Everything You Need to Know About Certifying Your UAS !

UAS Webinar Series

Presenters

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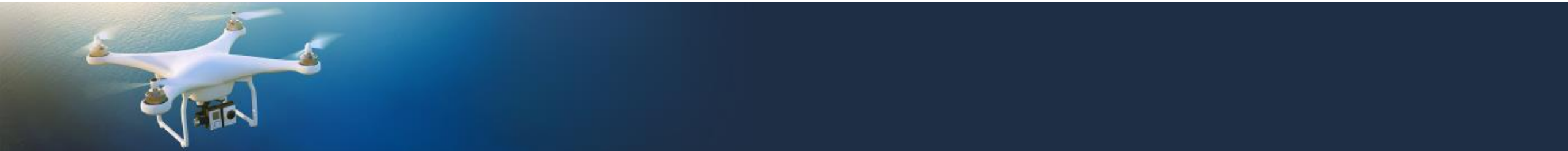
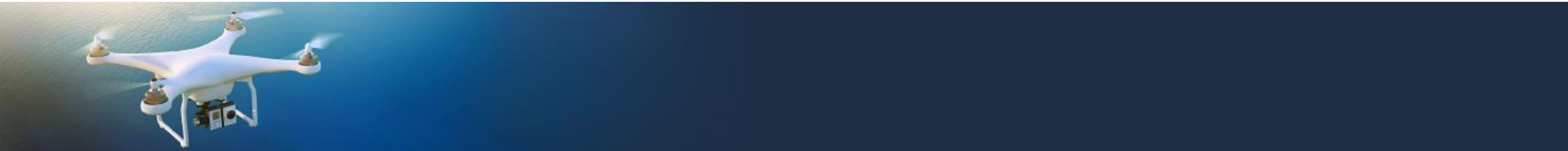


UAS Update - *Singer v. Town of Newton*

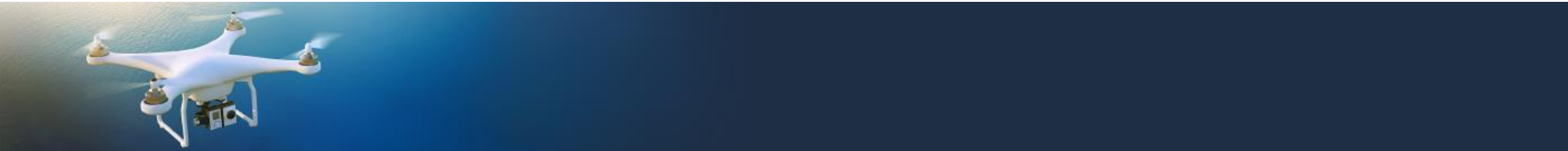
Town drone ordinance passed December 2016:

1. Local UAS operators must register their aircraft with the city at a cost of $10
2. Prohibited flight over private property below 400’ without permission of the owner; and
3. Prohibited flight beyond visual line of sight
4. Prohibited flight over any school, school ground, city property or sporting event without prior permission from the city
5. Prohibited surveillance of persons where they have a reasonable expectation of privacy



UAS Update - *Singer v. Town of Newton*

- No general field preemption for UAS, but extensive conflict preemption.
- Field Preemption for Aviation Safety
- Extensive Conflict Preemption
  - Compliance with state and federal law impossible
  - State law conflicts with the goal of the federal law
- State and local governments can only impose a registration requirement with FAA permission
- Requiring permission for flight over public or private property conflicts with Congressional intent to have FAA integrate UAS into the NAS
- BVLOS ban conflicts with the Part 107 Waiver process
- No challenge to restrictions as applied to hobbyists or to the privacy provisions.



UAS Update - Local Resistance to UAS Operations

ANNE ARUNDEL COUNTY PUBLIC SCHOOLS

Solley Elementary School

7608 Solley Road | Glen Burnie, MD 21060 | 410-222-6473

September 14, 2017

Dear Parents and Guardians:

I am writing to let you know about an incident that occurred outside today so that you can talk about it with your child in a manner you deem most appropriate.

As our fourth-graders were outside at recess today, one of our neighbors began flying a drone over his house. Unsure of the reason for this, we brought our students inside as a precaution and called police. During this time, the school was put on Lock Out to ensure that all students and staff remained inside of the building.

Police arrived quickly and investigated the situation. They determined the man was flying the drone to get footage of the top of his house due to a problem on the roof. There is no evidence whatsoever that any footage exists of our students.

Police, however, advised the homeowner not to fly the drone near school property in the future.

UAS Update – FAA Reauthorization

- 21st Century AIRR Act
  - ATC Privatization
  - Aircraft Certification Reform
  - 1 Year Push for Commercial Package Delivery
  - Changes to Model Aircraft Rule and Taylor Fix
- FAA Reauthorization Act of 2017
  - Push for Federal Drone Privacy Regulations
  - Aircraft Certification Reform
- Disaster Tax Relief and Airport and Airway Extension Act of 2017 (180 day extension)

Why Certify a UAS - BVLOS

- Some BVLOS can be done with a waiver
- Three waivers Issued
- VO Line of Sight at all times
- Communication with VO required
- Required for COA:
  - Operating procedures
  - Safety assessment
  - Preflight briefing
  - Additional operating restrictions
- FAA guidance available from FAA website: Waiver Safety Explanation Guidelines

BNSF Rail Inspection

Photo – BNSF Railway Co

Why Certify a UAS – BVLOS Extended Visual Line of Sight

One waiver granted

- Pilot sees operating area beyond UAS
- Special Training Required
- Limited to PrecisionHawk Lancaster System
- VO communications at all times
- Preflight survey of operating area
- C2 Range limits
- Contingency procedures
- Anti-collision lights

Precisionhawk Lancaster UAS

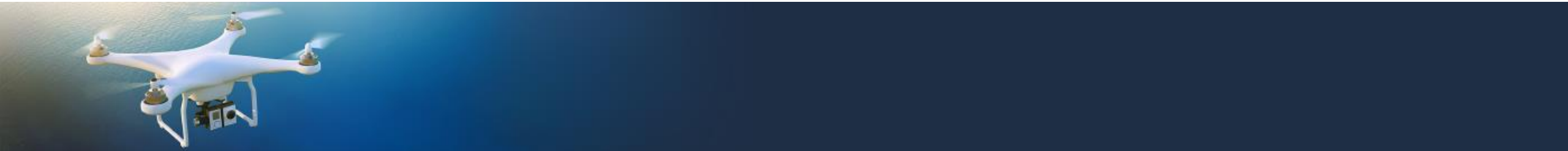
Photo – PrecisionHawk

Why Certify a UAS – Long Range BVLOS

- Current Projects
  - BNSF Railroad rail inspections
  - Xcel Energy powerline inspections
  - Others not publicized
- Certified (FAA Airworthiness Certificate) Required
  - Experimental Certificate – testing and evaluation only
  - Military Surplus – aircraft specific
  - Standard – impractical due to differences between existing rules and UAS
  - Special Category – 14 CFR Part 21 §21.17 (b) Best Option

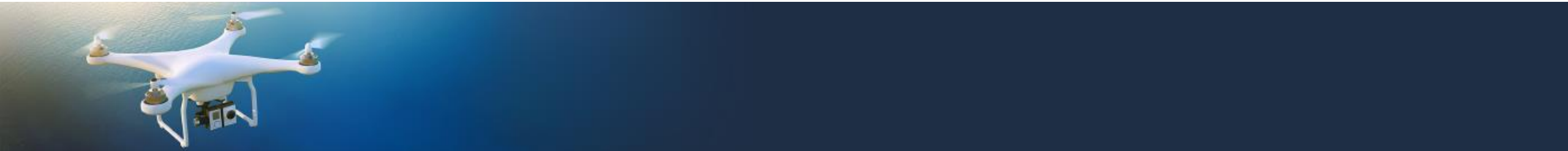
Why Certify a UAS – Flight over People

- MicroUAS ARC Proposal did not propose a certified aircraft, but as a result, relied on risk mitigation plans and operational restrictions.
- “Under Category 4, a small UAS may operate over people, including flights over crowds or dense concentrations of people prohibited in Category 3, if the manufacturer of the UAS certifies that the UAS does not, in the most probable failure modes, exceed the typical or likely impact energy threshold, if the UAS complies with industry consensus performance standards, and if the operation is conducted in compliance with a documented, risk mitigation plan, which was developed and adopted in accordance with industry consensus standards for conducting risk mitigation. The performance standards and operational restrictions that apply to Category 2 operations also apply to Category 4.”



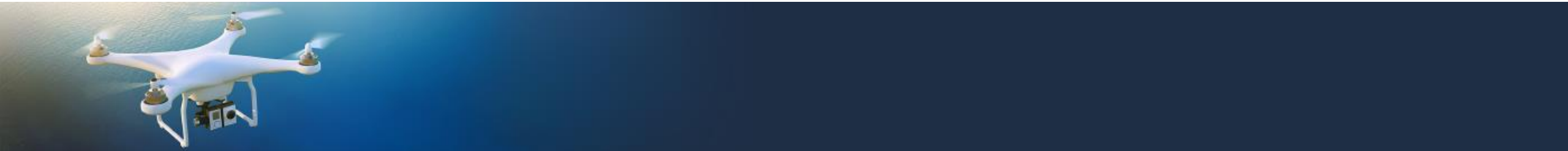
Why Certify a UAS – Flight over People

- “The ARC recommends that the industry consensus standard include the requirement of a preparation of risk mitigation plan that must address, at a minimum: (a) operator qualifications; (b) the method of approval and compliance with the risk mitigation plan, including the possibility of engagement with appropriate local entities. The ARC suggests that the standard-setting body may want to consider, as a reference, similar requirements for manned aircraft in 14 CFR 137.51.”
- **14 CFR 137.51**
- **(b)** No person may operate an aircraft over a congested area except in accordance with the requirements of this paragraph.
  - **(1)** Prior written approval must be obtained from the appropriate official or governing body of the political subdivision over which the operations are conducted.
  - **(2)** Notice of the intended operation must be given to the public by some effective means, such as daily newspapers, radio, television, or door-to-door notice.
  - **(3)** A plan for each complete operation must be submitted to, and approved by appropriate personnel of the FAA Flight Standards District Office having jurisdiction over the area where the operation is to be conducted. The plan must include consideration of obstructions to flight; the emergency landing capabilities of the aircraft to be used; and any necessary coordination with air traffic control.



Why Certify a UAS – Commercial On-Demand Package Delivery

- Large Scale Commercial Package Delivery will need to be conducted:
  - Autonomously or with one pilot supervising multiple aircraft
  - Beyond visual line of sight
  - Be able to fly in congested areas
  - Over people
  - Over pets
  - Over highways and active roadways
  - Over people
  - Be able to sense and avoid airborne traffic
  - Be able to sense and avoid ground obstacles while making the delivery
- The solution to these problems will require some form of certified aircraft



Certification and Risk Management

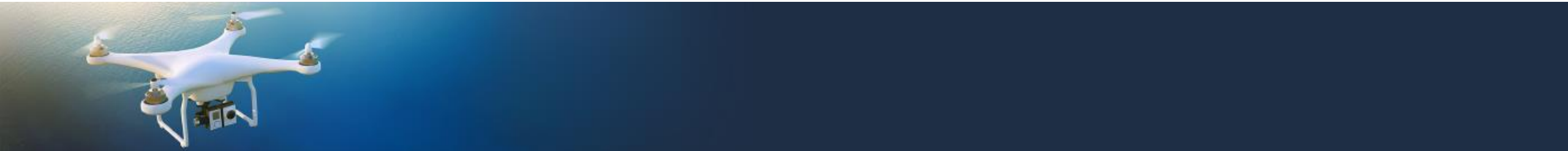
- Current UAS Rules are aimed at promoting safe UAS operations for users of the NAS and people and property on the ground
- FAA Strategy is, to the extent possible, mitigate risks through limitations on operations (speed, weight, altitude, etc.) and education of operators first
- Place limitations on design (such as requiring airworthiness certification) as a last resort
- Concerns about stifling innovation or limiting fast iterations of new technology

Military Aircraft Can Do These Things, Why Can't We Do Them Too?

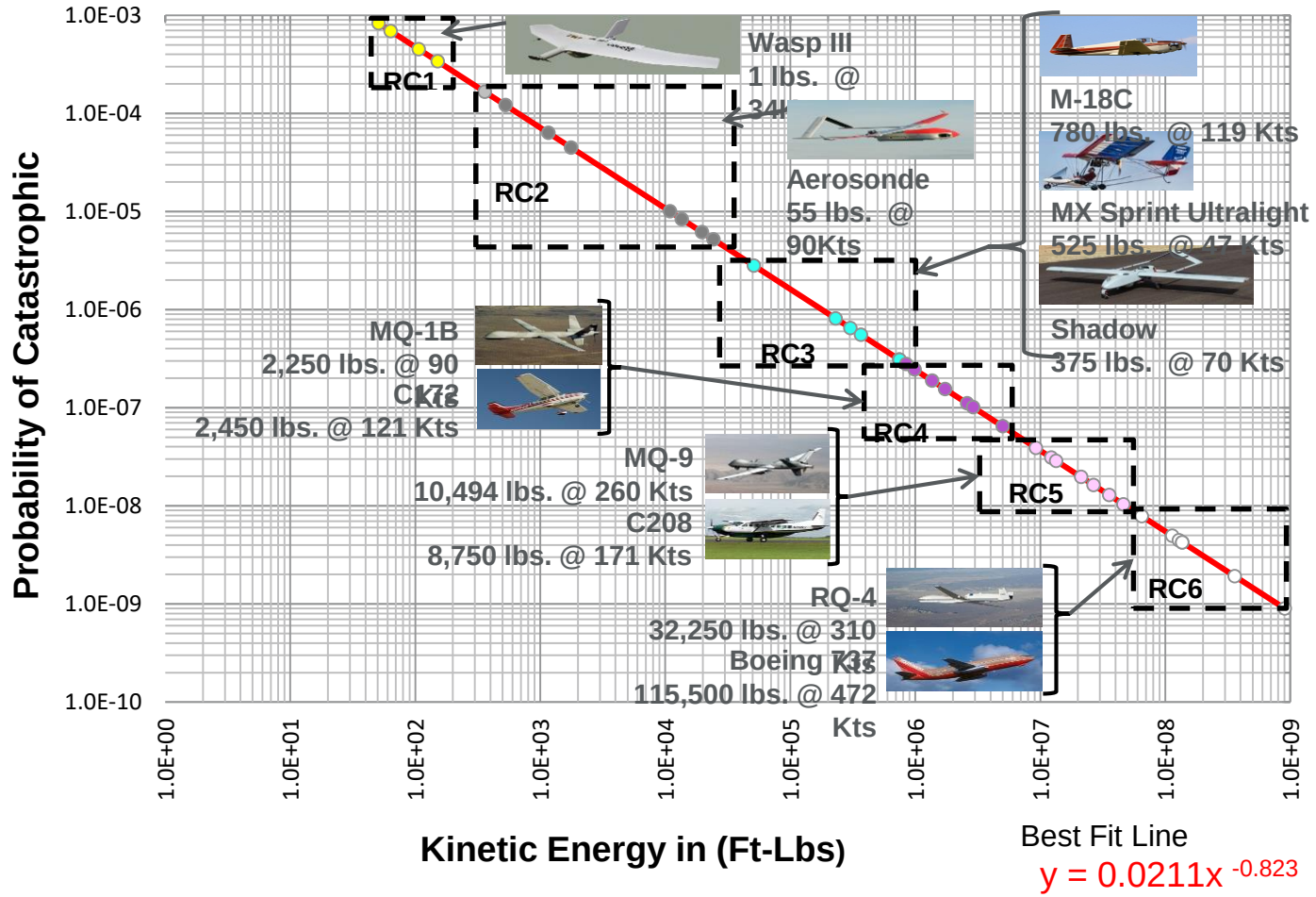
- Existing designs
  - May not meet FAA safety expectations
  - Requirements change for mission and operating area
  - DOD designs vs. design for reliable repeatable civil use
- Operators
  - Prefer to purchase existing designs
  - Seeking operational credit from DOD use
- DoD classifications don't meet FAA needs

DOD Classifications

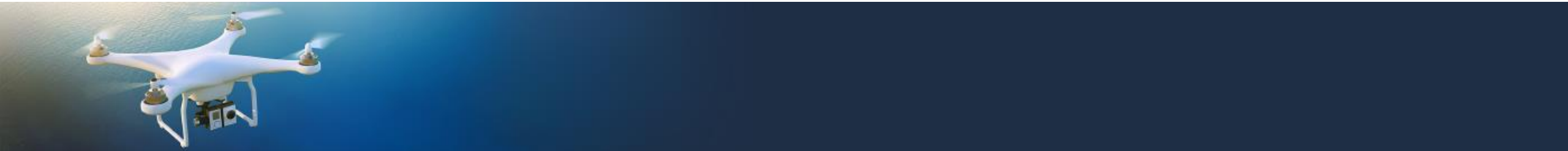
- DoD groups focus on airspace
  - Breaks at Class A (18K ft. for IFR)
  - Does not align with FAA Safety Continuum
  - Works for equipage, but not civil risk exposure
- FAA classification (next page)
  - Starts with energy based risk class
  - Allows mitigation down from initial certification class for operational and geographic mitigations



FAA Classification By Energy

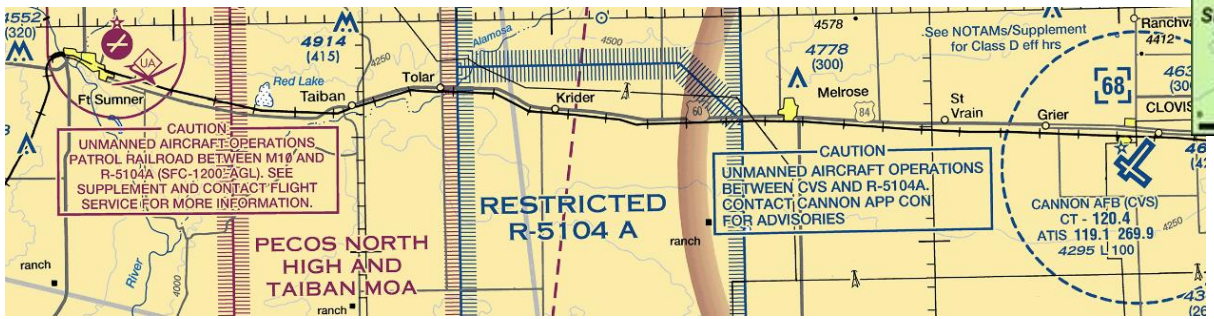


- FAA UAS groups match continuum, for manned aircraft
- Natural groupings by size, energy, airspace, means of control, etc.



Restricted TC For Remote Area Ops

- Operations – Chukchi Sea, AK North Slope, NM Desert
- Limited geographic area/strict operations
- Safety mission
  - Significant Risk for manned aviation
  - Wildlife, geological surveys, search and rescue, rail safety
  - Limited Risk Exposure



14 CFR 21.17(b) Tailored Certification Process

- Risk drives level of effort and oversight by FAA
- ASTM Standards used for small UAS outside of 14 CFR Part 107
- 14 CFR Part 23 Commuter or Part 25 rules for large UAS

Partnership For Safety Plan

- It is a written agreement that sets out the working relationship between an applicant for product certification or approval and the FAA.
- The Applicant and the FAA agree to work to the principles outlined in the PSP.
- PSP agreements will vary depending on the Applicant’s certification experience and/or level of interaction with the FAA.

Project Specific Certification Plan (PSCP)

- The PSCP is a key tool in meeting the 14 CFR part 21 requirements for the certification and approval of a product.
- It provides the detail definition of the product and the compliance requirements for successfully completing a specific certification or approval project.
- The PSCP is designed to be used as a project management tool, with gates (pre-defined critical program milestones), performance measures, and information unique to the certification project.
- The PSCP should allow you to manage a project in the manner most efficient within their company.

Project Specific Certification Plan (PSCP)

- At the time of application, the extent and depth of the information in the certification plan should be sufficient to determine the feasibility of the applicant's proposed schedule.
- When the certification plan does not give the FAA assurance to the applicant's understanding of the scope and magnitude of the certification project, the FAA should reject the application and consider the need for another familiarization briefing.

1) General information including applicant identification, application date, model designation, and so forth.

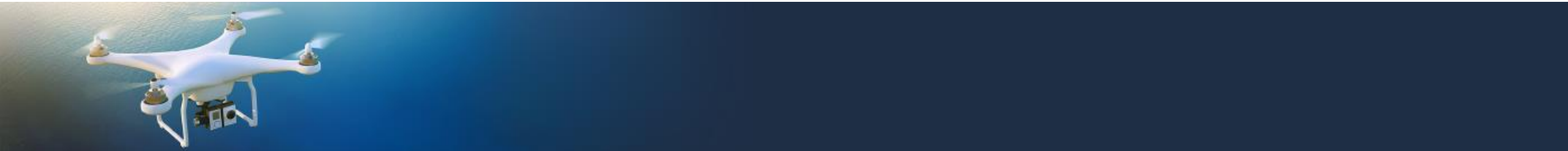
2) A description of the proposed design or design change including sketches and schematics.

3) The intended regulatory operating environment (for example, 14 CFR parts 91, 121, and 137). This should identify the kinds of operations for which the product will be used, and the kind of program under which the product will be maintained.

4) The proposed certification basis including applicable regulation paragraphs and subparagraphs with amendment levels, exemptions, ELOS findings, and special conditions.

Project Specific Certification Plan (PSCP)

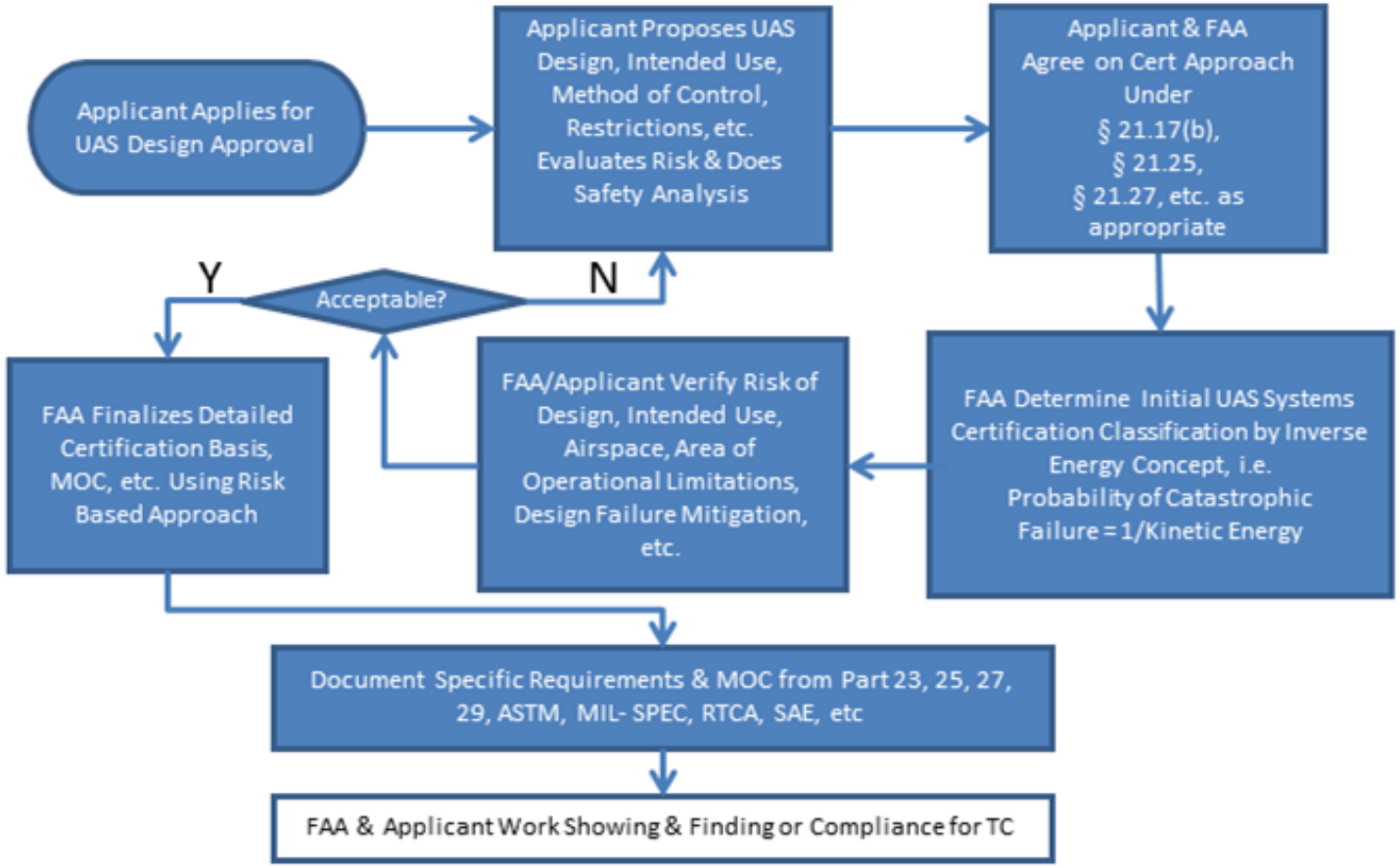
5) A description of how compliance will be shown (ground test, flight test, analysis, similarity, or other acceptable means of compliance). The description of the means of compliance should be sufficient to determine that all necessary FAA data will be collected and all findings can be made.
6) A list of documentation that will be submitted to show compliance with the applicable certification basis, and how the applicant will ensure that all showings have been made. This can be accomplished using a compliance checklist addressing each section of the regulations applicable to the product.
7) A list of test articles to be used to generate compliance data. Identify any features or attributes for which special instructions to the manufacturing inspector will be necessary to ensure the test article meets the requirements of its tests (for example, dimensions at one or the other end of a tolerance band).

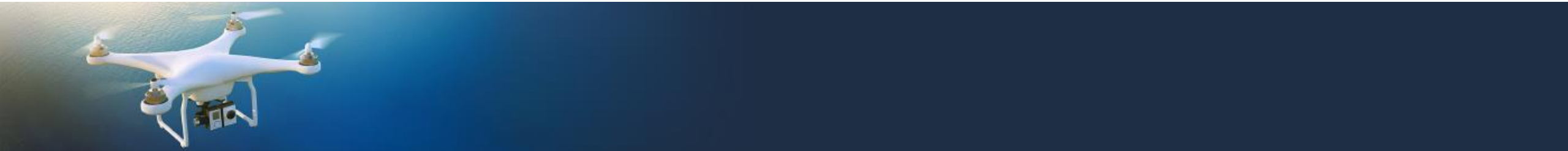


Project Specific Certification Plan (PSCP)

8) A description of how the continued operational safety requirements will be met after the TC is issued.
9) A project schedule including major milestones, such as preliminary hazard analysis submittal dates, substantiating data submittal dates, conformity and testing completion dates, and expected date of final certification.
10) Identification of all DERs intended for use in the certification project, their areas of authority, and whether they will be approving data or recommending approval of data.
11) Identification of all designated manufacturing inspection representatives (DMIR), designated airworthiness representatives (DAR), and organizational designated airworthiness representatives (ODAR) intended for use, their authorized function codes, and their proposed inspection activities.

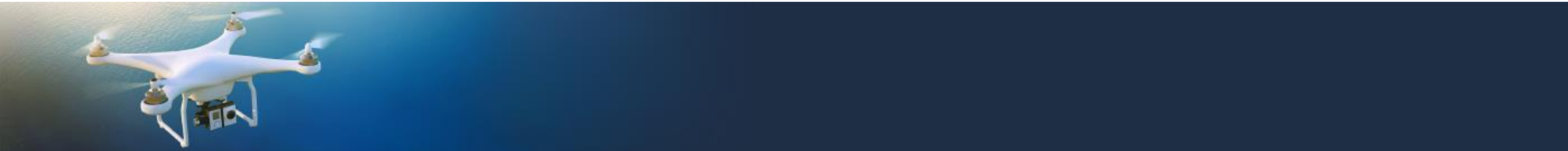
Tailored UAS TC Process





Certification: Driving Principles

- Tailored TC Requirements:
  - Vehicle, mission, and area of operation – managed risk
  - Use industry and FAA standards
- Single TC Approach Will Not Work
  - Follow safety continuum
- Manage Risks – Do-No-Harm
  - UAS must meet existing NAS requirements, not the other way around



Conceptual Certification Involvement