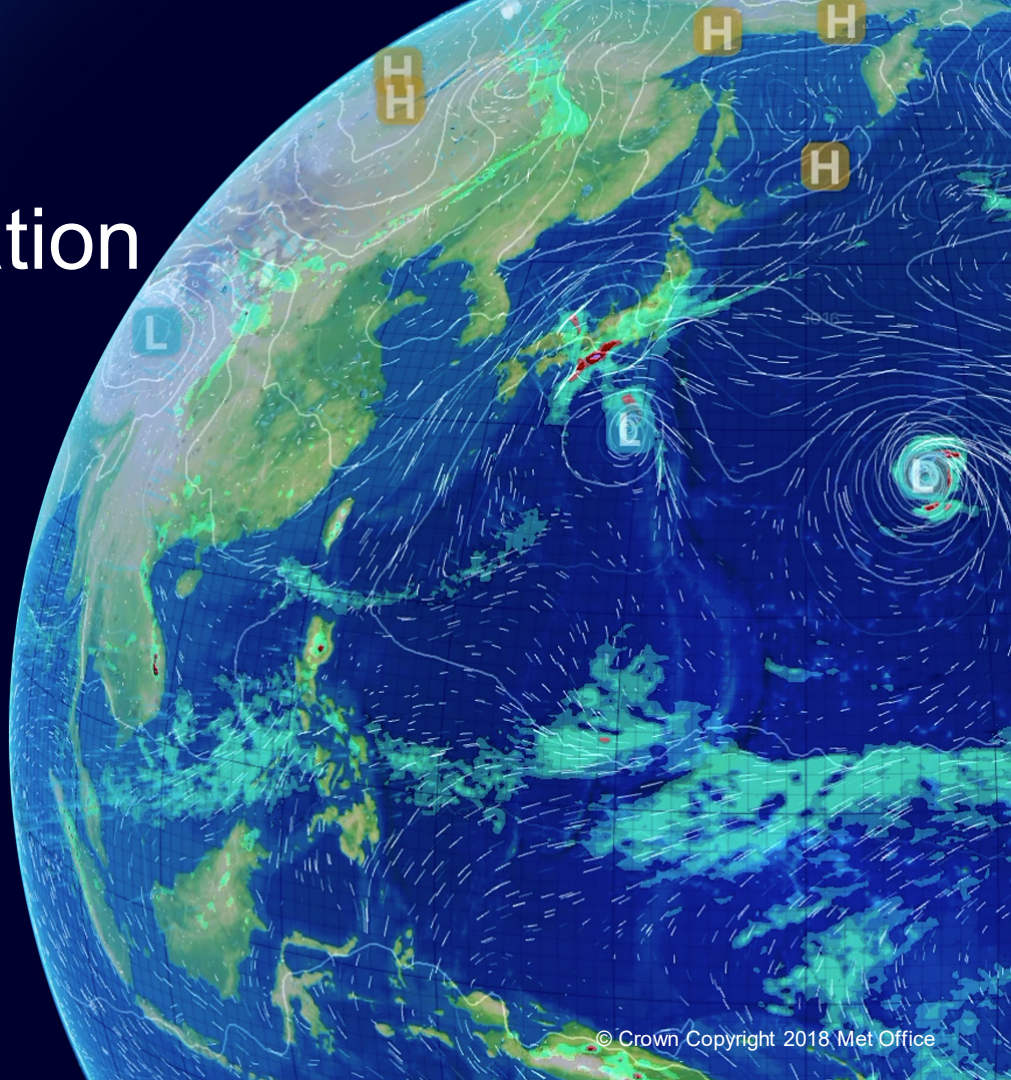
LEELA Lightning Location System

11th LI MAG

9th Febuary 2021

Graeme Marlton



What is LEELA?

Lightning **E**lectromagnetic **E**mission **L**ocation via **A**rrival-time-difference

UK Met Office's next generation lightning location system to replace ATDnet

Features:

New Hardware, firmware and central processing software

All processing: sferic detection and fix generation undertaken centrally

End goal is to provide lightning location, lightning type and intensity across Europe and N. Atlantic

Why a new LLS for the Met Office?

ATDnet (Arrival Time Difference)

- 10 VLF sensors located across Europe to geolocate lightning strokes primarily over Europe and the N. Atlantic.
- Designed to detect cloud-to-ground (CG) lightning.
- This data source (CG) remains highly regarded but is also failing to adjust to evolving user requirement e.g. cloud-to-cloud observations (CC).
- Inflexible design which severely limits our ability to enhance our capability.

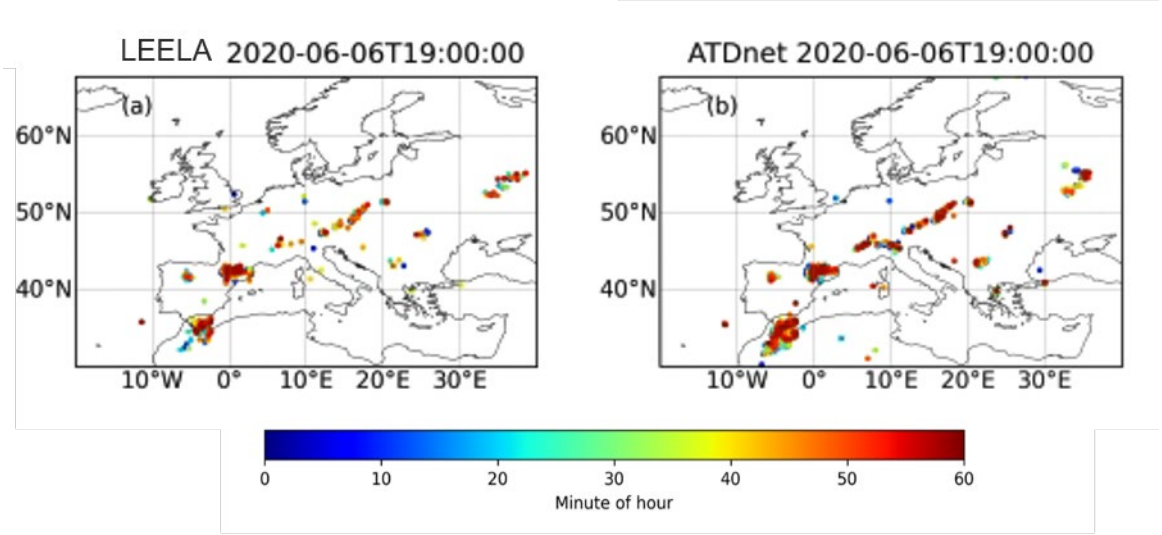
- Includes several Obsolete system components; PC on site, with associated patching, security issues.
- Susceptible to ground noise due to monopole antenna requirements.
- Requires Major ground works for site install, plus 2-3 day site install (2 persons), after ground works; Cost of components for one system ~ £10,000.
- Limited monitoring and system management capabilities.
- Limited derivable science from filtered and down sampled data, to accommodate slow communication speed.

LEELA

- 10 VLF sensors proposed across Europe to geolocate lightning strokes primarily over Europe & N. Atlantic.
- New VLF sensors utilising low-cost state of art hardware
- Designed to detect CG and CC lightning, with the view to develop classification algorithm with a follow-on project.
- Improve timeliness of the data to less than 30s from stroke detection by the out-stations.
- Sferic detection and fixing done centrally

LEELA 2020 summer trial

- LEELA has undergone summer trials using seven nodes across Europe
- Refinement work now being undertaken to improve LA and DE
- More LEELA nodes will be added in the next year with a view to LEELA going operational in 2022.




Met Office
Thank you for listening
Questions?
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