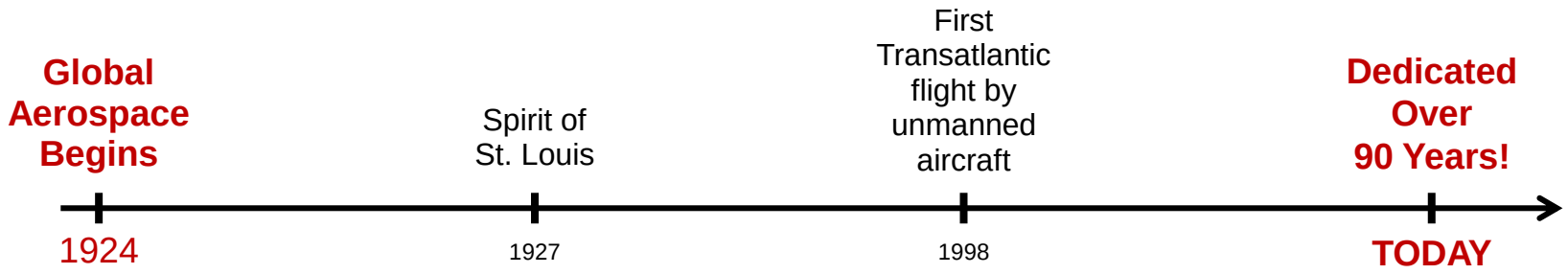
GLOBAL AEROSPACE

Service, Security, Solutions | Since 1924

Central Texas RIMS Drones Presentation

September 2015



Global Aerospace | A Brand Name in Aviation

Global Leads 20% of the World's Airlines

Global Leads 50% of the World's Aerospace Manufacturers

30,000 General Aviation Aircraft currently Insured

What do we bring to UAS?

- A dedicated team
- Policy forms developed for UAS
- A commitment to safety
- The backing of some of the best in the business
- 90 years of aerospace experience

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Coming to your town?

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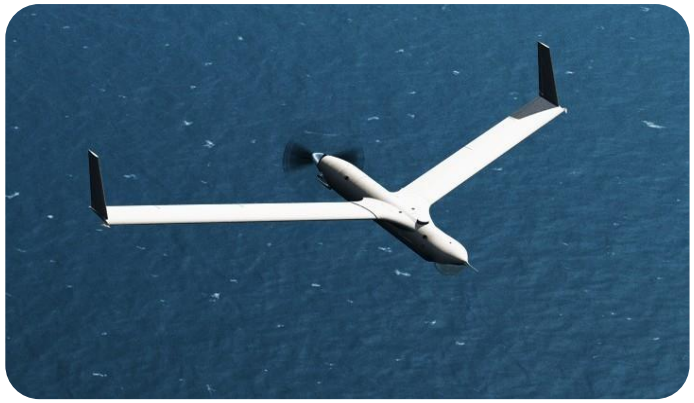
Overview/ regulations

Potential uses

What is covered?

Risk management



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Regulation

Commercial or Business

FAA Authorization needed via Section 333 approval


Air Center
N52
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Regulation – the next few years

- Operations:
  - <55 lbs , <500 feet agl, <87 knots
  - Visual line of sight - Daylight only - 3 miles visibility
  - Restricted airspace
- Pilot / Operator:
  - Aeronautical knowledge test
  - Small UAS rating / recurrent written test every 24 months
- Aircraft Requirements:
  - No airworthiness cert required
  - All aircraft must be registered and display an N#

No insurance requirements

Potential Market for UAS

- **AUVSI (Association for Unmanned Vehicles Systems International) predicts for U.S. :**
  - $83bn economic impact over next 10 years
  - 100,000 jobs
- **10% of commercial aviation unmanned by 2025?**
- **Commercial vs. Military?**
- **Payload vs. Platform?**
- **Reality vs. Fiction?**

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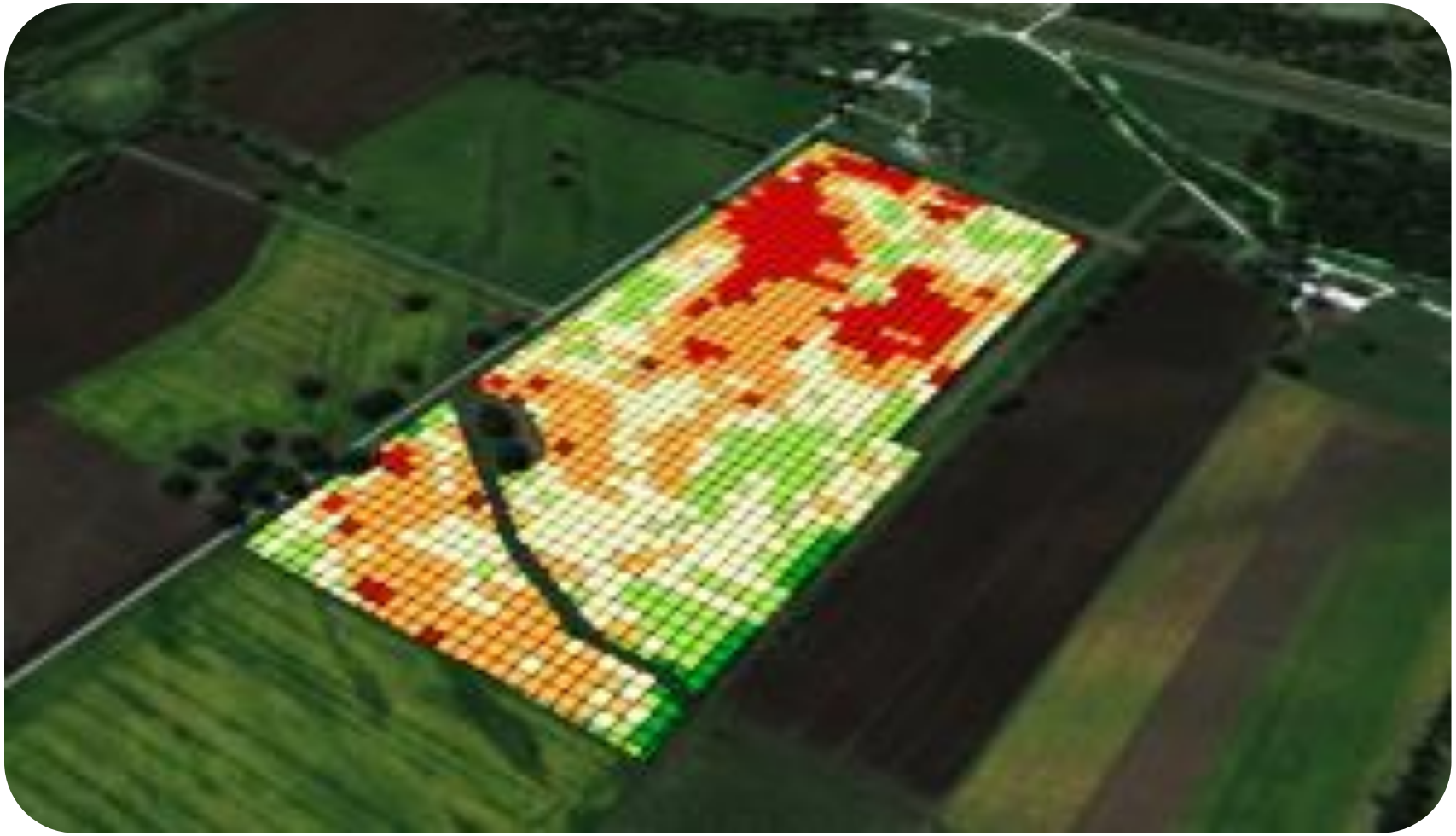
Potential Applications

- Agriculture
- Conservation
- Construction
- Disaster Relief
- Defense contractors / Border Patrol
- Energy
- Engineering
- Entertainment / Movie / Media
- Forestry
- Forest Fire
- Mapping / Geophysical survey
- Mining
- Municipal authorities / Police / Fire
- Parcel delivery
- Photography / Videography
- Realty
- Search and Rescue
- Security
- Sports teams
- Utility companies
- 3rd world medicine delivery……

Agriculture

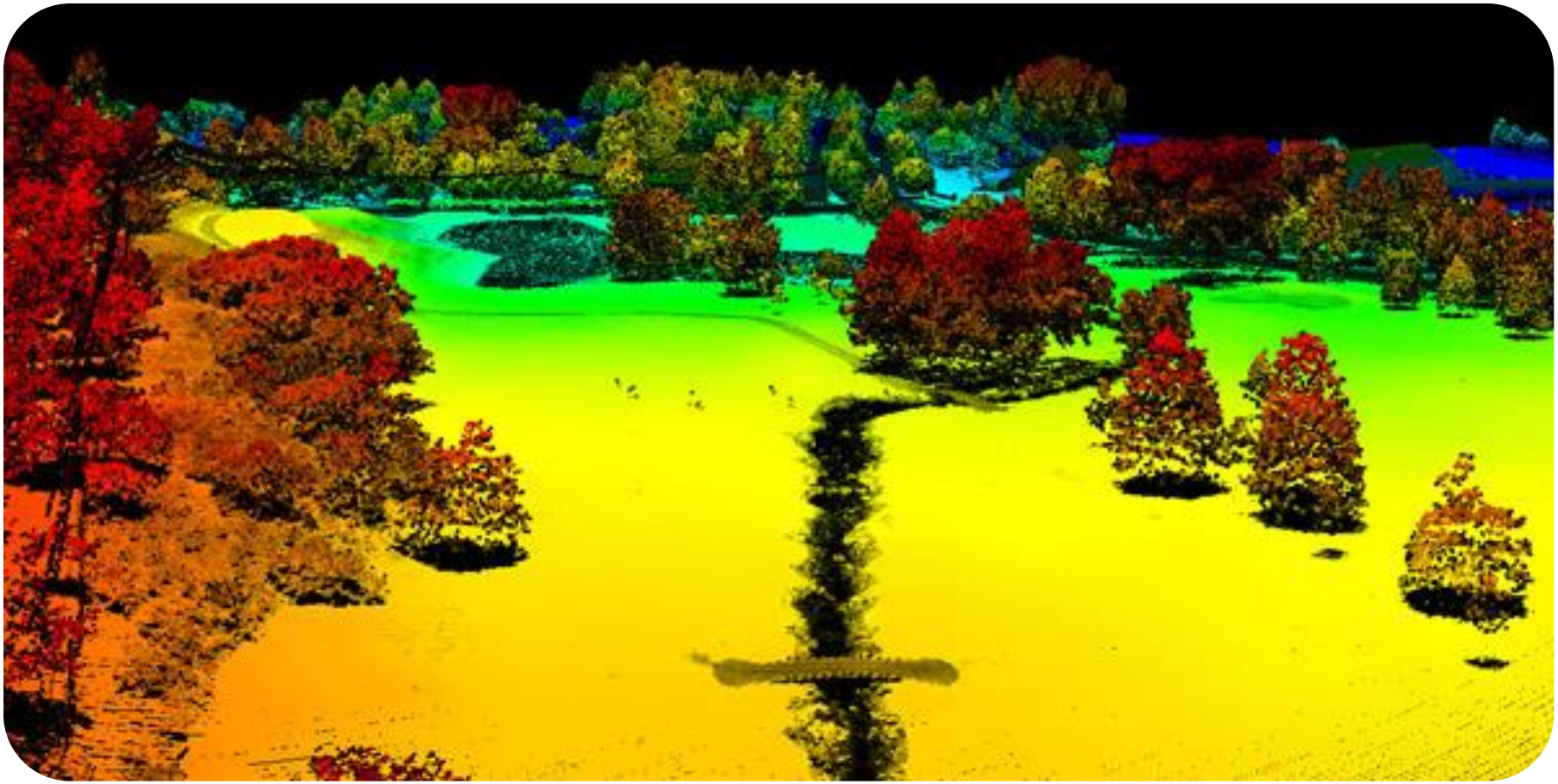
Agriculture



Construction

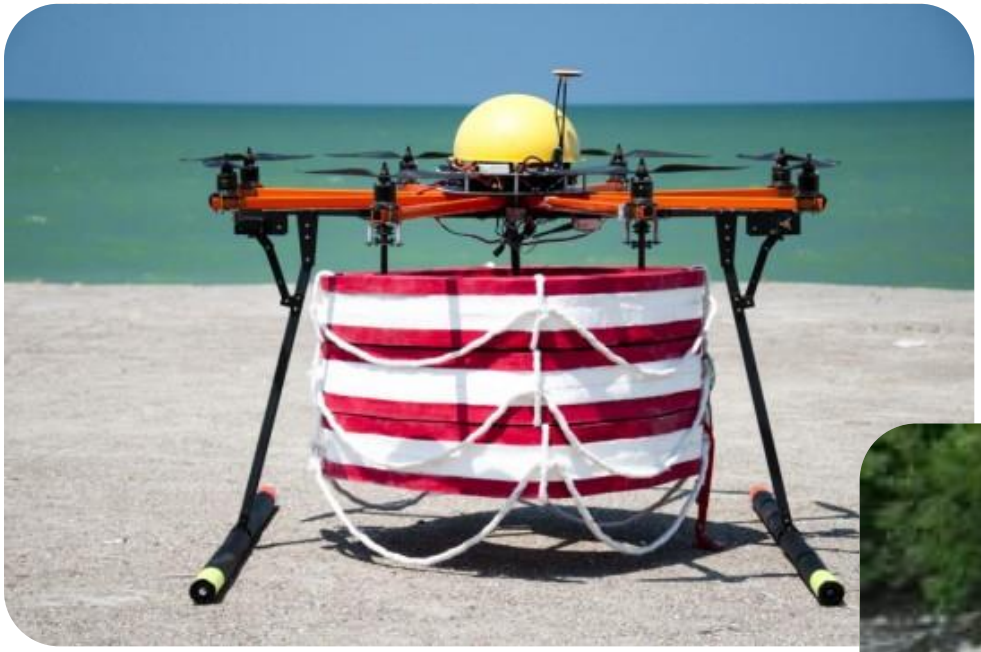
Energy

Mapping/ geophysical survey



Parcel Delivery

Search and rescue



Search and rescue

Third world medicine delivery

Search for “Matternet TED talk”

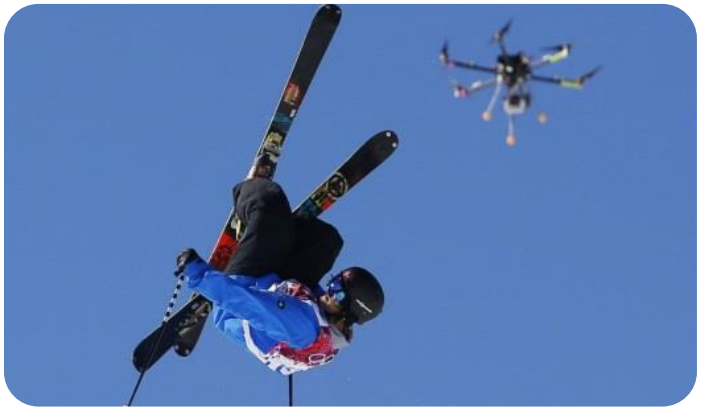
The insurance market for drones

A merger of two markets

Physical Damage (hull)

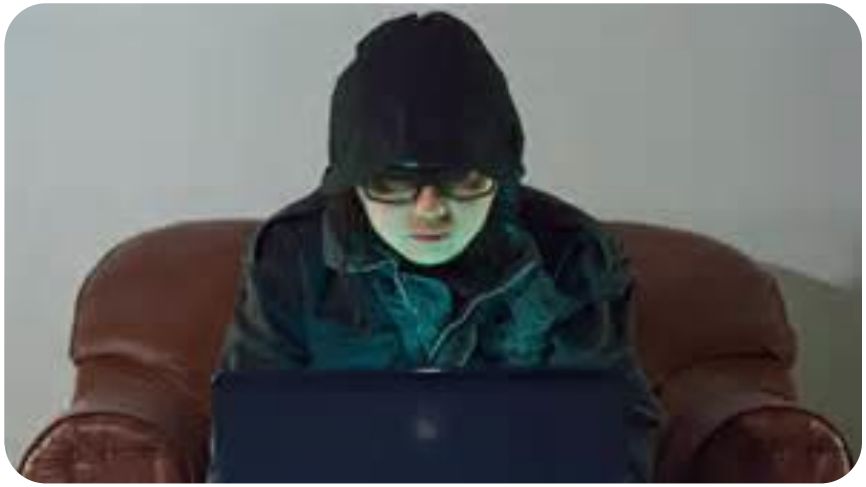
- Typical values between $1,500 and $150,000
- Payload often 90% of the total value

Liability to Third Parties



- Limits from $1m upwards
- Customers determining limits purchased

War and Allied Perils



Personal Injury (Invasion of Privacy)

Product Liability

Underwriting Considerations

Risk Management

Safety Management – UAS is an industry with some growing up to do.

- Checklist/ Logbook
- Standard Operating Procedure
- Emergency Response Plan

Risk Management

Safety Management System?

Lessons learned in blood

Lessons learned in blood

But we have the opportunity to do better…..

Risk Management

Use of SOP

Circle the description that closest resembles your situation, then follow instructions at the bottom of the page

Factor	Low Risk	Moderate Risk	High Risk
People			
Illness	Clean bill of health, no signs of illness	Common cold, under the weather, allergies, coughing	Very sick, eyes watering, flu-like symptoms, loss of balance, feeling spacey
Alcohol, drugs, or medication use	No alcohol, prescription drugs in the past 12 hours, free from all effects	Feeling dizzy or have a headache, sluggish and/or tired	Feeling the effects of drugs or alcohol, visibly hung-over, have consumed alcohol or drugs in the past 12 hours
Outside physiological stressors	No outside pressure	Sig…	…fight with …
Proper rest	Eight hours of uninterrupted sleep, well rested and energetic	Les…	…ling off or
Currency and proficiency	Above 100 FC*. Flown in the last 30 days, familiar with operation type	L…	…1-90 days,
Mode of communications	Use voice (if less than 100 meters) … dicated intercom system for crew to crew, Use an … with radio for crew to ATC or Aircraft	Use… held …	… crew, No
Planning time	Complete site survey, and more than two hours of planning and preflight time	Complete site survey, and less than two hours of planning and preflight time	no site survey, and less than two hours of planning and preflight time
Scale and complexity	1 take off and recovery, single air vehicle	2-4 takeoff and recoveries per day, single air vehicle in proximity of other UAS with frequency management plan	5 or more takeoff and recoveries per day, Several air vehicles without a frequency and airspace management plan
Mission duration	Under 2 hours	2-6 hours	>6 hours
System automation	Fully autonomous (autopilot controls all aspects of flight)	Full manual (but operator is experienced in manual 200 FC* or remote control)	Full manual (inexperienced operator, less than 200 FC*) or switching
Ground operations	Improved surface and area has been cleared of foreign object debris and obstacles (100x aircraft width)	Unimproved surface but foreign object debris has been cleared (50x aircraft width), first time operation at site	Unabl…
Launch and Recovery	No additional launch or recovery equipment required	Systems requires a launcher, is hand tossed, or needs a recovery area	Launch…
Navigation	Auto generated waypoints, overflight of land only, or launch and GPS hold only	Mixed method, overflight or property and/or water, transition <5 min	Manual…
Mission delay complexity	Simple and familiar with operation	Complex operation but familiar, or not familiar but simple operation	
System			
Lost data link	Dedicated frequency outside of ISM band, data link security, no detected interference, and no observed lost link events during previous flights in the operating area	Shared frequency, ISM band, or self-selecting frequency, detect interference in data link band; or new to the operating area and unable to scan frequency	Have ob…
Maintenance and status	Aircraft is mission ready with no new critical components	Aircraft has critical components with less than two hours of flight time or within two hours of Time Between Overhaul (TBO), MTBF, or regular…	No…
Environment			
Terrain and obstacles	Flat terrain, clear of obstacles, towers, struc… and or spectators	Moderate terrain or few buildings or towers that must be avoided, areas adjacent to the flight area have obstacles or property that could be a factor, may have onlookers, but contained to a specified area out of harm's way	High to… adjacent… or n…
Launch elevation	…ow elevation (sea level to 1000'). No noticeable loss of performance or difference in energy consumption	Medium elevation (1001' to 3999'), and/or suspect UAS performance may be degraded	High a…
Ceiling and visibility	…isibility greater than five miles and clear skies, UAS has aircraft lighting and brightly colored panels visible at one mile	Visibility greater than one mile but less than 5 miles low clouds (1000'), UAS is visible at half of a mile	Visibi… aircraft …
Winds	Winds are well within the manufacturer recommended limits, less than 10 knots for systems without published limits	Forecast wind near or out of manufacturer recommended limits, observed/measured winds at site are within limits but variable (wind gusts)	Actua… unab…
Temperature	Able to keep crew and equipment between 51 and 79 degrees F, have environmental conditioning available or in-use	Less than 50 degrees or greater than 80 degrees F without environmental conditioning equipment	L…
Airspace	Class G, below 400', greater than 10 miles from the closest airport. If in special use airspace - familiar with special instructions	Glass G, below 400', 5 to 10 miles from a public or private airfield, in the proximity of non-traditional aircraft activity (ultralights, balloons, aerial spray aircraft), first time in special use airspace	Class E… adja…
*FC= Flight Cycles	If all or almost all items are in this column the risk score is low, proceed as planned	4 or more in this column represents an overall risk of moderate; you may need to change the plan; formulate a strategy to reduce the risk or accept and proceed with caution	Any in this column represents a high risk! You must change the plan! Do not proceed unless you have developed contingencies and risk mitigation plans to reduce or control the risk

Launch and Recovery

Navigation

Launch elevation

Ceiling and visibility

Winds

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Risk Management

Operating Environment

The future of drone risk management

- Geo-fencing
- Sense and Avoid
- Operator ID
- Automation
- UTM (NASA)

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