
A green
light to
greatness.®
UNT
UNIVERSITY
OF NORTH TEXAS®

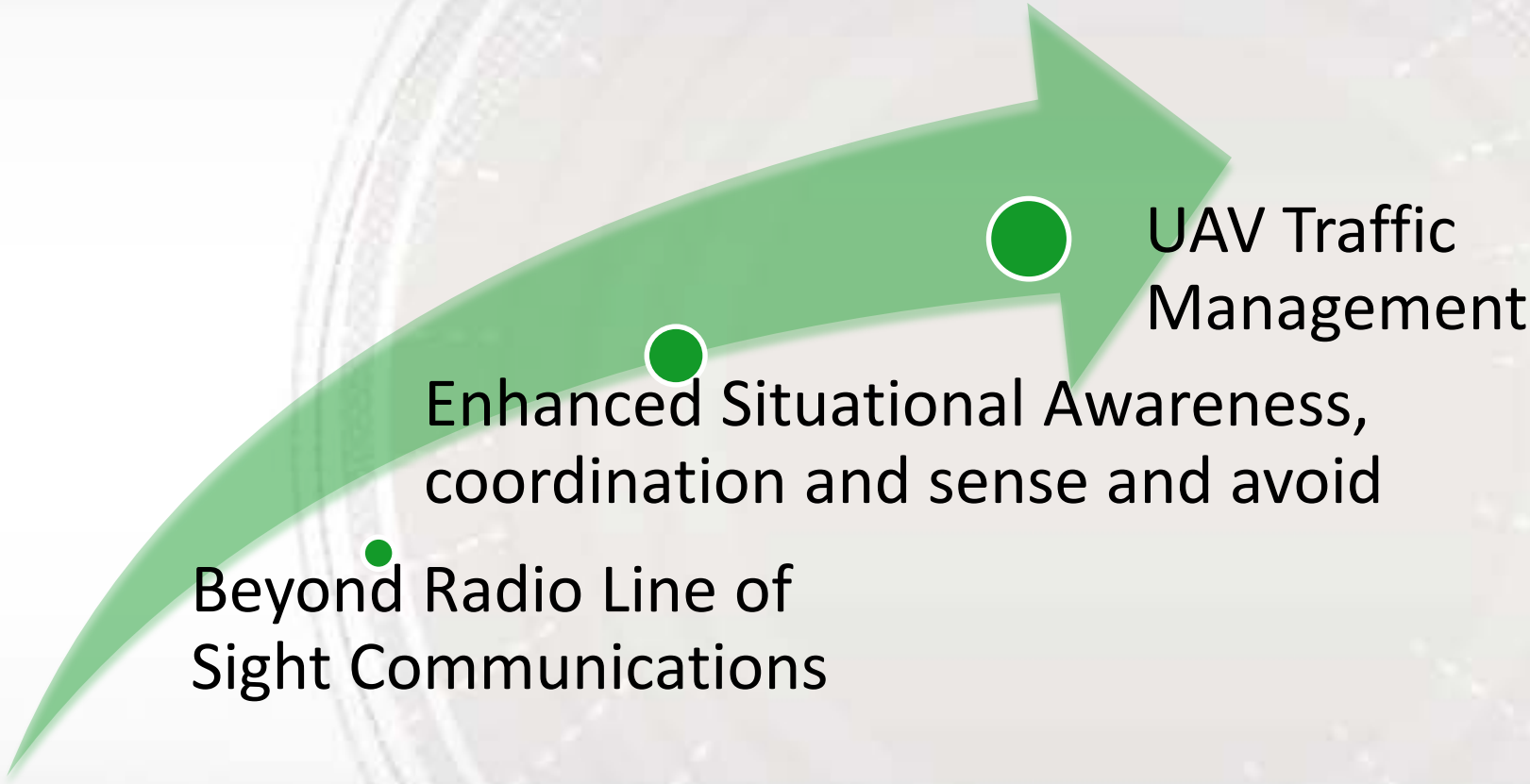
IEEE VTC Fall 2016

Unmanned Aerial Vehicles: Challenges Towards Mass Adoption

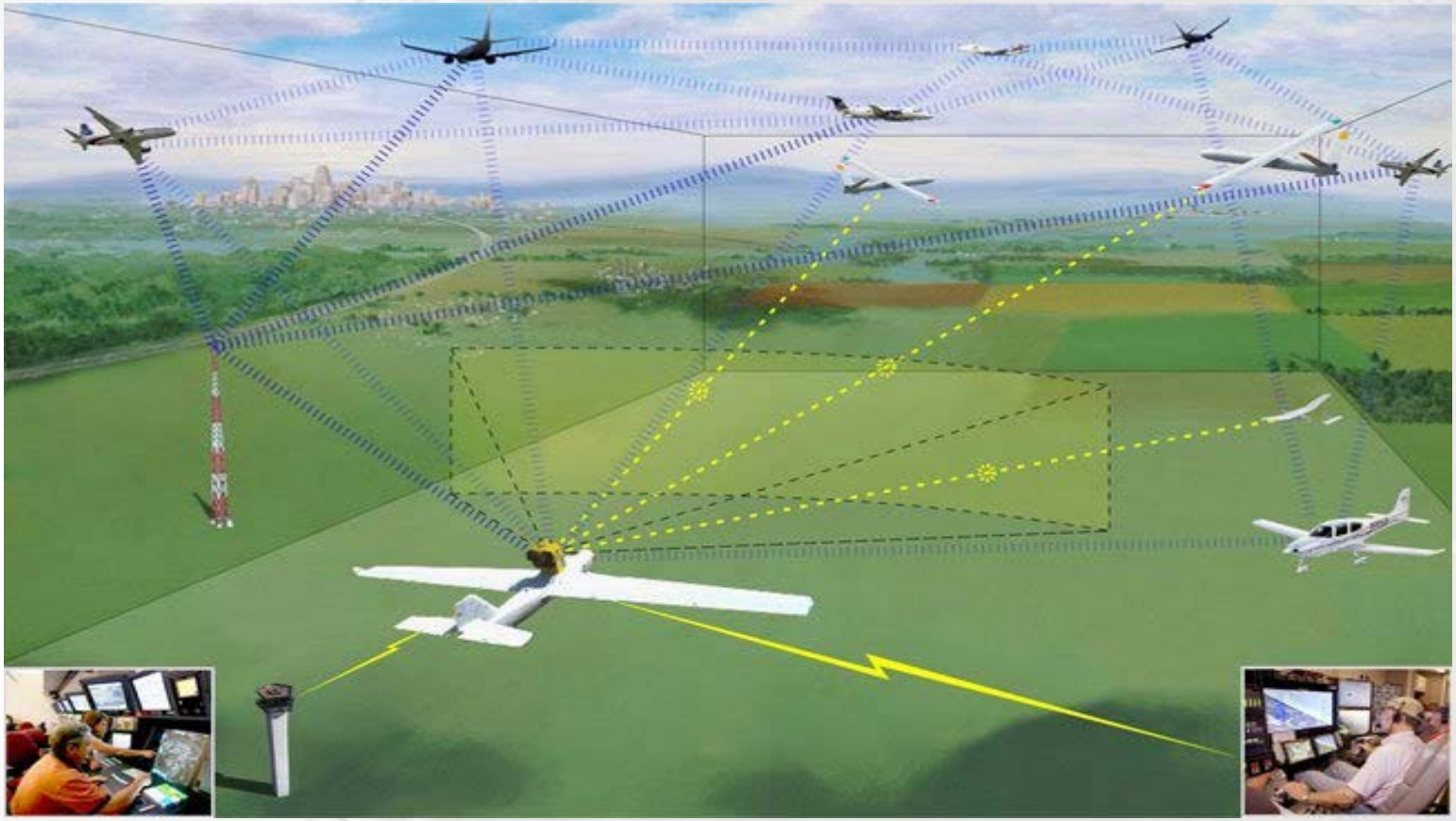
Kamesh Namuduri
Associate Professor, Electrical Engineering
University of North Texas

Kamesh.namuduri@unt.edu

Communication Beyond Radio Line of Sight is Critical for Mass Adoption of UAVS



UAS Traffic Management (UTA)



Courtesy, defenseupdate.org

Three Paradigms for UTA

- Satellite-based navigational support
- LTE-cellular network based navigational support
- Airborne or aerial network based navigational support

Satellite-based Navigational Support

Satcom – Courtesy gethow.org

Satcom-based Navigational Support

- SatCom is a centralized solution that allows aircraft to communicate to the Air Traffic Controller
- It does not allow one aircraft to communicate with other aircraft directly.
- For UAVs, the payload and cost are important factors that may prohibit mass adoption

LTE cellular Network-based Navigational Support

Courtesy, mobileworldlive.com

Airborne Communications

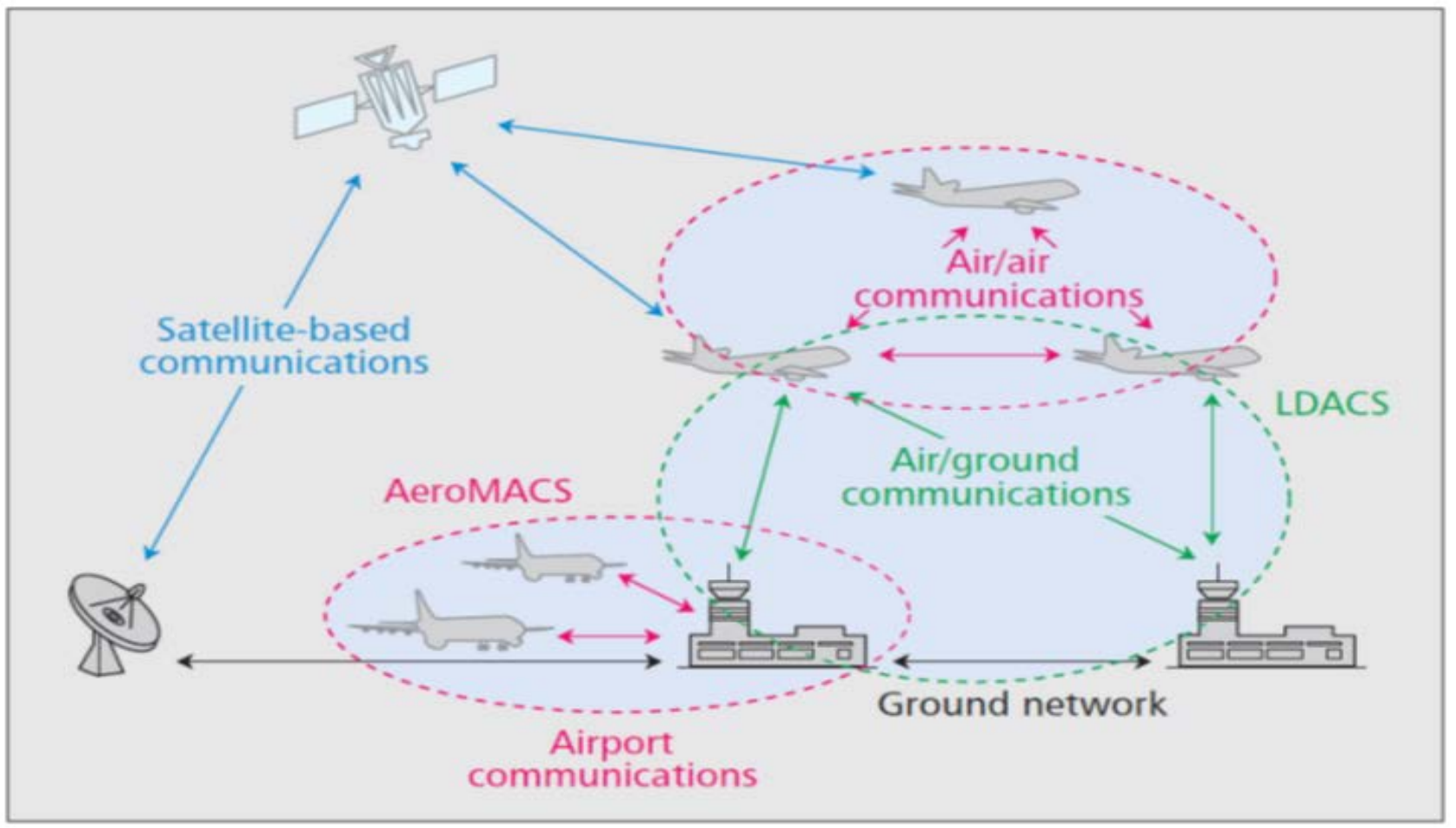


Fig. 1: Aeronautical Communications [1, Courtesy IEEE]

Automatic Dependent Surveillance-Broadcast

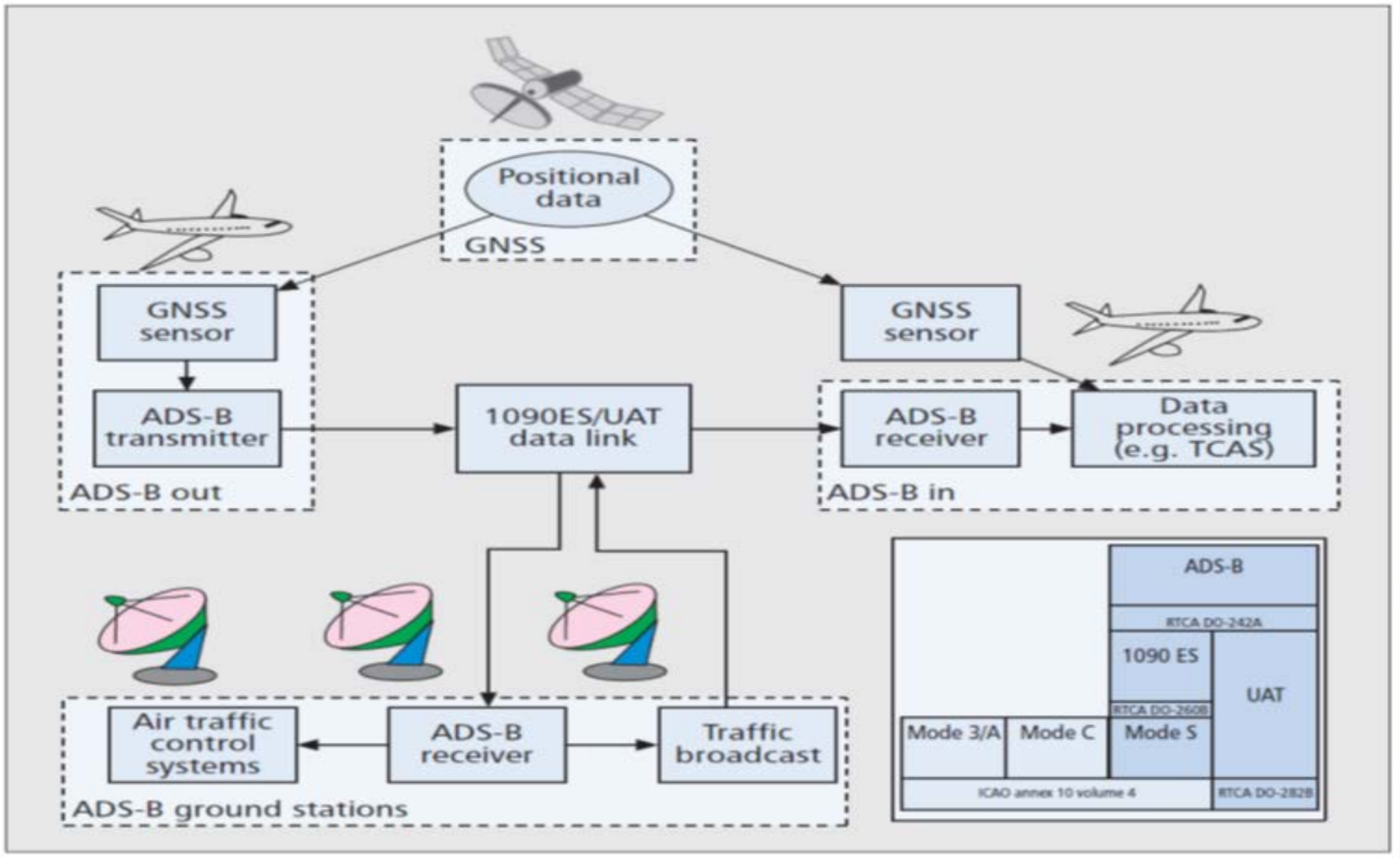


Fig.2: Overview of ADS-B [2], Courtesy IEEE

IEEE Standard P1920.1™

- Sponsored by the IEEE Communication Society
- IEEE announcement on June 29th, 2016
  - http://standards.ieee.org/news/2016/aerial_network_communications_working_group.html
- Working group has been formed
- First (online) meeting was held on 16th September 2016

IEEE Standard P1920.1™

"Aerial Network Communications brings many benefits, such as safer and more coordinated use of UAVs in emergency or natural disaster situations, greatly enhanced tracking of commercial and civil aircraft, and overall safer operation with more advanced collision avoidance data being shared directly between all aircraft."

---- IEEE Press Release on June 29, 2016

References

1. Martin Strohmeier, Matthias Schäfer, Vincent Lenders and Ivan Martinovic, Realities and Challenges of NextGen Air Traffic Management: The Case of ADS−B , In Communications Magazine, IEEE. Vol. 52. No. 5. Pages 111−118. May, 2014
2. Schnell, M.; Epple, U.; Shutin, D.; Schneckenburger, N., "LDACS: future aeronautical communications for air-traffic management," in Communications Magazine, IEEE, vol.52, no.5, pp.104-110, May 2014.
3. ICAO, “Use of Self Organizing Airborne Networks to Monitor Commercial Aircraft Globally”, working paper, WP/10, 2014.