How Drones Will Affect The Oil & Gas Industry

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Overview

• Background – What is a Drone?
• Technology and Applications
• Challenges
• The Future
• Q & A
What is a Drone?

• Many names
  • Unmanned Aerial Vehicle (UAV)
  • Unmanned Aerial System (UAS)
  • Remotely Piloted Vehicle (RPV)
  • Remotely Operated Aerial Vehicle (ROAV)

• Many sizes
  • Micro-Drones
  • Prosumer Drones
  • Commercial Drones
  • Military Drones
Background

- Rapidly developing industry
  - Estimated $90B market
  - 100K jobs in next 10 years
- Highly regulated... for good reason
FAA Regulations

• Commercial use of drones illegal **UNLESS:**
  • Granted a “Section 333” exemption
  • Received a Certificate of Authorization (COA) for each flight
  • Operated by a pilot with an FAA issued airman certificate
    • Pilot’s license is a requirement, currently no specific UAV training
  • Operated by a two man team
    • Pilot in command (PIC)
    • Visual observer (VO)
  • Less than 400’ AGL
  • Within visual line of sight of PIC
Technology and Applications
Every operator’s goal is improved **safety** with increased **savings**...

**Asset Integrity**

- **Prevention**
  - Design and construction
  - *Operation and maintenance*
  - Training and education

- **Detection**
  - Internal based systems
  - *External based systems*

- **Mitigation**
  - *Locate*
  - Recover
  - Cleanup
Technology and Applications

- Pipeline Patrol
  - Image analysis
  - Threat detection
  - Gas leak detection
- Cathodic Protection
- Vertical Structure Inspection
- Offshore Inspections
- Mapping
- Data Analytics
Pipeline Patrol – Image Analysis

- Vegetation health
- Soil erosion
- Encroachments
- Deviations from reference
- “Threats”
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Gas Detection

- Diff Absorption Laser
- IR Cameras
Gas Detection

• Diff Absorption Laser
• IR Cameras
Cathodic Protection Data Collection

- Wireless transmission processing unit
- Recorded pipe-to-soil voltage readings
Structure Inspection

- Visual Inspection
- 3D digitizing
- Orthomosaics
- Identify hot spots
- Measurement accuracy
Mapping & Modeling

- 3D, 2D
- Topographic
- Spill Modeling
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Current Challenges

We Are Here
Flight Time, Payload, and Distance

• Flight Time
  • Battery Powered – 10-18 minutes
  • Gas Powered – 2 Hours +

• Payload
  • Multirotor – 15 lbs
  • Fixed Wing – 5 lbs
  • Hybrid Multirotor – 20 lbs

• Distance
  • FAA regulations
  • Line of Sight Communications
Data Analytics

• Why Big Data?
  • Information from traditional sources
  • Information from new sources
  • Increased frequency

• Applications
  • Equipment maintenance
  • Production optimization
  • Safety and compliance

• Volumes of data increasing by a factor of 5 each year¹

• Highest big data priorities²:
  • Develop near real time analytics – 62%
  • Expand data storage – 58%
  • Analyze increasing unstructured data – 53%

• Expected challenges to big data²:
  • Managing data growth – 49%
  • Integrating disparate business tools – 41%

Data Analytics

• Apply predictive analytics to big data
• Empirical methods of data mining also used to avoid conditions where pipeline corrosion accelerates
• Real time data leading to prediction provide environment to increase support for safety

• Case Study - One meter, four variables
  • Pressure differential
  • Energy rate
  • Flow rate
  • Static pressure
• 100% on medium alert signals
• 57% on high alert signals
  • 100% precision
Data Analytics

- **Business Intelligence**
  - Use tools to find, select, and explore data in flexible ways

- **Data storage and management**
  - Capture and enable analysis of data
  - Server or cloud-based
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Summary

TODAY

• Patrol
• Vertical structure and facilities inspections
• Gas detection
• Video imaging
• Mapping
• Pre-construction survey
• Phase 1 environmental survey

TOMORROW

• Data analysis platform
  • Searchable user interface
  • Map-based
  • Timeline oriented
• Automated image analysis and threat detection
  • Class location
  • HCAs
• CP data collection