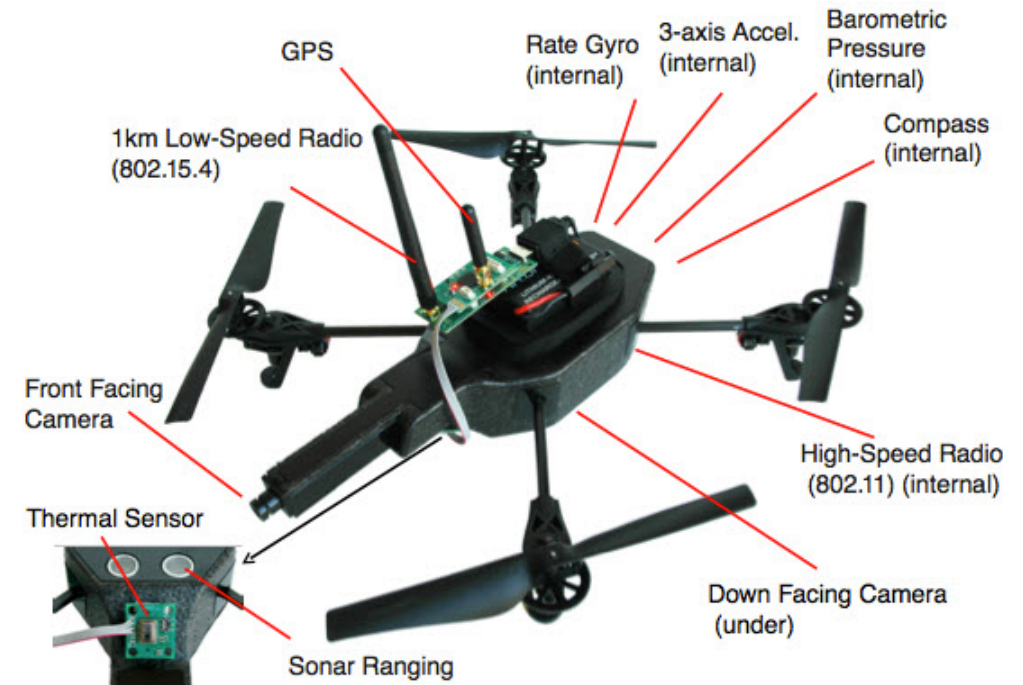




**Rise of the Drones - Understanding and Mitigating Business/Operational Risks™**

# What Is a Unmanned Aircraft Systems (UAS)?

The unmanned aircraft (UA) is the flying portion of the system, flown by a pilot via a ground control system, or autonomously through use of an on-board computer, communication links and any additional equipment that is necessary for the UA to operate safely.<sup>17</sup>



Unmanned Aircraft Systems Report, (February 2012)

# Unmanned Aircraft Systems (UAS)

**UAS offers its greatest promise by removing the human from the aircraft or vehicle.**

**No longer do aircraft systems have to be designed with a weight and systems complexity requirement driven by a human crew; this means greater vehicle efficiency and flexibility.**



# **UAS Subsystems Critical for Continued Growth and Deployment**

- 1. Continuing micro-miniaturization**
- 2. Sensor fusion**
- 3. Communication, command, and control standardization**
- 4. Infrastructure integration**
- 5. The development of 3-D printing may reduce small UAS manufacturing costs**

**These could result in smaller, more capable, efficient, and less costly UAS vehicles.<sup>8</sup>**

# **Who Makes Drone Regulations?<sup>7</sup>**

**That depends entirely on where you live.**

**Generally speaking, drones are considered unmanned aerial vehicles (UAVs) and as such, they are regulated by the national aviation authority of each country.**

**Thus, most countries will have their own rules, and often each state or city within the country might have further regulations.**

# Airspace Classification

**The two categories of airspace:**

- 1. Regulatory**
- 2. Nonregulatory**

**Within these two categories, there are:**

- 1. Controlled**
- 2. Uncontrolled**
- 3. Special Use**
- 4. Other Airspace**

# **Evaluating a Drone Program**

## **How Will Potential ROI Be Assessed & Quantified?**

# How Will the Organization Substantiate the Drone Investment?

## PAYBACK PERIOD

The time required for the amount invested in an asset to be repaid by the net cash flow generated by the asset. It is a simple way to evaluate the risk associated with a proposed project.

$$\text{PAYBACK PERIOD} = \frac{\text{Cash Outlay}}{\text{Amount Of Net Cash Inflow Generated By The Project Per Year}}$$

(which is assumed to occur entirely at the beginning of the project)

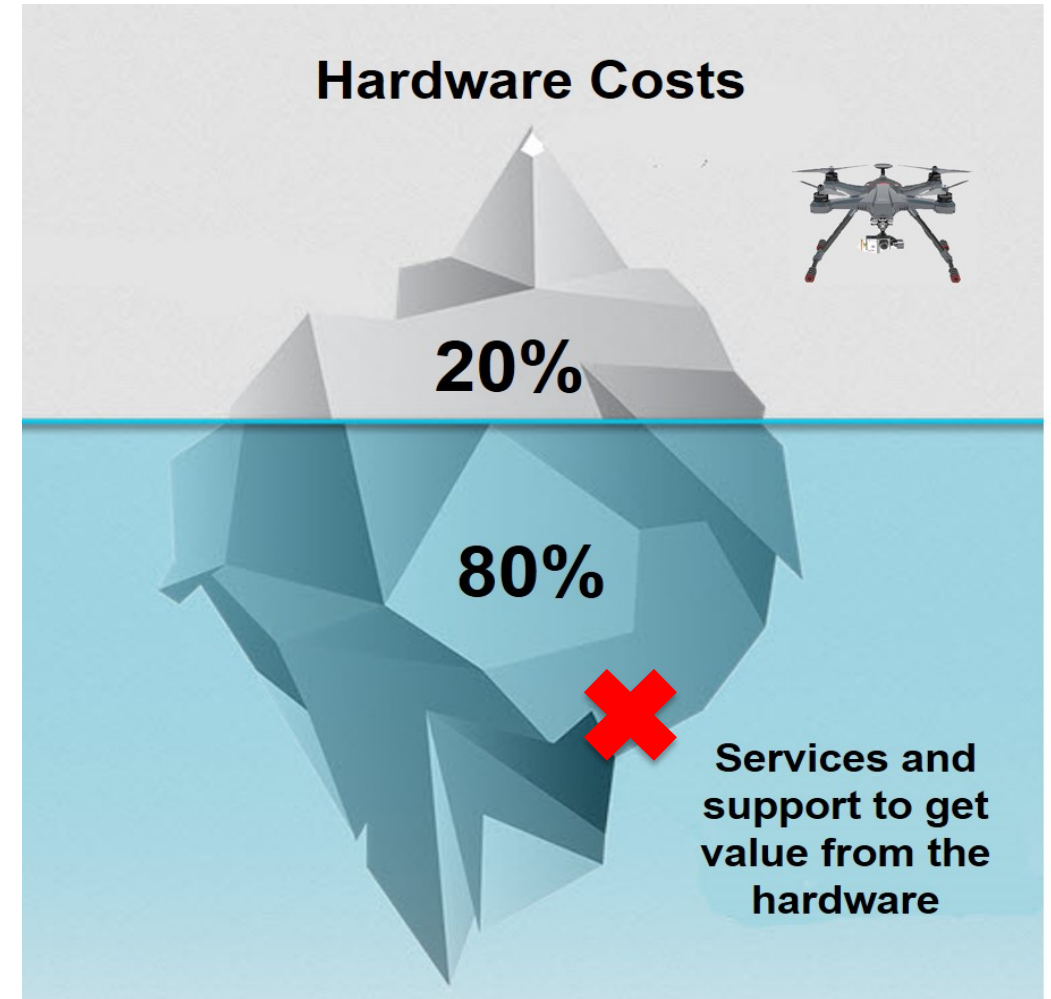
(which is assumed to be the same in every year)



# Operations Management Software

**Flight operations management software is typically a single tool that allows drone pilots to:**

- Do airspace research**
- Keep battery logs**
- Keep aircraft maintenance logs**
- Create and store pilot profiles**
- Track insurance**
- Track certification**
- Track registration information**



# **Autonomous Commercial Drone Deployment Issues**

- **Maintaining Internet Connection**
- **Managing Intermittent GPS Connections**
- **Drone-to-drone Communications**
- **Obstacle Avoidance**
- **Standardized Protocols**

# sUAS Security Considerations

## Protection of:

- 1. sUAS Electronics**
- 2. On Board Computer (OBC)**
- 3. On Board Aeronautical Telemetry Systems**
- 4. Captured Imagery**
- 5. Uploaded Data**
- 6. On Board Software (e.g. attitude control, telecommands execution or dispatching, telemetry gathering and formatting, failure detection, isolation and recovery).**

# **What Threats Does My Organization Face From Drones?**

**WIFI is the most common form of drone communication.**

**An individual can easily access free tools available online that allow for various forms of hacking into wireless networks.**

**Once in a network, all information within that network can be accessed.**

**If said network is being used with a drone, a hacker can jeopardize the security of that drone**

# **What Threats Does My Organization Face From Drones?**

**The hacker can:**

- 1. Take over control, and ultimately steal the drone.**
- 2. Crash the drone into people, buildings and critical infrastructures.**
- 3. Access sensitive data and video that are being transmitted and recorded, and in turn, the classified information obtained – especially in commercial applications.**

# What **CONTROL** Options Does My Organization Have?

**An effective controls must address the three main challenges:**

- 1. Threat variety – corporate espionage, cyber threats, physical threats, surveillance**
- 2. Lack of drone standardization and rapid evolution of technology**
- 3. Enterprise-wide protection: personnel, R&D, technology, IP, facilities**

# **Developing an Internal Drone Program vs Outsourcing Drone Services?**

**Commercial drone users must abide by a strict set of regulations.**

**The drone user must be certified and licensed, while simultaneously keeping up with the constantly evolving State and Federal drone laws.**

**Those that do not abide by these laws and regulations are subject to criminal charges and fees, which is just money lost for the business.<sup>12</sup>**

# **Where Does the Responsibility For Drone Program Management Fall?<sup>1</sup>**

- **Risk Management?**
- **Aviation?**
- **Logistics, fleet management?**
- **Emerging technology/innovation?**

**Dependent upon use case (how will drone(s) be used) and size and structure of the organization.**



# **Drone Operation Issues – Risk Management<sup>3</sup>**

- 1. High loss of altitude**
- 2. Loss of control**
- 3. Loss of transmission**
- 4. Collision with manned, unmanned aircraft or buildings, power lines**
- 5. Partial failure or loss of navigation systems**

# **Working with Legal & Corporate Compliance**

**Show your company's legal and corporate compliance teams how you will ensure full compliance with national airspace regulations and ordinances.**

**Provide full transparency into the drone operation.**

**Integrate your company's legal & compliance standards into your workflow for maximum efficiency.<sup>1</sup>**



**Legislation is pending that will allow federal law enforcement and homeland security to disrupt, take over or even destroy suspected hostile drones in U.S. airspace.**

**Objective... to reduce risks to public safety from the errant or hostile use of drones.**

