Ericsson - Energy plants use cases

Remote site inspections in energy plants

With 5G, nuclear power plant inspections can be performed by drones. Real-time in-air control and 4K secure video streaming reduce both risks and downtime.

Today, nuclear power plant inspections are hazardous to workers and requires production downtime. Workers get exposed to approximately 10% of the annual limit for radiation exposure after just 1-2 minutes of reactor inspection.

Conducting an inspection also requires 6 hours to power down/up the plant. [1] In total, conducting just one inspection of a single reactor could mean a production loss of up to $1M USD. [1]

Remote site inspections can create agility and unlock intelligence. 5G capabilities can provide the low latency, high network security required to let drones inspect the reactors and other hazardous areas. The solution require real-time in-air control, secure video transmissions and support for 4K video stream.

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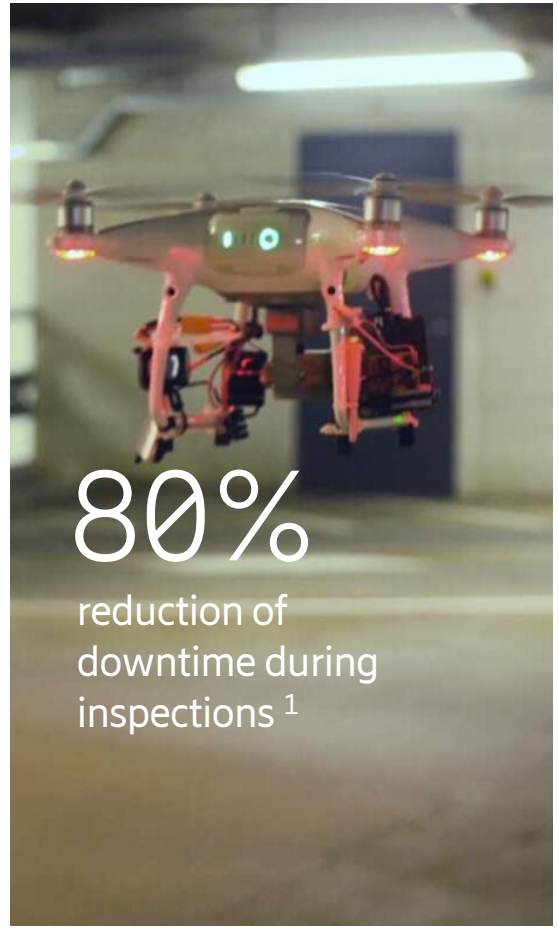
Case type: Concept/research
Category: Energy & utilities
Location: Global
Year: 2020



Source: 1. Flyability,

Remote site inspections in energy plants

Challenge

Conducting site inspections at a nuclear powerplant brings with it a need to enter a nuclear reactor, which is one of the most hazardous environments on earth in terms of radiation.

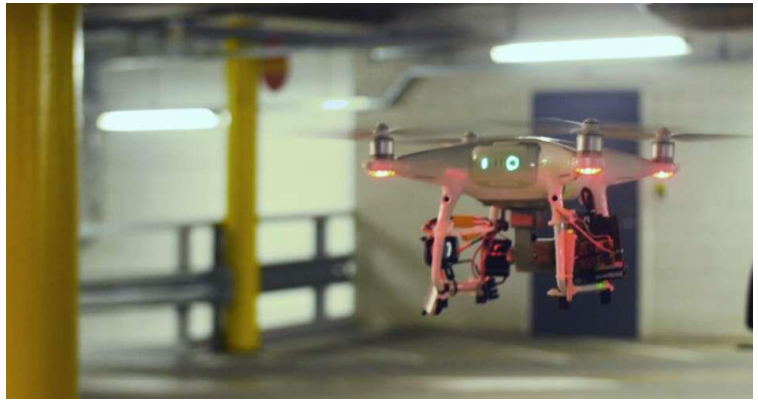
Unmanned drone inspections can be used to move the operator out of harm's way and can significantly reduce downtime. Conducting an inspection also requires 6 hours to power down/up the plant. [2] In total, conducting just one inspection of a single reactor could mean a production loss of up to $1M USD. [2]

The technical requirements to enable drone inspections are centered around the ability to stream real-time high-resolution video with low latency and high reliability.

Solution

5G is the key to enabling remote site inspections. 5G capabilities can provide the low latency, high network security required. It can also support 100 Mbps in uplink speed.

Drones capable of inspecting the reactors and other hazardous areas require real-time in-air control, secure video transmissions and support for 4K video stream.



Result

- Increased employee safety
- Decreased risk for environmental disasters
- 87% ROI by year 5, driven by a reduced labor costs for reactor inspections (15%) and reduced downtime cost from reactor inspections (85%) [1]

80% reduction of operator exposure to radiation during inspections [2]

83% reduction in time needed to carry out an inspection [2]

Source: 1.: Ericsson, Arthur D. Little; 2. Flyability

Cellular push-to-video in energy plants

The legacy systems in the power generation industry are costly to maintain. Upgrading to a cellular 5G push-to-video solution can generate a clear OPEX reduction.

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Since the power generation industry holds many different processes, operations and connections deemed mission critical not only for the company itself, but also for cities and countries, operations are largely running on legacy systems.

The legacy systems are costly to maintain and difficult to develop further. Replacements of these systems present significant opportunities of improvements and enhancements to both operations and results.

Across the industry and in general, there is an opportunity to experience up to 40% performance gains in areas such as safety, reliability and regulatory compliance. [1] Upgrading to a 5G cellular modern solution with push-to-video functionality is a clear example of capturing such gains and generate a significant reduction in annual operating expenses.

Case type: Concept/research
Category: Energy & utilities
Location: Global
Year: 2020

Source: 1. McKinsey

Cellular push-to-video in energy plants

Challenge

With a high degree of mission critical processes, the industry relies on legacy network systems for their operations. Costly to maintain and prone to outages, these legacy systems are becoming an issue and replacing them will be a priority for the coming years.

By upgrading to a more modern solution, such as 5G, research shows that operating expenses related to base systems could reduce by as much as 50% and decrease the number of outages experienced.

The technical requirements to enable the use of push-to-video device would require a network solution supporting high resolution video transfer, data analytics and high security.

Solution

A push-to-video device can capture detailed images of equipment in need of service, get direct expert assistance on-site from a supervisor and reduce fault duration and transportation needs.

However, push-to-video solutions will require real-time data transfer and high-resolution video.

A 5G network can meet the low latency, high network security and 100MBps in uplink speed needed to enable push-to-video.

Result

- Increased safety of equipment
- 66% reduction in the need for transport [1]
- 97% ROI by year 5, driven by a reduced service costs from push-to-video enablement (20%) and a reduced annual systems costs (80%) [1]

66% reduction in the number of roll-outs needed per service call [2]

50% reduction potential in annual OPEX compared with legacy systems [2]

Source: 1.. Ericsson, Arthur D. Little; 2. McKinsey

Predictive maintenance of turbines and generators

Predictive maintenance can improve both maintenance costs and production downtime but require reliable connectivity and real-time monitoring and analytics.

Case type: Concept/research
Category: Energy & utilities
Location: Global
Year: 2020

Predictive maintenance is the further development of asset condition monitoring, where the insight is increased to the level that maintenance can be predicted, moving from a reactive or planned maintenance approach. This is especially important for mission critical equipment such as turbines and generators.

Predictive maintenance uses data from machinery to tell both the status and the expected development of a machinery´s wear, functional deterioration and performance. Real-time insights are generated and tuned immediately, suggesting where to focus any required maintenance or replacement activities.

5G has the capabilities needed to ensure ultra-high network security, low latency and high connection density, allowing management of assets to drastically improve.

Source: 1. Neurospace (2019)

Predictive maintenance of turbines and generators

Challenge

Asset maintenance often relies on time and experience rather than actual maintenance need.

With predictive maintenance, life cycle management is improved through increased insight. Additionally, maintenance and related production outages can be lowered.

The technical requirements needed to enable predictive maintenance will be reliant on the ability to view and interpret asset conditions.

Solution

Predictive maintenance can be used to reduce the maintenance needs of the power plan, but solutions require reliable connectivity with many devices, real-time monitoring and data management and analytics.

5G has the capabilities needed to ensure ultra-high network security, low latency and high connection density.

Result

- Increased employee safety
- Extends equipment lifetime by 25% [1]
- 95% ROI by year 5, driven by a reduced service/labor costs from predictive maintenance (50%) and reduced downtime costs from predictive maintenance (50%) [1]

25% reduction in number of maintenance sessions needed per plant [2]

25% reduction in loss of income due to downtime of production [2]

Source: 1. Ericsson, Arthur D. Little.; 2. Neurospace (2019)