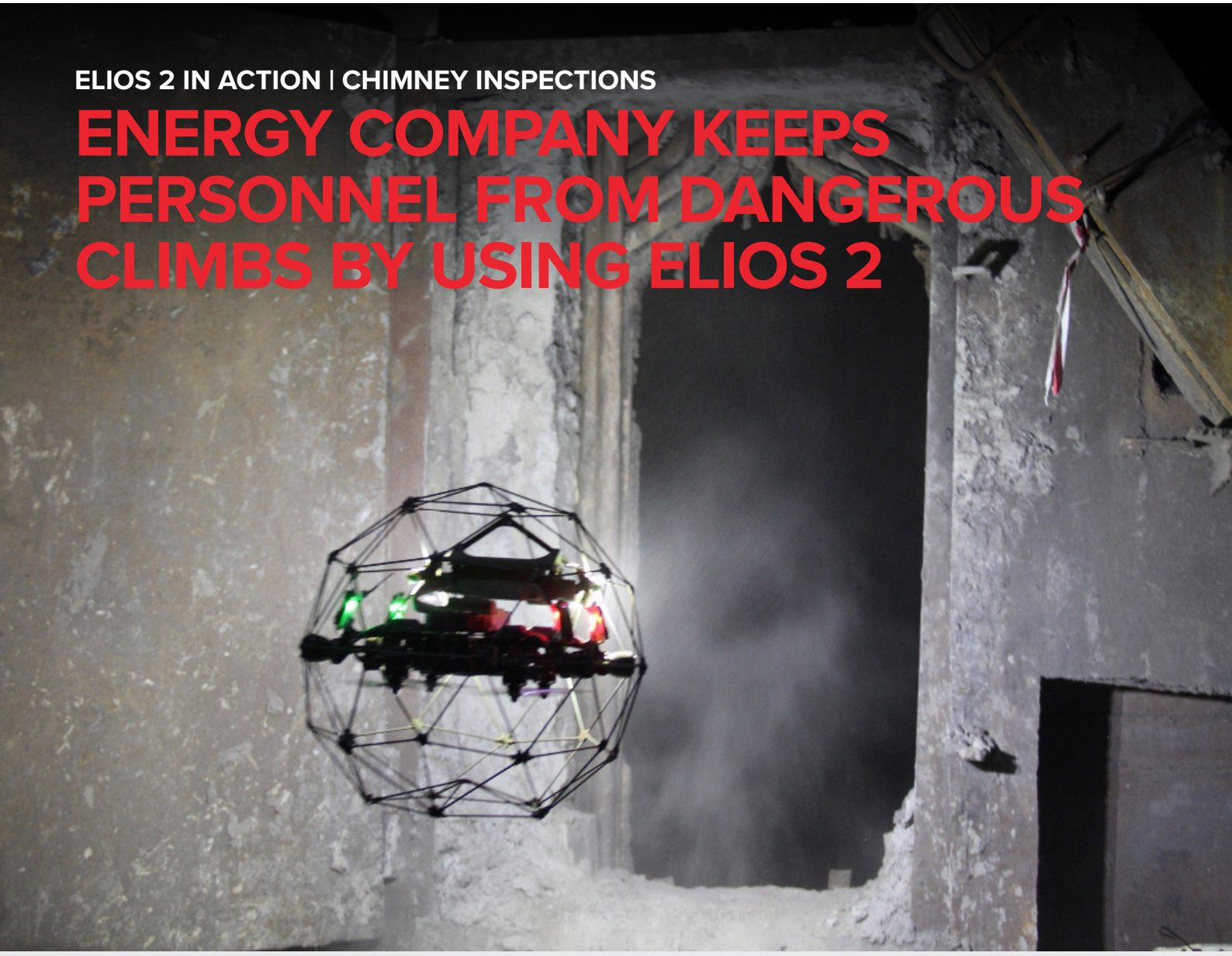
FLYABILITY

SAFE DRONES
FOR INACCESSIBLE PLACES

DTEK

DECEMBER 2019



ELIOS 2 IN ACTION | CHIMNEY INSPECTIONS

ENERGY COMPANY KEEPS PERSONNEL FROM DANGEROUS CLIMBS BY USING ELIOS 2

DTEK, AN ENERGY COMPANY BASED IN UKRAINE, RECENTLY TESTED THE USE OF THE ELIOS 2 FOR CHIMNEY INSPECTIONS AND BOILER INSPECTIONS AT ONE OF THEIR POWER PLANTS. THE DRONE WAS ABLE TO COLLECT VISUAL INSPECTION DATA MUCH MORE QUICKLY THAN THE USUAL METHOD USED WHILE KEEPING PERSONNEL OUT OF POTENTIALLY DANGEROUS SCENARIOS..

BENEFITS IN A NUTSHELL

SAFETY

Using a drone to collect visual data replaces the need for inspection personnel to climb 180 meters (656 feet) up a chimney to conduct a chimney inspection or three stories high on scaffolding to conduct a boiler inspection.

ROI

Savings of up to $50,000 by doing chimney and boiler inspections with a drone instead of using professional industrial climbers (for the chimneys) and needing to build scaffolding (for the boilers).

EFFICIENCY

The Elios 2 collected visual data on both the chimney and the boiler much more quickly than manual methods and it did not require any additional equipment or preparation, such as extra-long ladders or scaffolding.

OVERVIEW

DTEK is the largest private investor in the energy sector in Ukraine, with power plants throughout the country that supply electric power and other energy services.

Each of these power plants uses huge chimneys and boilers in its energy production work, which require periodic chimney inspections and boiler inspections to ensure that there are no issues that might require maintenance.

A problem that goes undetected, such as a scratch in one of the boiler's many steel pipes, could lead to costly delays in DTEK's power production work. If left alone, small problems like this can result in long-term damage to the asset.

CUSTOMER NEEDS

Both the chimneys and the boilers used at DTEK's power plants present their own unique inspection challenges.

The chimneys are over 180 meters (590 feet) tall and made out of bricks. To conduct a chimney inspection at the plant, professional climbers trained just for this job are hired by DTEK to climb them in their entirety. Climbers use special, extra-long ladders to scale the outer surface of the chimney, performing a visual chimney inspection as they climb, and then use a rope to return to the ground once they've reached the top.

To inspect the boilers, which are 45 meters (147 feet) in height, scaffolding must be built inside them that will allow inspectors to visually review the entirety of the inside of the boiler walls. Building this scaffolding requires eight people to work for an entire day, moving 8,000 kilos (17,636 pounds) of metal parts into the boiler and setting them in place.

These inspection methods are costly because they require so much labor, materials, and downtime—every minute a chimney or boiler is down represents a loss of potential revenue from power production. Downtime losses are especially acute for the boilers, which must be offline for an extra two days for the inspection scaffolding to be built up

and then broken down.

Given the dangers posed to inspection personnel, as well as the high cost of conducting these inspections, DTEK has been interested in alternate inspection solutions for some time.

Further, DTEK's maintenance data shows that only around 20% of chimney inspections and boiler inspections result in the need for actual work to address a problem. In these instances, a person would be required to climb a ladder up a chimney or climb scaffolding inside a boiler to perform the maintenance, but the majority of the time no person needs to be physically present except to collect visual data.

In other words, 80% of the time remote visual data would fulfill all inspection and monitoring needs. Given this information, DTEK has been searching for reliable ways to collect visual data on their chimneys and boilers remotely in order to replace the need for a manual collection of visual data.

SOLUTION

The idea of using a drone to collect visual data remotely first occurred to DTEK personnel about a year ago.

After conducting some initial research, they discovered that most drones could not fly inside a boiler due to the lack of GPS and the likelihood of crashing in such narrow, confined spaces.

But then they heard about the Elios 2—a drone made specifically for indoor inspections, which sits in a cage, allowing it to collide with objects inside indoor spaces and continue flying.

The Elios 2 can also be flown without GPS, and it has other unique features that make it an ideal solution for DTEK's inspection needs, including distance lock, stabilization, and oblique lighting. This last feature mimics the lighting inspectors provide when they move a flashlight around an object, allowing them to see texture and depth that may be missed by a direct light source.

RESULTS

The Elios 2 was used to inspect one chimney and one boiler at one of DTEK's power stations.

Chimney Inspection with the Elios 2

The Elios 2 was flown from the bottom of the chimney to the top, collecting data on the chimney with both a visual and a thermal camera while in flight.

Only three flights were required for inspectors to capture enough data for the chimney inspection.

Inspectors were impressed by the high quality of the visual data captured by the drone's camera and felt like this inspection method could potentially replace the need for sending climbers up ladders to perform visual inspections of DTEK's chimneys.

They were also pleased by how quickly the Elios 2 was able to complete the visual data collection. The total amount of time taken for all three flights was about thirty minutes, as compared to the several hours that would have been required for a manual inspection.

Boiler Inspection with the Elios 2

After conducting the chimney inspection, DTEK personnel used the Elios 2 for a boiler inspection at the same power station.

Using the Elios 2, inspectors were able to fly into the boiler and methodically collect visual data

on every part of it. In just one hour, the Elios 2 was able to collect all the visual data needed. If performed manually, the same collection of visual data would have taken a day to complete.

[Related reading: Inspecting a Recovery Boiler by Drone]

The boiler took longer to inspect than the chimney because it presented more technical challenges, since it contains a lot of small steel pipes, all of which need to be closely reviewed. A single, thin scratch in the steel of one of these pipes can eventually cause the boiler to stop functioning if left undiscovered and unrepaired.

One method commonly used to detect leaks or scratches in these pipes is to send low-pressurized water through them and look for places where the water may be escaping.

With the Elios 2, inspectors were quickly able to collect visual data of the pipes that could be used to identify any leakage. The same search for leakage performed by an inspector moving around on scaffolding with a flashlight would have taken much longer to complete.

CONCLUSION

The tests of the Elios 2 for a chimney inspection and a boiler inspection were successful and DTEK personnel are currently exploring ways to add drone inspections as a permanent part of their maintenance processes

Given the efficiency of inspections using the Elios 2, DTEK personnel think they might be able to conduct inspections more often than they currently do, which will help locate potential problems in these assets even earlier, thus improving overall safety and the longevity of the assets.

INSPECTION PICTURES TAKEN BY ELIOS 2

FLYABILITY SA
AV. DE SÉVELIN 20
CH-1004 LAUSANNE
+41 21 311 55 00
SALES@FLYABILITY.COM

TIME – COSTS – SAFETY

Flyability builds **safe drones for the inspection of inaccessible, confined, and complex places**. Focusing on the Energy, Oil & Gas, Chemicals & Maritime industries, Flyability enables end-users to save time, costs and reduce risks during visual inspections.