

ELIOS IN ACTION | POWER GENERATION INDUSTRY

# INSPECTION OF A COAL-FIRED BOILER SUPERHEATER

## INTRODUCTION

Ronik Inspectioneering, a Dutch inspection company, together with Flyability performed the general visual inspection of the boiler of a coal-fired power plant near Amsterdam. It was carried out with Elios: the world-first collision-tolerant UAV, especially well suited for the exercise.



## CUSTOMER NEED

During an annual plant shutdown, metal rings and connectors were found on the floor of a boiler. These elements are used to hold in place the horizontal piping located in the superheaters at the uppermost part of the boiler. The purpose of the mission was to determine the root cause of failure which made these elements fall on the boiler's floor.

For similar inspections involving work at height, rope access, sky climbing, or scaffolding would normally be used. In this case, due to the very narrow space (1.5 to 0.4 m) between the plates of the superheater, sky climbers were not an option. If rope access and scaffolding had been used, several days would have been necessary to setup and perform the inspection. Indeed, implementing safety measures, bringing in and installing inspection equipment as well as performing the actual inspection manually are lengthy processes which expose workers to high risks.

## A FOCUS ON SAFETY

The plant operator was particularly sensitive to worker safety as a serious accident took place with the collapse of a scaffolding in a boiler during a maintenance in 2003.

“We needed a very fast and safe option. Sky climbers and scaffolding were out of the question.”

- Ronik Inspectioneering



## PROCEDURE

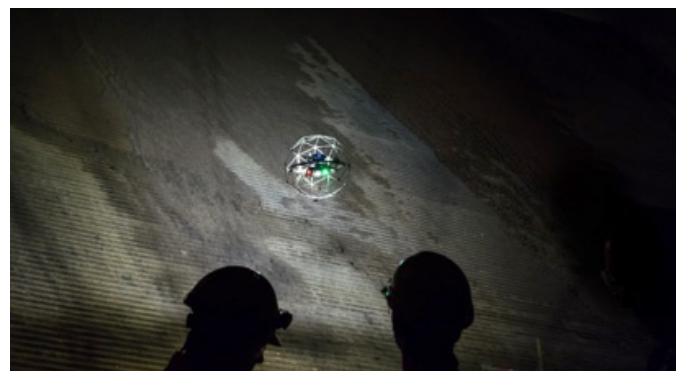
The mission was carried out overnight to accommodate the tight schedule of the power plant shutdown. After briefly preparing the inspection with the plant technical team, Flyability started the flights. The very short setup time needed to deploy Elios on a mission was particularly appreciated by the team because it offered flexibility in such a tight schedule.

The option to have a camera operator in addition to the pilot was chosen to increase the operation's efficiency. While the pilot was responsible to fly Elios 70m up, beyond line of sight, the camera operator was in charge of tuning lighting settings to ensure an optimal image quality was delivered to the technicians carrying the inspection in real time.

In total, Elios performed 15 flights over 4 hours. For each flight, it took about 1 minute to reach the superheater, the rest of the flight being focused on the inspection of the sections. When needed, Elios was flying directly in contact with the inspected structure to catch more details.

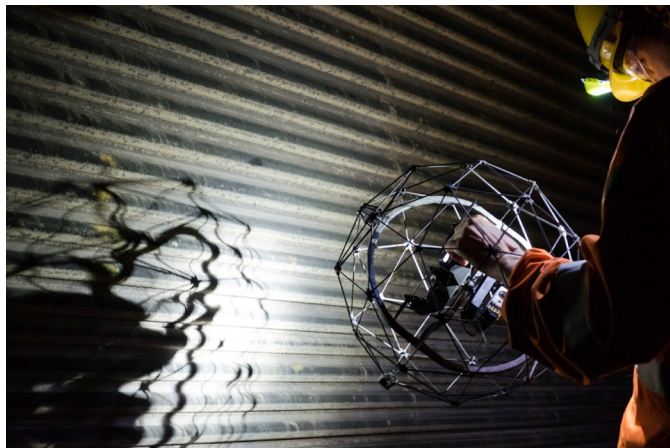
With its on-board LEDs, Elios captured high quality visuals and continuously transmitted its live video feed. This feed was then displayed simultaneously on multiple screens enabling a collaborative operation where the pilot, the camera operator and the technicians could work in parallel without perturbing each other.

Elios' ability to fly safely close or in contact with humans made possible for a team to keep working in the boiler while Elios was flying. Being able to parallelize tasks had been very beneficial for the plant team as it allowed to shorten even more the whole operation.



## RESULTS

The potential provenance of the missing elements found on the boiler floor were rigorously checked and a complete close visual inspection of the superheater was conducted. As a result, it provided sufficient visual proofs for the engineers to conclude, at the end of the mission, that no maintenance work for this part of the structure was needed. The plant was operational the next day, saving more than 12h of downtime over a standard manned inspection.



## CONCLUSION

This mission has proven the ability of Elios to evolve in difficult confined spaces, beyond line of sight, replacing a manned intervention at a fraction of the cost. Collision-tolerant Elios UAV allowed important savings:

### TIME

Between 12 and 24 hours of downtime saved compared to a regular manned inspection.

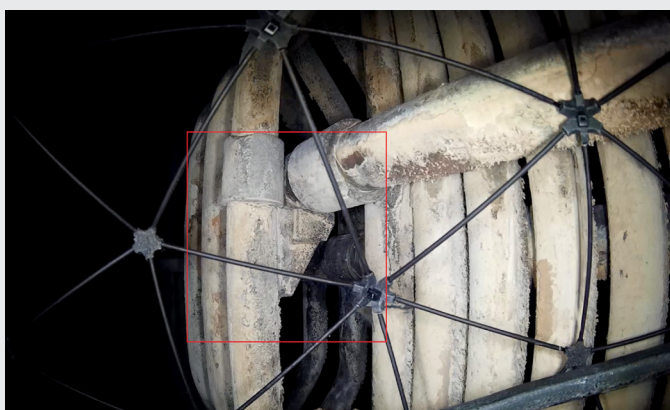
### COSTS

Only 4 hours with 2 engineers needed to perform the mission.

### SAFETY

Risks of a manned intervention avoided and HSE procedures shortened.

## MISSION PICTURES TAKEN BY ELIOS



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## 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.