Putting Drones to Work: Scaling for the Enterprises

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Why Enterprise Drones?
Resolution

Satellite imagery

Manned aircraft imagery

Drone imagery
Turnaround Time
Safety
Cost / Benefit

ROI
Enterprise Drone Applications, Lessons Learned in Europe
Many Industries & Applications

**Industries**
- Electric Utilities
- Telecommunications
- AEC
- Mining
- Oil and Gas
- Insurance
- Government

**Applications**
- Infrastructure Inspection
- Damage Assessment
- 3D Modeling
- Environmental Monitoring
- Search and Rescue
- Land Management
- Public Safety
- Survey and Mapping
Lessons Learned in Europe

Precision Agriculture  

Energy  

Oil & Gas
Enterprise Drone Solutions Must...

- Be reliable and repeatable
- Be compliant and insurable
- Automate difficult and repetitive tasks
- Require minimal training
- Integrate with existing software & workflows
- Scale in use cases, geography & time
- Create actionable insights
Enterprise Deployment Challenges
Multiple Applications & Aircraft
Scaling for Commercial Operations

- Workflow & approvals
- Data security & management
- Aircraft management
- Operator training
NASA's First Air Traffic Control Demonstration for Drones
Managing Drones in an Enterprise
Enterprise Solution Framework

Enterprise Drone Management Platform

- Property and Facility Management
- Resource Management
- Tower and Infrastructure Management
- Pipeline and Transmission Corridor Management

Aircraft
Workflows
Information Products
Aircraft, Sensors, and Flight Control

- Aircraft
- Sensor Integration
- Autonomous Flight Control

- Workflows
- Planning
- Work Mgmt
- Data Mgmt

- Information Products
- Mapping
- Analysis
- Reports

- Multirotor
- Fixed Wing
- E/O
- Multispectral
- Thermal

Flight Control Computer
Application Computer
Operations Workflow

Implementation of your business process
5 Questions
Five questions you need to answer to put drones to work

1. **Is the proposed application feasible?**
2. How will we tailor the solution to our business?
3. How will we comply with regulations?
4. How will we manage data security?
5. How will operations scale?

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**Technical Feasibility**
- Can we gather the data we need?
- Can it be processed?

**Operational Feasibility**
- Will the system integrate with business processes?
- How will we support the system?

**Economic Feasibility**
- What is the ROI of the system?
- How will cost/benefit be measured?
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Integration with business systems
- Will data be compatible with my ERP, GIS, EAM?
- Are there APIs?

User applications and workflows
- Can the workflow be customized?
- Can approvals be inserted in the workflow?

Operators
- In-house staff?
- Outside contractors?
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Operator management
- Are authorizations required to fly?
- How do I track users?

Aircraft management
- What is the state of my fleet?
- When is the last time aircraft x passed inspection?

Log and Audit data management
- Are flight logs tracked?
- Is there an audit trail?
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User Security
- Password security
- Role based access
- Feature based permissions

Project Isolation
- Database separation
- Obfuscated identifiers

Encryption
- Transport level encryption

Infrastructure Security
- Multi-factor authentication
- Security groups
- Physical security
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### User management
- How does the system handle large numbers of users?

### Infrastructure
- Storage expansion
- Compute expansion

### Training
- For in-house operators, administrators, maintenance personnel
- For contractors

### Support (software, data, aircraft)
- Software and cloud support
- Data processing support
- Aircraft warranty and support
Powering Drones for the Enterprise

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