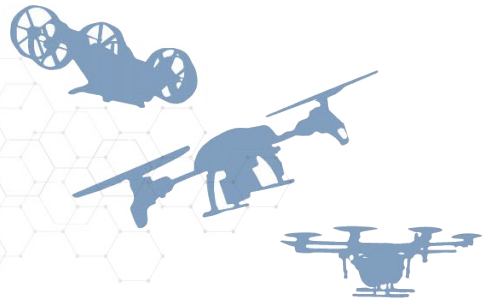




**Federal Aviation
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UAS Flight Rules

A Brief to SEA Civil Aviation Authorities

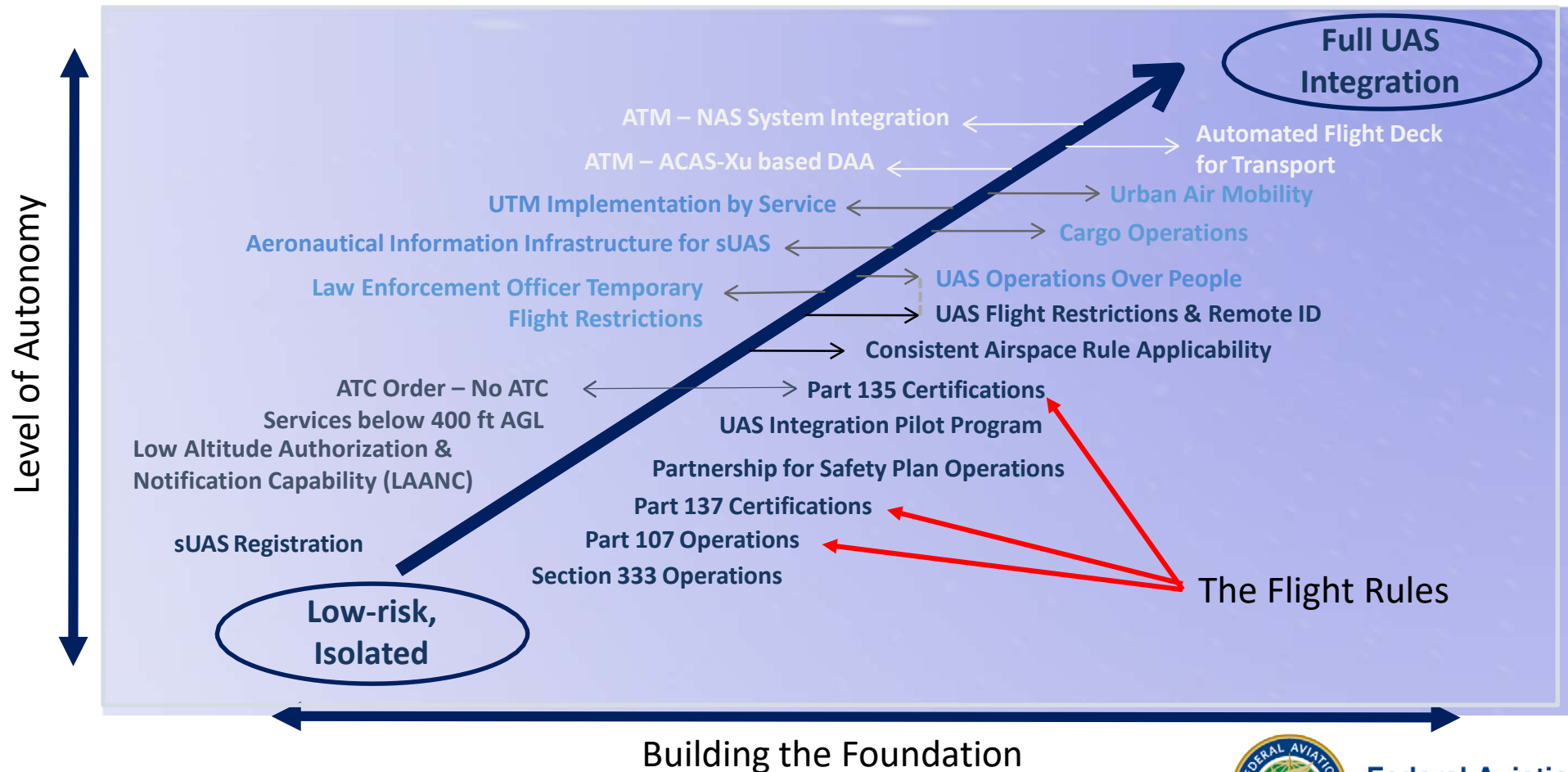
John Meehan, AFS-850

Some Terminology

- Many definitions found in 14 CFR 1.1
- Unmanned Aircraft System (UAS)
- Optionally Piloted Aircraft (OPA)
- In this presentation, UAS = UAV = RPAS = Drone
- A “Public Aircraft” is an aircraft, usually operated by a government, flown under strict statutory criteria (49 USC 40102(a)(41) and 49 USC 40125)
- A “Civil Aircraft” is any aircraft that is not a “public aircraft”
- Small UAS (sUAS) is a UAS that weighs less than 55 pounds (25kg)



The Roadmap and the Flight Rules



What rules do Non-Military UAS fly under in the USA?

Exception for
Limited Rec
Flyers
(49 USC 44809)

Title 14 of the US
Code of Federal
Regulations

General Operating
and Flight Rules
(Part 91)

All Public UAS
Civil UAS 55 pounds (25kg) or more
And more...

Small UAS
Operating Rules
(Part 107)

Civil UAS up to 55 pounds (25kg)

Commuter and On-
Demand Operations
(Part 135)

BVLOS UAS Cargo delivery
Across US State Lines



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Other “Additive” Rules

- External Sling Load Operations-
 - 14 CFR Part 133
- Agricultural Aircraft Operations-
 - 14 CFR Part 137
- These rules are *additional (additive)* to the other flight rules, and usually require additional certification, depending on the nature of the operation



Civil Small UAS Rules (Part 107)

- Applies to small UAS up to 55 pounds (25 kg), flown as a “civil” (not “public”) aircraft
- Uncontrolled airspace
- Daylight
- Up to 400’ (122m)
- No Hazardous Materials (HAZMAT)
- Visual Line Of Sight (VLOS)
- Requires Visual Observer (VO) if using First Person View (FPV)
- All drones flown under Part 107 must be registered and marked



General Operating and Flight Rules (Part 91)

- Originally written (and still used) for manned general and commercial aviation
- **Used for Civil UAS** operated for non-recreation purposes that weigh 55 pounds (25kg) or heavier
- **Used for Public UAS (aka Public Aircraft)**, of ANY weight, used for some Federal, State, Local, US Territory, and Indian Tribal Nation entities for limited, “qualified” missions



General Operating and Flight Rules (Part 91)

- **All UAS flown under Part 91** are required to obtain a Certificate of Waiver/Authorization (a COA) FAA Form 7711-2 to operate in the US National Airspace System (NAS)

The COA is a dual purpose document and functions as an Airspace Authorization and waives some Part 91 rules (and imposes other conditions and terms)

- **Civil UAS flown under Part 91** require a Part 61 pilot certificate and may need to obtain additional exemptions
- **Public UAS** are exempt from *some* rules, Part 61 certificate not required because they certify their pilots



UAS Part 91

- **Special Airworthiness Certificate- Experimental Category (SAC-EC)** Used for flight testing, market surveys, customer demos of 55 pounds (25kg) or heavier UAS
- **Public Aircraft Operations**
- UAS 55 pounds (25kg) or heavier UAS **flown for a commercial purpose**



On Demand Cargo Delivery (Part 135)

- On-demand delivery UAS operations that
 - cross US state lines or
 - Fly Beyond Visual Line of Sight (BVLOS)
- **Requires a Type Certificated UAS as part of the application**
- No “unrestricted” Part 135 UAS certificates have been issued yet, but dozens are in the queue
- Operations under 14 CFR Part 135
- Will likely require a COA to operate



Compliance and Enforcement Issues

- Most UAS regulations enforcement actions fall into these categories (usually multiple violations)

• 107.12	Remote Pilot Certification	48%
• 107.13	UAS Registration	46%
• 107.23	Hazardous Operations	43%
• 107.39	Operations Over People	40%
• 107.41	Controlled Airspace	33%

- Education and outreach are key
 - FAA leverages social media, civilian representatives (DronePro's), and industry to get the word out



Part 107 Waivers

- Waiver requests provide insight to rulemaking activities
- Most frequent waiver granted is 107.29 Daylight (to allow night ops)
- Waiver/Exemption process is laborious for both applicant and FAA
- Most waiver requests are denied due to failure to address published guidelines or inadequate safety mitigations

Top 5 Requested Provisions	Requests Submitted	Waivers Approved
Night Operations	16,803	4,269
Operations over People	6,284	158
BVLOS Operations	4,045	81
Operational Limitation: Altitude	2,765	96
Operations from a Moving Vehicle	1,831	6

As of 31 July 2020



Summary

- Many sets of flight rules, depending on many factors
- Integrating UAS into existing flight rule framework requires many exemptions and/or waivers
- Exemptions and waivers inform rulemaking and policy
- Part 107 enabled low risk operations to start the learning
- Heavier and more complex operational concepts proposed are increasing in frequency



Supplemental Information



Type Certificate (TC)

- Rigorous process, similar to manned aircraft certification
- **The long term solution for commercial and public aircraft operators**
- currently managed by FAA Los Angeles Airworthiness Certificate Office (LA-ACO)
 - Two restricted TCs have been issued for sUAS for limited package delivery
 - Dozens of applications in the pipeline
- First step to a Production Certificate (PC) which is needed to mass produce TC'd UAS



Part 91 Operating Examples



Agricultural Aircraft Ops

- To spray “economic poisons” with an aircraft (UAS included), the operator must comply with Part 137
 - Civil UAS Ag Ops require a Part 137 Ag Aircraft Operating **Certificate**
 - Public UAS Ag Ops must comply with most of Part 137 but do not require an Ag Aircraft Operating Certificate
- Advisory Circular 137-1B describes the process
- Part 137 certification process is managed by FAA local (district) offices



Agricultural Aircraft Ops

- **Flown under Part 91** if UAS weighs 55 lbs (25kg) or more (or any weight if operated as a Public Aircraft)
- **Flown under Part 107** if UAS weighs under 55 lbs (25kg) and is operated as a civil aircraft
- **Civil UAS require “exemptions”** from many regulations
- “Exemptions” must be obtained **prior to** applying for the Ag Aircraft Operating Certificate



Platform testing/market surveys

- Flown under Part 91 with a **Special Airworthiness Certificate, Experimental Category (SAC-EC)**
 - Applies to non-recreational UAS/OPA, usually weighing 55 pounds (25kg) or more used for research and development (R&D), showing compliance with regulations, crew training, exhibition, and/or market survey, as defined in 14 CFR 21.191
 - Also used for **Special Flight Permits** for flight testing uncertificated UAS/OPA
 - **Often used for purposes leading to a Type Certificate**
- FAA Order 8130.34D describes process
- Requires a COA to fly in the NAS



Flying a civil UAS 55 pounds (25kg) or more in commercial operations

- Section 44807 Grant of Exemption
 - Formerly known as a Section 333 Grant of Exemption
- Civil UAS weighing 55 pounds (25kg) typically used short term (24 months) for commercial purposes
- Often used with a Part 133 or 137 certificate
- **Does not lead to a Type Certificate**
- Usually limited to 24 months



Flying a civil UAS 55 pounds (25kg) or more in commercial operations

- Operator petitions for a “grant of exemption” from rules they want relief from under Section 44807
- Operates under Part 91 with a COA

