

LEGAL, POLICY, REGULATORY, LEGISLATIVE OUTLOOK

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Forbes

An aircraft is “any” “device” that is “used for flight.” We acknowledge the definitions are as broad as they are clear, but they are clear nonetheless.”

—NTSB in *Pirker* decision



Current Regulatory Environment For Commercial Operation

- All Commercial UAS Operations Still Illegal Without Approval
- Fly at an approved test site
- COA (limited to public agencies)
- Experimental certificate (Amazon testified today that their Experimental Certificate approved last week is already out of date)
- 333 exemption for your specific site
 - pilots/closed site/90 day turnaround
 - 90 days for each modification
- Go to Canada/Australia

Today's Developments

- New and existing 333 exemptions will now come with a blanket COA
- FAA will begin engaging in summary approval of similar 333 exemption requests

What's Coming In Europe

- Far more permissive, and about to get more so
- Three categories of operations
 - Open
 - Specific
 - Certified

Timeline

- NPRM Publicly Released at 10 AM Sunday Press Conference on February 15, 2015
- NPRM Opened for Comment on February 23, 2015
- Comment Period Closes April 24, 2015
- Comment period can be extended by FAA
- FAA Conducts Analysis and Internal Review of Comments
- Release of Final Rule between late 2016 and early 2017

sUAS Rule

- Rules will be codified in the Federal Aviation Regulations
- Proposes creation of new FAR Part 107
- Regulations will be enforceable in the same way as any other portions of the FARs
- FAA Civil Penalty system will apply to violations of the new regulations
- FAA will take certificate actions against unsafe UAS Operators

Model Aircraft/Hobbyists

- Do not need to comply with sUAS rule, instead are governed by model aircraft rules
- However, any flight that is not purely for recreational purposes must comply with Part 107

To provide guidance, the following are examples of flights that could be conducted as hobby or recreation flights and other types of flights that would not be hobby or recreation.

Hobby or Recreation	Not Hobby or Recreation
Flying a model aircraft at the local model aircraft club.	Receiving money for demonstrating aerobatics with a model aircraft.
Taking photographs with a model aircraft for personal use.	A realtor using a model aircraft to photograph a property that he is trying to sell and using the photos in the property's real estate listing. A person photographing a property or event and selling the photos to someone else.
Using a model aircraft to move a box from point to point without any kind of compensation.	Delivering packages to people for a fee. ⁶
Viewing a field to determine whether crops need water when they are grown for personal enjoyment.	Determining whether crops need to be watered that are grown as part of commercial farming operation.

14 CFR Part 91, [Docket No. FAA-2014-0396]

Interpretation of the Special Rule for Model Aircraft

What types of operations will be allowed under NPRM/Part 107

- Crop Monitoring/Inspection
- Research And Development;
- Educational/Academic Uses;
- Power-line/Pipeline Inspection In Mountainous Terrain;
- Antenna Inspections;
- Aiding Certain Rescue Operations Such As Locating Snow Avalanche Victims;
- Bridge Inspections;
- Aerial Photography
- Wildlife Nesting Area Evaluations.

Operator Qualifications Under NPRM

- Regulations do not refer to them as “Pilots”
- Proficient in English
- Must be at least 17 years old
- Must pass an Initial Aeronautical Knowledge Test
- Tests administered at FAA-approved Knowledge Test Centers
- TSA Background Check
- No Medical Certificate required
- No vision test
- No requirement to demonstrate flight proficiency
- Application process expected to take 6-8 weeks

Knowledge Test

- Airspace classifications
- Flight restrictions
- UAS regulations
- Obstacle avoidance
- Weather effects on small UAS
- How to respond to an emergency
- Weight and Balance
- Aeronautical decision making and crew resource management
- Airport and radio operations
- Effects of drugs or alcohol
- Renewed every 2 years (covering smaller subset)

Beyond VLOS Not Permitted

- All flights must be conducted where the Operator can see the aircraft at all times
- Beyond Visual Line of Sight (BVLOS) not permitted
- If a VO is used operators must still have the capability of exercising control based on VLOS
- First Person View (FPV) technology exists, but FAA is not willing to allow it yet. (tunnel vision concerns)



- Operation in Class A Airspace Prohibited (18,000'+)
- Operation in Class B, C, or D airspace permitted only with permission from Air Traffic Control (ATC)
- Operation in lateral boundaries of the surface area of Class E airspace designated for an airport only permitted with ATC permission.
- No equipment technically required for operating in B, C or D airspace
- Procedures are left to local ATC
- Letter of Agreement can be used to establish procedures (recurring
- UAS cannot fly in airspace restricted by a NOTAM
- Operation above 500 feet prohibited

Operational Restrictions

- Maximum take-off weight 55 pounds, Maximum air speed 87 knots (100 MPH)
- Flights only permitted in daylight (official times in FAA Almanac)
- Minimum visibility 3 miles
- Must keep no less than 500 feet below clouds and 2,000 feet horizontal separation from clouds
- UAS must always yield right-of-way to other aircraft (Yielding the right-of-way means that the small unmanned aircraft must give way to the aircraft or vehicle and may not pass over, under, or ahead of it unless well clear)
- Objects cannot be dropped from the UAS if it causes a hazard to persons or property on the ground
- UAS operators and visual observers would also be subject to the existing regulations of § 91.19, which prohibit knowingly carrying narcotic drugs, marijuana, and depressant or stimulant drugs or substances
- UAS cannot be operated in a careless or reckless manner
- Cannot fly directly over persons

Registration and Markings

- All small UAS flown commercially have to be registered
- Any foreign entity that cannot register an aircraft in the US can't fly under these rules
- All small UAS flown commercially have to display their registration number
- No requirement for manufacturer-supplied fireproof identification plate

Discussion



Future Look

Why Drones?

SAFETY

Remotely piloted

Access to hard-to-reach places

Likelihood and impact of accidents reduced

Insurance less complex

COST

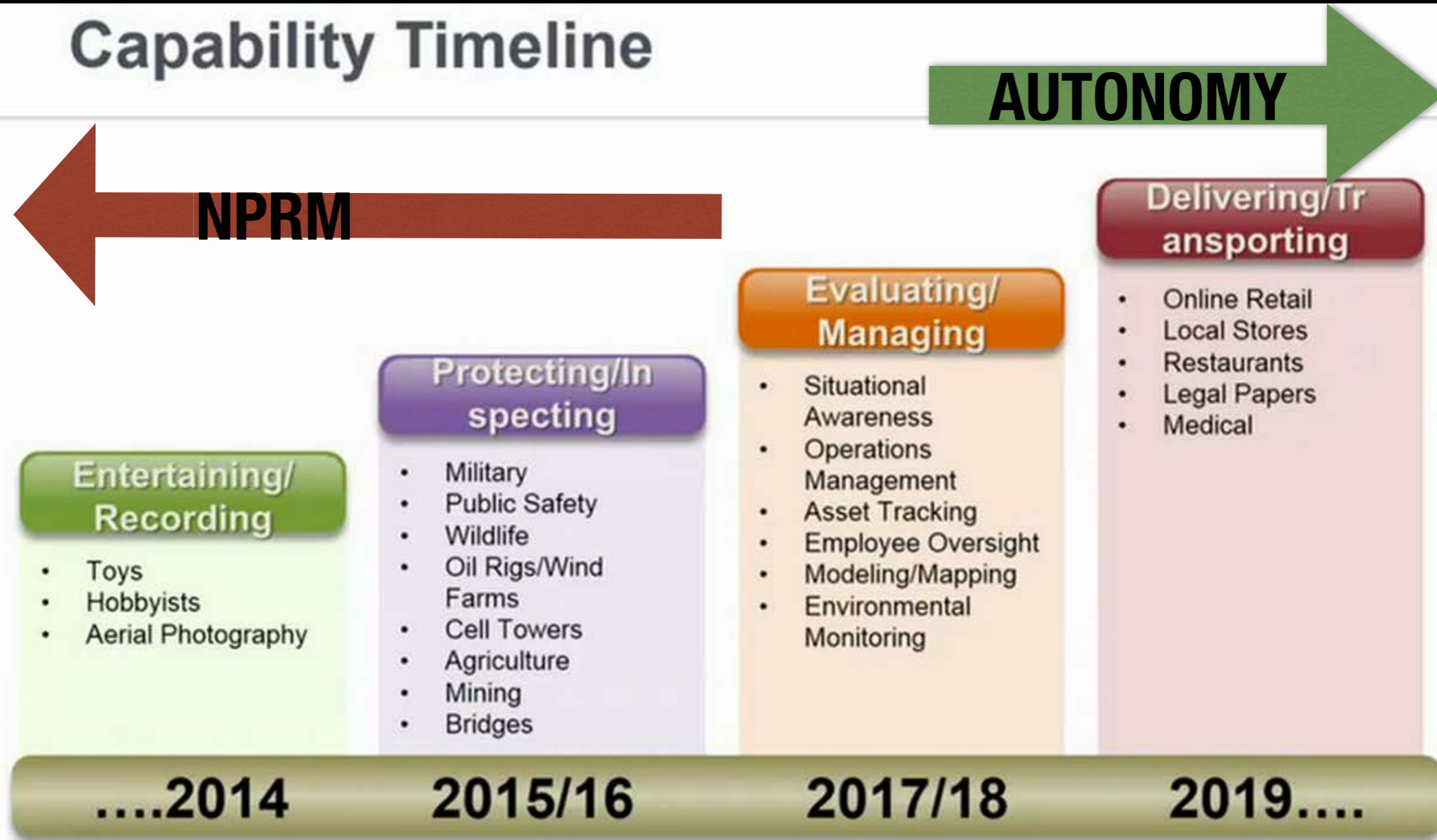
More accurate imagery and data than ground-based sensors

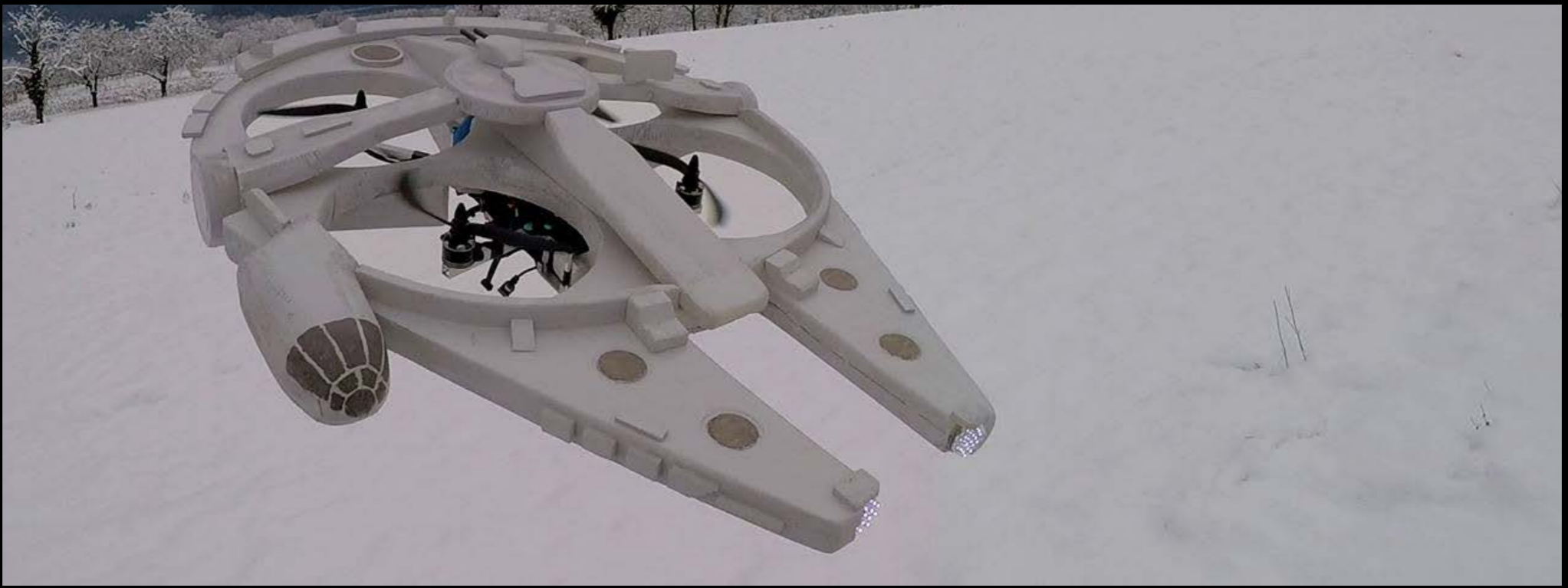
Results available same day compared to weeks from satellites

Flight endurance of 12 hours+ reduces number of missions

Actionable data improves yields and reduces expenses

Capability Timeline







Some of the more than 1000 available drones

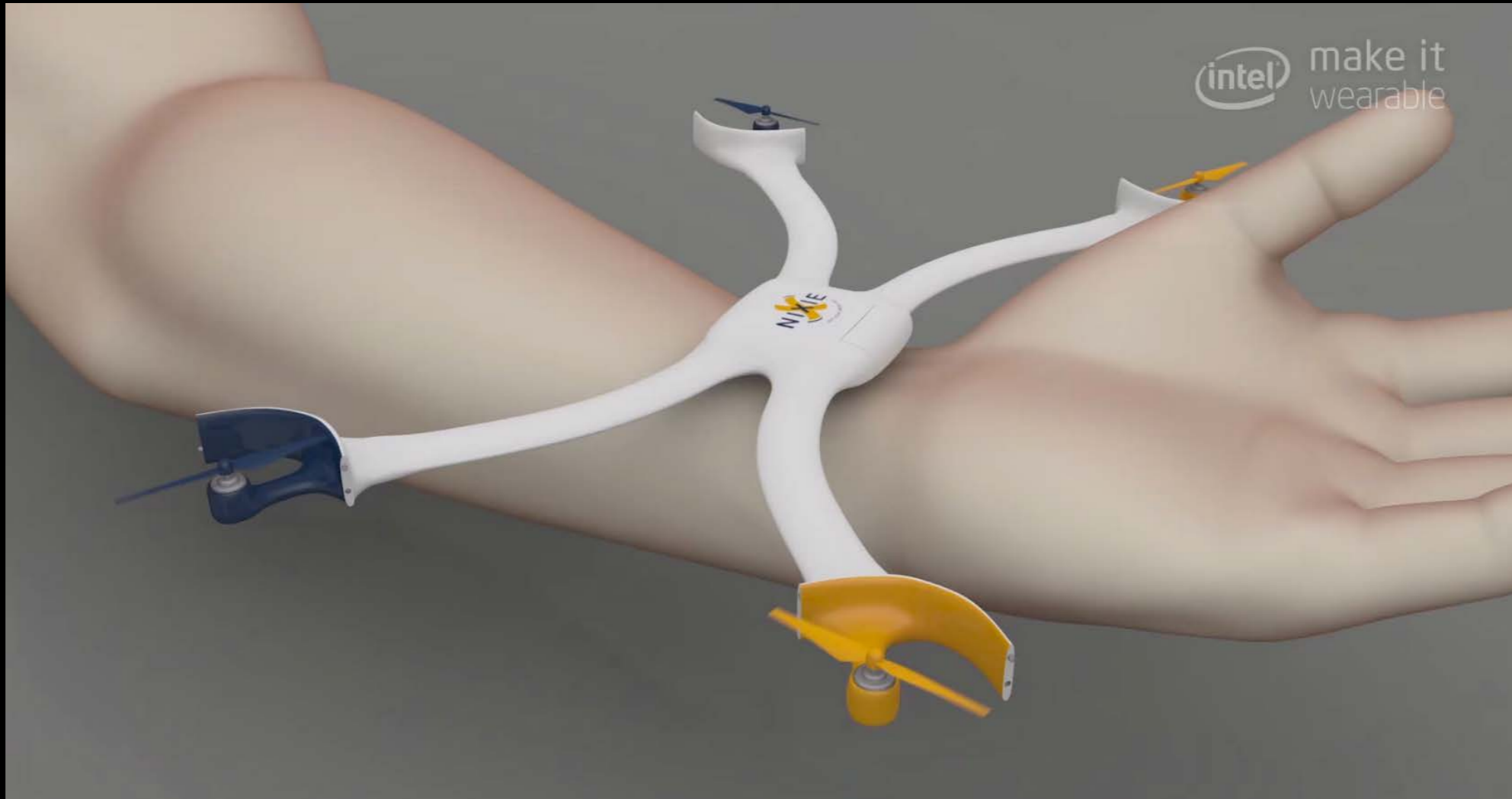
COMMERCIAL-GRADE

INDUSTRIAL-GRADE

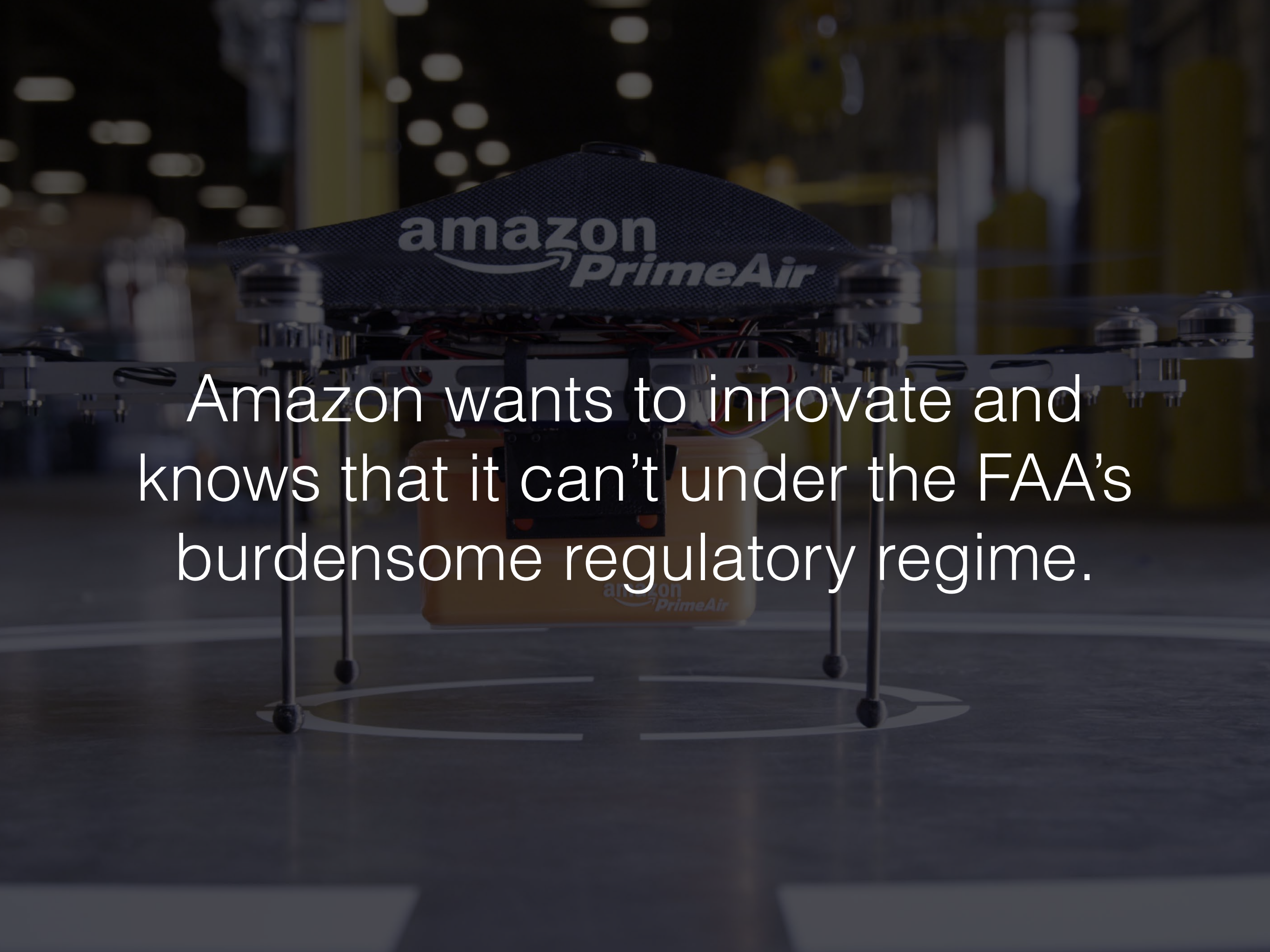


Manufacturer	Lockheed Martin	Draganfly	Lehmann Aviation	Boeing Insitu	Arcturus UAV, LLC	Elbit Systems	Lockheed Martin
Model	Indago	X6	LP960	ScanEagle	T20 with JumpVTOL	Hermes 450	Fury
Max T/O Weight	4.8 lbs	2 kilograms	1.25 kilograms	22 kilograms	79 kilograms	550 kilograms	Unspecified
Endurance	45 minutes	~20 minutes	25 minutes	24-28 hours	>16 hours	17 hours	>15 hours
Payload Capacity	Unspecified	0.5 kilograms	Not Specified	3.2 kilograms	~34 kilograms	~180 kilograms	Unspecified






But The Future Is Not
Entirely In FAA Hands

A close-up, slightly blurred photograph of an Amazon Prime Air drone. The drone is white with a black top surface featuring the 'amazon PrimeAir' logo. It has four propellers and a central motor assembly. The background is dark and out of focus, showing some vertical lines and light spots. The text is overlaid in white, centered on the drone's body.

Amazon wants to innovate and knows that it can't under the FAA's burdensome regulatory regime.

LESSONS LEARNED FROM
FMRA SECTION 332 (ARCTIC OPERATIONS)
FMRA SECTION 333 (EXEMPTION PROCESS)



A close-up, slightly blurred photograph of an Amazon Prime Air drone. The drone is dark-colored with a white top canopy that features the 'amazon PrimeAir' logo in white. It has four propellers and is positioned on a light-colored surface. The background is dark and out of focus, showing some vertical lines and lights.

If the FAA doesn't grant Amazon's request, the company will move their drone R&D operations outside of the U.S.

Amazon's Competition



Taking Their Business Abroad

THE LANCASTER PLATFORM



ARTIFICIAL INTELLIGENCE

In-the-air flight path calculations

Our proprietary AI detects weather conditions in the air and creates its own optimal flight path while in the air.

In-the-air data assessment

All data that is collected is instantly assessed in the air to ensure and eliminate the need to re-fly.

IN-FLIGHT DIAGNOSTICS & MONITORING

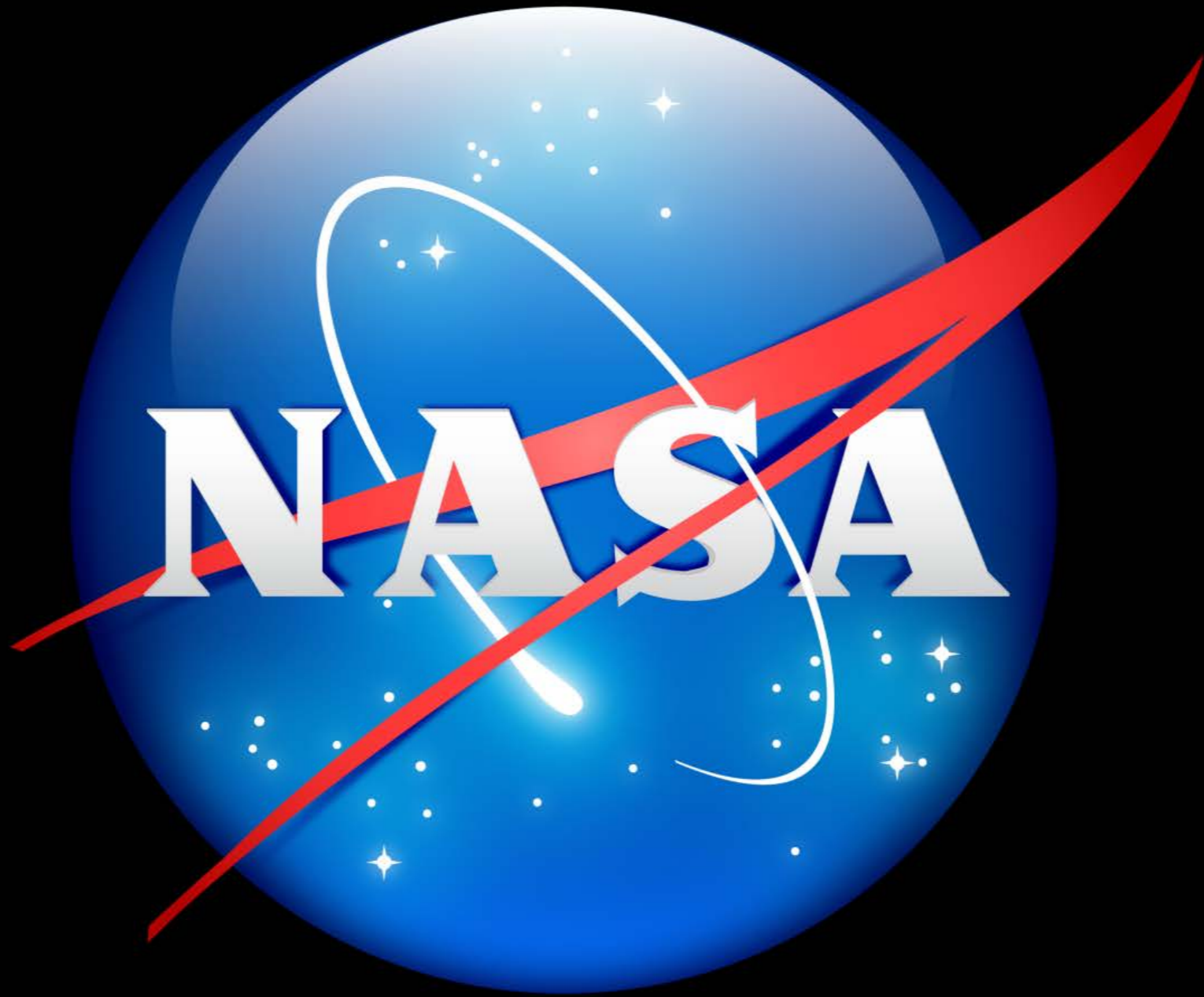
Continually monitors itself while in flight: checking battery life, operational weather/wind limitations, structure cracks, fatigue analysis and other internal performance checks.

HARDWARE

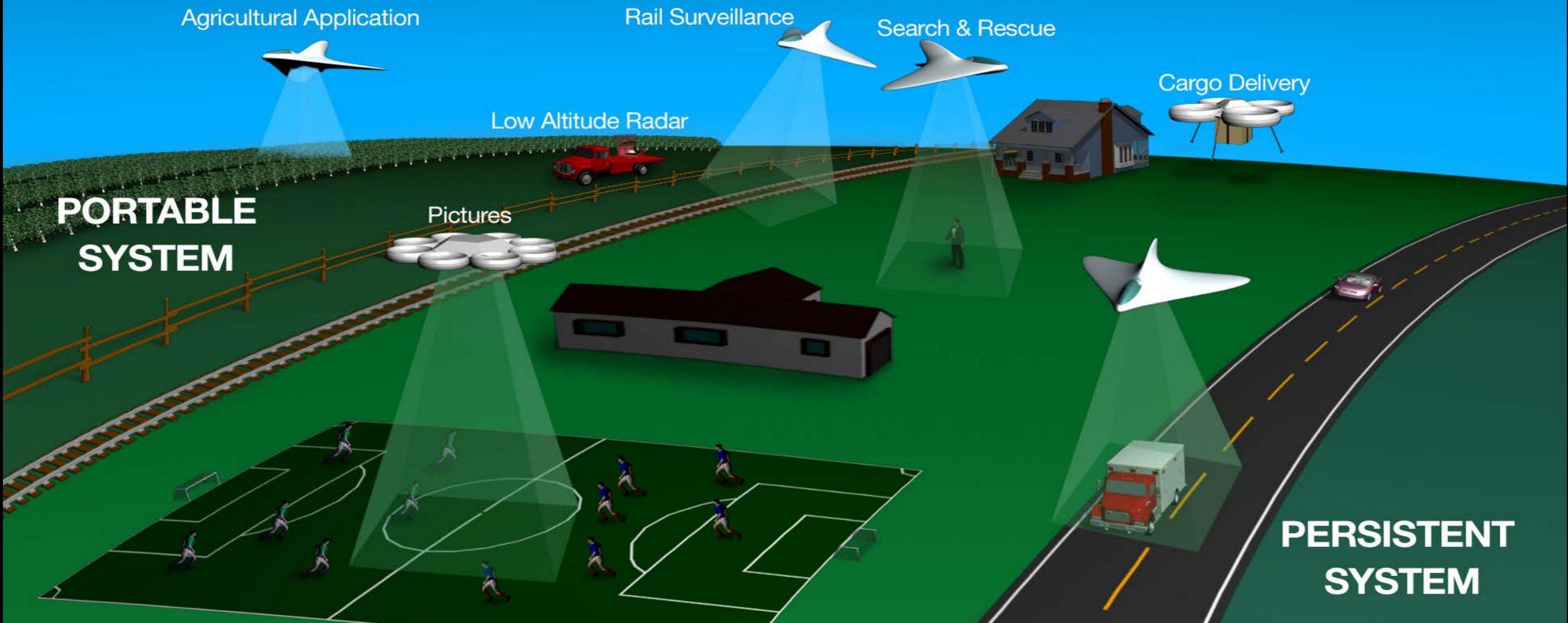
Processors : 600 Mhz CPU with linux os Embedded Processing	Weight : 3lbs
Interfaces : Wifi, Ethernet, Bluetooth, Serial, USB, Digital, Analog, IIC	Wingspan : 4 feet
	Payload : Capacity - 2.2lbs Swappable

Capability Timeline





NOTIONAL SCENARIO



- **Near-term Goal** – Enable initial low-altitude airspace and UAS operations with demonstrated safety as early as possible, within 5 years
- **Long-term Goal** – Accommodate increased UAS operations with highest safety, efficiency, and capacity as much autonomously as possible (10-15 years)

PRIVACY



**““THERE WAS A DRONE RIGHT THERE AT
THE WINDOW LOOKING OUT AT ME.”**

—SENATOR FEINSTEIN

All ready to uncover why
Feinstein voted for the Iraq War.



Drone
Technology



\$17.85



A \$17.85 PINK TOY (NO CAMERA)

DIANNE FEINSTEIN AND THE PINK DRONE, OR WAS IT? —THE DAILY BEAST

“EARLIER THIS YEAR AT A SENATE COMMERCE COMMITTEE HEARING ON DRONE POLICY, SEN. DIANNE FEINSTEIN (D) OF CALIFORNIA SHARED A STORY ABOUT HOW A DRONE HAD CRASHED RIGHT OUTSIDE THE WINDOW OF HER HOME. SHE USED THIS STORY AS AN ANECDOTE FOR WHY LAWMAKERS SHOULD "PROCEED WITH CAUTION" IN PERMITTING A MORE WIDE-SCALE USE OF DRONES.”

—CHRISTIAN SCIENCE MONITOR, AUGUST 29, 2014

Phone
Technology



**AIRSPACE BELOW 500 FEET IS NOW
SOMETHING EVERYONE SEEMS TO
CARE ABOUT**

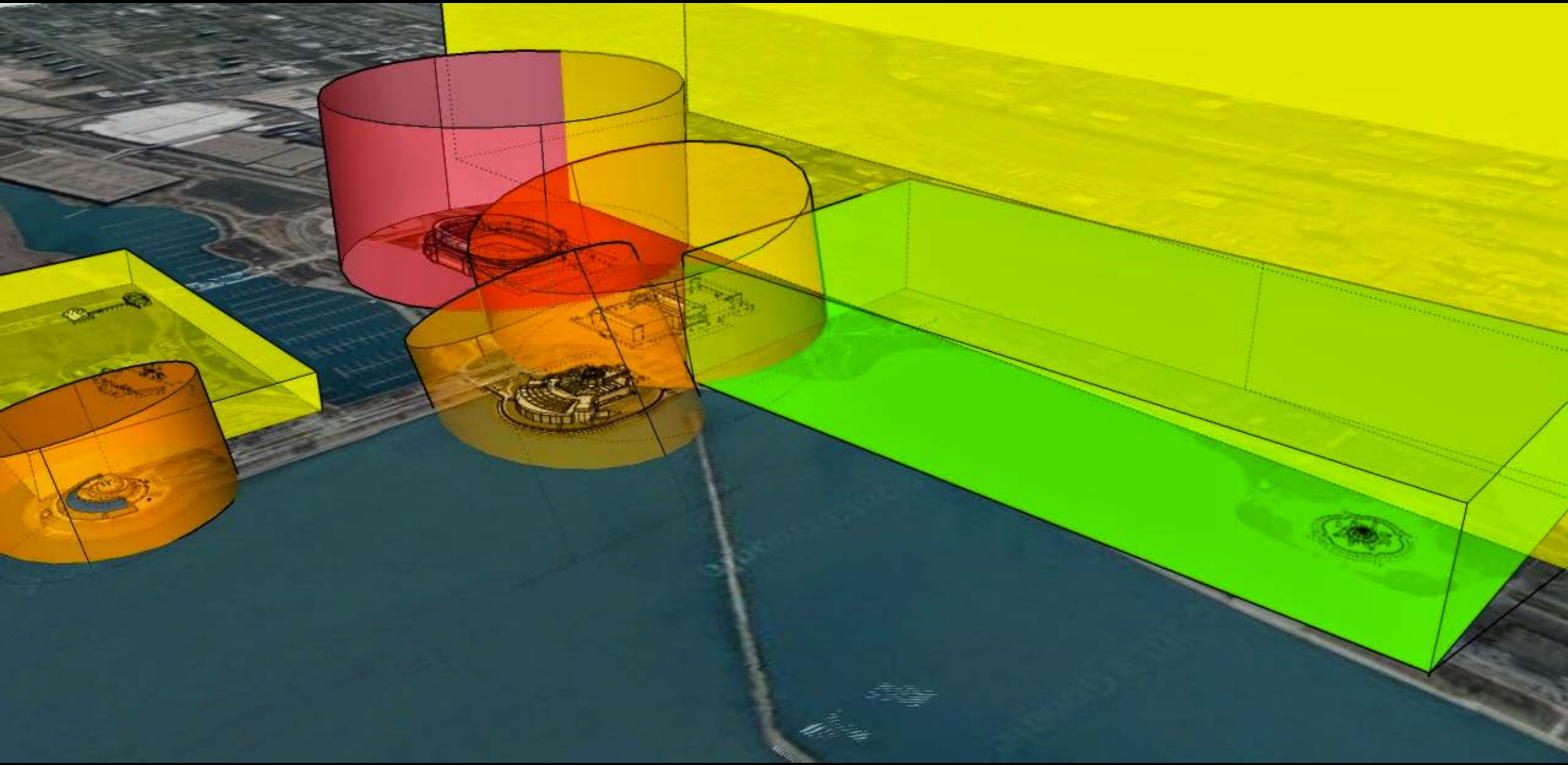
California SB142

(a) A person knowingly enters onto the land of another person ... if he or she operates an unmanned aerial vehicle below the navigable airspace, as defined in paragraph (32) of subsection (a) of Section 40102 of Title 49 of the United States Code, overlaying the property.



Hannah-Beth Jackson
REPRESENTING SENATE DISTRICT 19





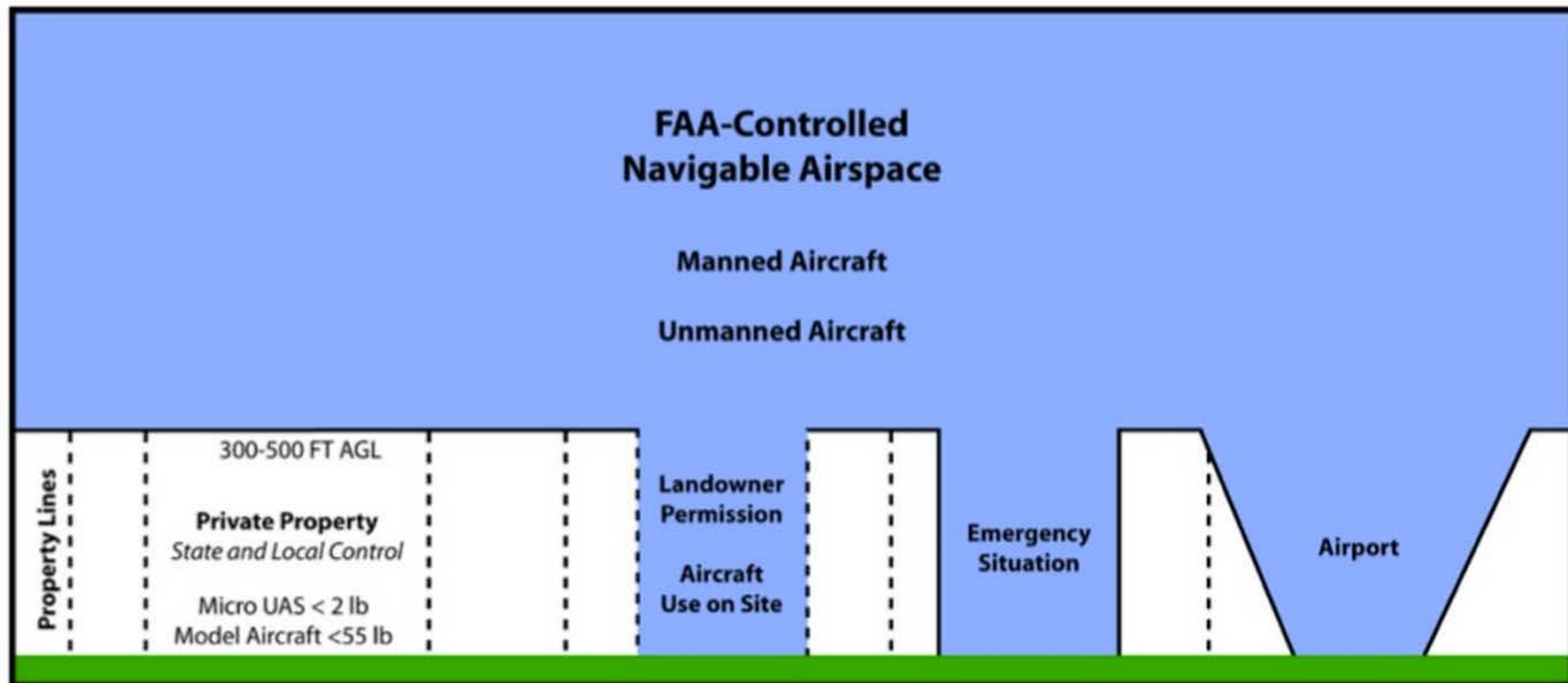


Figure 1. Zoned model of airspace in which UAS would only be allowed onto private property (below 300-500 feet altitude) with permission from the landowner, a warrant from a judge, or in the event of a public emergency. With this safer partitioning of the airspace, it is conceivable that micro-sized UAS could be operated over private property (below navigable airspace) without substantial FAA involvement. A zoned model nearly identical to the one shown here has served the United States well since the dawn of aviation.

Navigable Airspace

1000ft and above (Ciraolo)

500ft and above

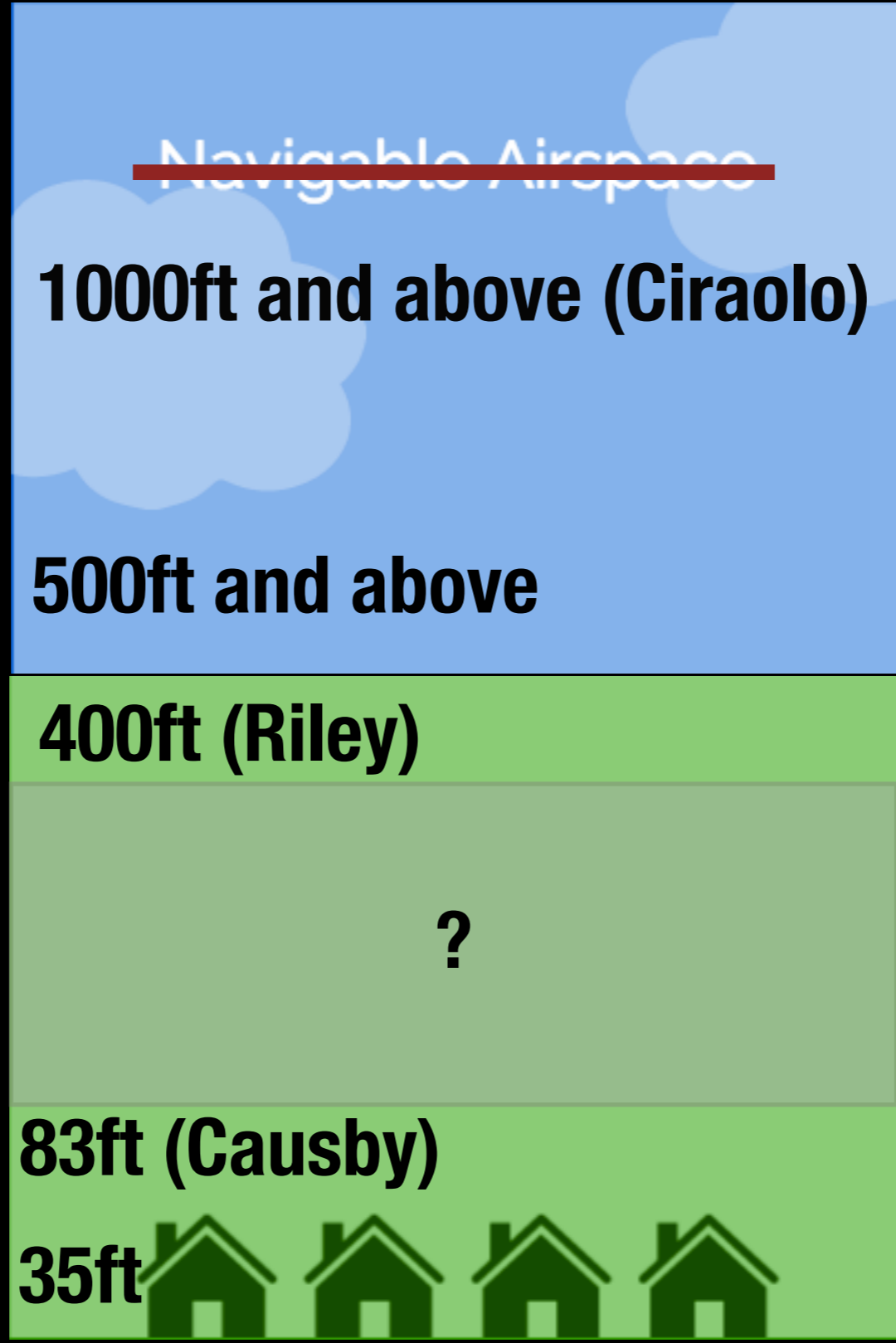
400ft (Riley)

?

83ft (Causby)

35ft





NAVIGABLE AIRSPACE???

Innovation

Capability Timeline

