Today's CNS with Tomorrow's Traffic Management

ICAO Drone Enable 2023

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ANRA TECHNOLOGIES

ISO 27001

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Providing solutions that enable enterprise operations for autonomous systems

- Since 2015, digital airspace solutions

- Software modular services evolve with standards and regulatory environment

- Multimodal and Mission Management solutions with value-added services

- Fortune 50 Enterprises, US DOD, NASA, FAA, EASA, UK-DASA, EU Space Agency, AU CASA, Swiss FOCA, DGCA

- ISO 27001 Certified for Information Security Management Systems

- Offices Washington DC, London, Asia, and Europe

Our Active Footprint

Our Value Proposition

Technology

Standards

"We live at the intersection of the three pillars"

Regulations

ICAO: AAM/UTM Working Group
UK: Future Aviation Industry Working Group - Airspace
US: USDOT Advanced Aviation Advisory Committee

Europe: Ongoing EASA certification
Standards: ASTM and EUROCAE
UAM: NASA, SESAR, Korea GC

CNS: Addressing Urban Air Mobility Challenges

- Existing CNS infrastructure limitations in urban environments

- Growing need for UAS Traffic Management (UTM) systems at higher altitudes

- Leveraging commercial technologies for scalable and widely implemented CNS models

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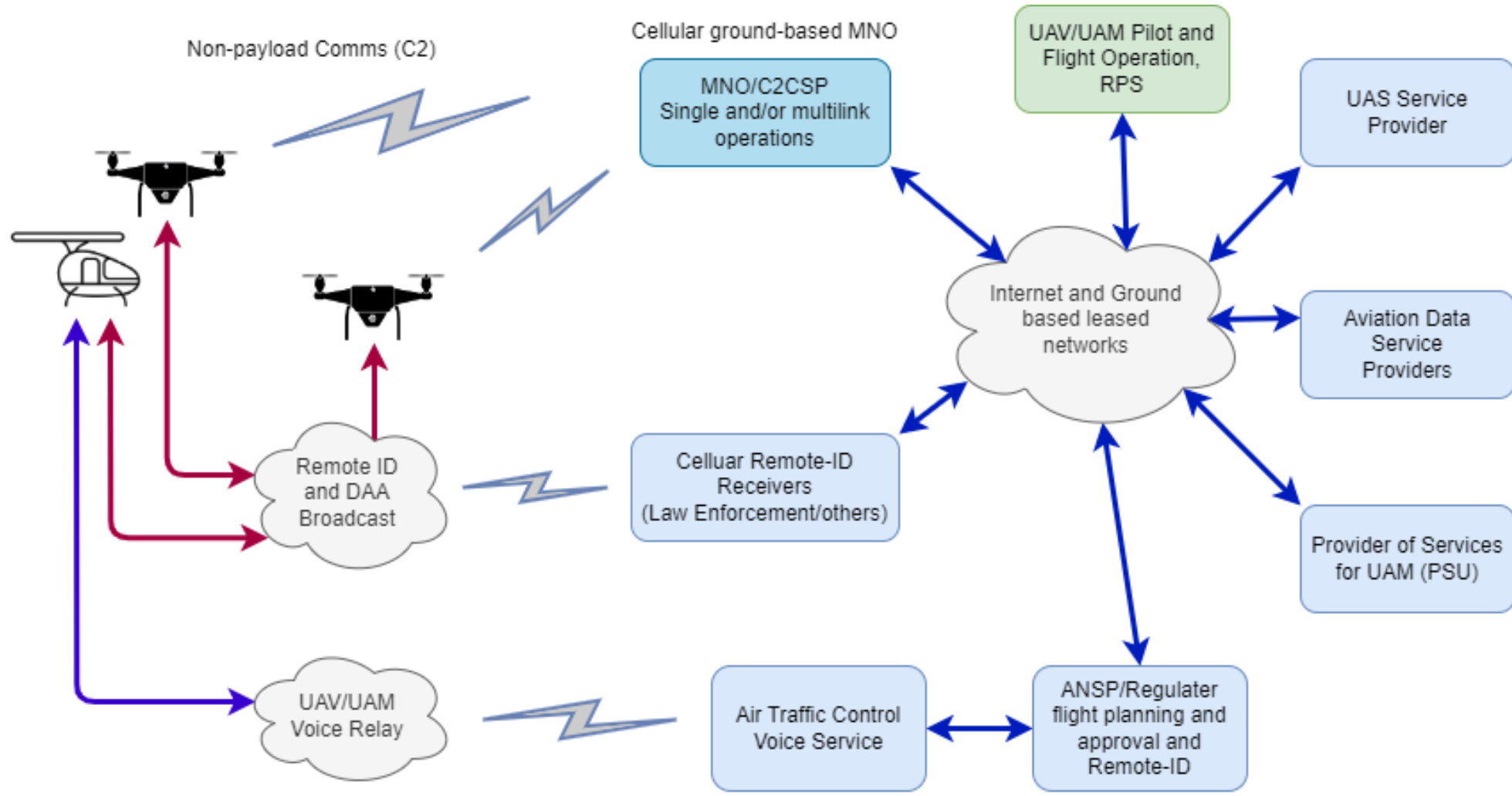TECHNOLOGIES

CNS: Enhancing Communications for UTM

Cellular Infrastructure for UTM

- Importance of cellular infrastructure for reliable drone communication during flight.

- Real-time digital data exchange enhances command and control.

- Ensuring adequate and seamless cellular coverage adds value to UTM operations.

Challenges and Opportunities

- Value additions of UTM in managing changing cellular infrastructure during flight operations.

- Real-time identification of different routes in case of communication lapse.

- Utilizing ground network data for generating flight paths based on safety and lowest population density.

- The role of 4G and 5G infrastructure in creating a robust platform for drone services.

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CNS: Communications Landscape View

Courtesy: GUTMA ACJA Working Group

CNS: Overcoming Navigation Challenges in UAM

Challenges with GNSS in urban environments

- Receiver antenna obscuration.

- Severe signal multipath in urban areas affecting positioning availability and accuracy.

- Ranging error due to signal propagation through the ionosphere and troposphere.

Overcoming GNSS challenges in urban air mobility

- Addressing performance degradation in urban environments.

- Strategy for predicting GNSS performance in urban airspace.

- Assessment of trade-offs between distance and navigation performance in dense urban environments.

- Utilizing generated 3D models of the navigation environment and GNSS, including receiver characteristics.

- Rules engine integration for flight safety decisions using radar, ADBS-B, terrain, weather, etc.

CNS: Ensuring Air Domain Awareness

Surveillance Challenges for UAM Scaling

- Flying complex UTM or UAM missions demands awareness of all airspace participants for safe operations.
- Operating in crowded airspace increases risk without integrated surveillance data.
- Confusion arises when the same aircraft has multiple, disparate reports for its location.
- Need for visibility into both cooperative and non-cooperative traffic.

Sensor Fusion Solution

- Utilizes a combination of sensors and methodology for drone detection.
- Provides a meaningful and useful air picture for navigating air hazards.
- Reduces air and ground risk by offering information about airspace participants.

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Surveillance and Identification: UTM System with Sensor Fusion
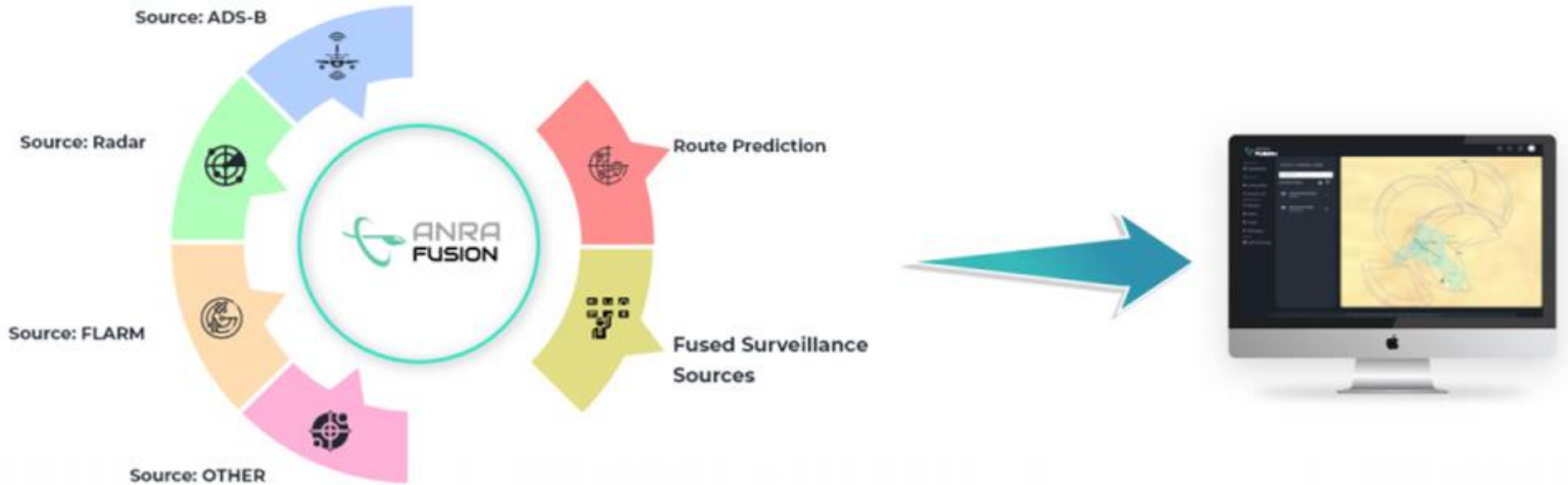
Surveillance and Identification:

- UTM system with Sensor Fusion uses data feeds from radar, electro-optic, and electronic broadcasts.
- Develops a well-defined airspace environment to detect and track vehicles.
- Includes low-level surveillance sensors for both cooperative (PSR, SSR, ADS-B, FLARM) and non-cooperative aircraft.

Single Integrated Air Operations Picture:

- Aggregates and integrates networked and non-networked surveillance data with UTM.
- Creates a more complete air picture distributed to authorized users.
- Enhances situational awareness for effective and safe airspace management.

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Surveillance and Identification: UTM System with Sensor Fusion

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