From Manual Labor to Modern Technology: Drones Transforming Power Line Inspections

For over 10 years, Mr. Dam Chantala has worked on the operation and maintenance of substations and transmission lines, which are essential components of the energy delivery system in the Substation and Transmission Line Operations Office of Vientiane Capital Branch 1 under Électricité du Laos (EdL). His team, consisting of 4-6 people, inspects transmission lines and substations. Every day, they work against time to prevent power outages, especially in areas with large institutions such as schools and hospitals, where power failure leads to significant losses and disruption.

The investigation of each power failure incident begins with a preliminary inspection, which involves appraising the environment surrounding the transmission poles and lines, looking for potential damage or obstacles that could disrupt work. The main challenge is the surrounding environment, as many areas have trees, undergrowth, or water drainage. After the field inspections, the team assesses the structural condition of the transmission pole, insulator, and transmission lines, a process that requires careful attention, safety equipment, and caution. These tasks demand considerable time and effort, and specialized equipment is often required to ensure safety and reduce risks.

In recent years, infrared drones have proven to be invaluable aids in power line inspections, with the potential to reduce personal risk and time associated with inspections. On this recommendation, USAID approved and handed over a drone to the Ministry of Energy and Mines (MEM) and the Electric Power Authority in November 2024, through a project aimed at strengthening technical expertise in the energy sector. USAID then conducted a series of workshops to train MEM and EdL staff in basic drone flying and techniques for using the technology for fault location and preventive maintenance activities related to reliability improvements and loss reduction.

After using the drone for a few weeks, Mr. Dam observed that his team's efficiency improved significantly. Before using this tool, the team would spend an entire day surveying 6-10 towers. With the drone, they can now survey 8-12 towers per day, or even more,

depending on the location and terrain conditions.

Mr. Dam stated, “Since the team started using the drone, they have gained confidence, and their work has become faster. With the drone, the risk of working at heights and dealing with potentially unstable power infrastructure is significantly reduced. The drone can conduct inspections remotely, thus greatly minimizing the potential dangers with much more accurate insight than the human eye. With the new technology, the team can now perform their tasks more efficiently and quickly.”

Mr Dam explained that when surveying electrical infrastructure in person, the team must first turn off the power. This poses high risks, especially for those with less experience, and can cause temporary blackouts within a large geographic area. In contrast, when working with drone technology, the power can remain on, and the remote technology minimizes the danger of electrocution and structural failure, making the work much safer for the team members. Drones also provide precise data that can be recorded as statistics, enabling real-time reports, which allows for the swift sharing of information across teams, thereby reducing unnecessary energy consumption.

Mr. Dam said he has learned to use the drone through practical experience and also took the initiative to research on his own, using online resources. He has turned this challenge into a shared learning experience among the team members. This process fosters hands-on knowledge, boosts confidence, and creates excitement as they tackle their tasks with each new effort. He added, “The tools help increase the capabilities of the staff. It’s not just about learning how to use the technology; they also gain technical knowledge through various images and videos derived from these tools. This helps them analyze scenarios involving different kinds of damage, maintenance methods, safety measures, and repairs or equipment replacement when necessary.”

Mr. Dam expressed his gratitude to USAID for providing the drone technology, emphasizing the multiple improvements it has created in the system: reducing safety risks, collecting data in a shareable format, increasing efficiency, and lowering costs. Drones may also help identify potential hazards to prevent problems from occurring, such as identifying hotspots in wiring. These multiple advantages will continue to strengthen power line inspections in the Vientiane area for years to come.