STATUS OF OPERATIONAL AMV PRODUCTS AT EUMETSAT

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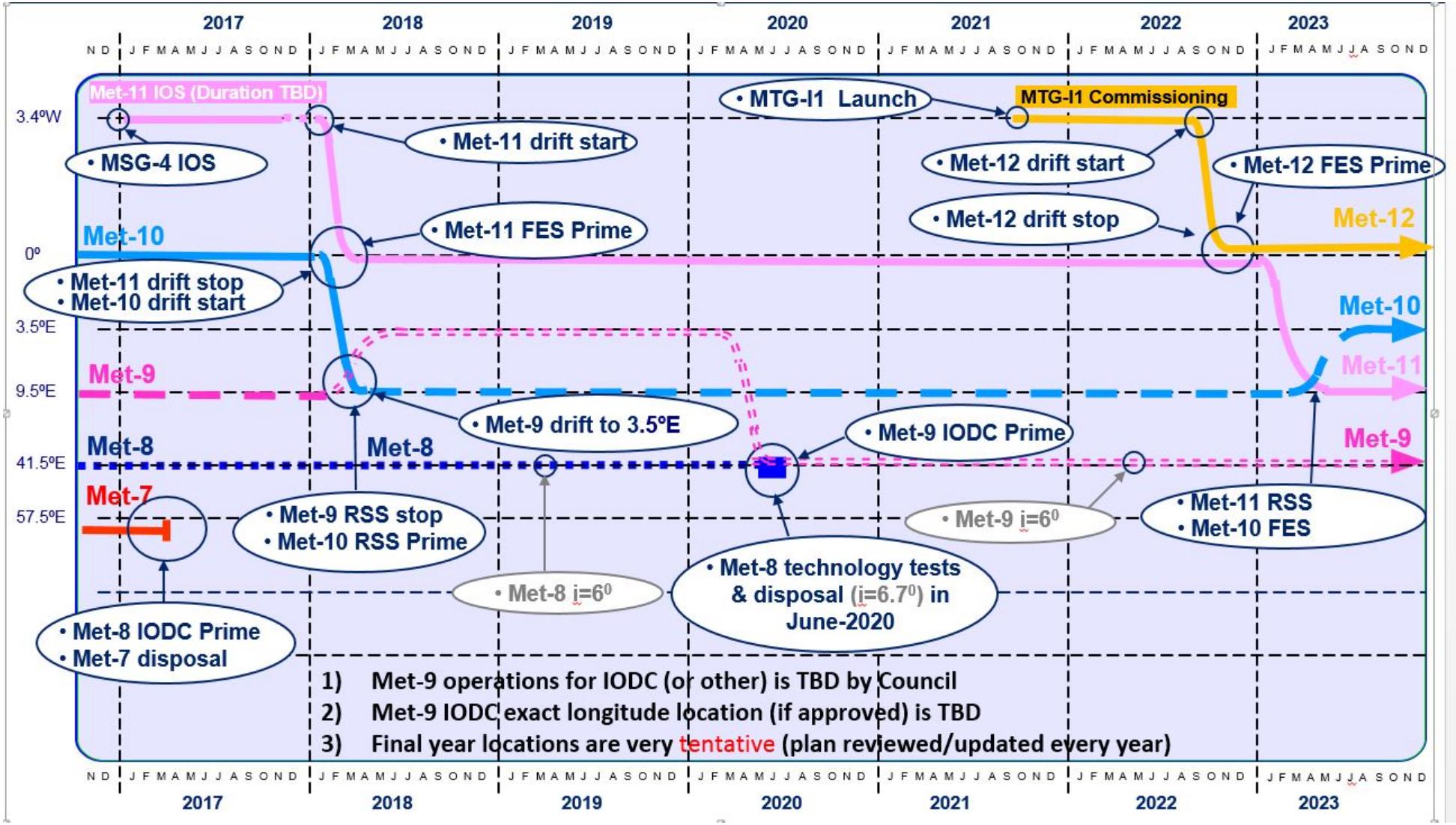
Content

- ✓ AMVs from Geostationary Satellite status
  - MSG Planning
  - Recent activities on GEO AMVs since IWW13
  - Upcoming activities
- ✓ AMVs from Low Earth Orbiting Systems status
  - Upcoming Metop satellite changes
  - Recent activities on LEO AMVs
  - Upcoming changes and activities
- ✓ Mid-Term strategy and activities

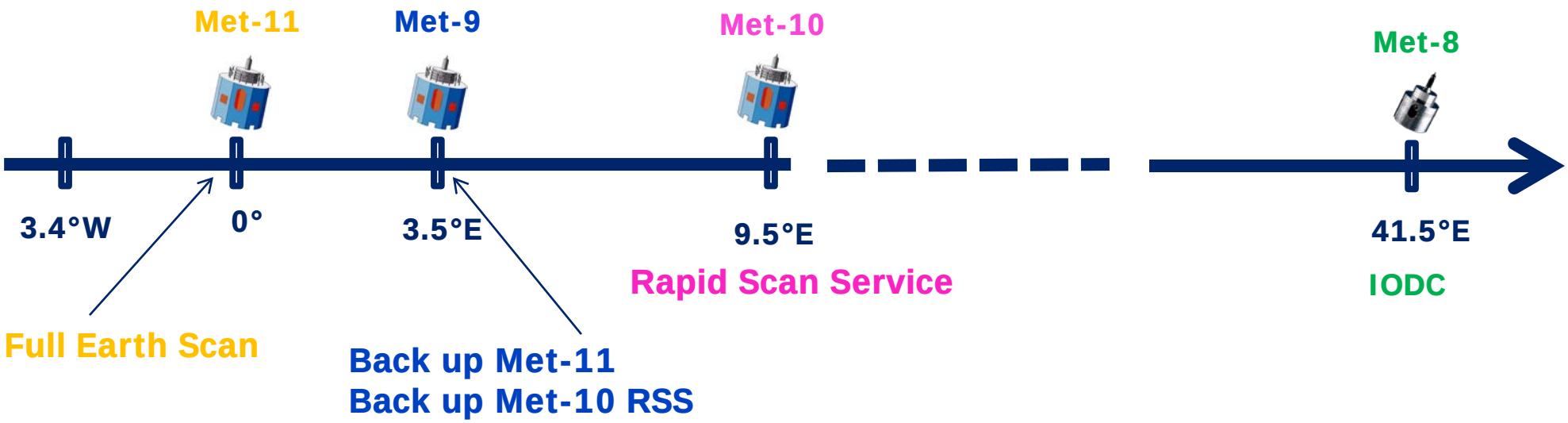
Meteosat Planning Reference Baseline - 2018



From the document: *EUM/STG-OPSWG/43/18/DOC/02*

EUMETSAT

Current MSG space segment configuration



Recent activities on GEO AMVs.

- Meteosat 11 prime FES (February 2018)

- Meteosat 8 prime over IODC (February 2017)

- MTG prototype developed from MSG code
  - ✓ Comparison MTG - MSG.

  See Manuel's talk, Technical and Scientific Verifications of the EUMETSAT MTG-FCI AMV Prototype.'
  - ✓ Adaptation to HIMAWARI data, comparison with KMA.

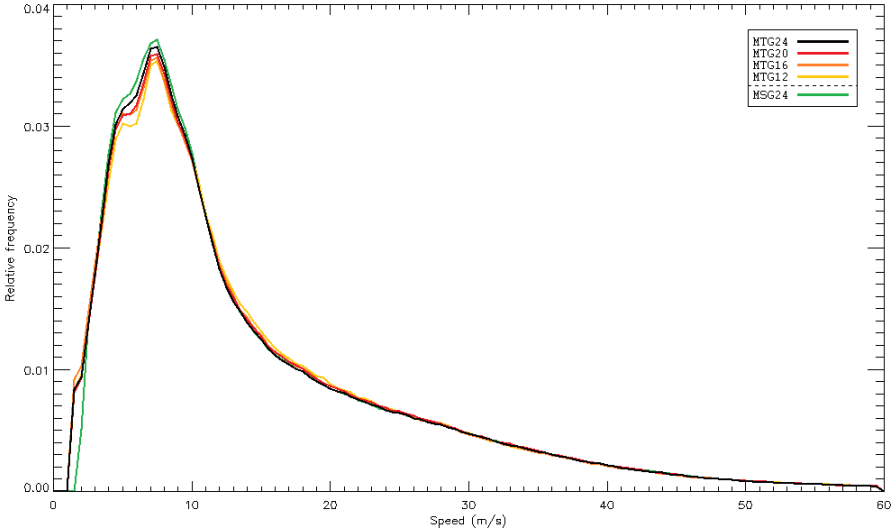
  See Soomin's poster, : 'AMV Inter-Comparison Between GK-2A and MTG Algorithm Using Himawari8/AHI Data.'

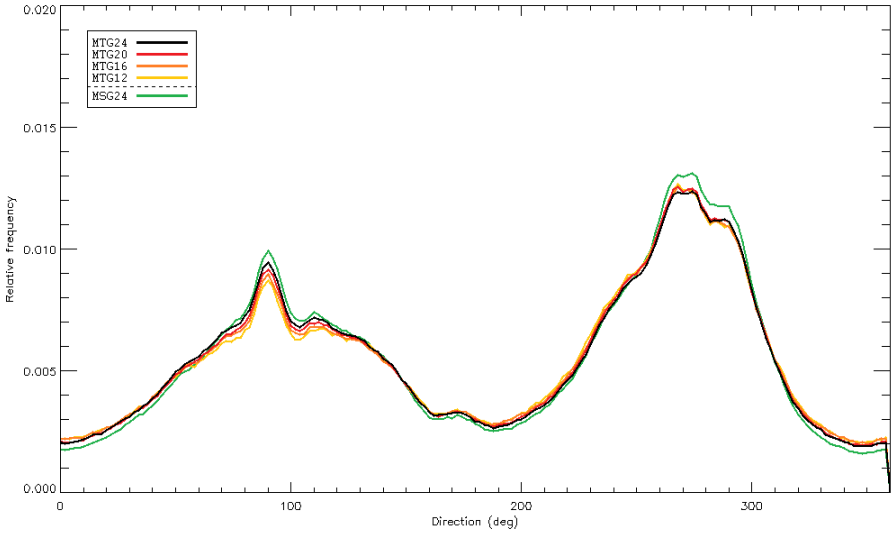
- 3rd Intercomparison study

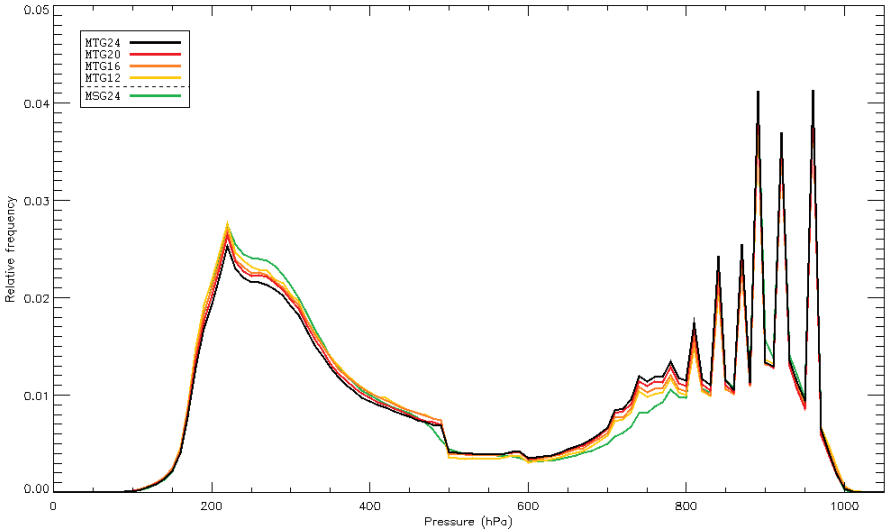
  See Plenary presentation.

MSG vs MTG algorithms using MSG data

AMV histograms; Periode: 14/05/2016 – 14/06/2016 ; QI>80







- MTG algo extracts 8% more AMVs, especially at mid and low levels
- Direction differences due to MSG averaging.
- MSG AMVs slightly higher.

Future activities on GEO AMVs.

- Operations activities
  - ✓ Change BUFR format
- MTG prototype
  - ✓ Comparison of MSG and MTG codes performances
  - ✓ Verification against reference code (L2PF activities, 2019)
  - ✓ Scientific validation using Himawari data (Collaboration with KMA)
- New developments
  - ✓ Use OCA microphysics to improve AMV HA.
  - ✓ Develop speed and direction error estimates from Level1.5 data navigation errors

Metop-C Launch

Metop-C launch :

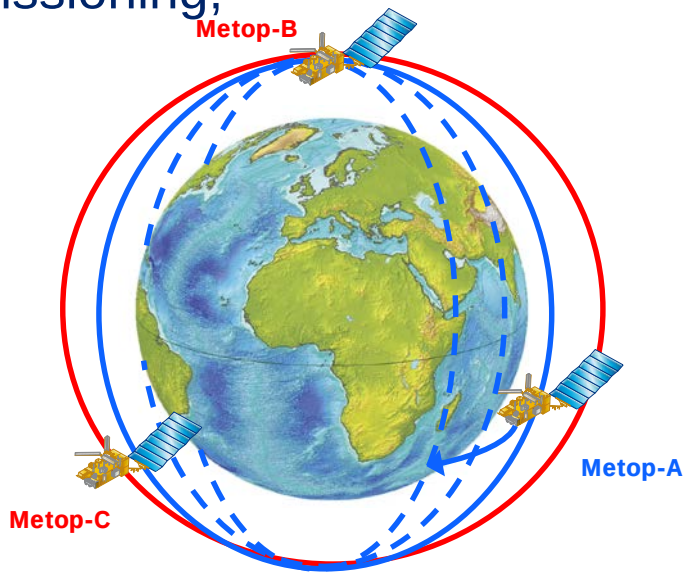
- Launch site Kourou (Arianespace CSG) instead of Baikonur;
- Launch vehicle Soyuz ST-B with Fregat-M upper stage;
- New payload adapter ring with regards to Metop-A/B;
- Launch :
  - Period : 20/09/18 – 31/12/2018
    (later than originally planned due to Metop-A longevity);
  - Target Launch Date : 21 Sept 2018 @00:47 UTC; (current baseline)
    (= 20 Sept 2018 @21:47 Kourou, 18 September (Kourou time under formalisation)
- Separation in visibility of both launcher and LEOP stations.

From the document: *EUM/STG-OPSWG/43/18/VWG/04*

Metop-C Phasing Approach

Metop-C Commissioning to be performed in an approximately equal-spaced phasing configuration = “Tristar” configuration:

- dual-/tri-Metop processing algorithms products may (to be checked during Metop-C commissioning) be adapted;
- Tristar retained at least until end of Metop-C Commissioning;
- After Metop-C Commissioning, options:
  - retain Tristar configuration; OR
  - establish “Trident” configuration; (Metop-B/C in current Metop-A/B configuration, with Metop-A midway between).
- After Metop-A de-orbiting, re-establish current dual-Metop configuration with Metop-B/C.
- decision will be based on user feedback, taking into account optimal phasing wrt. Metop-SG satellites.



From the document: ***EUM/STG-OPSWG/43/18/VWG/04***

Recent activities on LEO AMVs.

- Drift of Metop A (change of production rules)

- Inter-comparison of the 3 AVHRR wind products.

See Olivier's talk: 'Intercomparison of the different AVHRR winds products at EUMETSAT.'

- 3D IASI winds
  - ✓ Integration of new model that consider both Q, T and O3.
  - ✓ Adaptation to IASI data
  - ✓ Demonstration period

See Olivier's talk: '3D IASI Winds Product at EUMETSAT.'

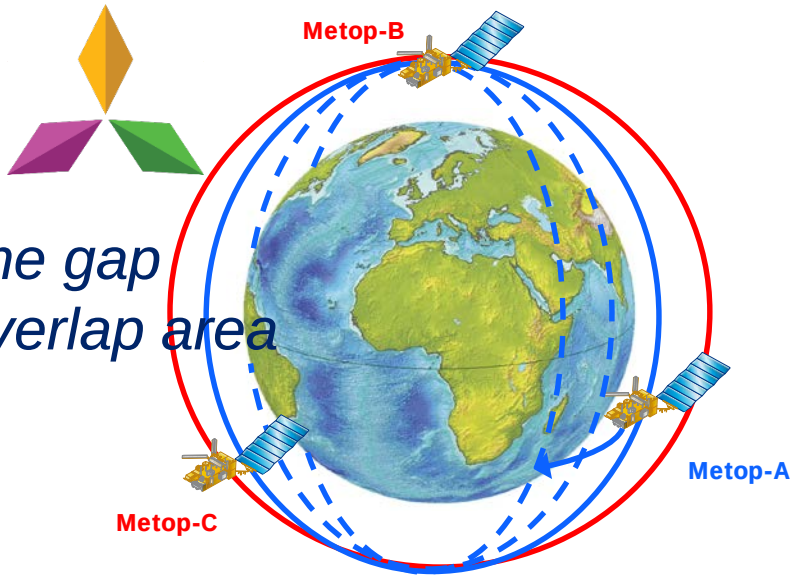
Future activities on LEO AMVs.

- Commissionning of Metop C
- Tristar configuration of Metop satellites
- 3D IASI winds
  - ✓ Scientific validation and comparison.
  - ✓ Operational production foreseen (mid 2019)
- Development of EPS-SG VII AMV prototype
- Development of Sentinel 3 SLSTR AMVs

Product characteristics (*Dual*)

- ✓Dual configuration on 9:30 orbit
  - ~45-55 minutes of separation between successive views
- ✓Coverage
  - Production on Northern and Southern Hemispheres (poleward of 45°)
  - ~1 observation around 9:00-10:00 (local solar time) Same around 21:00-22:00 (ascending part) for latitude 60°.
- ✓Timeliness
  - For SH products: ~1h - 1h30 after South Pole overpass
  - For NH products: ~1h - 2h30 after North Pole overpass (depending on possible secondary dump on McMurdo station)

Product characteristics (*Tristar*)



✓Tristar configuration on 9:30 orbit

- ~30-35 minutes of separation between successive views
  - ➢ *Quality will benefit from the reduced time gap*
  - ➢ *Coverage will benefit from increased overlap area*

✓Coverage

- Production on Northern and Southern Hemispheres (poleward of 45°)
- ~3-4 successive observations around 9:00-10:00 (local solar time) Same around 21:00-22:00 (ascending part) for latitude 60°.
  - ➢ *Time consistency will benefit from successive observations capability*

✓Timeliness

- For SH products: ~1h - 1h30 after South Pole overpass
- For NH products: ~1h - 2h30 after North Pole overpass (depending on possible secondary dump on McMurdo station)

Main users wind requirements for near future

- Get smaller scale information to feed regional models
  - Better spatial and/or temporal resolutions
  - Appropriate QI for mesoscale winds ?
- Better quality AMVs
  - Speed and direction error estimates
  - Height assignment error estimate
- Get 3D wind profiles
  - Lidar missions (Aeolus)
  - IR sounders

Perspectives for MTG-FCI

- Improvements expected from MTG-FCI data
  - Repeat cycle 15 min (MSG SEVIRI) 10 min (MTG FCI)
  - Pixel size 3 km (MSG SEVIRI) 2 km (MTG FCI)
- Main changes from MSG AMV scheme
  - Use 3 images instead of 4 (1/2 hourly product)
  - No averaging process
  - Better Cloud product expected to set the altitude
- MTG FCI AMV prototype developed
  - Adapted to both MSG data and Himawari data
  - Scientific validation on going

Perspectives for EPS-SG VII

- Improvements expected
  - Channels used — 1 (AVHRR) — 4 (VII)
  - Pixel size — 1 km (AVHRR) — 0.5 km (VII)
- Main changes from AVHRR scheme
  - Use cloud product to set AMV altitude
  - Extraction of AMVs in 2 WV channels
  - VII data needs to be re-projected before tracking
- EPS-SG VII AMV prototype still to be developed

Perspectives for Sentinel 3 SLSTR

- Very similar to AVHRR

	AVHRR	SLSTR
Band used for AMV extraction	10.8 micron	10.85 micron
Pixel resolution	1 km at nadir	1 km at nadir
Swath	~2900 km	1400 km (nadir view) 740 km (oblique view)
Cloud mask	Yes	Not ready
Cloud product	No	No
Height assignment	EBBT or IASI	EBBT or stereo (oblique view swath)
Temporal gap between consecutive images	~100 min	~100 min

- Main changes from AVHRR scheme
  - SLSTR data needs to be re-projected before tracking

- S3/SLSTR AMV prototype still to be developed

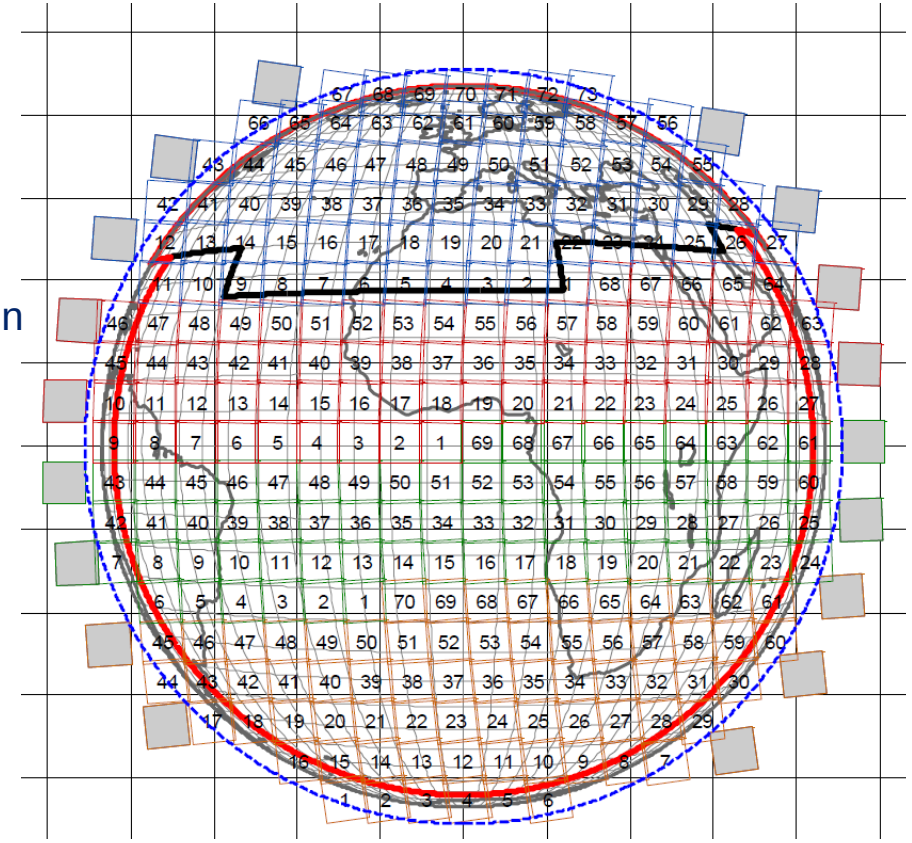
Perspectives for MTG-IRS

- Software can be adapted to MTG-IRS data
  - Dwell of 160x160 pixels (IRS) 2x2 pixel (IASI)
  - Pixel size of 4km (IRS) 12 km (IASI)
- Sparse data not a huge problem
- MTG-IRS 3D wind product could be as follow:
  - 4 km resolution
  - Using image pairs (30 min gap) and the current baseline [3-4 3-4 3-4 3-4 3-4; 2-4 2-4 2-4 2-4; 1-4 1-4 1-4] allow a ½ hourly product over Europe (LAC-4) and ~3 series of 3 products per day for LAC-1,2.

3D winds MTG-IRS product characteristics

- Coverage
  - 4 LAC (Local Area Coverage) defined
  - LAC4 covers Europe, Mediterranean Basin and North Atlantic. It is acquired every 30 minutes.
  - Pixel sampling = 4 km at SSP
  - ➢ *Spatial resolution enhanced will allow the use in High Res NWP application*
- Profile
  - 20 levels from 10 to 1000 hPa, covering Low Stratosphere to Surface
- Frequency
  - Number of products per day depends on acquisition scheme.
  - Current baseline:
    - 48 products for LAC4
    - 16 products for LAC3
    - 12 products for LAC2
    - 8 products for LAC1
- Timeliness (expected)
  - ~45 minutes after LAC acquisition

➢ *Fulfill the Global NWP and High Res NWP application requirements*



Aeolus ???

Aeolus science meeting
EUMETSAT, 29 May 2018

The European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) are happy to invite you to attend the Aeolus Science meeting on 28 November 2017. The topic of the meeting is the preparations of the meteorological community for the assessment of Aeolus and its potential for a follow-on

Thanks for attention

Questions ?