


# **THE USE OF MTG AND RADAR AT METEO RWANDA**

## **Weather from Space A Game Changer for Africa**

**Country: RWANDA**



# Strategic Observational Infrastructure Overview on METEO RWANDA

- C-Band Doppler Radar Network. High-resolution local monitoring (1km resolution) for internal storm dynamics and QPE
- MTG (Meteosat Third Generation). Next-gen satellite data for continental perspective
- PUMA-2025 Reception Stations. Real-time data processing and visualization
- MTG satellite system (Synergy). Satellite The Eye above providing continental perspective 'fills the gaps' caused by Rwanda's mountainous terrain (beam blockage) 

# **Meteo-Rwanda: Mission and Vision**

- Modernizing weather services
- Committed to accurate and timely weather/climate information for safety of life and property
- ISO 9001:2015 certified operations
- 24/7 Monitoring and Forecasting
- Strategic focus on disaster risk reduction



# Monitoring Challenges in Rwanda

- **Topographic Blockage:** Complex terrain creates significant radar beam blockage in valleys and leeward slopes
- **Rapid Convection:** Convective storms in the tropics develop with extreme speed. Severe thunderstorms can form and peak within 15-30 mins, requiring sub-10 min observation cycles



# Rwanda's Current Radar Network

- Precision via Terrestrial sensing
- C-band Doppler radar provides high-resolution data on precipitation and wind fields
- High Update Rate: 5-minute scan cycles
- Hydrology: Essential for quantitative precipitation estimation (QPE)
- Limit: Range degradation and blockage in Western and Northern highlands

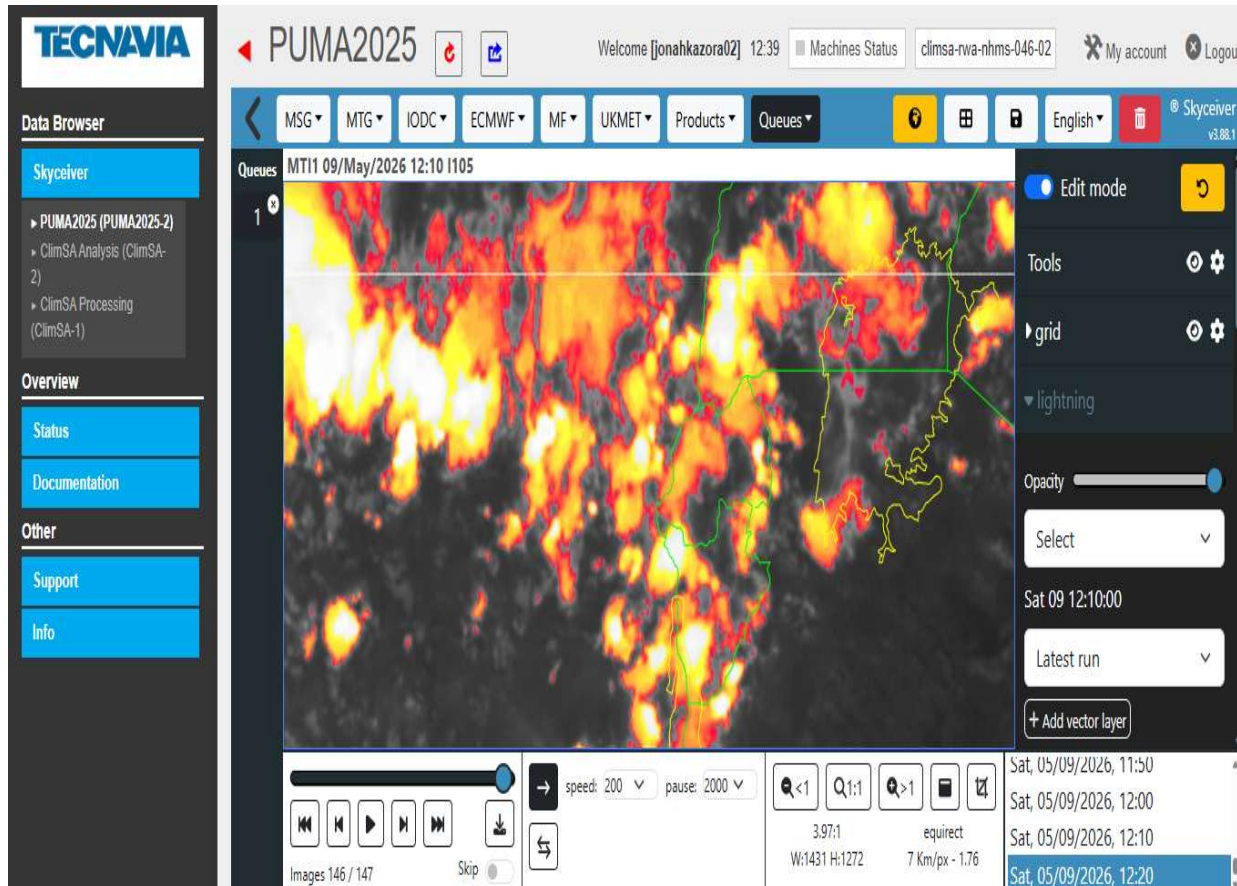


# Critical MTG Instruments for Africa

- FCI Imager: 16 channels for better spatial/spectral resolution for cloud top cooling detection
- PUMA station: Direct downlink for real time visualization
- LI Imager: Continuous monitoring of total lightning (IC and CG) as proxy for storm intensity
- PUMA-2025: Next-gen reception stations for high-bandwidth data flow



# MTG: The Game Changer



**09 May 2026 at 1220Z**

- Closing the Gap
- Meteosat Third Generation (MTG) provides a 'top-down' view that eliminates topographic shadows
- FCI imager: 10-minute full disk updates
- LI: Continuous lightning detection
- Seamless monitoring canopy from Congo Basin to the Akagera national park



# Impact on Warning Lead Times

- Lead time for severe thunderstorm warnings evolved from 15 min (2021) to projected 60 min (2026 Est)
- Significant jump noted since MTG Start
- **Enhanced Early warning System**
  - Improved Lead Times: Warning window increased from ~15 to ~45 + minutes
  - Impact-Based Forecasting: Better precision for flash flood and storm warnings
  - Socio-Economic Value: Protection of agriculture and infrastructure in high-risk districts
  - Future Outlook: Integration of MTG Sounder (MTG-S) for pre-convective analysis



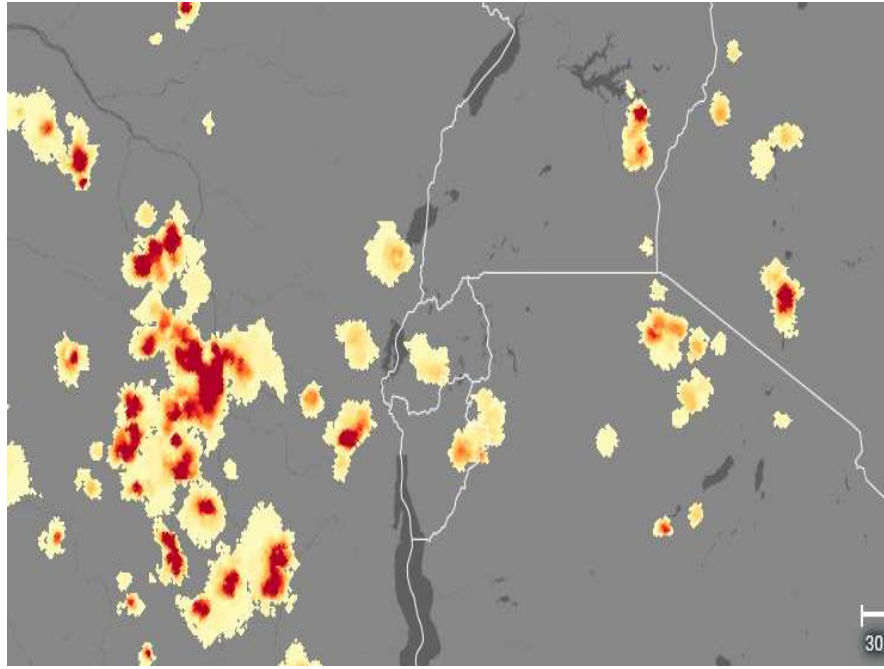
# The Power the Lightning Imager Advantage

## ❖ Total Lightning Monitoring

- Lightning (LI) detects intra-cloud flashes often preceding ground-based rainfall by several minutes
- Nowcasting: Early identification of rapidly intensifying convective cells
- Lead Time: Lightning often precedes precipitation echoes by 15-30 minutes
- Convective Initiation: Identify convective 'hot spots' before radar reflectivity emerges
- Validation: Confirming radar-observed storm cores
- Aviation Safety: Critical for operations at Kigali International Airport



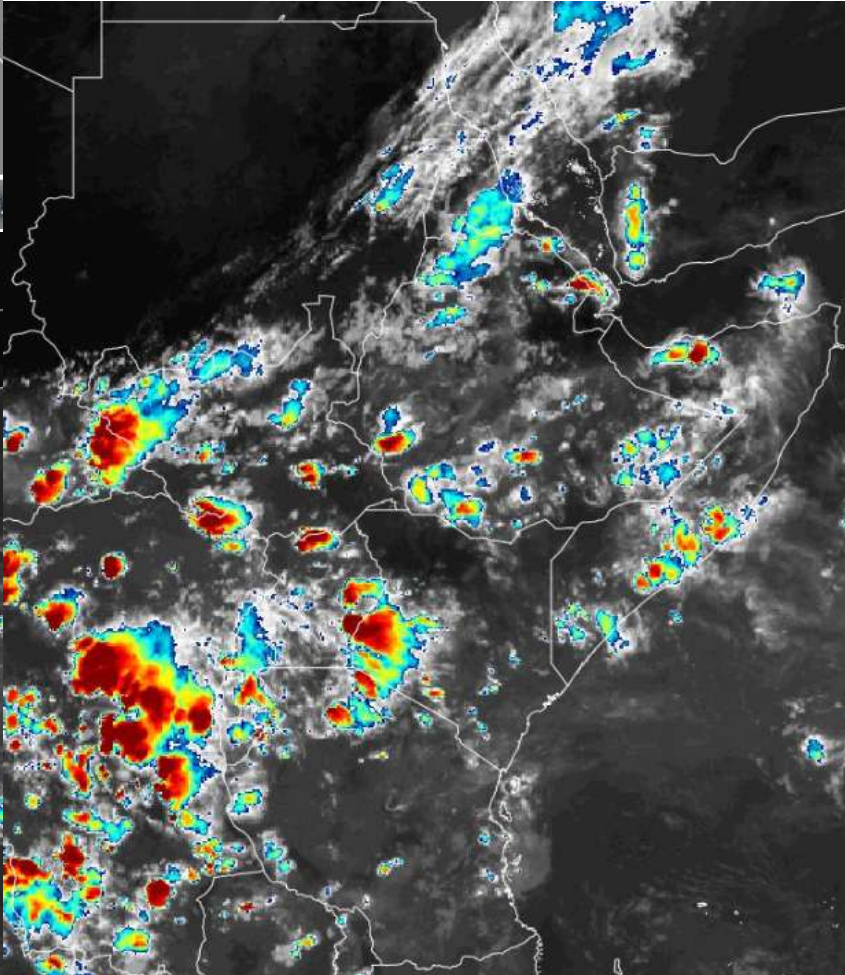
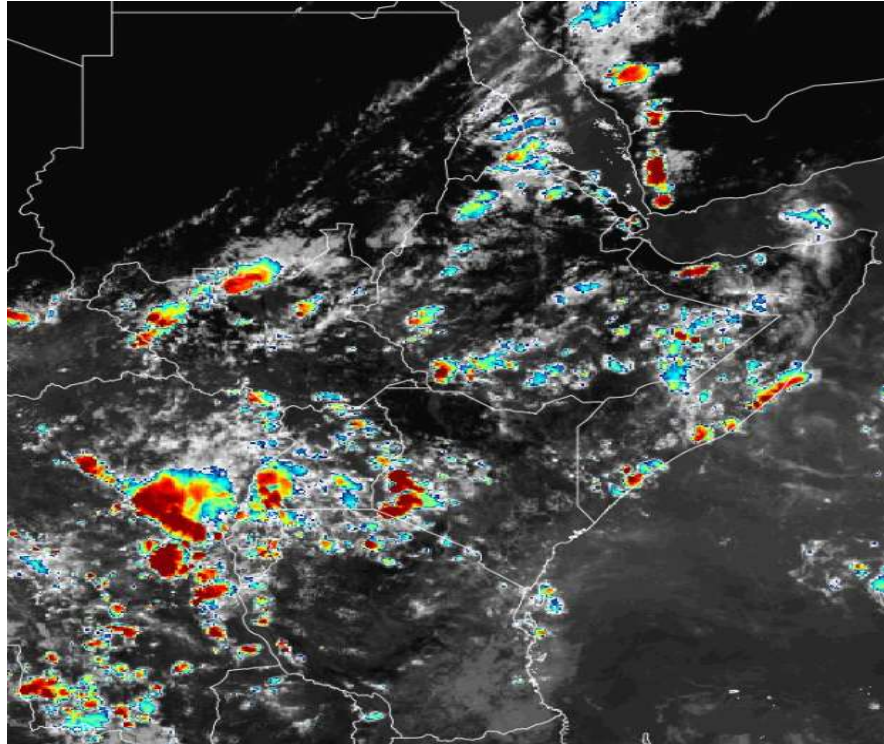
# Lightning Monitoring



Accumulation of multiple flashes over 30s (AFA) on FCI 2km reference grid



EUMETVIEW FCI HRFI IR10.5 μm Image - MTG - 0 degree



07 May 2026 at 1250Z

07 May 2026 at 1550Z

# Future Roadmaps & Innovations

- Expanding Radar Network to full country coverage (e.g., Congo-Nile Ridge)
- MTG Sounder (MTG-S) integration for profiling instability before cloud formation
- BioAppRadar Development for monitoring pests and bird movements
- Hyper-Local Warnings leveraging USSD and mobile integration



*Thank you for Your Attention*

Q/A?

Contact: [info@meteorwanda.gov.rw](mailto:info@meteorwanda.gov.rw)

[www.meteorwanda.gov.rw](http://www.meteorwanda.gov.rw)

