Richard Fellner, CEO, Nowcast

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Saving lives in MALAWI

Malawi's death rate by lightning is 16 times higher than in other countries in southern Africa. To combat this, UNDP has chosen **Nowcast**'s LINET technology to create an ultra-precise lightning detection network in the country

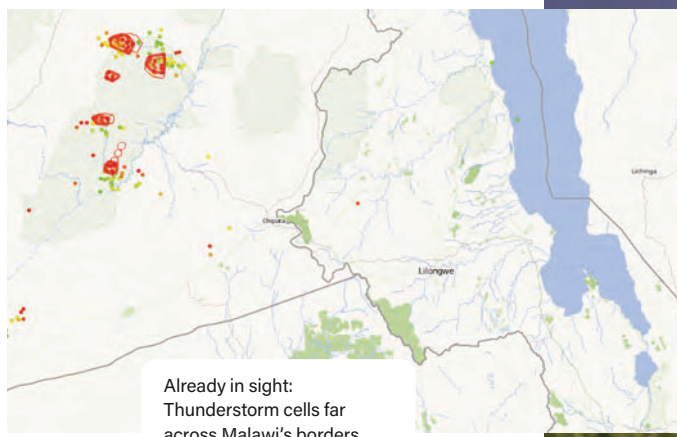
When a relatively large part of the workforce operates outdoors, the probability of accidents involving lightning rises. Consequently, certain countries have a higher risk of lightning-induced mortality than others. Malawi's death rate by lightning is 16 times higher than that of other countries in southern Africa. Therefore, a technology capable of delivering real-time insights into thunderstorm activities is required.

A reliable early warning solution could be a game changer. Due to its accuracy, efficiency and reliability, Nowcast's modern lightning detection technology (LINET) is capable of dispatching life-saving warnings, including estimated time of arrival (ETA) and estimated time of departure (ETD) of existing thunderstorms, for customer-defined alarm areas. To achieve the highest precision, sophisticated algorithms group detected thunderstorm activities into cells to track the movement by factors such as velocity, direction and lifetime. This movement can be projected into a short-term prediction called nowcasting. Warnings and alerts can be triggered up to 60 minutes in advance. As precision matters most in a critical event like lightning, every new stroke detected is used to recalculate and reshape the thunderstorm cell in real time. Thus nowcasting is able to deliver optimum results that support safety in the strongest possible way.

This nowcasting information is vital for a variety of weather-dependent industries and sectors. Not only can air traffic controllers manage handling flight operations stoppages accordingly and precisely, but also farmers, construction workers and those engaged in other outdoor work can be alerted in time to seek proper shelter. Players on a soccer field or participants in outdoor events can also benefit from accurate and timely lightning warnings.

Technology as a lifeline

When Malawi's Department of Disaster Management Affairs (DODMA) and Department of Climate Change and Meteorological Services (DCCMS) decided to introduce modern lightning detection in cooperation with the United Nations Development Programme (UNDP), the goal was crystal clear. The higher the detection and data quality, the more lives could be saved. The system had to be highly reliable with minimal maintenance required, as sensors were to be installed in remote regions of the country.



Already in sight: Thunderstorm cells far across Malawi's borders

A look back at the project

Jolamu Nkhokwe, director of the Department of Climate Change and Meteorological Services, and Rodrick Walusa, its deputy director, headed the project and its local execution. Their extensive experience in meteorology and local weather observation in Malawi ensured that the setup of the technology went smoothly.

Nkhokwe and Walusa spoke to Nowcast about the project and its outcome.

Please can you describe the project, its goals and the most important criteria.

Walusa: Malawi suffers significantly more from lightning-induced threats than many other countries. The objective of the project was to find a professional solution to minimize this danger. To get the required results, we turned to the UNDP for support.

In April 2019 Malawi was able – through its M-CLIMES project, which involved scaling up the use of modernized climate information and early warning systems – to acquire and install a lightning detection system. This system consists of

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eight lightning detection sensors installed across the country and is equipped with antennas highly sensitive to the electromagnetic waves emitted by lightning strikes. All sensors work hand-in-hand, providing wide coverage for thunderstorm monitoring in the country.

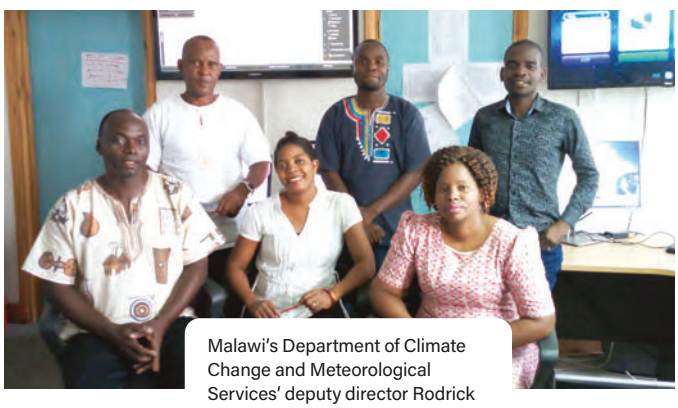
How would you describe the project execution and service from Nowcast?

Walusa: We are more than happy with the overall execution of the project. Not only was the installation very fast and professional, but also the training on-site in Malawi was comprehensive and fruitful. Nowcast took us through the process step-by-step and equipped the team to make the best possible use of the system. We particularly appreciate the advanced visualization application, as well as the usability and capability of the system-monitoring solution.

What was the most challenging part in this endeavor?

Nkhokwe: In my experience, projects like this do not always move fast and smoothly. Different groups and people have to work hand-in-hand to bring such a system to life. In this case, however, all the pieces fitted together precisely, leading to an excellent working detection network. One of the project requirements was to make the sensor stations fit for high and flood water as well as for autonomous energy supply via solar panel and battery pack. This was also solved very professionally by the installation team.

Nowcast's project management, the local installation partner (Wagtech) and our meteorological team worked together to make this project a great success in only a few weeks.



Malawi's Department of Climate Change and Meteorological Services' deputy director Rodrick Walusa (*back left*) with his team of meteorologists in front of the lightning data live-screen

Nowcast's LINET system has been operational in Malawi for almost a year. What is your overall assessment of this lightning detection system?

Walusa: The LINET lighting detection system has contributed to Malawi meteorological services in many ways so far. Among the most important benefits is the reliable tracking of weather systems affecting Malawi, as a localized thunderstorm can easily be monitored and tracked in development and progression. The nowcasting tool assists in providing information for forecasting directions of thunderstorms and warnings for areas hit by severe weather.

The high sensitivity of the system also enables us to monitor weather systems outside the country that may have an impact on Malawi weather. Thanks to the real-time operation of the system, we can maximize use of the alert functionalities of LINET for live-saving early lightning warnings.

We will also make use of historical lighting data, to identify areas with a high density of lightning strikes. Geospatial querying of lighting data has already assisted in research and review of specific areas of interest where issues of lightning and thunderstorm impacts occurred. The lightning detection system is also used as a feedback mechanism to monitor how weather forecasts relate to what is actually happening on the ground.

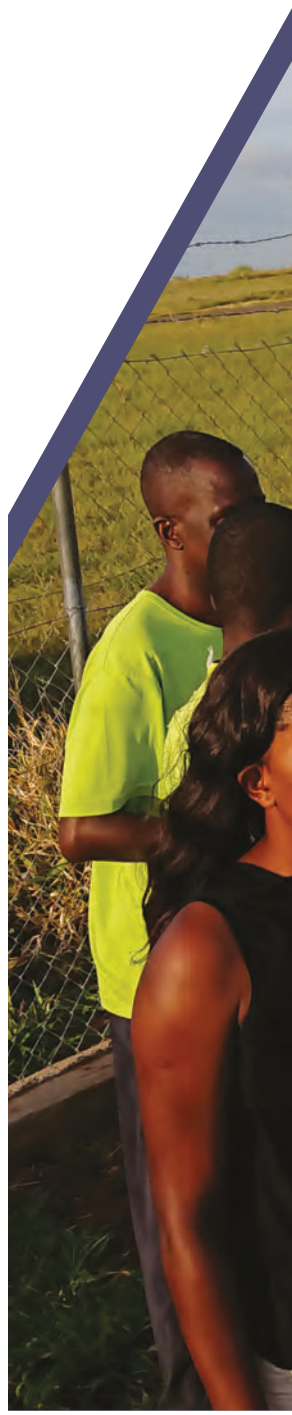
LINET's capacity to provide area-specific alerts has proved very appropriate for Malawi.

What are your recommendations to other countries looking at similar options?

Nkhokwe: Quality comes first. What point is there if you do not aim for the best possible detection when it comes to spatial events such as lightning? For us, the reliable nowcasting algorithm and the low maintenance requirement were also key facts in the process. Setting the project up with the help of the UNDP was of great advantage to us – not just because we got the financial backing to make the project happen, but also because the UNDP took care of the whole procurement process. Having this support meant that we could focus on the meteorological aspects of the project as well as our everyday workload.

Conclusion

Lightning detection matters not just for sophisticated weather analysis, but also for acute life-saving warnings and decision making. The key to an advanced system is precision, reliability and stability, enabling it to also work in areas with weaker infrastructure and extreme conditions such as high temperatures and strong winds. ▮



A professional setup in Malawi for lightning detection has been key for precision and reliability

NOWCAST AT A GLANCE

- Specialized German company in ultra-precise lighting detection (hardware and software)
- Patented 3D-total lightning detection (CG and IC, including emission height)
- Accuracy of 75m on average, detection efficiency down to 2,5 kA strokes
- Real-time operation, as well as historical lightning data
- Providing data services, complete autonomous networks and hybrid solutions
- Trusted by numerous customers around the world

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