

# Rise of the Drones: The Growing Proliferation of Unmanned Aircraft in the National Airspace System

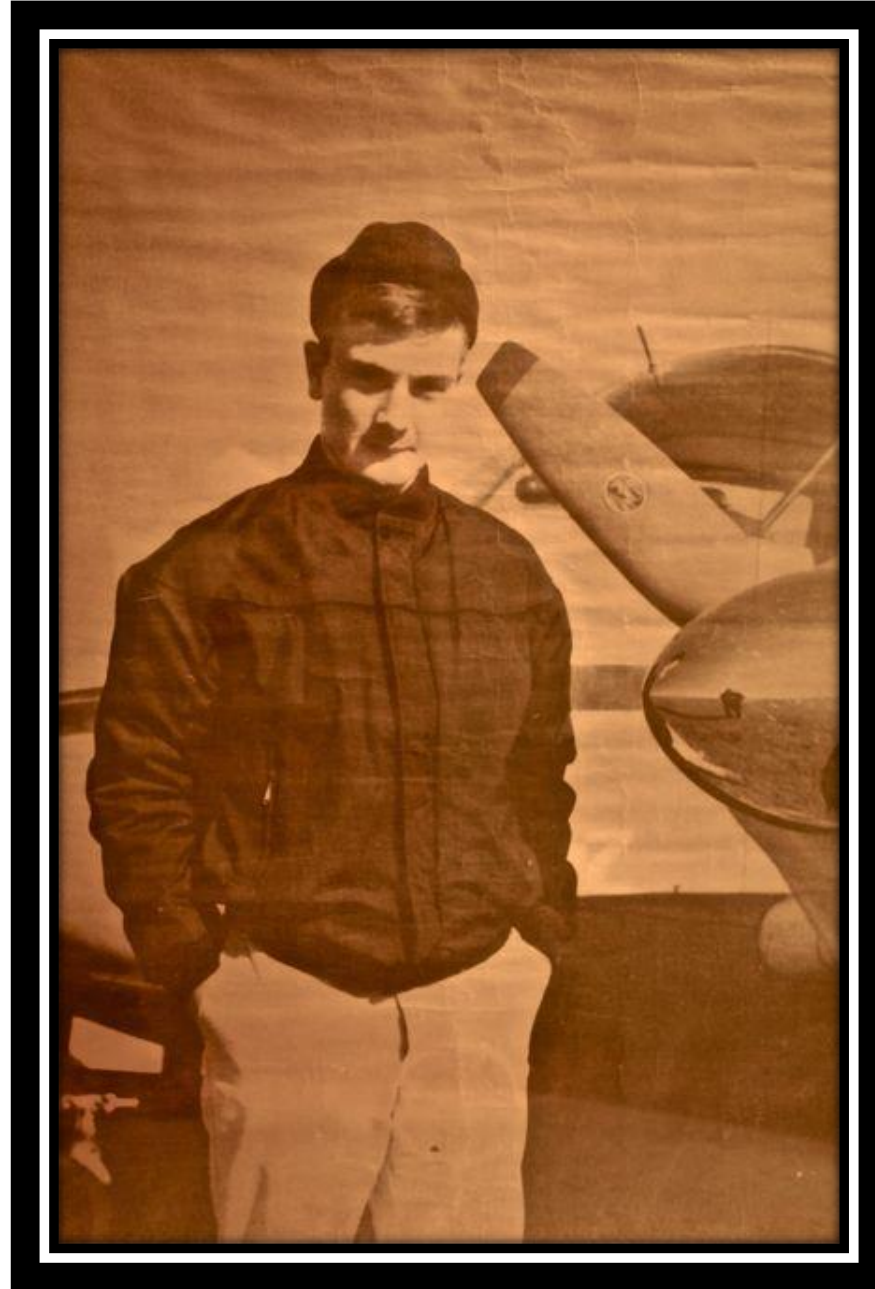
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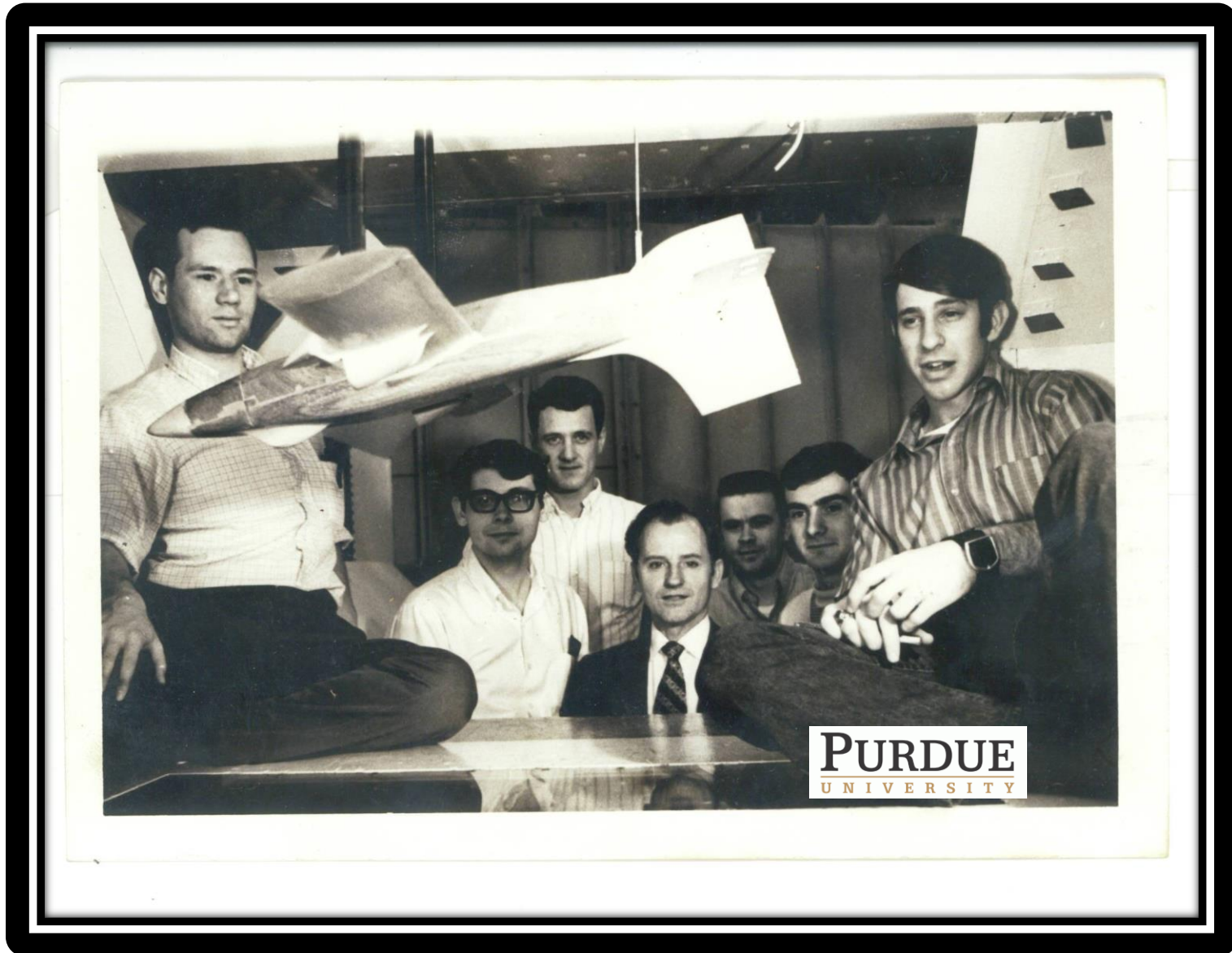


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# The Journey Begins, Circa 1963



# Class of '71



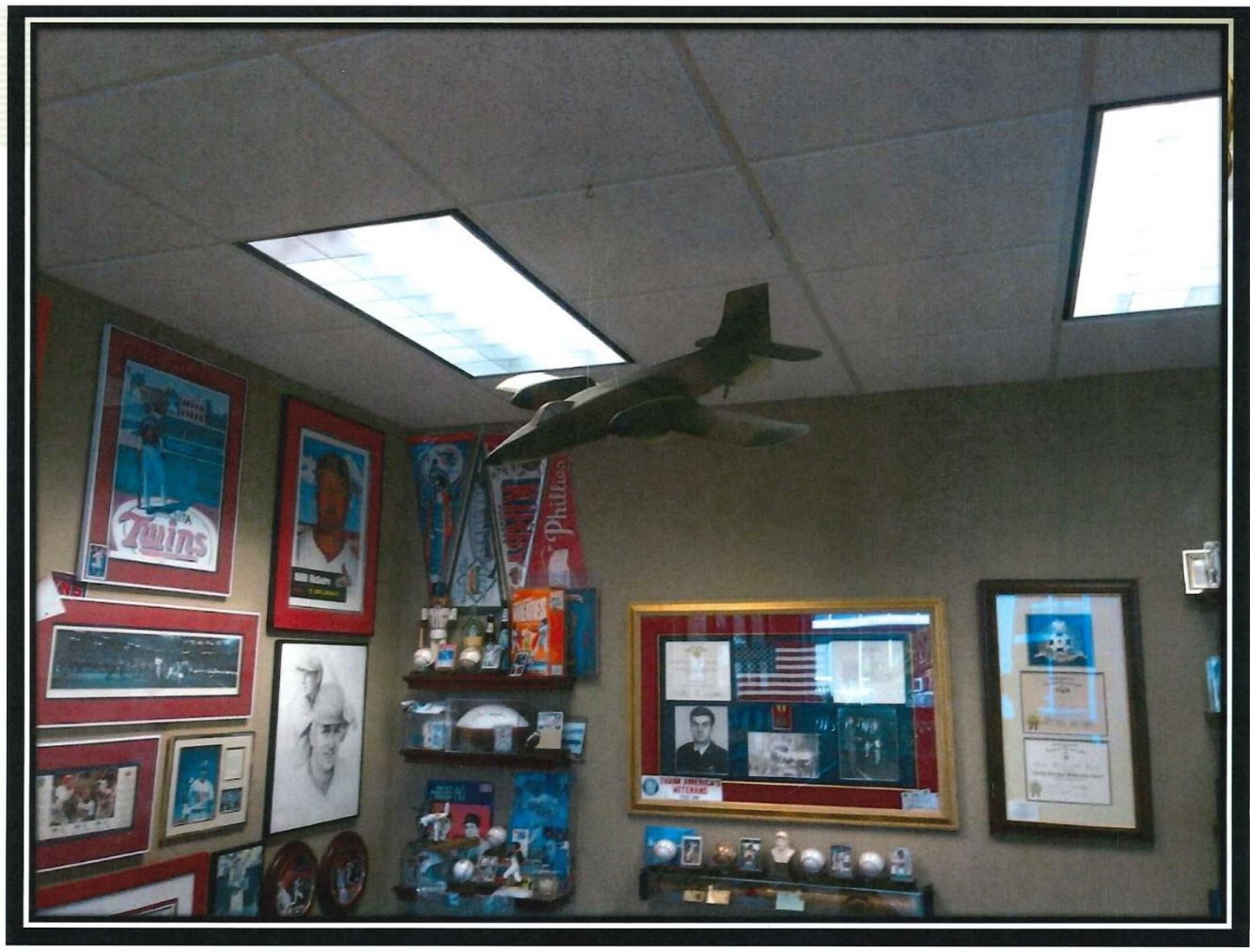
# AX-AGNEW, Circa 2001

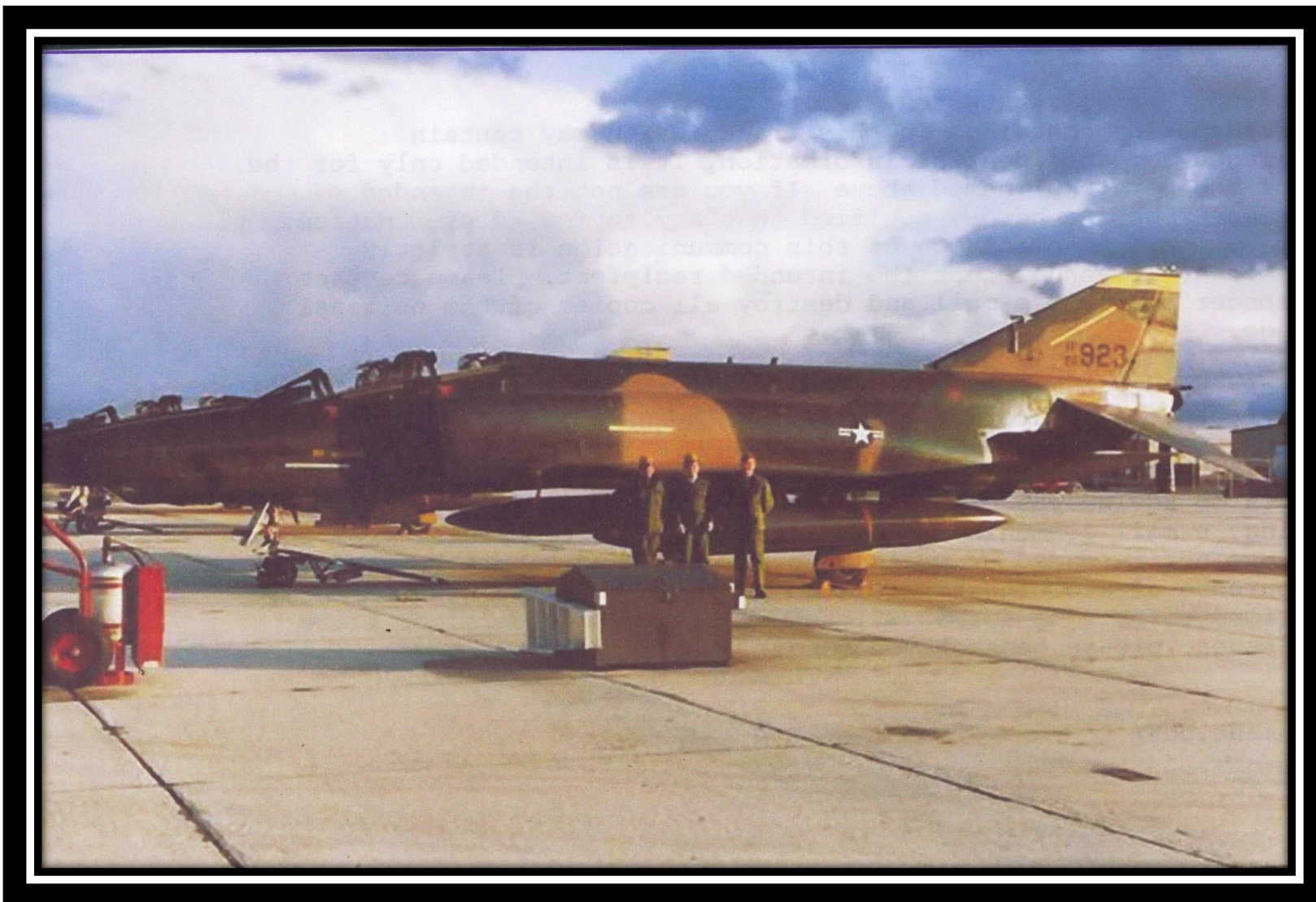


# Corso Office – Fort Myers



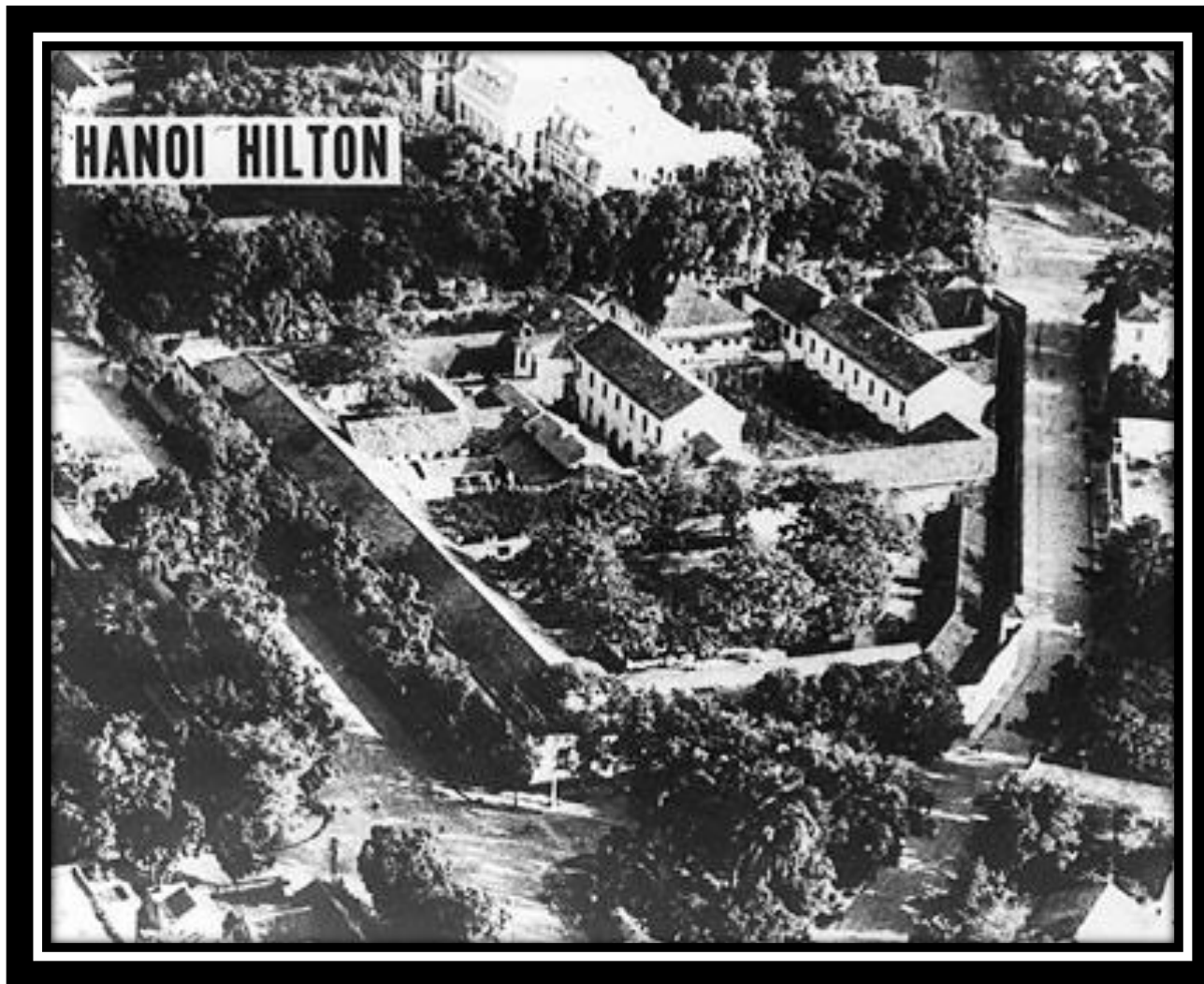
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# McDonnell Douglas RF-4C Phantom



- Maximum Speed = 1400 mph (Mach II)
- Cruise Speed = 590 mph
- Weight = 30,000 pounds (empty)
- Engine = 2 General Electric J79
- Drone use = QF-4 → 314 conversions

# Northrop Grumman RQ-4 Global Hawk



- Cruise Speed = 357 mph
- Weight = 15,000 pounds
- Engine = Rolls Royce
- Flying close to 20 years for USAF, USN & NASA

# General Atomics Predator



- Cruise Speed = 84 mph
- Weight = 1,130 pounds
- Engine = Rotax 914F
- 4 cylinder engine

# Yamaha Rmax



- Introduced in 1997; high performance standard in remotely-piloted helicopters; flown more than 2 million hours; treats 2.4 million acres of farmland in Japan each year
- Over 2,600 Yamaha helicopters are operating worldwide
- Pictured here in October 2016 at Cal-Poly University in San Luis Obispo



# The Rise of the Drones



- Commercial drones weigh less than 55 pounds, fly less than 400 feet high and remain within the operator's line of sight (sUAV)
- Teal Group [forecasting support group for the FAA ] 2018 World Civil UAS Market Profile and Forecast projects that non-military UAS production will total **\$88.3 billion** in the next decade, including commercial, consumer and civil government systems



# Domino's



- 2 large pepperoni pizzas, please!
- Domino's tested its drone traveling almost 4 miles in just 10 minutes in the United Kingdom



# Amazon



- July 9, 2014 Petition for Exemption from Amazon to FAA administrator (see handout)





# Drone Safety Campaign



- January 2017: Alarmed by increasing encounters between small drones and manned aircraft, drone industry officials have started: [www.knowbeforeyoufly.org](http://www.knowbeforeyoufly.org)
- FAA received 25+ reports per month in 2014 on drones sighted flying near manned aircraft or airports and 100+ reports in 2016; **today, the FAA receives more than 100 such reports each month**

# Drone Safety Campaign



- On January 28, 2015, FAA announces that the NFL Super Bowl on February 1, 2015 is designated as “No Drone Zone”
  - FAA bars unauthorized aircraft, and drones, from flying over or near NFL regular and post season football games
  - Same restriction applies to NCAA college games, major league baseball games and many NASCAR events

# Drone Safety Campaign



- Effective December 31, 2015, anyone who owns a small unmanned aircraft of a certain weight must register with the Federal Aviation Administration's Unmanned Aircraft System (UAS) before they fly outdoors
- People who previously operated their UAS must register by February 19, 2016
- People who do **not** register could face civil (up to \$27,500) and criminal (fines up to \$250,000 and/or imprisonment up to three years) penalties

# Drone Safety Campaign



- **Who must register a UAS?**

- Owner must be 13 years of age or older
  - if owner is less than 13 years old, a person 13 years of age or older must register the small unmanned aircraft
- A U.S. citizen or legal permanent resident



# Drone Safety Campaign



- **Which unmanned aircraft have to be registered?**
  - Owners must register their UAS online if it meets the following guidelines:
    - Weighs more than 0.55 lbs. (250 g) and less than 55 lbs. (25 kg)
    - Unmanned aircraft weighing more than 55 lbs. cannot use this registration and must register using the Aircraft Registry process  
[www.faa.gov/licenses/certificate/aircraft/certification/aircraft\\_registry](http://www.faa.gov/licenses/certificate/aircraft/certification/aircraft_registry)
  - See examples of UAS that do and do not require registration  
[www.faa.gov/uas/registration/rags/media/UAS\\_Weights\\_Registration.pdf](http://www.faa.gov/uas/registration/rags/media/UAS_Weights_Registration.pdf)

# Drone Safety Campaign



- Owners must register their UAS by paper [www.faa.gov/licenses\\_certificates/aircraft\\_certification/aircraft\\_registry/UAV](http://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/UAV) if it meets the following guidelines:
  - Your aircraft is used for commercial purposes
  - Your aircraft is used for purposes other than hobby and recreation
  - Your aircraft is greater than 55 lbs.
  - You intend to operate your aircraft outside of the United States

# Drone Safety Campaign



- Cost to register a UAS is \$5.00 and is valid for three years; one drone registration covers all the drones a person owns
- As of mid-February 2016, more than 325,000 people registered their drones, which surpasses the 320,000 piloted aircraft registered with the FAA!
- As of January 2018, drone registrations with FAA eclipsed one million
- Projected number of drones in US by 2020:  
7 Million

# Drone Safety Campaign



- May 2017: A Washington, D.C. Court ruled that the FAA drone registration rule violates the FAA Modernization and Reform Act, as to hobby/model aircraft only; the Court's decision does not impact registration for commercial drones
- December 2017: The registration rule was reinstated in the National Defense Authorization Act



# Drone Safety Campaign



- **B4UFLY** Mobile App (As of August 2017)
- Smartphone app that helps UAV operators determine whether there are any restrictions or requirements in effect at the location where they want to fly



# Why Regulate UAS?



- **Feds and State systems differ over who are legal users**
  - FAA limited legal permission for any “commercial,” or for profit, UAS flights (civil operations); see exemption discussion
  - Certain public entities have received approval
  - Our society still values privacy
  - Jeopardize our physical safety



# Government Regulation of UAS



- Unmanned Aircraft System (UAS)
- Unmanned Aerial Vehicle (UAV)
- FAA uses “system”
  - Pilot on ground and communication link to the vehicle
- Flight for recreation or enjoyment - hobby and okay

# Government Regulation of UAS



- Flight for any commercial “purpose” requires explicit permission to fly
- Request for Commercial Drone Exemption Process (Section 333)
- As of September 28, 2016, 5,551 exemptions approved in UAS database, see **AUVSI.ORG**; **California, Florida and Texas in top 3**
- Part 107 Small Drone Rule

# Commercial Drone Exemptions



- **June 2014**
  - BP and drone manufacturer Aero-Vironment approved to fly aerial surveys over Alaska's North Slope
- **September 2014**
  - 7 approved to film and video companies
- **December 10, 2014**
  - 4 more approved to conduct aerial surveys, monitor construction sites and inspect oil flare stack

# Category of Drone Exemptions



- Many for construction, surveying and inspection
- Breakdown of FAA 333 exemptions by keyword as of April 27, 2016
  - Inspection – 1,985
  - Survey – 1,635
  - Construction – 875
  - Mapping – 691
  - Data Collection – 594
  - Engineering – 303
  - Aerial Photography – 3,420

# Category of Drone Exemptions



- Photo/film = 46%
- Utilities/energy/infrastructure = 25%
- Real estate = 25%
- Agriculture = 18%
- Construction = 15%
- Education = 7%
- Emergency services = 5%
- Government contracting = 4%
- Conservation = 3%
- Manufacturer = 3%
- Insurance = 2%
- Scientific studies = 2%
- Other = 1%



Some exemptions counted in more than one category

# Conditions to Commercial Drone Exemption



- Each operation must have a pilot and observer
- Pilot must have at least a FAA private pilot certificate and a current medical certificate
- Drone must also remain within the line of sight at all times
- On technical front, geo-fencing technology creates a GPS-based circle around airports, and if you fly inside circle, software shuts down drone



# Latest FAA Drone Regulations



- On June 21, 2016, the FAA announced a new small drone rule [Small Unmanned Aircraft Rule (Part 107)]
- Person actually flying drone must have “remote pilot certificate” with a small UAS rating, or be directly supervised with someone with such a certificate
- For the certificate, you must either pass an initial aeronautical knowledge test at an FAA approved knowledge testing center, or have an existing non-student Part 61 pilot certificate
- Transportation Security Administration (TSA) will conduct a security background check of all pilot applications prior to issuance of a certificate

# Latest FAA Drone Regulations



- As of August 2018, 100,000+ UAS operators have passed the FAA Remote Pilot Knowledge test
- Estimates for the 2016 holiday season suggest over 1.2 million drones were given as gifts and more than 2.8 million purchased in calendar year 2016; more than 3 million shipped in 2017
- See 3 page summary of latest FAA rule (See handout)
- Section 333 versus Part 107 – what works for you? (See handout)

# Latest FAA Drone Regulations



- **April 2017:** FAA plans to release first set of UAS facility maps on April 27
- Maps will depict areas and altitudes near airports where UAS may operate safely
- **Intent** – help drone operators improve quality of their Part 107 airspace authorization requests and will help FAA process these requests more quickly

# Latest FAA Drone Regulations



- Beginning **April 27, 2017** users may access the facility maps at <http://www.faa.gov/uas>
- Maps will be informational only; they do not automatically authorize flights; remote pilots must still submit online airspace authorization applications at <https://www.faa.gov/uas>

# Enforcement of FAA Regulations



- As of February 2018, the FAA has caught and “punished” only one drone pilot for operating a drone business without a license
- Where? Overhead shots of Kauffman Stadium in Kansas City, MO
- Punishment? Warning notice – otherwise monetary fines apply
- Future? FAA retains responsibility for enforcing Part 107, but recognize state and local law enforcement agencies in best position to deter and detect

# Enforcement of FAA Regulations



- Local police departments say they largely have no idea how to enforce drone laws
- Skypan International
  - FAA initiated a civil penalty action for \$1.9 million in 2015 related to UAS operations in New York City and Chicago during 2012 – 2014
  - Result -- in 2017 \$200,000 fine with other terms

# State Legislation



- 41 states have passed laws placing restrictions on UAS usage; 3 other states adopted resolutions related to drones
- 6 states **including Florida** and Indiana forbid use of UAS by law enforcement to gather evidence unless a warrant has been issued
- Other examples (Arkansas, Hawaii, Idaho, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Michigan, Mississippi, Nevada, New Hampshire, North Carolina, North Dakota, Oregon, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin)

# 2017 Legislation



- At least 38 states considered legislation related to UAS in the 2017 legislative session
- Five states – Kentucky, South Dakota, Utah, Virginia and Wyoming – passed eight pieces of legislation
- Utah also adopted a resolution, HCR 21, supporting the building of a NASA drone testing facility and Command Control Center in Tooele County, Utah
- See National Conference of State Legislatures = [www.ncsl.org](http://www.ncsl.org)



# Florida Legislation



- **2015 Legislative Session**

- Amended existing F.S. 934.50, “Freedom From Unwanted Surveillance Act”
- Effective July 1, 2015 (see handout)
- Broadens prohibited use of drones equipped with an imaging device to any person with intent to conduct surveillance on individual or property captured in the image in violation of such person’s reasonable expectation of privacy without his/her consent

# Florida Legislation



- **2015 Legislative Session**

- Does not prohibit certain circumstances – F.S. 34.50(4)(d) and (e) such as use for property appraisers and utility companies
- Provides for civil remedies for violations of statutes, including reasonable attorney’s fees to prevailing parties - F.S. 934.50(5)
- F.S. 330.41 “Unmanned Aircraft Systems Act” (see handout)
- F.S. 330.411 “Prohibited Possession or Operation of Unmanned Aircraft” (see handout)

# Federalism



- **Issues of Federal preemption**
  - Concerns over privacy tend to manifest themselves at local level
  - FAA regulates and oversees general scheme of national airspace usage – something no state can accomplish alone
  - State oversees more local concerns of how airborne vehicles interact with citizens with regard to safety on the ground, noise at low altitudes, curfews and privacy with low-flying motorcraft

# Federalism



- **Issues of Federal preemption (cont'd)**
  - On December 17, 2015, the FAA put state and local governments on notice that they cannot issue laws or regulations that conflict with those issued or planned by the FAA regarding the flight and safety of drones in the NAS
  - In 2015, 45 states debated 168 bills about drones and 26 states passed some piece of drone legislation
  - In 2016, 2017 and 2018, at least 38 states debated legislation related to UAS

# Privacy Considerations



- **February 2015**

- On the subject of drone privacy, President Obama released a Presidential directive the very same weekend of the FAA announcement on February 15, 2015 that would change how Federal agencies would be required to publicly discuss where they fly drones in the U.S. and what they do with the information they gather
- The privacy memorandum also called for agencies to review their use of drones every three years to insure compliance with the Federal Privacy Act

# Lawsuit



- **Huerta v. Pirker** – filed at NTSB June 27, 2013
  - Enforcement action by FAA for reckless operation of “aircraft”
  - UAS operator Pirker was taking photos near University of Virginia
  - Pirker moves to dismiss challenging FAA jurisdiction over UAS as “aircraft”
  - NTSB law judge granted motion and dismissed holding that UAS and model aircraft never defined in FAR as “aircraft” since the dawn of aviation

# Lawsuit

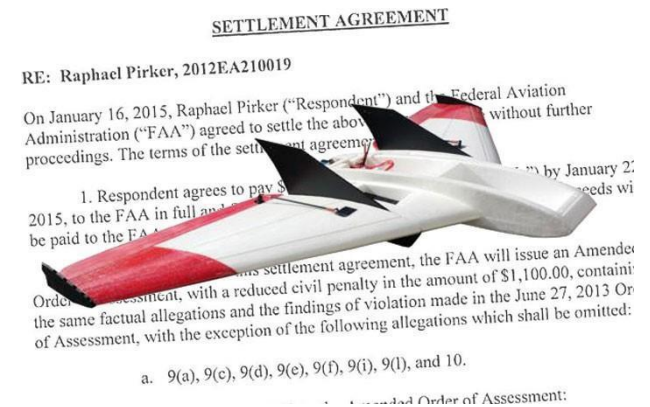


- **Huerta v. Pirker – filed at NTSB June 27, 2013 cont'd)**
  - FAA appealed within NTSB; four amicus briefs
  - Collateral confusion
    - 2012 legislation making hobby use generally off-limits to FAA regulation
  - Late November 2014
    - NTSB decision over-ruled law judge stating that FAA rules that apply to manned aircraft also apply to UAVs

# Lawsuit



- Huerta v. Pirker - Corso  
**Conclusion**
  - FAA caught off guard by Pirker case
  - Now playing catch up
  - Has issued at least 17 other warning letters to UAS operators
  - FAA fined a Texas company that provides search and rescue operations using UAS leading to an appeal like Pirker





# Fourth Amendment Protections



- Common motivation for state laws has been lack of confidence over Fourth Amendment over protecting citizens from unwarranted UAS searches
- US Supreme Court decisions okay naked-eye or photo observations from manned flights for surveillance without warrant



# Fourth Amendment Protections



- GPS tracking, where a person has a reasonable expectation of privacy, is prohibited absent a warrant
- UAS surveillance - manned flight or GPS? Fine line
- Broad reading of Fourth Amendment does nothing to prevent non-government actors from UAS usage



# Fourth Amendment Protections



- **Corso Conclusion**

- Neither FAA nor state governments can easily legislate specific use of UAS as they become more routinely used by the general population
- May see extension of civil and criminal laws on stalking and similar privacy issues for UAS usage



# Safety of Flight



- Public entities are eligible to get a waiver (certificate of authorization - COA) from FAA to fly a UAS; allows for a particular UAV to operate in a particular area for a particular purpose
- PUBLIC = Federal, state and local government and public universities

# Safety of Flight



- **Accident example and close call**
  - See handouts (RQ-4 @ Tyndall AFB, Florida)
  - U.S. Airways flight from Charlotte to Tallahassee – March 22, 2014
- **UAS - no transponder/collision avoidance**
- **“Next Gen” system (including Automatic Dependent Surveillance – Broadcast = ADS-B)**
  - ADS-B in every aircraft in specified airspace by 2020; ADS-B OUT/IN
  - FAA 5 year plan discusses need for airborne sense and avoid but no ADS-B OUT in UAS by any specific date

# Liability and Lawsuits



- Design professional who employs a third party vendor to retrieve data through the use of a drone:
  - UAS owner and/or operator liability for negligent operation
  - Comparative fault defense for elevated objects once property owners become aware of regular “flight patterns” of UAS



# Liability and Lawsuits



- Design professional who employs a third party vendor to retrieve data through the use of a drone (cont'd):
  - Product manufacturers face exposure for software malfunctions, design or manufacturing defects in the UAS, inadequate warnings and negligently designed manuals
  - Companies that offer training will face exposure for inexperienced UAS purchases similar to flight schools
  - What if UAS rental product and the lessor is not monitoring the novice user?

# Liability and Lawsuits



- **Corso Conclusion**

- Many risks will be underwritten by insurers willing and able to assess losses
- As industry grows, indemnity agreements will become commonplace among operators, flight instructors, rental companies, property owners who lease space for flights and others
- A sample addendum type agreement between design professional and third-party drone vendor spelling out insurance and indemnity requirements (see handout)



# Insurance



- **Need for generated mostly outside United States**

- UAS usage ongoing in Africa, Asia and, to a lesser extent, Europe
- FAA 5 year plan does not refer to minimum limits for insurance for UAS operators
- Early on, risk of hull loss versus third party damage greater
- As time passes, as reliability improves, third party liability losses will increase and contribute to costs of any insurance program



# Insurance Coverage - UAS



- Homeowner/CGL Policies
- Current “Aircraft” Exclusion = No Coverage
  - Exception for model or hobby aircraft not used or designed to carry people or cargo
- No reported appellate decisions yet
- Policies for UAS exist now; as of early 2016, approximately 15 companies exist
- Commercial policy for a DJ1 Phantom 3 covering liability up to \$1 million and hull damage up to \$1500 can run around \$1500 a year (with a 10% or 15% deductible)
- As of June 2018, 20 plus companies specializing in UAV coverage exist, plus more endorsements for UAV coverage available on traditional liability carriers policies

# Latest Federal, State (Florida) and Local Laws



## UAS Integration Pilot Program (IPP)

- October 2017 – President Trump and Secretary of Transportation Chao announced plans for IPP
- May 2018 – U.S. Transportation secretary named Lee County (Fort Myers) Mosquito Control District (one of only 10 state, local and tribal governments) to be selected for the FAA UAS Integration Pilot Program
  - A person may not knowingly or willfully operate a drone over a critical infrastructure facility (such as electrical power generator; chemical or rubber manufacturing; mining; natural or compressed gas; aboveground oil or gas pipeline; and wireless communications)

# Latest Federal, State (Florida) and Local Laws



## UAS Integration Pilot Program (IPP)

- **City of Orlando Municipal Law**

- Drone use restricted within 500 feet of city-owned parks, schools and venue, such as the Amway Center, Camping World Stadium and Harry P. Leu Gardens
- Drones are also restricted within 500 feet of gatherings with more than 1,000 people
- Permit is required to fly in these areas, which costs \$20 per flight or \$150 annually
- Those caught in violation of the ordinance will have to pay fines between \$200 and \$400

# Latest Federal, State (Florida) and Local Laws



- **Town of Defuniak Springs Municipal Law:**
  - Drones may not be flown over public or private property without consent
  - Drones may not be flown for commercial use unless first registered with the town police department
  - Restrictions on drone-based photography

# Latest Federal, State (Florida) and Local Laws



- **City of Miami Municipal Law**

- Drones prohibited over or within a half-mile radius of sporting events or large-venue events, including Bayfront Park, Marlins Ballpark, Miami Marine Stadium, Calle Ocho Festival, and any other public parks or facilities *during special events*
- Drones (in Miami) weighing more than 5 pounds may only be flown by registered members of the Academy of Model Aeronautics

# Latest Federal, State (Florida) and Local Laws



- **City of Miami Municipal Law (cont'd)**
  - Drones may not be equipped with any type of detachable cargo, and may not carry any type of weapon
  - City permit required for certain drone-related activities
  - Drone flight is prohibited within a 1 mile radius of Miami International Airport

# Latest Federal, State (Florida) and Local Laws



- **Town of Bonita Springs Municipal Law**
  - Drones may only be flown at Community Park, and may only occur when the fields are unoccupied
  - Unlawful for drones to fly within 25 feet of people, power lines, buildings or light fixtures





# Low Altitude Authorization and Notification Capability (LAANC)



- Automates how UAS operators get permission to fly in controlled airspace
- FAA conducting Beta Test starting April 2018
- Projected coverage: 300 air traffic control facilities and 500 airports



# Conclusion



- Legality of certain types of UAS will continue to change as numbers increase and lawmakers, as well as the general public, become more educated about safety issues, civil liability concerns and profitability from commercial applications
- Many types of operators make oversight and regulation a significant challenge – especially as technology advances and systems become less expensive and more available

# Conclusion



- Safety of flight and protection of privacy will be the two major issues that states and municipalities confront as governmental organizations and private citizens vie for use of airspace
- The magnitude of the challenge for the FAA mandate to safely integrate UAS into national airspace cannot be underestimated



**Thank you for your time and attention!**

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