Operation Reliability In The Industry 4.0

Power Utility Transformation; Drones For Powerline Inspection
Imagine.....

Self driving cars preventing thousands of accidents every year;
Will see Robots in between us, which will help in our daily works;
Wristwatches monitoring vital signs to predict your health condition;
Factories, industries running at optimal capacity with every process monitored and controlled;
Smart phone, smart fridge, smart house, smart city;
Personal experience and based on convenience retails, banks, education, health care;

Can you imagine more!!
About Me

Yaqoob Al-Hattali
Cofounder & Managing Director FrontierTech

An accomplished leader in multidiscipline with two successful startups to credit, with Over 10 years of experiences before embarking on my entrepreneurial journey. During my association with multiple companies in various sector (Oil & Gas), Project development & investment, Aviation (Salam Air Project)), I have gained good expertise working in strategies, Project Management, Contract's managements, Service Delivery, Service Management, Infrastructure Operations, ICS System, Wireless Radio communication and Digital Oil field.

MSC (Masters of Information Technology)

Digital Oil Field

Big Data

Digitalization

Cofounder & Managing Director
FrontierTech LLC

Information Technology Management
ASAAS Oman ‘Muscat National Development & Investment Company’

Daleel Petroleum LLC
Information Management & Application

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Digital is about innovation through exploiting new technological opportunities for value creation, efficiency, reduces cost. Everyday life is constantly changing and requires businesses to act faster than ever before.
Four Phases of Industrialization

Industry 1.0
End of 18th century
Use of water and steam power to run mechanical production facilities
Mechanization

Industry 2.0
Beginning of 20th century
Use of electrical power to enable work-sharing mass production
Mass Production

Industry 3.0
Early 1970s
Use of electronics and IT to automate production
Computerization

Industry 4.0
Today
Use of cyber-physical systems to monitor, analyze and automate business

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Industry 4.0 characterized by increased digitalization in more integrated business models. People and technology are tied closer together in the value chain to support the most efficient logistics and production.
Industry 4.0 Landscape

- Cloud Solution
- Big Data Analytics
- IOT Platforms
- Virtualized Process
- Artificial intelligence (AI)
- Robotic
- Smart Sensors
- Drones
- Mobility Solution
- Wearables
- 3D Printing
- Blockchain
On the Way to Industry 4.0 – The Digital strategy

Today Industry 4.0 is transforming economies, jobs, and even society itself

It can be the catalyst of changes in different fields like governance, economics, companies, jobs, etc.

Resistance for adoption

Fails to adoption, control & regulation

Shift of control from one side to another; brings a new type of security challenges

Risks of recourses take over by machines
• Digitizing the manufacturing business won’t be cheap; most likely, it will have a few casualties along the way — when businesses fail to plan properly and invest unwisely in Industry 4.0 projects.

• It is estimated that some manufacturing organizations will allocate as much as 50 per cent of their planned capital investment to Industry 4.0 projects, hoping to make significant gains in productivity and improve competitiveness on the world stage.

• Unwise IoT investments, therefore, carry a significant risk to an enterprise’s future well-being. That’s why prudent planning in keeping with wider business strategy and imperatives is paramount.
In an era which is being referred to as Industry 4.0, government departments are increasing their digital footprints and adapting their technology and engagement environments to remain competitive and relevant.

A study by Deloitte, show that only 14% are highly confident their organization are ready to fully harness the changes associated with industry 4.0. And only quarter showed high confidence that they have the right workforce and skills sets for the future.
Challenges

Reasons holding back implementation

Clear Strategy (written strategy is a key)
People & Culture (Lack of digital culture and training is the biggest challenge facing companies)
Siloed data and no integration across business units
Cybersecurity risk increases fears
Talents
Commitments

Globally 800 MILLION JOBS Likely to be automated by 2030

*Source: McKinsey & Company
As forces of change in the power and utilities sector accelerate, utilities are turned their eyes towards their standard operations to see how tapping new technologies can increase efficiency.

The major concern is to secure uninterrupted distribution of electricity, effective monitoring and maintenance of power lines are needed.

Operation Excellence is the leadership elements that stress how technologies, people and process are to put together for sustainability improvements on key performance metrics.
Smart Drones for Smart Operation

Unlocking the inspection and early failure detection capabilities for your critical assets, no matter how difficult to reach, or even inside the assets in extreme environments. Improves your safety, reduces your maintenance budget and ensure you operation sustainability.

The conventional method for inspecting power line begins with an inspector using field glasses to gain a first assessment of the tower. If a potential defect or damage is spotted, the inspector will climb the tower for a closer look.

**Facts**

Reduced costs of inspection

Increased asset integrity

Increased uptime & productivity

**VALUE DRIVERS**

**CONSEQUENCES OF Conventional Inspection**

- Time consuming
- Dangerous & Safety Concerns
- Poor asset integrity performance
- Asset downtime
- HSE incidents
- Personal, production loss and reputation at stake

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Drones For Powerline Inspection

Drones offer cost-effective and highly accurate data which can be shared and analyzed quickly in real-time; and provide unique views compare to manual and other costly inspection methods like Helicopter.

Current Drone Power Line Inspections Practices

- Power Line Inspection including hard-to-reach
- Power Substation Inspection
- Intermittent electricity
- Corona Detection
- Corridor Mapping using LiDAR

Drone Solution Adding Value for Power Utility Sector

To help access hard-to-reach areas; reduce human intervention by taking people away from dangerous situations; are a portable and quick solution.
Unlocking the inspection and early failure detection capabilities for your critical assets, no matter how difficult to reach, or even inside the assets in extreme environments, improves your safety, reduces your maintenance budget and ensures your operations sustainability.

Drones enable collecting the needed data for identifying and mitigating risks in power distribution in advance.

Greatly reduce man hours and costs by automating inspections, saving 30 – 50% of the cost and time when using drones to conduct power line inspection.

Assess the condition and orientation of all components of towers with no need for workers to ascend to height.

Inspections are drone from a safe distance while increasing efficiency due to data accuracy and reliability with real-time images, video feed, and zoom/thermal/4k capabilities can be transmitted to a ground control station.

Thermal and LIDAR can be used to aid in inspecting and monitoring the corridor for power lines and towers.

Higher-resolution visual inspections than ground-based inspections.

Towers remain functional during inspection.

Drone Inspection Benefits

Drone inspection makes infrastructure’s inspections faster, safer and more accurate. Drones offer more effective inspection and surveillance services that cost a fraction of traditional methods such as helicopters or deploying an army of inspectors on foot.
key objective

To establish the need of using advance technologies for inspection of large and inaccessible assets such as transmission lines constructed in hard to reach and harsh environments such as the locations chosen for this project. The purpose of this exercise was not just to emphasize on the value addition, both tangible and intangible, that using new and unconventional technologies over existing and conventional methods, but also to demonstrate the operational advantage that such technologies offer in terms of quick and quality delivery.
Transmission Line inspection in Khasab, Oman

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Inspection Overview
Sample Finding

1) Corrosion marks observed at the conductor to insulator disc connection at marked location
   Pole no. 1: Lat: 00000000; Long: 00000000

23) Discolouration/corrosion observed in the conductors
    Take off to pole no: 1; Lat: 00000000; Long: 00000000

Hotspot observed in the discoloured region of the conductor
   Pole no. 3: Lat: 00000000; Long: 00000000
8) Tension clamp and insulator discs observed in good condition
   Pole no. 2: Lat: 00000000; Long: 0000000

9) No major damage observed in the transformer and insulators; minor
   corrosion observed on piping for the coolant tank of the transformer at
   marked location
   Pole no. 2: Lat: 00000000; Long: 0000000
Building Internal/External team dedicated for Drone Inspection

Effective HD and thermal imaging drone equipment’s

Conduct drone inspections frequently or post-event emergency response;

Conduct quarterly comprehensive inspection services for entire network part of proactive asset management;

Drone inspection before and after emergency response in conjunction with your outage management system (OMS);

Discover failures ahead of time to identify hot spots, poor connections, damaged components and security concerns;

From **proactive asset management** to **post-event emergency response**, to ensure it operations efficiency and maximised the time of inspection and data processing.
Thank You!

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