UAS
(Unmanned Aerial Systems)

Current and Future Uses, Regulations and Evolution

Current State of NCDOT DOA UAS

All UAS pilots certified by the NCDOT DOA operate under the FAA Part 107 Remote Pilot License for Commercial and Government operators.

In addition per State of North Carolina DOT/DOA rules, all Part 107 licensed operators, flying for the DOA, must obtain a NC UAS Government Operators Permit.

All DOA remote pilots are covered by FAA waiver 107.29 Daylight Operations, allowing flight operations during nighttime hours, dusk until dawn.

The DOA is currently working on obtaining FAA waiver 107.31, Visual Line of Sight Aircraft Operation, allowing the UAS pilot to fly beyond visual line of sight.

Current State of NCDOT DOA UAS IPP

IPP Integrated Pilot Program:

In May 2018, the Federal **Aviation** Administration selected the **N.C.** Department of Transportation as one of 10 participants in its Unmanned Aircraft Systems **Integration Pilot Program**, which involves implementing drone **programs and** emerging UAS technology with current state and federal regulations.

Current State of NCDOT DOA UAS IPP

- Currently testing localized package delivery within a defined airspace by establishing drone delivery stations in local communities.
- Matternet at Wake Med delivering blood.
- Flytrex delivering food in Holly Springs.
- Enables small businesses to utilize UAS for commercial purposes and prove the viability of this technology.
- Ending fall of 2020 – no continuation is expected
- FAA is crafting new safety standards for specific unmanned-aircraft models, which will eventually lead to the authorization of widespread delivery of packages by drones.

UAS Rule and Regulations Changes

FAA Remote ID Notice of Proposed Rulemaking (NRPM) is available for review and comment in the Federal Register through March 2, 2020

Remote ID is the ability of a UAS in flight to provide identification information that can be received by other parties using the same airspace.

The development of Remote ID builds on the framework established by the small UAS registration rule, and the LAANC capability to lay the foundation of an Unmanned Aircraft System Traffic Management System (UTM) that is scalable to the national airspace.

Remote ID is the next step to enable safe, routine drone operations across our nation. This capability will enhance safety and security by allowing the FAA, law enforcement, and Federal security agencies to identify drones flying in their jurisdiction.

Remote ID Continued

The Remote ID NPRM describes a data subscription plan that drone users would purchase from designated UAS Service Suppliers who will collect, record, and share your drone and flight operation data with the federal government, law enforcement, and the general public.

The FAA has estimated $2.50/month on average per operator.

Standard remote identification:

UAS would be required to broadcast identification and location information directly from the unmanned aircraft and simultaneously transmit that same information to a Remote ID USS (Unmanned Service Suppliers) through an internet connection.

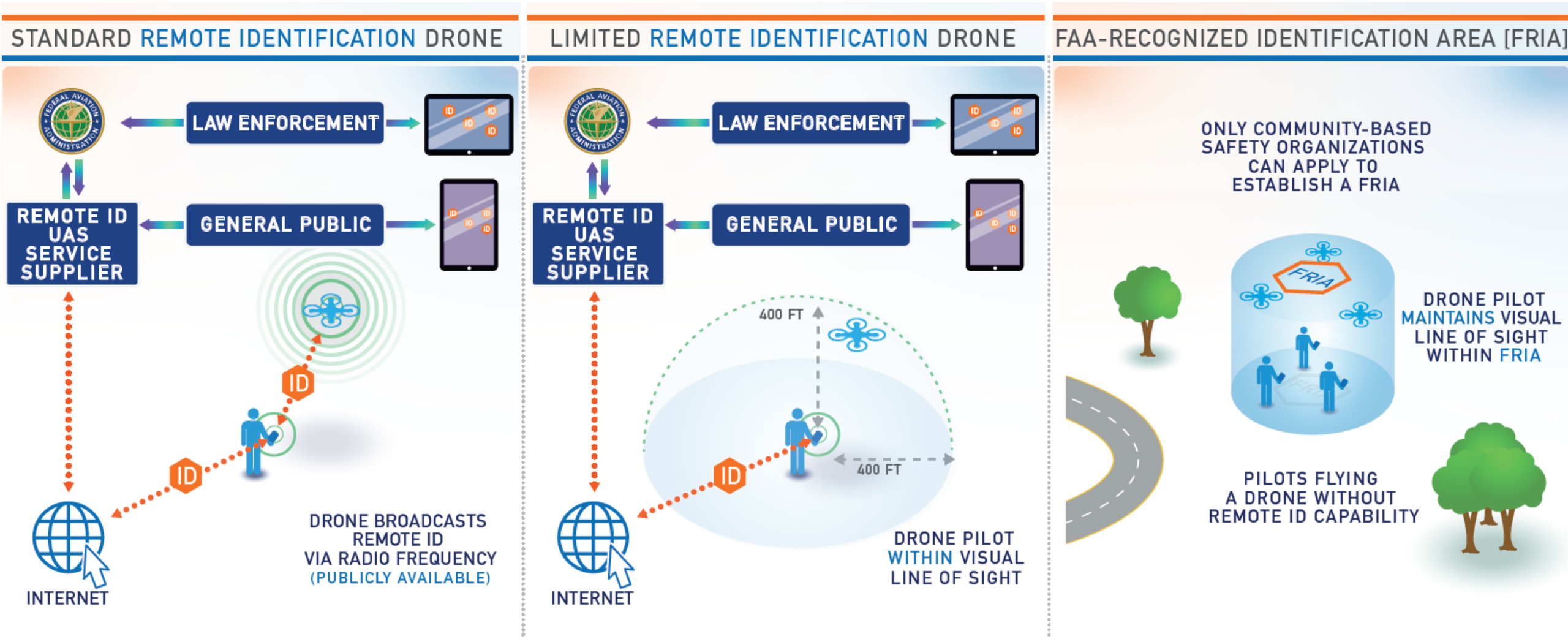
Limited remote identification:

UAS would be required to transmit information through the internet only, with no broadcast requirements; however, the unmanned aircraft would be designed to operate no more than 400 feet from the control station.

UAS without remote identification:

UAS flying under this category would be limited to specific areas, or other “FAA-recognized identification areas” (FRIA). Any UAS flown under this category "must operate within visual line of sight and within the boundaries of a FRIA".

3 Ways of Remotely Identifying



Remote ID NPRM Concerns

- Latitude/longitude and altitude of the control station [operator] and UA are transmitted and available to the public.
  - The concern is that data being transmitted over public airways and available to the general public upon request can endanger UAS operators and or legitimate UAS operations commercial, governmental and recreational.
- Cost: The FAA estimates a $2.50, subscription cost, and you will need a data plan for internet messaging.
- All drones to be compliant within three years of the effective date of the final rule
- They are limiting use to factory manufactured drones. Any UAS that are not built from the factory with Remote ID is banned except for specific AMA locations.

Remote ID NPRM Concerns

Internet Connectivity:

- If internet connectivity is unavailable:

"If the internet is unavailable at takeoff, or if during the flight, the unmanned aircraft can no longer transmit through an internet connection to a Remote ID USS, the UAS would have to broadcast the message elements directly from the unmanned aircraft from takeoff to landing."

- If you lose internet connectivity during flights:

"A person manipulating the flight controls of a Standard Remote Identification UAS that can no longer broadcast the message elements would have to land as soon as practicable."

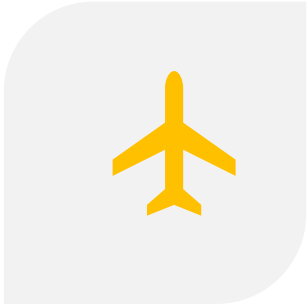
*5G Ultra Wideband will allow pilots to operate drones remotely, even from thousands of miles away, and actionable insights can be relayed in virtual real time.

Type Certification of Unmanned Aircraft Systems – A Proposed Rule by the FAA 2/3/2020

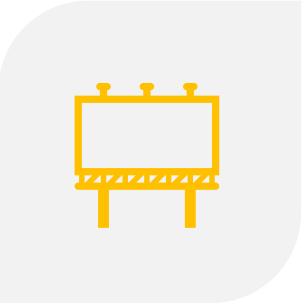
- The FAA proposes that some UAS may be type certificated as a “special class” of aircraft under § 21.17(b). _____

- "By announcing the initiative and seeking public comment, the agency started down the path to certify drones as a “special class” of aircraft—essentially seeking to give them some of the regulatory certainty that airliners, business jets, helicopters and small private planes enjoy."

UTM
UAS Traffic Management

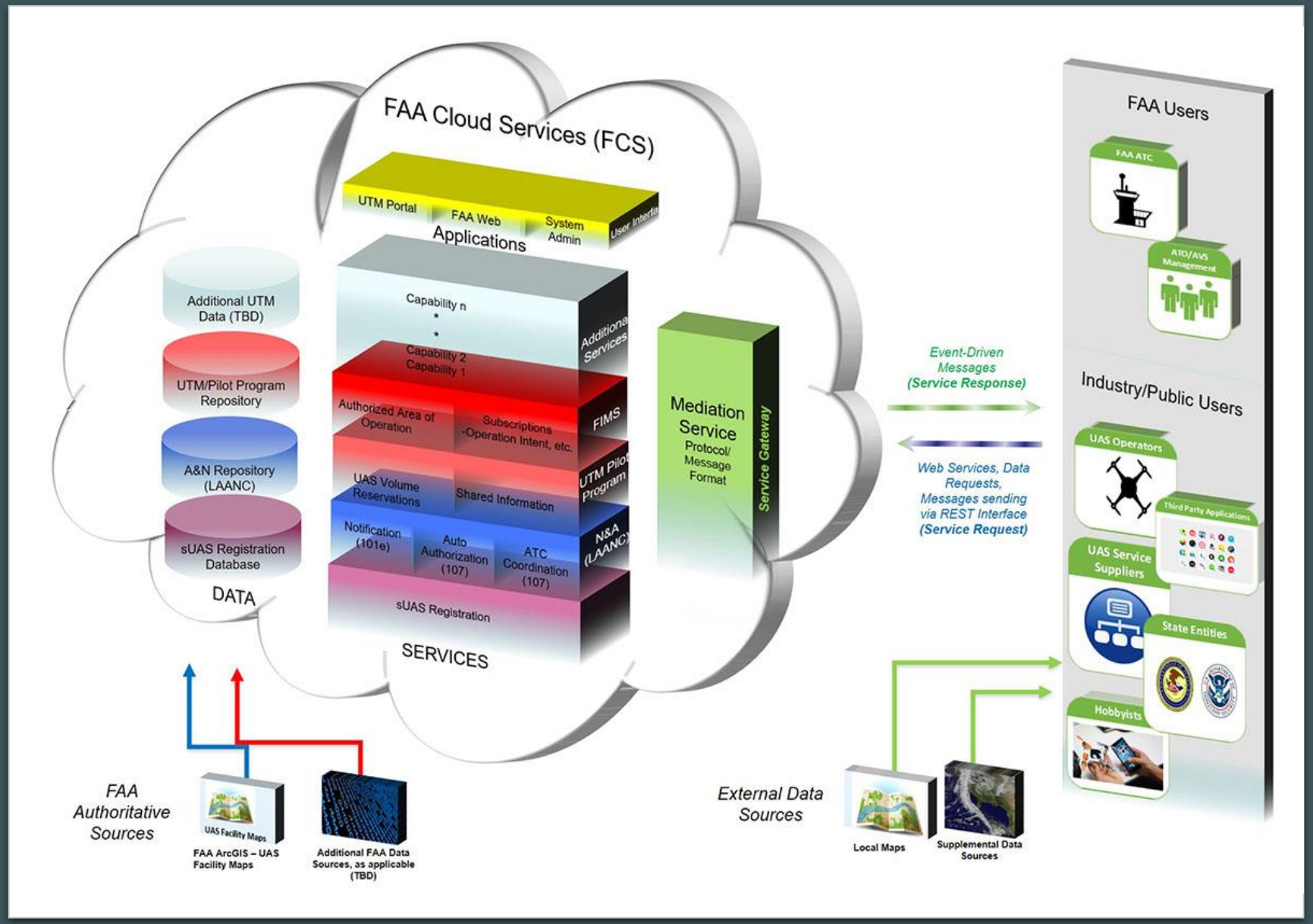


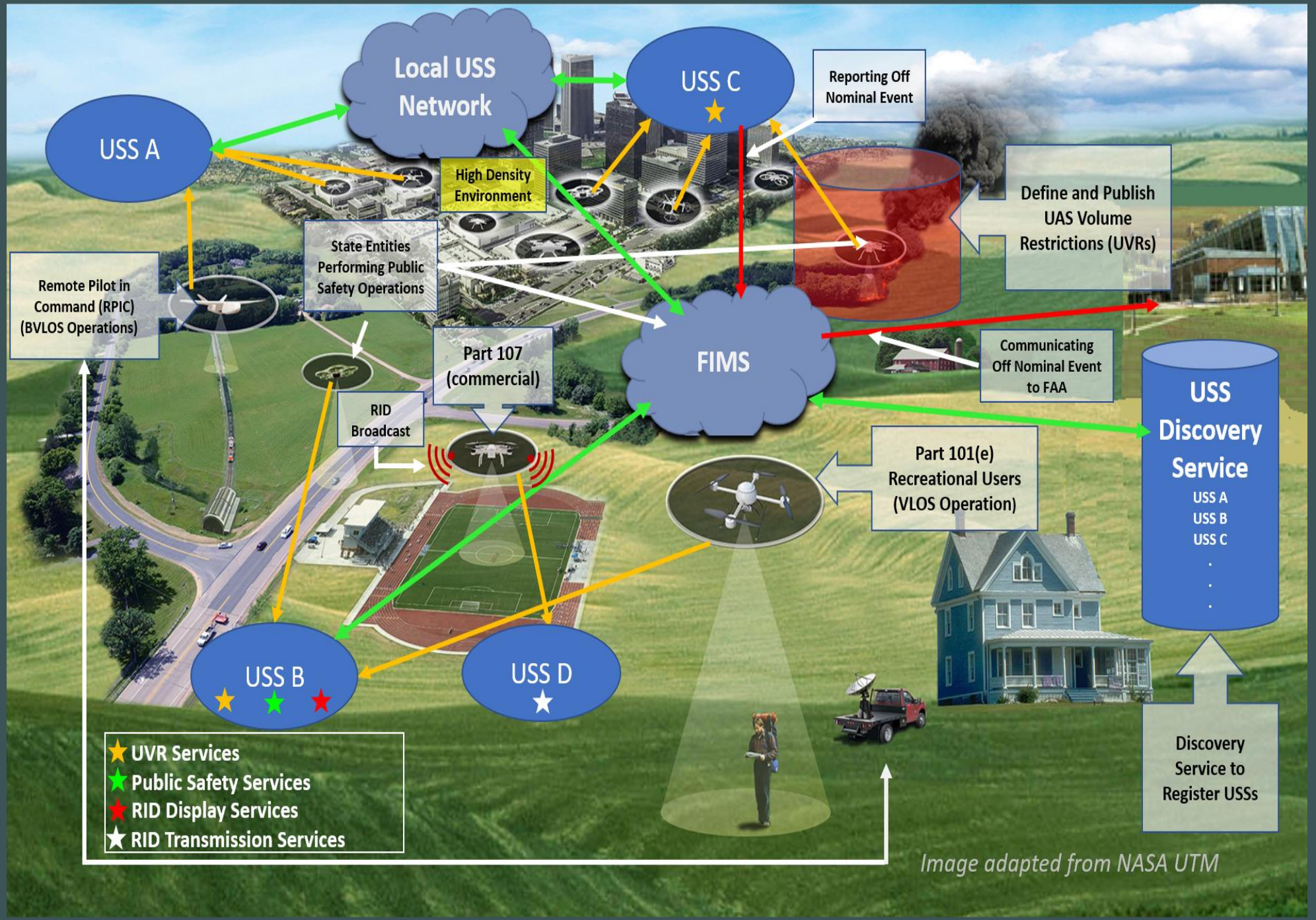
(UAS TRAFFIC MANAGEMENT) UTM:
THE GOAL IS TO CREATE A SYSTEM THAT CAN INTEGRATE DRONES SAFELY AND EFFICIENTLY INTO EXISTING AIR TRAFFIC FLYING IN LOW-ALTITUDE AIRSPACE. THAT WAY, COMMERCIAL PACKAGE DELIVERY, 'AIR TAXI' FLIGHTS, SAFETY DRONES BEING FLOWN BY FIRST RESPONDERS, ETC. AND RECREATIONAL OPERATORS WON’T INTERFERE WITH CURRENT FAA AIRSPACE REGULATIONS FOR HELICOPTERS, AIRPLANES, AND AIRPORTS.



UTM IS BASED ON DIGITAL SHARING OF EACH USER'S PLANNED FLIGHT DETAILS. EACH USER WILL HAVE THE SAME SITUATIONAL AWARENESS OF AIRSPACE, UNLIKE WHAT CURRENTLY HAPPENS IN TODAY’S AIR TRAFFIC CONTROL SPACES.

UTM Architecture





High Level UTM Concept

NCDOT/NCDIT/T Collaborative Efforts

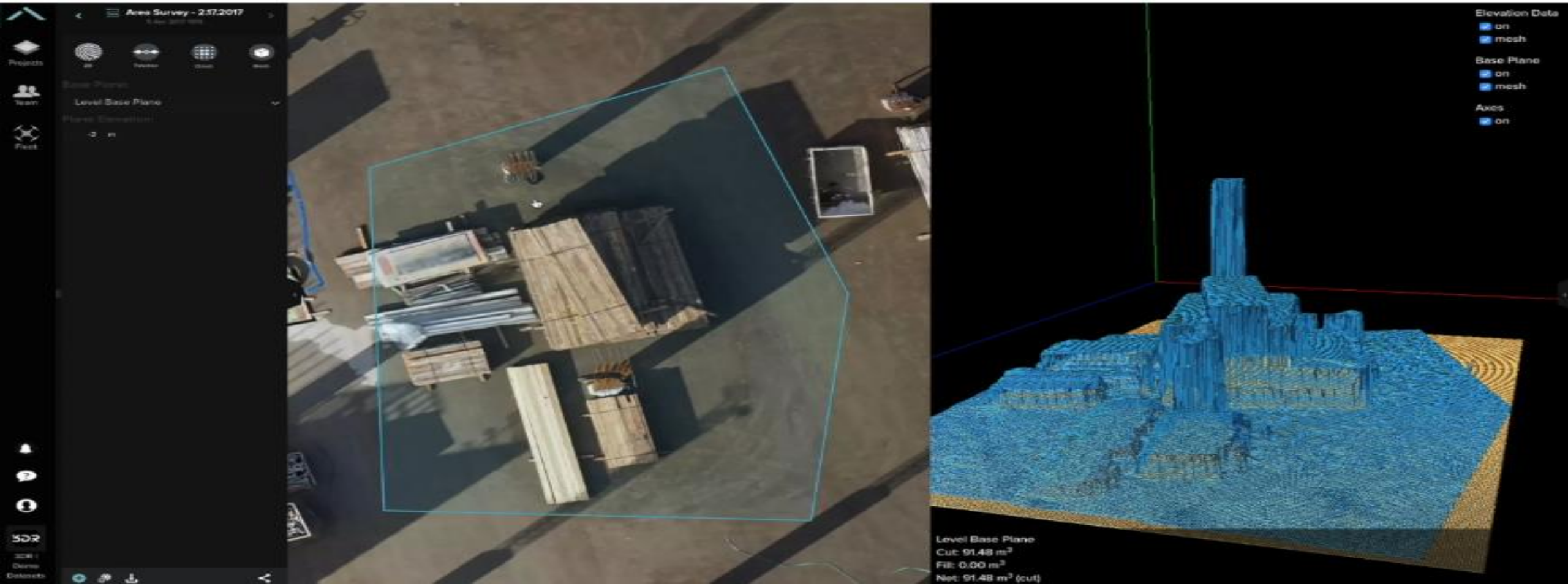
Currently Jaimie and I work closely with members of the DOA UAS unit to promote UAS usage, and awareness.

Supporting routing, mission planning and imagery needs during emergency events.

Creating viewable dashboards of UAS, National Guard, FEMA, and Photogrammetry imagery.

Working towards a holistic solution incorporating UAS mission planning, team tracking and real time communication, and imagery processing with AI and Deep Learning capabilities.

- Site Scan is a drone-to-data platform developed by 3DR; now integrated with ESRI (subscriptions available)
- New aerial imagery offering: ArcGIS Drone Collection
- Complete end to end drone data and analytic solution



- Users can upload, process, and store an unlimited number of images and projects in an elastic and scalable environment.

- 3DR's integration with ESRI ArcGIS Online allows users to compile, transform, and deliver various data file outputs into their ArcGIS Online account

- It enables organizations to better communicate, share progress, and identify issues

Current Events

UPS gets its,'FAA Part 135', and becomes the first, 'Drone Airline'.


poised for
TAKE OFF!

Current Events

Governor Cooper presides over the first, 'Air Taxi', demonstration.

Closing

Currently over 200 different models of eVTOL (electric vertical take off and landing) aircraft are in production, including models from Boeing, and Airbus, Hyundai, and Toyota.

Uber Air currently has three cities, Los Angeles, Dallas, and Melbourne Australia as the first to offer Uber Air flights with 'Demonstrator' flights starting in 2020 and full commercial operations by 2023.

The 'Drone Market' generated an estimated 14.1 billion dollars in 2018. That figure is estimated to almost triple by 2024 at over 43 billion dollars.

Links and Thank you!

- Remote ID
  - https://www.faa.gov/uas/research_development/remote_id/
  - https://www.thedroneu.com/blog/faa-announces-drone-remote-id/
  - https://uavcoach.com/remote-id-nprm/?utm_campaign=Community%20Newsletter%20&utm_source=hs_email&utm_medium=email&utm_content=81464395&_hsenc=p2ANqtz--vCqebqFYIV9zibTMb4I1NDv2oM6FnuAc176ADom49x-XMvUZBxNar33XgsoiU1yG21WvFwyUEupKerHfIU6dr13Zc_Q&_hsmi=81464395
- UTM
  - https://utm.arc.nasa.gov/documents.shtml
  - https://www.faa.gov/uas/research_development/traffic_management/utm_pilot_program/
- IPP
  - https://www.ncdot.gov/divisions/aviation/uas-integration-pilot/Pages/default.aspx
- News
  - https://uavcoach.com/flight-forward-part-135/?utm_campaign=Community%20Newsletter%20&utm_source=hs_email&utm_medium=email&utm_content=77684842&_hsenc=p2ANqtz-_aVkXE97c54DAiW6mpz0AFFLKb4tf93xVrz6Qu9ZTr-GCiiTYpOwagy-Z5JfBdG-g-m9zMy5eVUVy_jp8_o649rOLnlw&_hsmi=77684842
  - https://www.newsobserver.com/news/local/article238944193.html
  - https://www.uber.com/us/en/elevate/uberair/