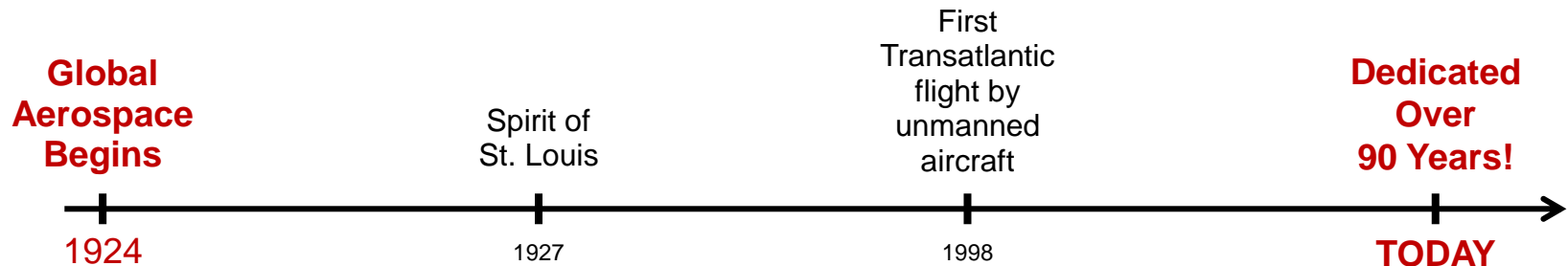




# Drone Insurance. The Aviation Market's Perspective

Mike Falcone

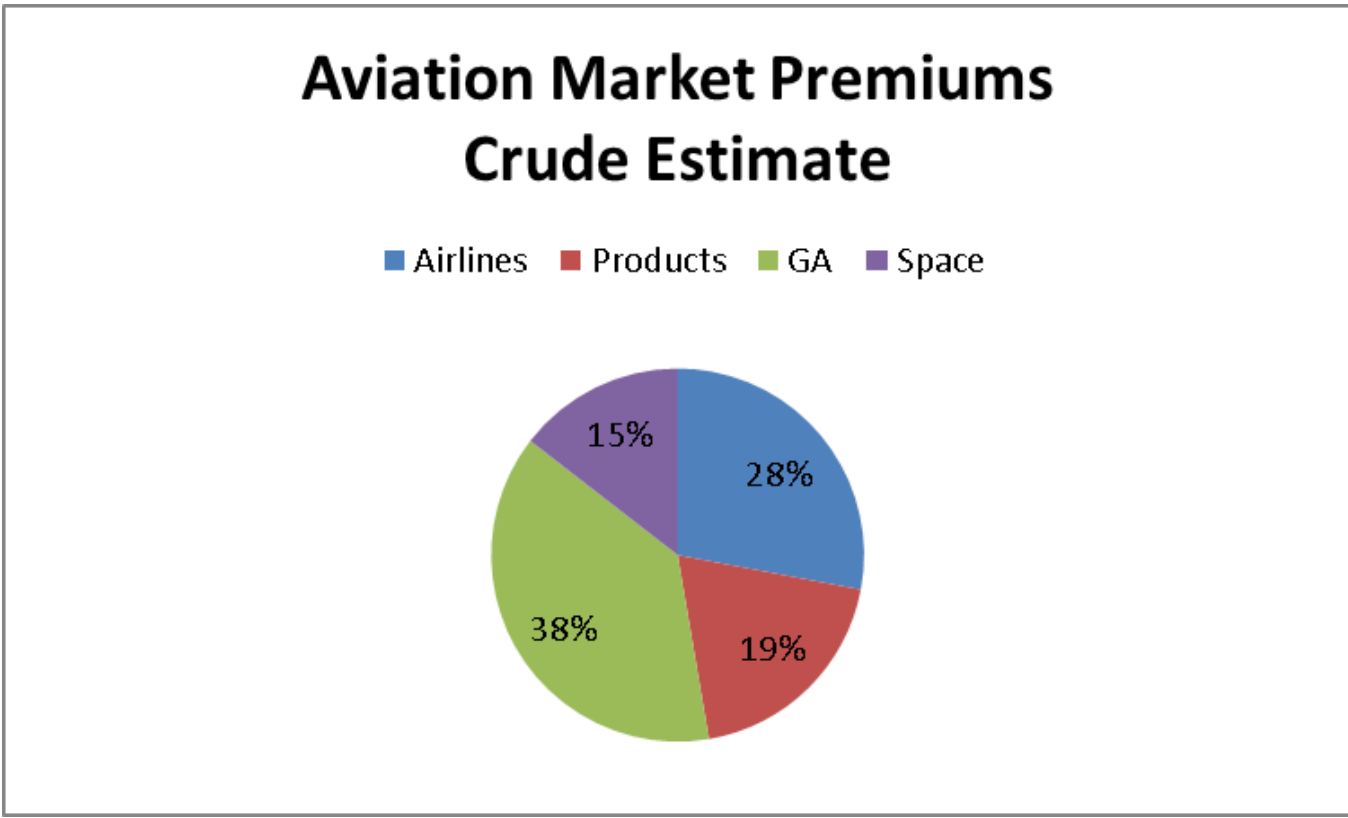
CAS Annual Meeting , Orlando 2016



# Agenda

- **What is the Aviation Insurance Market?**
- **Some issues we have encountered with Drone Insurance**
- **How do we see the Drone Market Evolving**
- **How do we see Insurance of the Drone Market evolving**
- **Operating regulations in some other key jurisdictions (time permitting)**

# Size of the Aviation Market

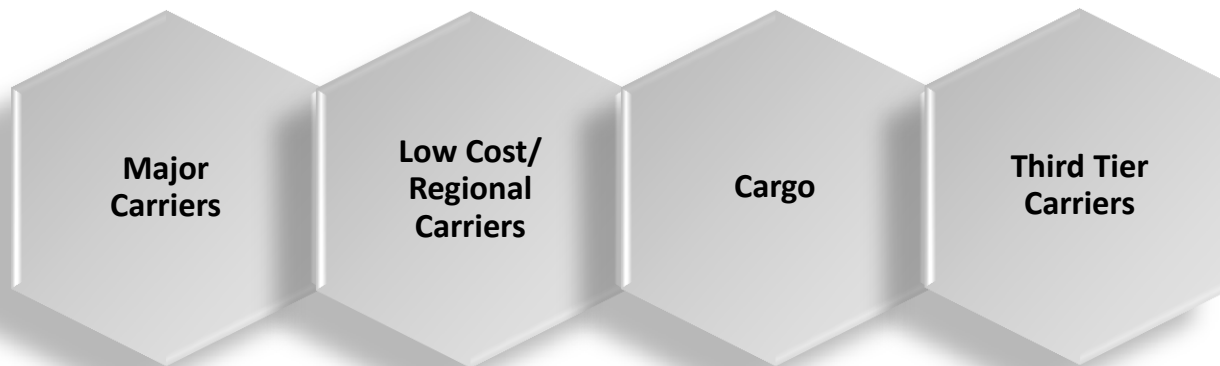


**We estimate the size of the Aviation Market as about \$4.65bn**

## Market Characteristics | **Airline**

### Market:

- Low barrier to entry
- Verticalized pricing (Leaders obtain preferential treatment)
- Highly volatile
- “Short-tail” claims exposure
- 4 Sub segments



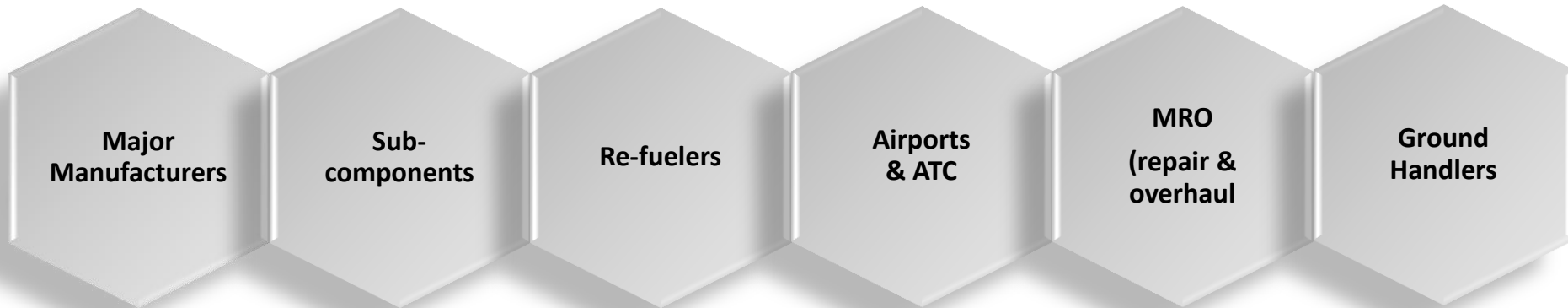
### Buyer Characteristics:

- Relatively price sensitive
- Well informed/sophisticated buyers (major carriers)

## Market Characteristics | **Aerospace**

### Market:

- High barrier to entry
- Some verticalized pricing
- “Long-tail” claims exposure
- 6 sub-classes



### Buyer Characteristics:

- Less price sensitive (Major manufacturers)
- Very good security a requirement
- Well informed/sophisticated buyers (major risks).

## Market Characteristics | **General Aviation**

### Market:

- High barriers to entry – distribution network
- Price sensitive buyers
- “Short-tail” claims exposures
- Risks placed regionally
- Divided into 5 sub-classes

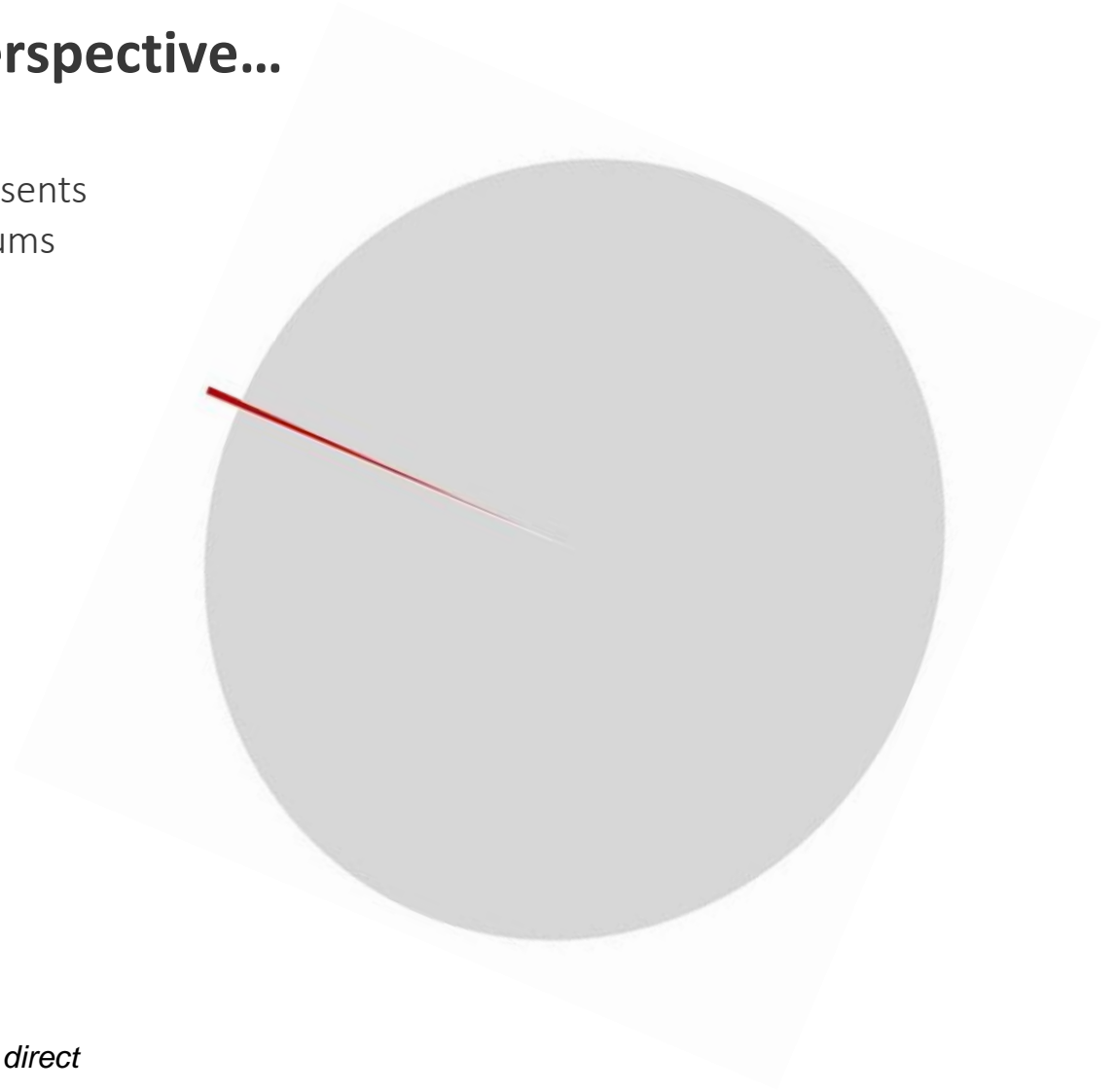


### Buyer Characteristics:

- Price sensitive
- Mixed buyer profiles

## Putting things into perspective...

... The Airline/Aerospace sector represents around 0.3%\* of total non life premiums



*\*Based on OECD estimate of worldwide non life direct premium*

# The merger of two markets



**“Its only a drone”**





# Global Aerospace | A True Worldwide Leader



Global Leads 20% of the World's Airlines



Insuring Airline Risk in Over 80 Countries Worldwide



Global Leads 50% of the World's Aerospace Manufacturers



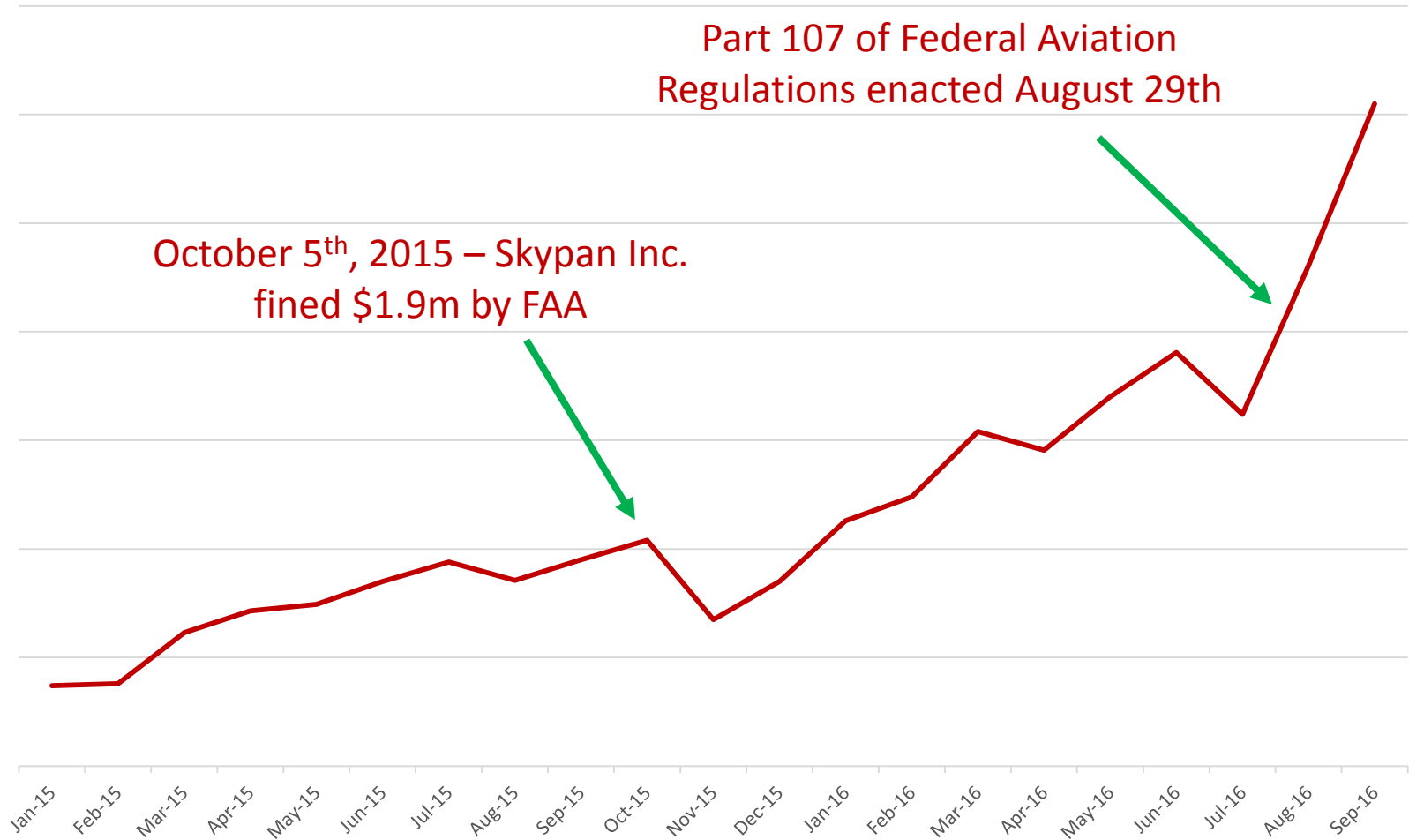
Decades of Protection and Service for Fortune Companies



Respected and Trusted by the Industry



# 2015/6 applications, Global US



## How do we see the UAS Business Model Evolving

- **Segment that will be the Sophisticated Users**
  - Drone Service Operators
  - Larger entities that will manage their own fleets
  - High limits
  - Structured SOP's
  - Extensive Training and Control
  
- **Segment for the less sophisticated users**
  - Small Commercial
  - Aerial Photography

# What have been the main challenges?

- **Volume**
- **New technology, unknown risk**
- **Under-developed regulation, eager users**
- **Lack of flight management / standards**
- **Claims**
  - **Repairs**
  - **OEM support**

# Volumes



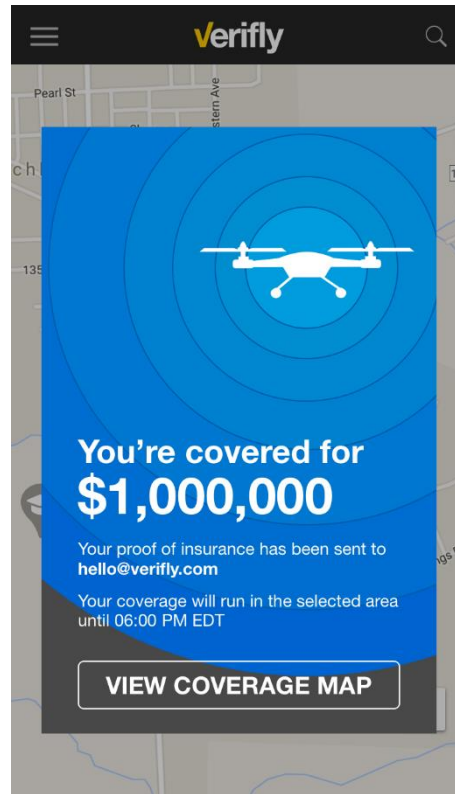
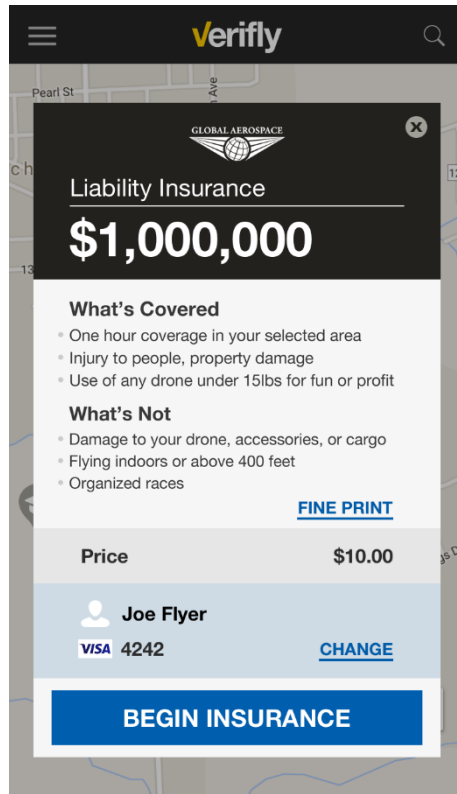
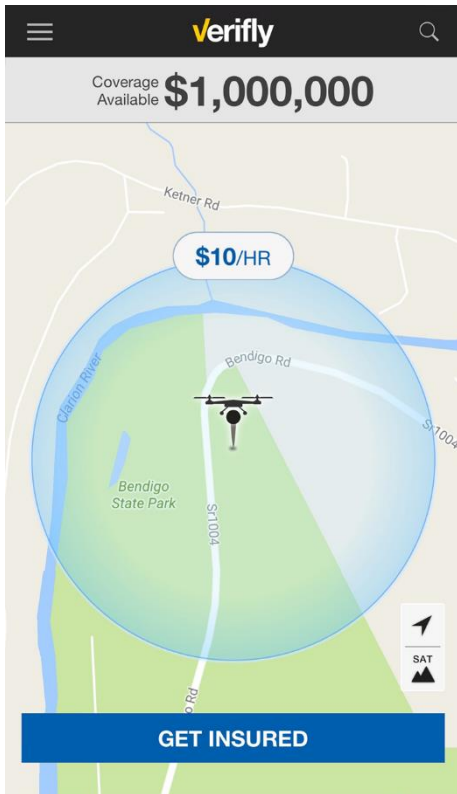
# What has Global and the wider insurance market done to address these challenges?

- Adopted technology to help with the volume (Verify)



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- Adopted technology to help with the volume (Verify)



# What has Global and the wider insurance market done to address these challenges?

- Adopted technology to help with the volume (Verify)
- Explored distribution channels (Zurich)
- Worked with OEMs and other stakeholders to understand the risks
- Taken a risk based approach in the absence of regulation
- Partnered with training companies
- Developed relationships with repair stations





Aircraft Certification

Aircraft Registration

Airworthiness Certification

Continued Operational Safety

**Design Approvals** →

International

Locate an Office

Production Approvals

Airline Certification

Airmen Certification

Airport Certification

Commercial Space Transportation

## Design Approvals

- Aircraft Certification Software
- Chief Scientific and Technical Advisors (CSTA)
- Engines and Propellers (Including Auxiliary Power Units)
- FAA and Industry Guide to Product Certification (PDF)
- Field Approval
- Human Factors in Aviation Safety (AVS)
- National Automated Conformity Inspection Process (NACIP)
- Original Design Approval Process
- Parts Manufacturer Approval (PMA)
- Search Technical Standard Orders (TSO)
- Technical Standard Orders (TSO)
- Technical Training Program
- Approval of Safety Enhancing Non-Required Equipment under 14 CFR 21.8(d)



# Risk Management

Use of SOP



UNMANNED SAFETY INSTITUTE™

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

Factor	Low Risk	Moderate Risk	High Risk
		People	
Illness	Clear 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	Significant pressure	Significant pressure with time to complete flight
Proper rest	Eight hours of uninterrupted sleep, well rested and energetic	Less than eight hours of sleep	Less than six hours of sleep
Currency and proficiency	Above 100 FC*. Flown in the last 30 days, familiar with operation type	Less than 100 FC*	Less than 50 FC*
Mode of communications	Use voice (if less than 100 meters) dedicated intercom system for crew to crew, Use an aircraft radio for crew to ATC or Aircraft	Use handheld radio	Use handheld radio
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 something
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	Unimproved surface and no debris clearance
Launch and Recovery	No additional launch or recovery equipment required	Systems requires a launcher, is hand tossed, or needs a recovery area	Launch and recovery requires specialized equipment
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 navigation
Mission delay complexity	Simple and familiar with operation	Complex operation but familiar, or not familiar but simple operation	Complex operation and not familiar
		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 observed lost link events
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 repair	Not mission ready
		Environment	
Terrain and obstacles	Flat terrain, clear of obstacles, towers, structures, and 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 observers, but contained to a specified area out of harm's way	High terrain or structures adjacent to flight area
Launch elevation	Low elevation (sea level to 1000'). No noticeable loss of performance or difference in energy consumption	Medium elevation (1000' to 3999'), and/or suspect UAS performance may be degraded	High elevation (>4000')
Ceiling and visibility	Visibility 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	Visibility less than one mile
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)	Actual winds are outside of manufacturer recommended limits
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	Less than 30 degrees or greater than 90 degrees F
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 (paragliders, balloons, aerial spray aircraft), first time in special use airspace	Class E or higher
*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

# Claims



## Advantages of the Aviation Insurance Market

- See this risk as a natural extension to what we do
- Limits
- Coverage for Vehicles, Payload, etc.
- Ability to differentiate between types of operators and vehicles



# Regulations around the world – general observations

- The rapid growth of the commercial drone surprised regulators
- The operator and the flight profile is being certified and regulated, not the drone itself
- Distinction is drawn between recreational and commercial use
- Commercial demand is outpacing regulatory action
- There are few standards, making it confusing for operators
- *The European Aviation Safety Agency (EASA) only regulates drones over 150kg, the others are left to individual countries*
- Nothing addresses BVLOS yet
- Some insurance minima but not common

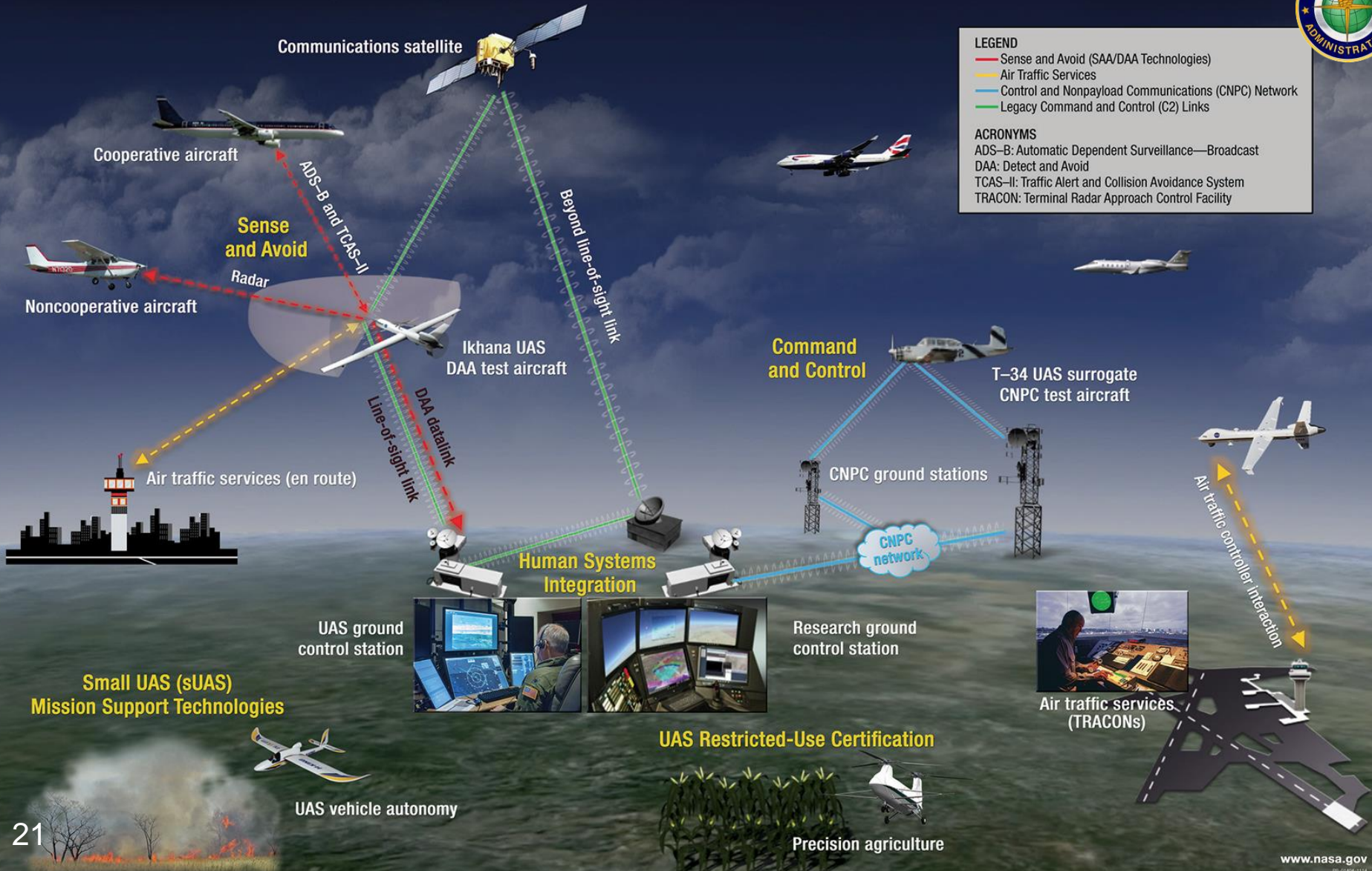
# The future.....

## Unmanned Aircraft Systems (UAS) Integration in the National Airspace System (NAS) Project

➤ **BVLOS**

➤ **Full integration**

National Aeronautics and Space Administration



**LEGEND**

- Sense and Avoid (SAA/DAA Technologies)
- Air Traffic Services
- Control and Nonpayload Communications (CNPC) Network
- Legacy Command and Control (C2) Links

**ACRONYMS**

- ADS-B: Automatic Dependent Surveillance—Broadcast
- DAA: Detect and Avoid
- TCAS-II: Traffic Alert and Collision Avoidance System
- TRACON: Terminal Radar Approach Control Facility

# Australia



Any drone weighing under 2kg for hobby use doesn't require an operator to be certified. Drones over 2kg or any unit used for commercial purposes requires the operator be licensed. Australia has had regulations in place since 2002 and has just updated them in 2016.



# Canada



A Special Flight Operations Certificate is required for any drone weighing over 35kg or for any drone used for commercial purposes. New regulations are being drawn up that would allow for more permissive use of drones under 25kg.



# China

The Civil Aviation Administration of China regulates use of drones under 150kg. Drones are put into 7 categories but all must be registered with the CAAC



# France



New rules came into effect in January 2016 which split drones use into three categories – hobby, experimental and commercial. Within those rules there are weight restrictions and requirements for knowledge and training, based partly on use cases and population density

# Germany



Beyond Visual Line of Sight (BVLOS) flights are permitted for certain commercial use. Operators are required to be licensed. The weight limit is 25kg and other restrictions apply based on population density and particular hazards.

# Switzerland



Drones weighing up to 30kg can be operated with some restrictions including no overflight gatherings of people and always within VLOS. Permits can be obtained for operations beyond those limits





# United Kingdom



Drones weighing under 20kg are subject to rules relating to population density and other restrictions. Those over 20kg are subject to all articles of the Air Navigation Order and require certification, licensing and a permit to fly. The UK has been chosen by some drone companies as a test site given its relatively accessible regulatory environment.

# U.S.A.



Part 107 of the Federal Aviation Regulations enacted in August 2016 governing VLOS, daytime operations of drones weighing under 55lbs (25kg) for all non-recreational use. Additional rules apply including a requirement for all operators to pass a knowledge test.



# Questions?

