

AED30 (1) Sensing Technologies Subcommittee Report, Jan. 7, 2021 & Jan. 13, 2021 Subcommittee Meeting Minutes

Co-sponsored by AED30 Information Systems & Technology and AED40 Geographic Information Science standing committees

Co-Chairs: Colin Brooks (Michigan Technological University, cnbrooks@mtu.edu) and Zhong-Ren Peng (University of Florida, zpeng@ufl.edu)

Subcommittee webpage: <https://www.abj50.org/subcommittees/sensing-technologies/>

1. Report to AED30 Information Systems and Technologies full committee on our activities during the past year:

- a. 2020 TRB Annual Meeting Sub-Committee meeting on Jan. 13, 2020: Helped organized 2020 workshop on Data Governance; supported sensing technologies-focused call for papers with 40 papers; planned for upcoming UAS webinar; focused on moving ahead with new Research Needs Statements
- b. **Supported TRB webinar on “Why surface transportation agencies use drones”** help on February 25, 2020.
 - i. Slides available at <http://www.trb.org/Main/Blurbs/180139.aspx>
 - ii. Presenters: James Gray (FHWA); Basil Yap (NCDOT); Colin Brooks (Michigan Tech Research Institute)
 - iii. Presentations focused on perspectives on UAS, agency organization around UAS & UAS applications; data collection & integration for UAS; and potential impacts on future applications.
 - iv. 474 site log-ins with estimated 976 people attending; 95% of post-webinar survey respondents stated they were satisfied or very satisfied.
- c. Helped put together **2021 Annual Meeting lectern session on Monday, January 25, 2021 from 1:00 PM- 2:30 PM ET: “1086 - Advances in Sensing and UAV Technologies”**
 - i. <https://annualmeeting.mytrb.org/OnlineProgram/Details/15543>
 - ii. 4 presentations (planned on 5):
 1. Radar Sensing Technology Application on Intersection Safety Assessment - a Kentucky Case Study
 - a. Richard Li, University of Louisville (P21-20569)
 2. Development of Mixed Reality Experiments for Smart City Test Centers
 - a. Joseph Paki & William Buller, Michigan Technological University (P21-20614)
 3. *Withdrawn due to COVID-19 impact on Cherokee Nation: The Use of Drone Technologies by the Cherokee Nation Department of Transportation*
 - a. Andy Quetone, Cherokee Nation P21-20571
 4. Use of UAS for Traffic Incident Management during Suboptimal Environmental Conditions
 - a. Cesar Quiroga & Edgar Kraus, Texas A&M Transportation Institute (P21-20801)
 5. Integration of UAV Sensor Data into Michigan DOT Workflows

- a. Colin Brooks, Michigan Technological University (P21-20572)
- d. Research Needs Statement activity:
 - i. Agreed at 2020 Subcommittee meeting we would move forward on four potential RNS topics:
 1. Safety applications of sensors – Richard Li, University of Louisville, richard.li@louisville.edu
 2. Using sensor data to feed into BIM processes – Basak Keskin, Syracuse University – bkeskin@syr.edu - ABJ95 – airport BIM example
 3. Atmospheric challenges to sensors - Kevin Salzer – Kevin.Salzer@myhealthdriv.org
 4. Air quality sensors for roadside environments – inc. connecting sensors (Zhong-ren Peng, University of Florida - zpeng@ufl.edu)
 - ii. Richard Li & Muting Ma (University of Louisville) moved ahead with leading their RNS idea and it will be submitted to FY2022 NCHRP Synthesis Topic Statements by the deadline of Feb. 17, 2021
 1. Formal title: “Practices for Assessing Traffic Safety for Applying Sensing Technologies”. Includes planned focus on radar, vehicle, air vehicle, lidar, cloud circuit TV, and data fusion topic areas.

2. Minutes for January 13, 2021 Sensing Technologies Subcommittee TRB meeting:

- a. Held Subcommittee meeting on Wednesday, January 13, 4-5:30pm ET (link: <https://annualmeeting.mytrb.org/OnlineProgram/Details/15593>)
- b. Discussed interest in putting together new Lectern Session focused on sensing technologies
 - i. Critical and emerging research areas – see what papers get submitted
 - ii. Traffic flow assessment – Cris Druta – onsite aerial surveillance w/ real-time communication – with UAS – integrate with traffic management practices – Virginia
 1. O/D & vehicle trajectory studies – John Hourdos – How can UAV data help get beyond traditional limits of embedded bridge sensors
 2. Use of UAS for initial performance analysis of Traffic flow and vehicle trajectory when a smart corridor is implemented with a few CAV applications keeping in view various levels of self driving engagement of vehicles mixed with human vehicles on the corridor. – Padmaja Sampat
- c. Support development of new RNS statements. Suggested topics:
 - i. Resilience & security of sensors – Kaveh Kelarestaghi, Kaveh.bakhshkelarestaghi@icf.com
 1. <https://www.mytrb.org/OnlineDirectory/Committee/Details/6450-AMR40> Standing Committee on Systems, Enterprise, and Cyber Resilience – Kaveh recommended collaborating on RNS ideas -
 - ii. IoT & other sensors – Aaron Costin, aaron.costin@ufl.edu – help with reaching out
 1. Reach out to State & AASHTO research, AED30 committee members

- d. Discussed interest in holding new webinar
 - i. Potentially do Traffic Flow Assessment with UAS as a webinar
 - ii. Use of UAS with the ASCE Transportation & Development Institute (T&DI) UAS Impacts Task Force Committee (Halil Ceylan, hceylan@iastate.edu - ISU)
- e. Other topics of interest:
 - i. Paving operation inspection via UAS – new UAS rules enabling more – Aaron Chamberlin, Aaron.Chamberlin@dot.ca.Gov– Caltrans
 - ii. UAS accuracy stands for surveying- Caltrans example - <https://geocue.com/caltrans-high-accuracy-mapping/> - Aaron Chamberlin
 - iii. Machine learning to analyze sensor data – David Reinke, dbreinke@alum.mit.edu – AED50 (TRB Committee on AI and Advanced Computing Applications)
 - iv. Standard collection of drone data –
 - 1. Being done by specific topics
 - a. Such as bridge inspection
 - b. For surveying
 - c. Construction inspection
 - d. Traffic monitoring
 - 2. Effects of camera optics on UAS video & imagery quality
 - a. What sensors meet different needs
 - 3. Could there be limits on products used because of federal funding?
Example: some restrictions on
 - v. IoT wireless network service for construction and mobile environments – Aaron Costin, UFL
 - vi. IEEE. They have an Intelligent Transportation Systems Society and a Smart Cities Initiative
- f. Interest in mid-year meeting?
 - i. Yes. Include updates on ongoing studies from various DOTs