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Definitions: Drone



- Remotely Piloted Aircraft System (RPAS)
- Unmanned Aerial Vehicle (UAV)
- Small Unmanned Aircraft System (SUAS)
- Model Airplane/Model Aircraft



- Key characteristic of a drone is that the aircraft portion of the system is unmanned, although all drones are piloted either by a person or computer.
- Take a Wide Variety of Forms, from small indoor-use children's toys to large sophisticated equipment
- As of Dec 21 2015, if over .55lb (250 Grams) must register with FAA



What does a SUAS consist of?

- In addition to the Aircraft itself, Unmanned Aerial Systems often include associated system components and support equipment-
 - Control Station
 - Computer Software
 - Communication Systems
 - Data Links
 - Telemetry
 - Navigational Tools
 - Data Storage, Processing, Analysis
 - Operator



FAA & UAV — Regulation struggles to keep up with technology

- 1981: Advisory Circular 91-57 Model Aircraft Operating Standards
- 2005: FAA Memorandum: AFS-400 UAS POLICY 05-01
 - outlining an interim policy for approving drones for domestic use.
- 2007: FAA clarified Advisory Circular 91-57
 - only applies to hobbyists and model aircraft, to the exclusion of individuals or companies flying a UAS for commercial or otherwise business purposes

1981



2005



2007



Huerta v. Pirker

- The FAA took action to punish someone for flying a drone.
 - On October 17, 2011, Pirker was hired to operate his 4.5-pound Ritewing Zephyr powered glider to snap a variety photos & video of the University of Virginia campus. The FAA alleged that he flew the drone at extremely low altitudes, through tunnels with moving cars below, and in close proximity to railway tracks and individuals, all in violation of an FAA regulation stating that “no person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.” In light of this alleged violation, the FAA levied a \$10,000 civil penalty against Pirker. (The private company that had hired Pirker to operate the drone faced no fine, nor did it receive a cease-and-desist letter.)
- Pirker fought the enforcement action in front of the National Transportation and Safety Board (NTSB),
 - Arguing the FAA did not have any authority to fine someone operating a drone because it had not issued any formal rules governing their use. Although the FAA’s 2005 memorandum and 2007 policy statement claimed that drone operators were subject to FAA regulation and purported to ban commercial use of drones, Pirker argued that these pronouncements were unenforceable because they had not been issued as formal rules consistent with the Administrative Procedure Act. Thus, the pronouncements could not bind him, and the fine was unenforceable.
- On March 6, 2014, an NTSB administrative law judge agreed.
 - According to the judge, if the FAA’s contention concerning the scope of its existing regulations were correct, its position “would then result in the risible argument that a flight in the air of, e.g., a paper aircraft, or a toy balsa wood glider, could subject the ‘operator’ to” FAA’s existing regulations. Moreover, that judge held that at the time of Pirker’s flight, “there was no enforceable FAA rule” that governed Pirker’s drone. As **the judge explained, Congress enacted the FMRA because “there were no effective rules or regulations” in place.**
- FAA appealed the *Huerta v. Pirker* ruling almost immediately.
 - On Nov 19, 2014, in a unanimous decision, the NTSB concluded that UAS are Aircraft within the FAA statutory & regulatory definition



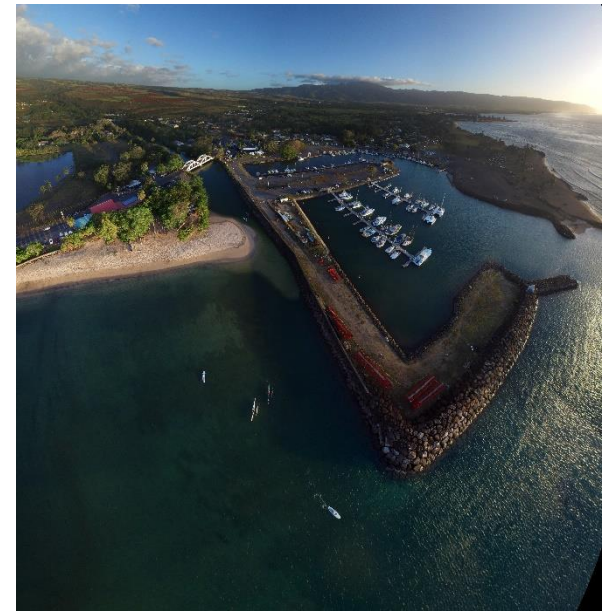
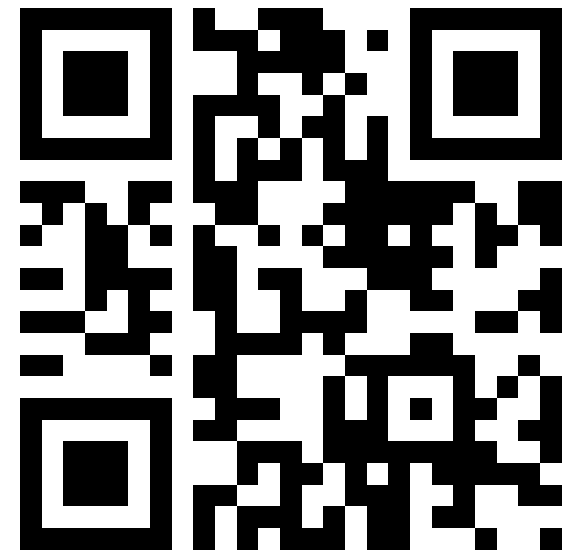
2012- FAA Reform & Modernization Act

- Stipulated UAV were to be integrated in NAS by 2015
- Section 333 Special rules for certain unmanned aircraft systems
- Section 336 Special rules for Model Aircraft



FAA UAV Categories

- Public: (Government)
 - Before deploying a UAV, local, State, & Federal Law enforcement agencies must obtain a COA from the FAA. When Applications for a COA are received, the FAA conducts a technical review of the UAS to ensure it is in the Public interest to operate the UAV, it is safe, and it does not significantly impact other air traffic.
- Recreational Users: (Hobbyist, for fun)
 - FAA Advisory Circular 91-57 covers the recreational use of airspace. Published in 1981, the advisory circular was an effort to regulate the recreational community. It outlines and encourages voluntary compliance by hobbyist – those that operate a UAS for recreational enjoyment and not for compensation. Limits flights below 400 feet AGL within Line of Site (LOS) and away from airports and air traffic. Although hobbyists are not required to comply with the Circular, they are held to a good judgement standard in operating a UAS.
- Civil: (Non-government)
 - Commercial operation of UAV is allowed with a Section 333 Exemption with UAV operated by FAA Aircraft License, or Under Part 107



Section 333 Exemption



HBWS received an exemption #13059 & Blanket COA

- 14 C.F.R. 61.23f(a) (c) Medical Certificate
- 14 C.F.R. 61.101e(4) & (5) Recreational Pilot Privileges
- 14 C.F.R. 61.113(a) Private Pilot Privileges
- 14 C.F.R. 61.315(a) Sport Pilot Privileges
- 14 C.F.R. 91.7(a) Civil aircraft airworthiness
- 14 C.F.R. 91.119(c) 500ft buffer
- 14 C.F.R. 91.121: Altimeter settings
- 14 C.F.R. 91.151(a)(1) Fuel minimums
- 14 C.F.R. 91.405(a) Maintenance Related
- 14 C.F.R. 91.407(a)(1) Maintenance Related
- 14 C.F.R. 91.409(a)(1) & (2) Airworthiness certificates
- 14 C.F.R. 91.417(a) & (b) Maintenance record keeping



February 2015: Proposed Rule Making

- The FAA proposed new regulations that will allow routine use of small (under 55 pounds) UAS in American skies. The rule proposes certain operating limitations designed for the safety of the public and other aircraft.



Presidential Memorandum

Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems

Memorandum for the heads of Executive Departments & Agencies

- Policies & Procedures for Federal Government Use
- Privacy Protections
- Civil Rights & Civil Liberties Protections
- Accountability
- Transparency
- Multi-stakeholder Engagement Process



June 21, 2016, Part 107



- New Rules for Non-Hobbyist for SUAS operations.
 - Covers a broad spectrum of commercial uses for drones weighing <55lbs.
 - Small UAS operator (≥ 16 yrs old) manipulating controls should avoid manned aircraft & never operate in a careless or reckless manner
 - Operate within Line of Site (LOS)
 - Fly during daylight or in twilight with appropriate anti-collision lighting
 - Minimum weather visibility of 3 miles from control station
 - Maximum allowable altitude is 400 feet AGL
 - Operating in class G airspace without ATC permission, Operations in Class B, C, D & E airspace need ATC approval
 - Transportation of property for compensation or hire is allowed IF:
 - The aircraft, including payload and cargo, weigh less than 55 pounds total
 - Flight conducted within LOS & not from a moving vehicle or aircraft
 - The flight occurs wholly within the bounds of a State & does not involve transport between Hawaii and another place in Hawaii through airspace outside Hawaii.
 - May apply for a COA for operations not currently covered by part 107

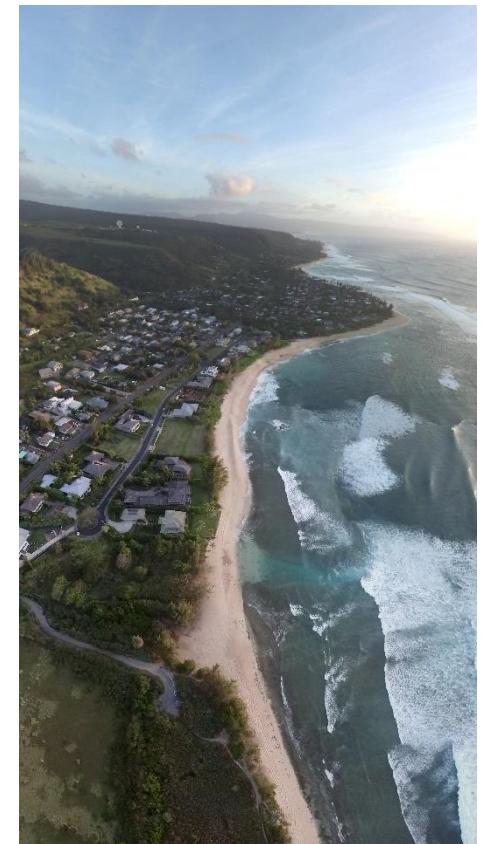


Voluntary Best Practice for UAS Privacy Transparency, & Accountability



Airspace & Common Law?

- Existing state law may protect people's interest against having drones flying over their property, most notably through the law of trespass.
 - At common law, "ownership of the land extended to the periphery of the universe." The potentially sweeping nature of that rule, however, was abrogated following the advent of airplanes and the Supreme Court's 1946 decision in *United States v. Causby*,
 - *U.S. v. Causby* involved a 5th Amendment takings claim by a chicken farmer who lived near a new runway. The government used the runway for Army and Navy aircraft, which would fly over the farm "close enough . . . to appear barely to miss the tops of the trees." The noise literally frightened dozens of the farmers' chickens to death and destroyed his ability to use the property as a chicken farm. The Court sympathized with the farmer's plight but placed limits on a property owner's ability to state a takings claim based on airplanes' flight over his property. It held that a landowner "must have exclusive control of the immediate reaches of the enveloping atmosphere" and that a taking occurs only when the government engages in activity that has a "direct and immediate interference with the enjoyment and use of the land."
 - In light of the *Causby* decision, the *Restatement* provides that "flight by an aircraft" constitutes a trespass if "it enters into the immediate reaches of the air space next to the land" and "interferes substantially with the [owner's] use and enjoyment of his land"

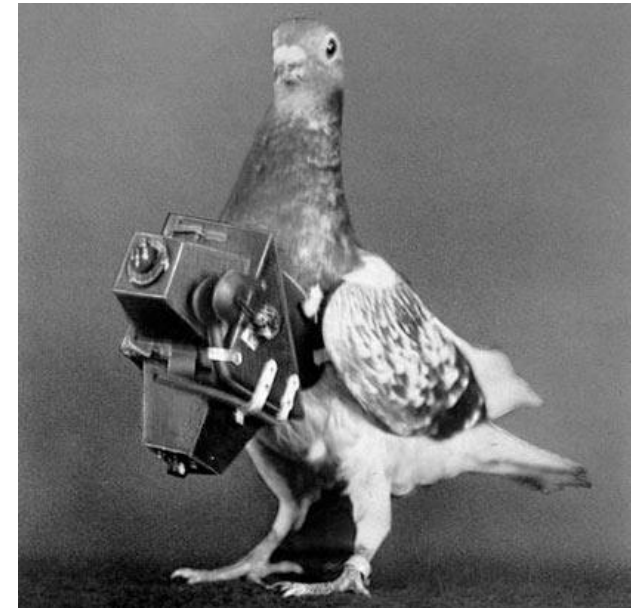


The Sky is the Limit...



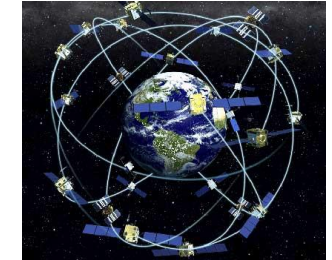
UAV's by Private Actors & Implications to Common-Law Privacy

- Safe guarding Privacy from UAV is an important societal interest.
- When confronted with UAV surveillance perpetrated by non-governmental actors, individuals, and private businesses, may rely on tort law claims. However traditional tort law falls short in addressing individuals' privacy.
- Tort Laws also protect people against physical harm that drones might cause. For instance, if a drone crashes into a person, that person can assert claims for battery or negligence, just as she could pursue a claim if she were hit by a ball or other flying object.
- In thinking about the private uses of UAS, the sky literally is the limit.





Advantages of UAV Technology



• Operational Costs	\$	\$\$	\$\$\$	\$\$\$\$
• Range of Missions	+++	+	++	+
• Transportation/Deployment	Easy	Medium	Hard	Rocket Science
• Potential	++++	+	++	Gov & Big Business
• Repeatability	On Demand	?	\$\$\$	Varies \$\$
• Turn-Around Time	Next Day	?	?	Varies ???

Risks of Drone Use

- Piloting error
- Inadequate training of personnel controlling drones, or overseeing drone use
- Mechanical or technical failure of drone
- Mechanical or technical failure of associated drone software, hardware or associated system
- Maintenance and storage of data and information, including images, captured via drone use
- Inappropriate use of drone by an employee
- Unauthorized breach of drone technology systems, including data & information storage and control systems
- Contracts related to drone use and operations
- Drone Accidents



How Might Local Municipalities Apply Drones

- Crime, Accident, and Fire scene investigation & documentation
- Search & Rescue
- Law Enforcement surveillance
- Fire suppression activities
- Monitoring & Inspecting Infrastructure
- Aerial photography & filming of events
- Property inspections & appraisals
- Natural Disaster Response, Damage assessment & mapping

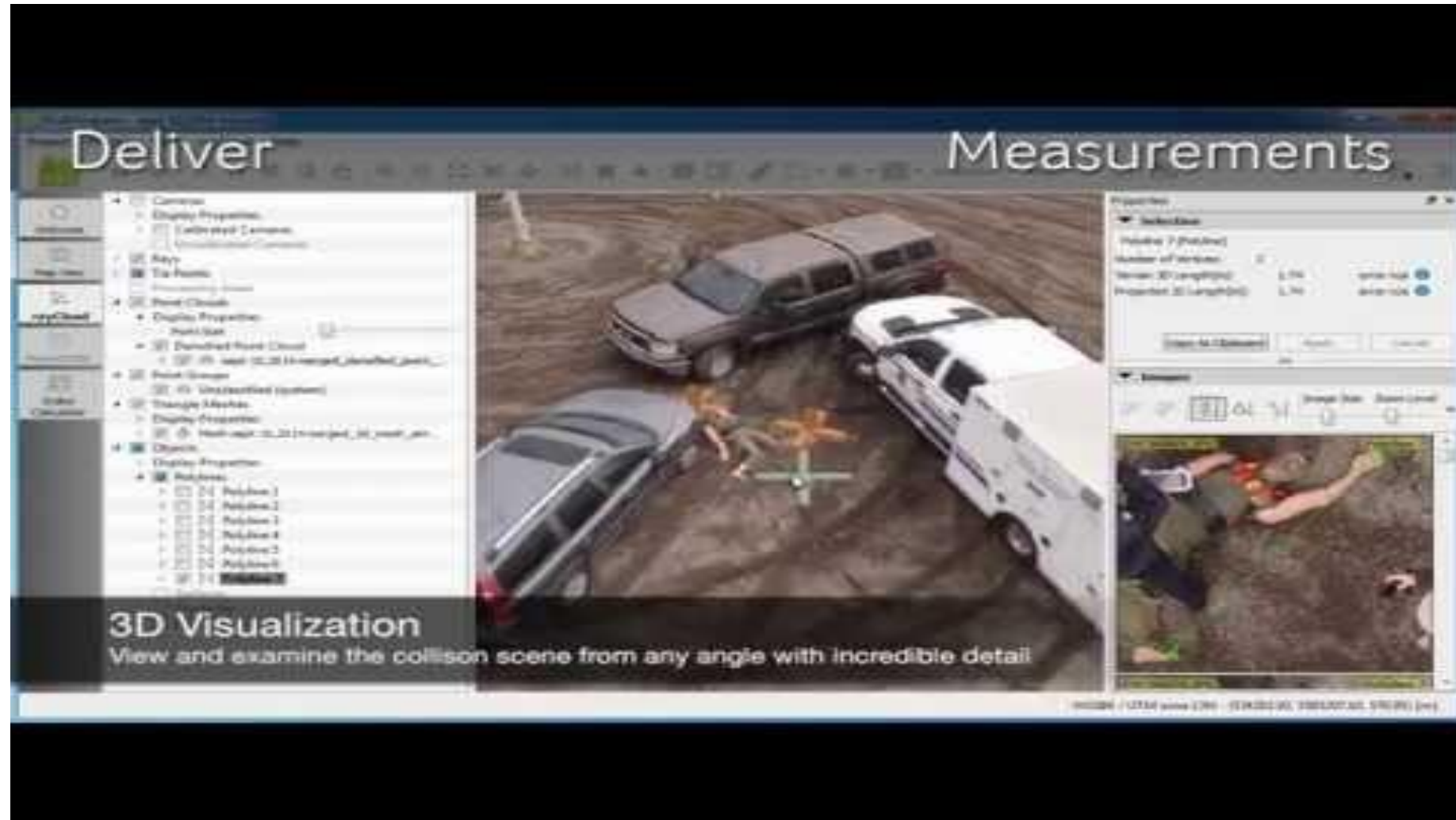


Evolving Private Application of Drones

- Infrastructure inspection by Engineers, construction firms, maintenance companies, etc.
- Commercial aerial photography, photogrammetry & mapping
- Entertainment, video feeds, filming events, news media
- Private surveillance & investigation
- Agricultural surveys, inspections & maintenance



Crime Scene Investigation



Rescue Crew Delivers a line



COURTESY: AUBURN FIRE DEPARTMENT

MECHANIC FALLS, ME / WCSH

USA
TODAY

Drone Life Guard



Minnesota Dept.of Transportation

Bridge Inspection



3D Model of cultural/historical site

Brazil



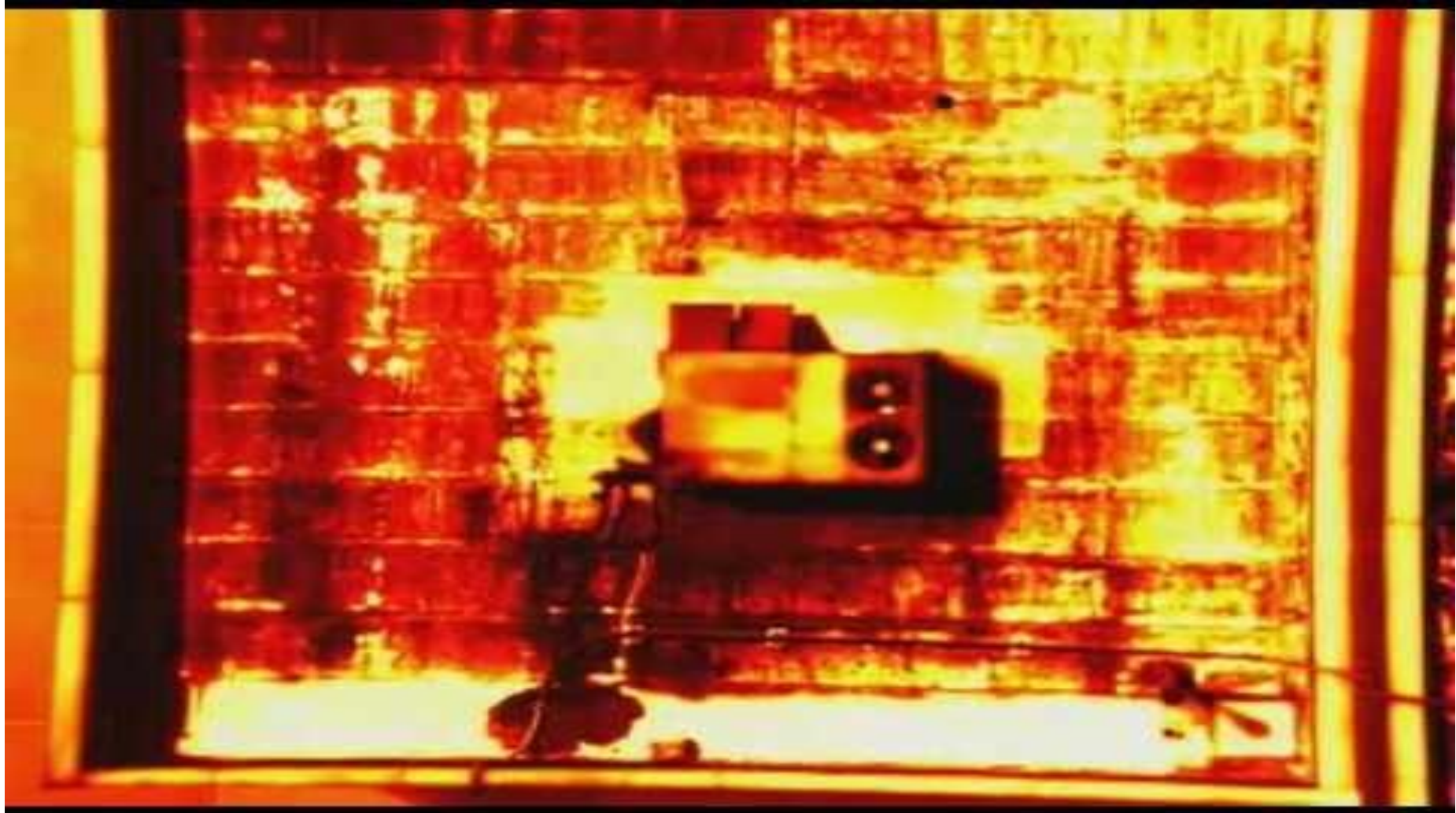
Drones for Marine Research



PV Inspection



Roof Inspection via Thermal Imaging



Beach Erosion



Monitor Dangerous/difficult to access area

Haiku Stairs



Conclusion.....

- As drones begin to take flight in the U.S., their operators must navigate a patchwork of property, safety, and privacy laws. Legislators and government officials appear poised to pile on new statutes and rules. Although some regulatory guidance is necessary, the public should remember that today's drone enthusiasts are not so different from previous innovators using cameras & sensors to explore the world through a new vantage points. To protect this period of exploration and the nascent drone industry, journalists and press advocates should remain engaged in the political process and speak out against proposed legislation and regulation that might unnecessarily restrict the use of drones or thwart the development of this emerging technology.

