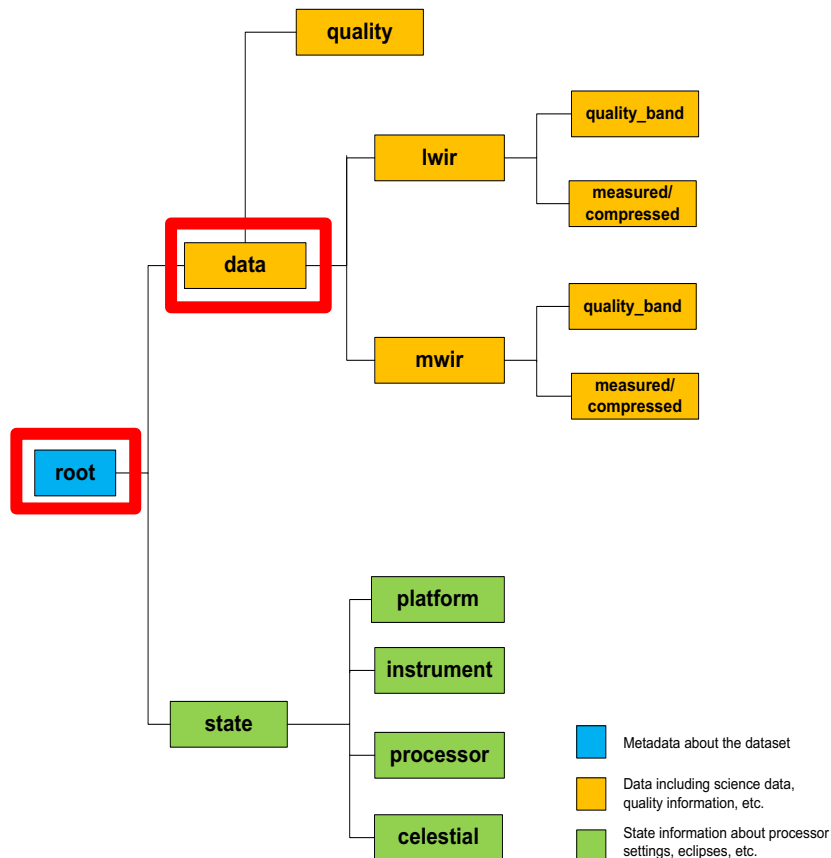
Dataset structure

- All IRS L1 datasets (SSS, PC, body, trailer) share the same group structure
- Science data are split by band (LWIR/MWIR)
- They include quality, at four different levels:
 - Dwell/LAC level
 - Band level
 - Sample level
 - Detector level



Root and Data groups

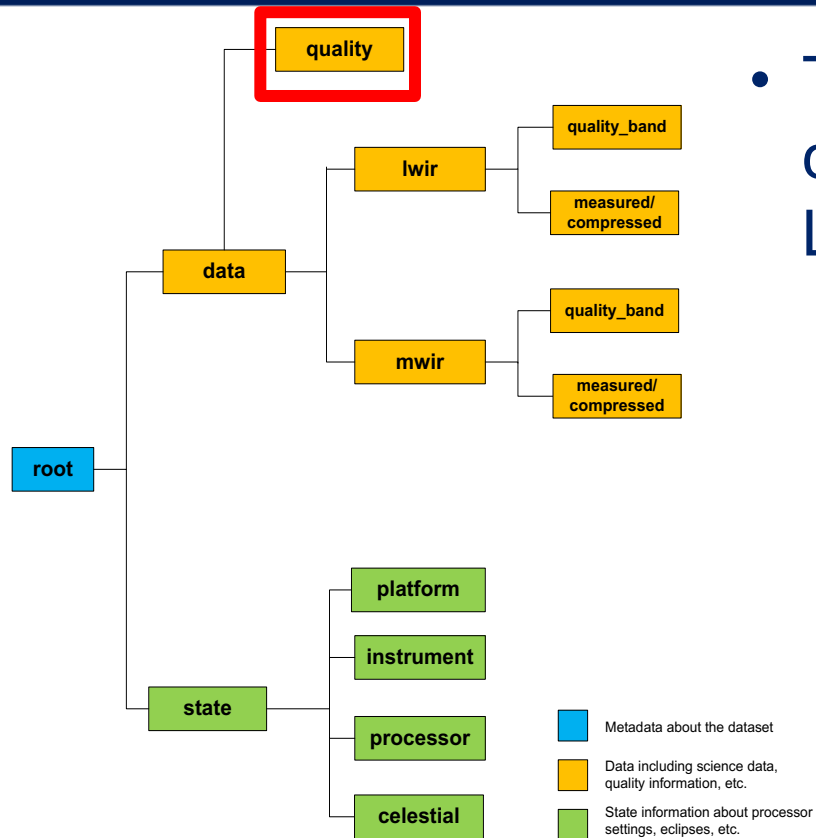
- The root group contains general info
- The data group contains information at sample level, including latitude and longitude (shared between LWIR and MWIR)



Body		
Group	Data Class	Description
Root	None	Summary data
Data	General info	Time and dwell info
	Geolocation	Latitude and Longitude
	Orbital info	Satellite position data
	Sun position	Solar az/el angles, per sample

Trail		
Group	Data Class	Description
Root	None	Chunk number and status
Data	None	Timeliness compliance status

Quality at dwell and LAC level



- These groups contain quality information common to the highest levels (dwell and LAC), shared by the two bands

Trail (LAC level)

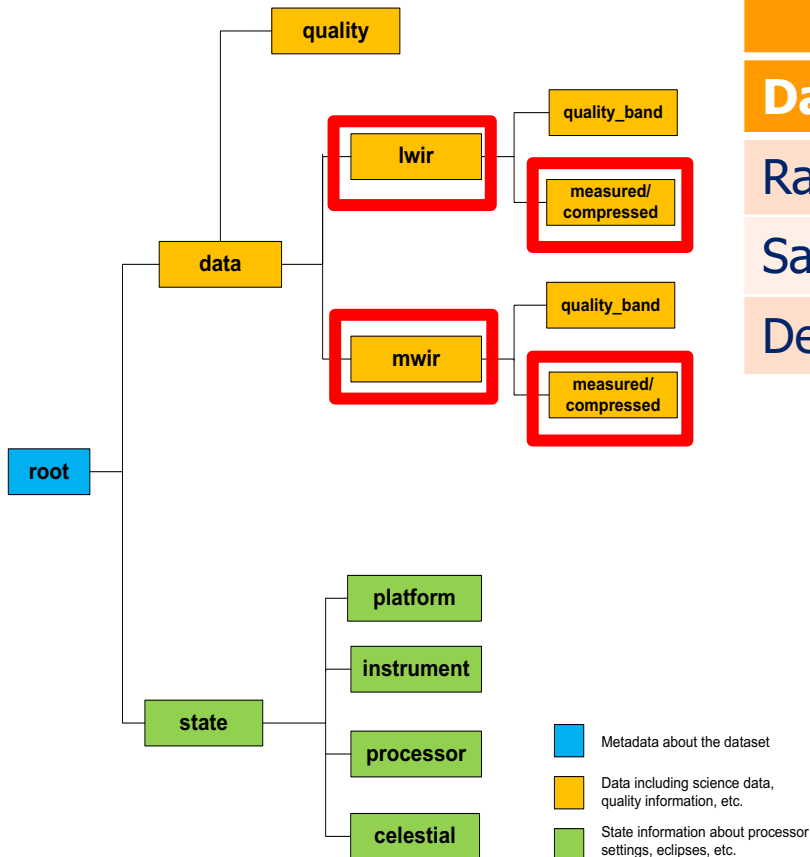
Timing compliance at LAC level

Body (dwell level)

Data Class	Description
Timing compliance	Timeliness and Repeat Cycle compliance
Eclipse condition	Sun eclipse status and timing (start and end time)
Restricted operations	Presence of Sun or Moon, with start and end time

Measurement groups

- These groups contain the actual measures, either compressed or not, plus quality data at the lowest level



Group	Description
Band (LWIR/MWIR)	Spatial and spectral sampling info
Measured data	Measured spectra
Compressed	PC scores

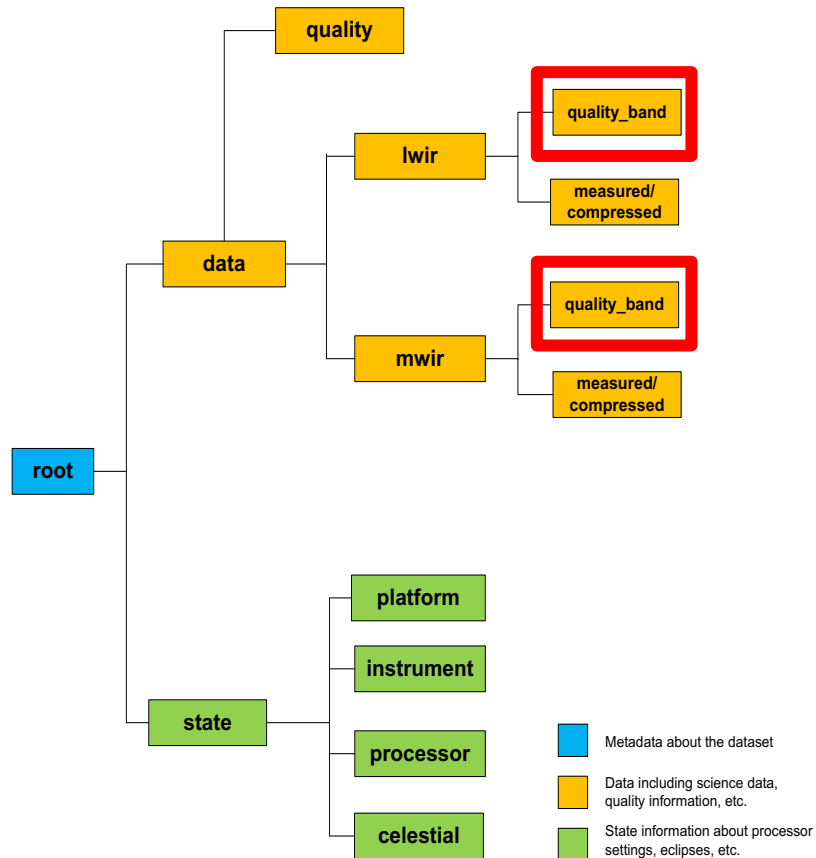
Measured data (spectra)

Data Class	Description
Radiance data	Raw radiance, offset and gain
Sample quality data	Sample quality flag
Detector quality data	Detector quality flag

Compressed data (PCs)

Data Class	Description
Method (TBC)	Ask TA and TH
PC scores	Ask TA and TH
Sample quality data	Sample quality flag
Detector quality data	Detector quality flag

- Spatial sample quality flag:
 - Type of view (Earth, space, limb, cloudy)
 - Sample status (nominal, saturated, noisy, missing, etc.)
 - Sun straylight status (warning, correction status)
 - Spectral accuracy and stability
- Detector quality flag (sub-pixel level)
 - Saturated
 - Under saturated
 - Noisy
 - Defective and excluded elements



Body (dwell)

Data Class	Description
Dwell coverage	Completeness, clipping, overlap
Radiometric quality	Noise, non linearity, stability
Spectral quality	Stability, fringe count errors
Sample data	Statistics at sample level

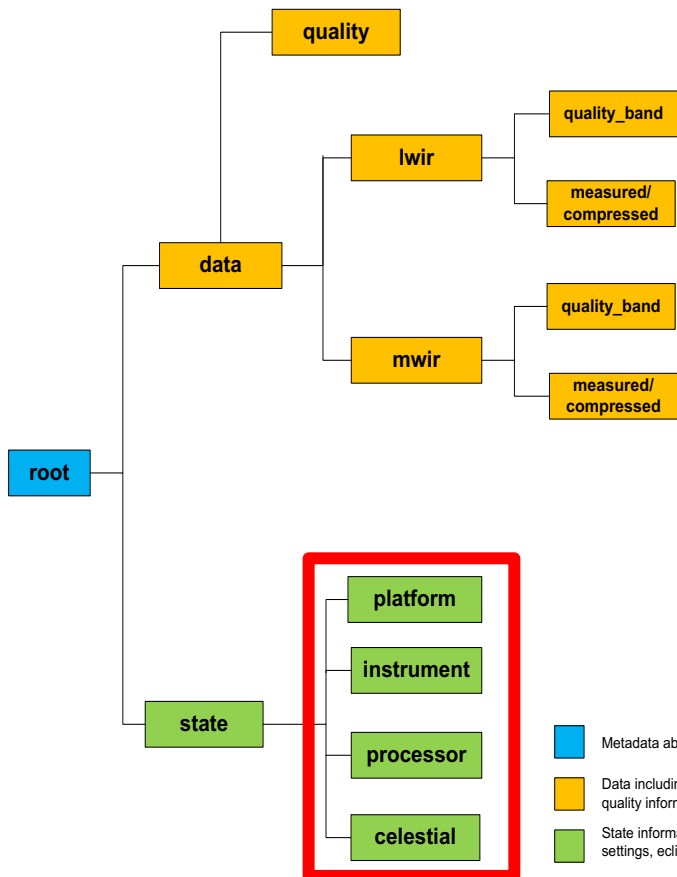
Trail (LAC)

Data Class	Description
Dwell coverage	Coverage and overlap
Quality	LAC completeness and accuracy
Geometric quality	Absolute and relative errors
Radiometric quality	Stability and non uniformity
Sample data	Statistics at sample level

- Dwell and LAC level quality information, band specific

The State groups

- These groups do not contain information on the measure but on the status of the entire system (S/C, instrument, on-ground processor, effect of celestial bodies)



Group	Data Class	Description
Platform	None	S/C manoeuvre info
Instrument	Mode and settings	Instrument status info
	RC and RS data	Time and counters
Processor	Aux dataset	Used aux inputs
	Straylight	Correction applied
	Spectral calibration	Calibration timings
	Models	Used models
Celestial	None	Sun and Moon info

- Metadata about the dataset
- Data including science data, quality information, etc.
- State information about processor settings, eclipses, etc.