Meteosat-8 IODC & options for HRV Scan Configuration

Presentation based on slides presented by Claudia Tranquilli for STG-SWG and STG-OPSWG in March 2016

MSG-IODC project – an overview

- The MSG-IODC (Indian Ocean Data Coverage) project has been established to coordinate the activities necessary to relocate Meteosat-8 (MSG-1) over the Indian Ocean and to establish the “MSG” IODC services.
- Moving the satellite still requires approval by the various Delegate Body meetings.
- The preparatory work (feasibility & technical analyses) is planned to be completed by the end of June in anticipation of a positive decision from the summer Council.
- This would allow the start of the drift of Meteosat-8 to 41.5°E to be initiated in July.

MSG-IODC project – scope and background (1)

- EUMETSAT now has four MSG satellites in orbit after the successful launch and commissioning of Meteosat-11 (MSG-4).
  - **Meteosat-9, at 0° prime mission, Full Disk Service**
  - **Meteosat-10, at 9.5°E Rapid Scanning Service**
  - **Meteosat-11, stored in orbit**
  - **Meteosat-8, the oldest MSG satellite in orbit, available to support IODC service until at least April 2019.**
- Pending Council approval in June 2016, EUMETSAT will relocate the Meteosat-8 satellite to 41.5°E longitude.
- It will replace the 19-year-old Meteosat-7, currently located at 57.5°E, which will be sent to the graveyard orbit in spring 2017.

MSG-IODC project – scope and background (2)

- Once arrived at 41.5°E in September 2016, Met-8 will undergo a number of tests.
- About two months of parallel operations for Met-7 and Met-8, with data dissemination to users. The start of the Met-8 IODC operational service expected in early 2017.
- The start of the operations of Met-8 over the Indian Ocean region will mark an important change for the services provided to users – a transition from the 1st to the 2nd generation Meteosat satellites.
- Will provide a significant improvement in the service, offering a wider suite of products, more channels, an enhanced image spatial resolution and a shorter repeat cycle.

Proposed Services – Image Data

View from 41.5 deg

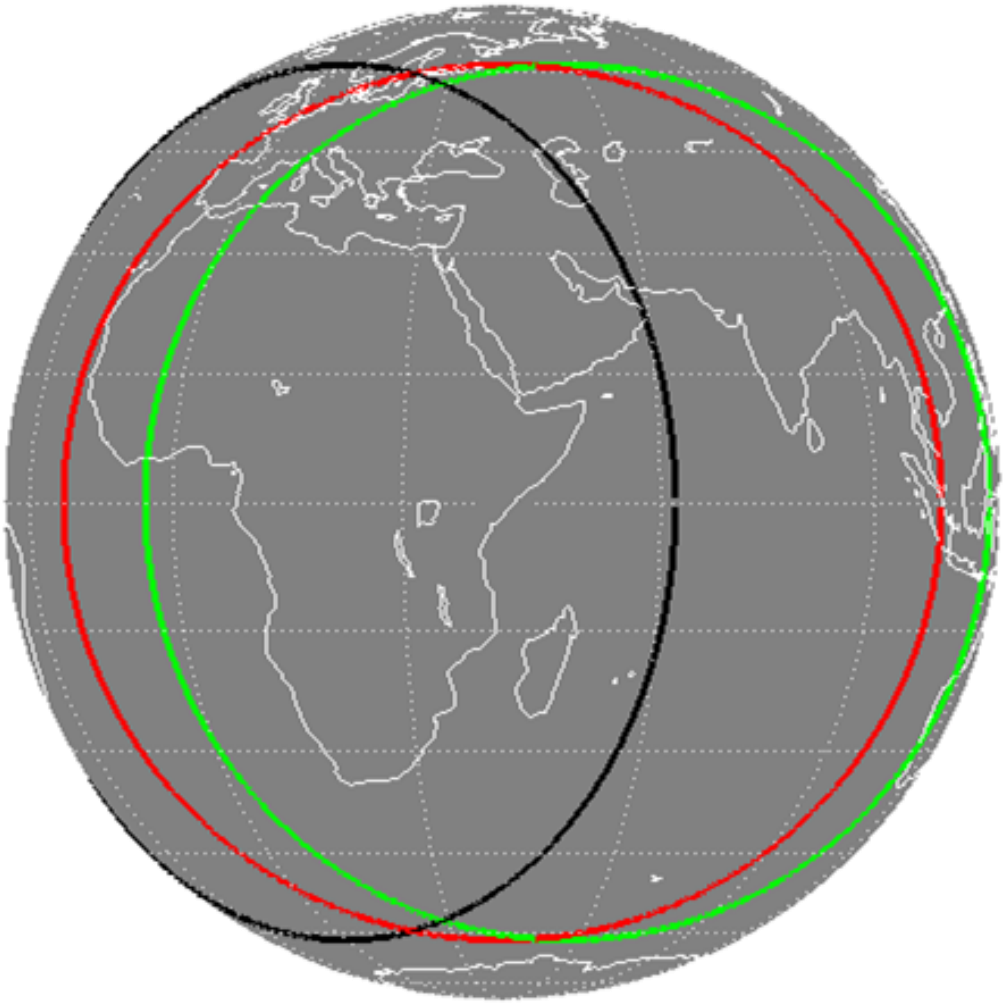
- Full Earth scan - 12 channels/15 Minutes
- Covering ~40°West to ~120°East
- HRV Scan pattern see later slides

Proposed Service – Meteorological Products

Product Name	Product Acronym	Number/ Day	Product Name	Product Acronym	Number/ Day
Active Fire Monitoring	FIR	96	Divergence	DIV	24
Aerosol Over Sea	*AES*	*1*	Global Instability Index	GII	96
Atmospheric Motion Vectors	AMV	24	*High Resolution Precipitation Index*	*HPI*	*1*
All-Sky Radiances	ASR	24	Multisensor Precipitation Estimate	MPE	96
Clear-Sky Radiances	CSR	24	Normalized Difference Vegetation Index	NDVI	1
Clear Sky Reflectance Map	CRM	1	Normalized Difference Vegetation Index – decadal	NDVI-D	1/10 days
Climate Data Set	*CDS*	*96*	Optimal Cloud Analysis	OCA	24
Cloud Analysis	CLA	24	Tropospheric Humidity	TH	24
Cloud Analysis Image	CLAI	8	Total Ozone	TOZ	96
Cloud Mask	CLM	96	Volcanic Ash	VOL	0 96 (netCDF) (CAP-on request)
Cloud Top Height	CTH	96			

(*Italic: only to Data Centre* gray background: common MTP & MSG)

Meteosat-7 – Meteosat-8 – Meteosat-10 Earth views



Illustrating the visible Overlap between

Meteosat-8 @ 41.5° East

with

Meteosat-7 @ 57.5° East

and

Meteosat-10 @ 0.0°

HRV Scan configuration

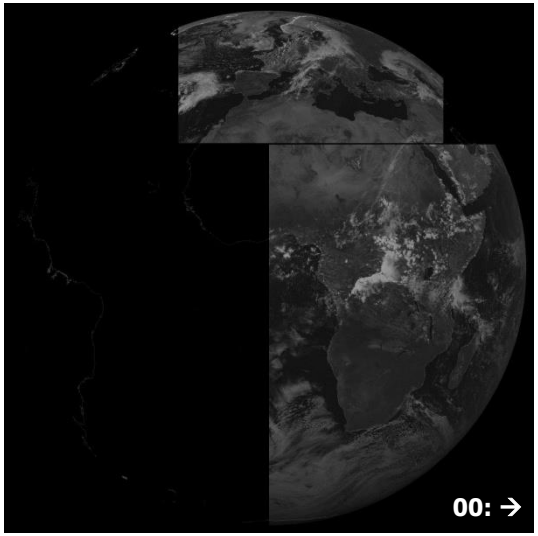
- Changing the view of the Earth from the spacecraft implies the identification of a strategy for the monitoring with regards to the HRV channel over the Indian Ocean;
- This topic has been matter of discussion in the EUMETSAT delegate body meetings in 2015
  - EUM secretariat has been tasked to investigate various HRV strategies for proposal in the 2016 round of meetings

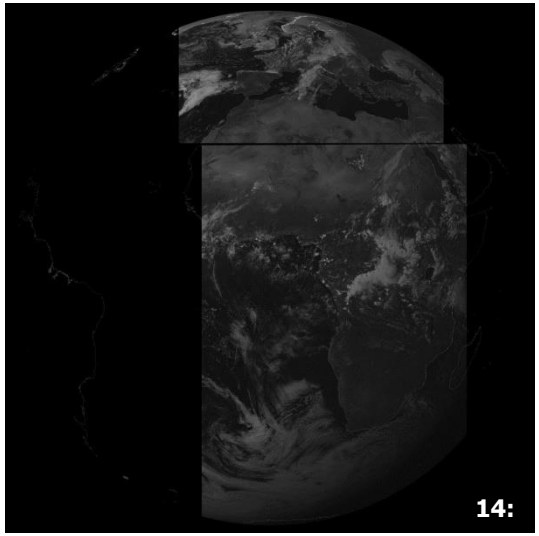
Current HRV Strategy for 0 deg FES mission

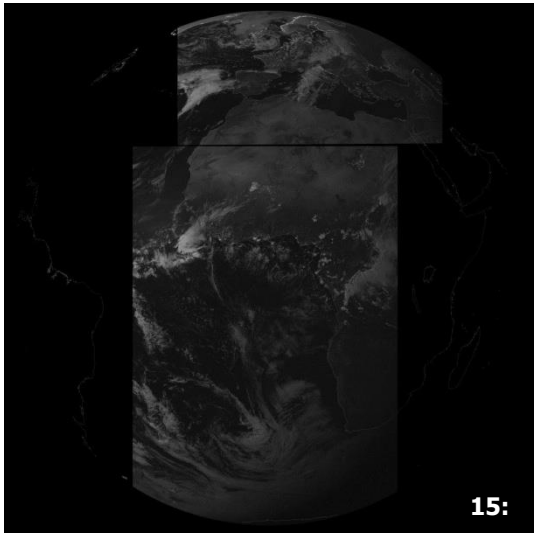
For 0° FES mission, the current strategy for HRV is:

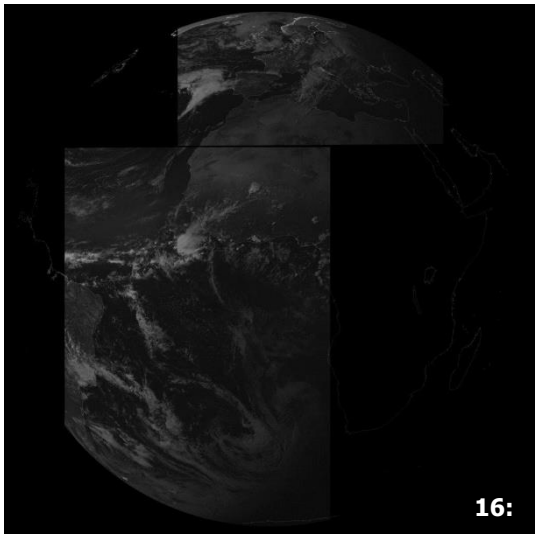
- HRV window split at line 914 (North Africa);
- Upper window over Europe, moving twice a day, at 17:00 UTC westward (≈ 973 km) and at 00:00 UTC back to initial position;
- Lower window over Africa, moving five times a day following Sun illumination (at 14, 15, 16, 17 ≈1434 km per shift, then back to initial position at 00:00 UTC).

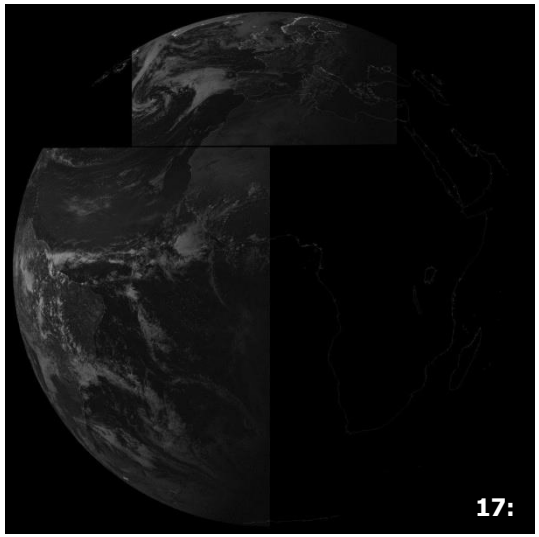
Meteosat-10 HRV Window Shift (0 deg)









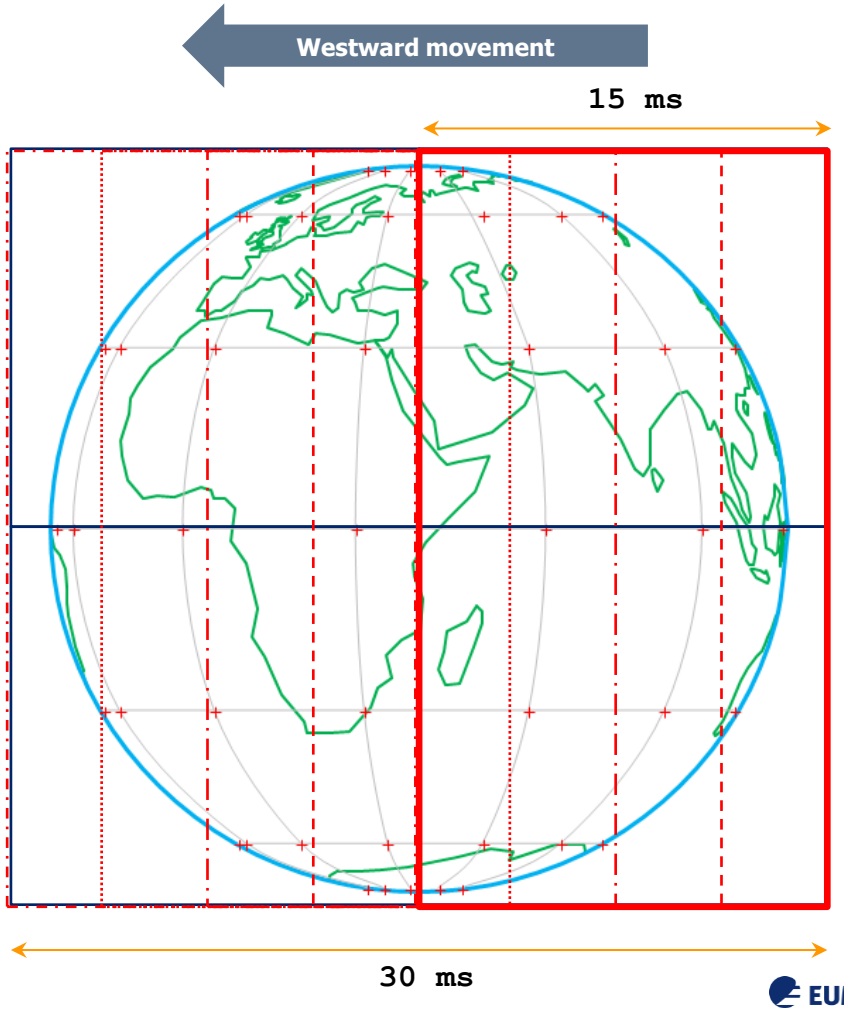


Following the Sun at 41.5° East

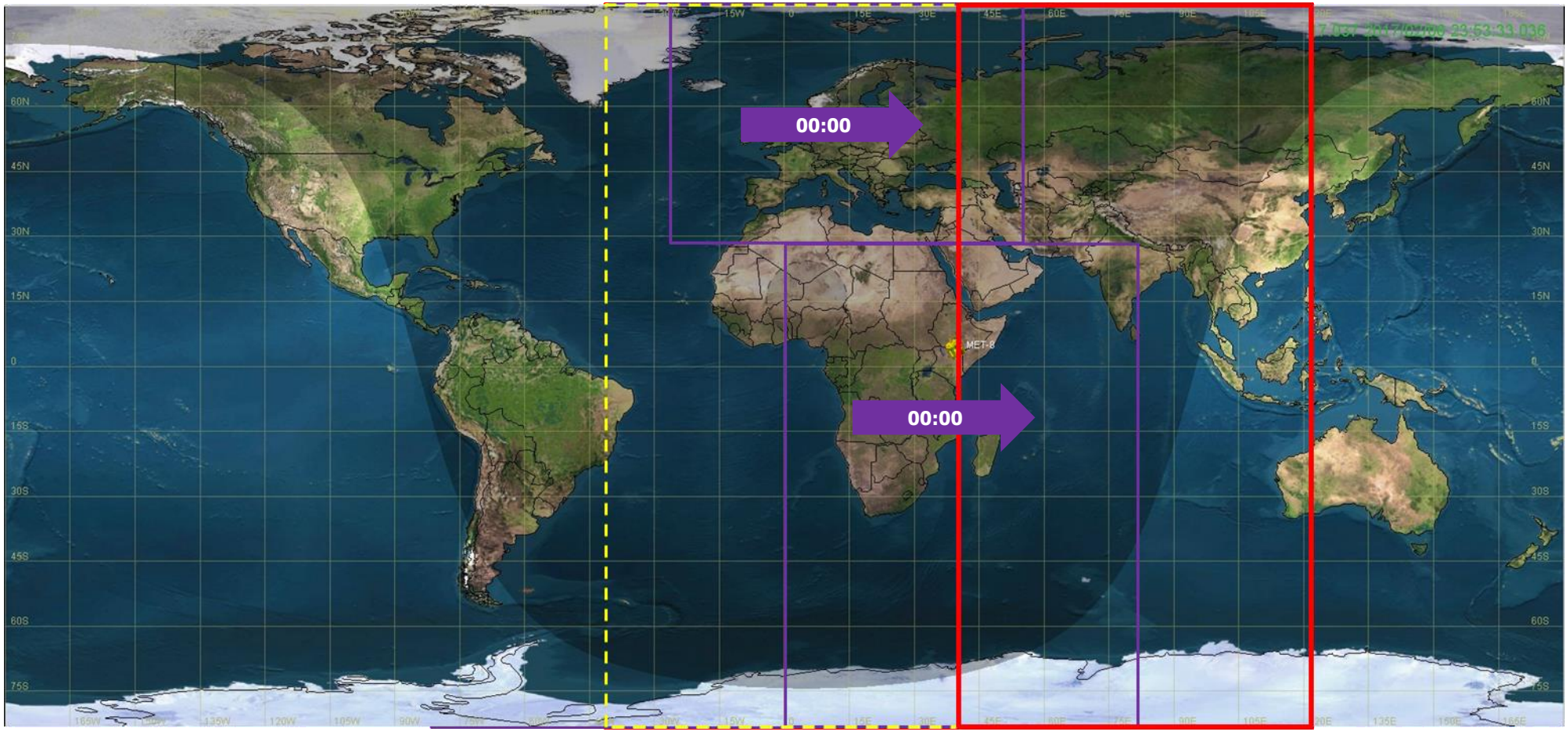
To maximize the IODC coverage following the Sun, the HRV window should be shifted westwards at the following times

Time [UTC]	DELAY [ClkP]*	[≈km]
12:00	14336	1434
13:00	28672	2867
14:00	43008	4301
15:00	55808	5581
22:00	0	0

(10 ClkP ≈ 1 km)



IODC HRV Option #2 (following terminator – no split)



Assessments

- **Option#1** maximizes the IODC coverage during illuminated hours;
- **Option#2** anticipates the overlap of the area already covered by the 0 deg mission;
- **Option#3** uses the lower HRV window maximising IODC and HRV AMV generation, and the upper window to maximise coverage and use over land thanks to the synchronisation with the 0 deg mission upper HRV window.

Conclusions

- EUMETSAT plans to start IODC parallel operations using either options #1, #2 or #3