Level 1B Phase F implementation status

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Level 1B Phase F implementation status

Presentation Plan

- Level 1B Phase F investigations/results since last meeting
  - Pointing
  - ILS
  - 3rd order non-linearity correction
  - Band B jumps

- Implementation Status
  - Work done
  - Short term remaining work

- Planning of remaining phase F work
  - WBS
  - Schedule
  - Main milestones
MIPAS Mispointing Investigation [1/7]

- Presented during EO Level1 Lessons Learned Workshop June 2013
- Sciamachy

Elevation angle mispointing time series

- Red dots: individual offsets / Green line: Fitted function
- Large tangent height anomalies (Attitude test, Orbit change, OCM excluded)
- Seasonal cycle $\pm 127$ m, mean offset 249 m.
- 50 m drift 2002-2006, stable further on.
- Remaining tangent height uncertainty $< 26$ m for individual measurements.

Bremstedt et al, AMT, 2012
MIPAS Mispointing Investigation [2/7]

- Comparison with Ozone Sonde (D. Hubert, J. Granville and J.-C. Lambert)
- Similar seasonal cycle, negative trend
MIPAS Mispointing Investigation [3/7]

- MIPAS Pointing Error using Stars (LOS mode) see monthly report
- Noisy data, can distinguish 2 seasonal cycles, negative trend
- Currently, L1B makes a bias correction to remove offset

![Graph showing pointing error over time]
MIPAS Mispointing Investigation [4/7]

- MIPAS Pointing Error after L1B bias correction in meters
- Fit a model?
MIPAS Mispointing Investigation [5/7]

- Use knowledge of Sciamachy and Ozone validation
- I.e., seasonal cycle and trend
MIPAS Mispointing Investigation [6/7]

- MIPAS Pointing Error after model correction in meters
- Standard deviation below 200m
MIPAS Mispointing Investigation [7/7]

- **Summary**
  - Model correction reduces cycle and trend significantly
  - Improve model (trend only during 2002-2006 period)
  - Initial model implemented in processor
  - Investigation in sideways still remaining
ILS parameters [1/2]

- A re-characterization of ILS parameters was done
- Started from work done on ILS by NovaSyst
  - Addition of pressure broadening
  - More averaging to reduce noise
  - Remove from results fits that do not converge (reach maximum number of iterations)
- New parameters found very similar to those fitted by IMK (see QWG2)
- L2 PS2 parameter file was generated for testing
ILS parameters [2/2]

- New value fitted
  - Shear var. Z: 9.15e-04
  - IR misalig. Y: 8.45e-05
3rd order non-linearity correction

- Algorithm was implemented in Level 1B processor as per DLR TN
- DLR has provided the fitted coefficients
  - Need extended wavenumber range for v8
- The 14 non-linearity test orbits were regenerated
- Other orbit test set can be processed if needed
- Has an impact on band A only
  - Correction is wavenumber dependent
  - Vary along the mission (decreasing)
- Exemple of correction 10 Oct 2002
Band B jumps

- CH4 time series discontinuities (Piera, Michael and Quinten)
- Short duration (1 week) anomalies explained by band B detector strange behavior
- In v8, duration will be reduced to one or 2 days and flagged
- Long duration discontinuities cannot be explained by detector strange behavior
- Still under investigation
Work Performed

- Prototype
  - Ported to 64 bits linux
  - Verification was done
    - Very minor differences for orbit propagator (satellite position and hence long/lat at limb)
  - Handling of DOR_VAR file (containing precise satellite positions)

- New algorithm
  - 3rd order non-linearity correction done
  - First pointing correction model done
  - Addition of long/lat error done
  - Removal of WCC done
  - Offset validation (threshold and handling of invalid) done
  - Non-rejection of scene with transmission error flag

- Update DPM/IODD in progress
Short Term Remaining Work

- Prototype
  - 1 second difference with IPF
  - Handling of filenames
- New algorithm
  - Modified pointing correction model
  - Invalid flag approach (scene, offset and gain)
- Finalize DPM/IODD
- Update validation plan
- NetCDF exporter (TBD)
  - Need to define format
- Finalize pointing investigation (including sideways)
- Error budget TN
WBS
Schedule

- Still on schedule as presented in proposal
Main Milestones

- Level 1B baseline verification May 2016
  - Code freeze, start verification
- Acceptance Review September 2016
  - Ready for reprocessing
Main Deliverables

- Technotes (Interchannel validation, budget improvements, ...)
- Updated DPM/IODD
- Software (source and binary)
- Updated ATP, SVVP, TPD/TDD, CRN, SUM
- Updated ATBD and Product handbook
- Quadruplet ADFs with TN