

## IEEE UAS Standards Tracking and Standards Development-Related Research Needs

### Industry Connections Activity Initiation Document (ICAID)

Version 1.0, 12 November 2021

IC21-014-01 Approved by the IESS SMDC 13 December 2021

#### Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- **Shaded Text** indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE SA) Industry Connections Committee (ICCom) Administrator at the following address: [industryconnections@ieee.org](mailto:industryconnections@ieee.org).
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

#### 1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

**Name:** Richard S. Stansbury

**Email Address:** stansbur@erau.edu

**Employer:** Embry-Riddle Aeronautical University

**Affiliation:** ASSURE Center of Excellence for Unmanned Aircraft Systems

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

#### 2. Participation and Voting Model

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

Individual-based

#### 3. Purpose

##### 3.1 Motivation and Goal

Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

The proposed Industry Connection (IC) activity seeks to inform the FAA UAS Research Office (AUS-300) of IEEE's existing Unmanned Aircraft System (UAS)-relevant standards and standard development activities. This activity shall help inform an active FAA/ASSURE UAS Center of Excellence research project, A37: UAS Standards Identification, Tracking, and Mapping, to track UAS standard development activities across many standard development organizations (SDOs) such as IEEE and identify forthcoming needs for future FAA research support to support standard development activities.

To meet this objective, the IC's members shall be representatives of IEEE's standards development committees/working groups across its societies. The committee shall meet every-other-month to:

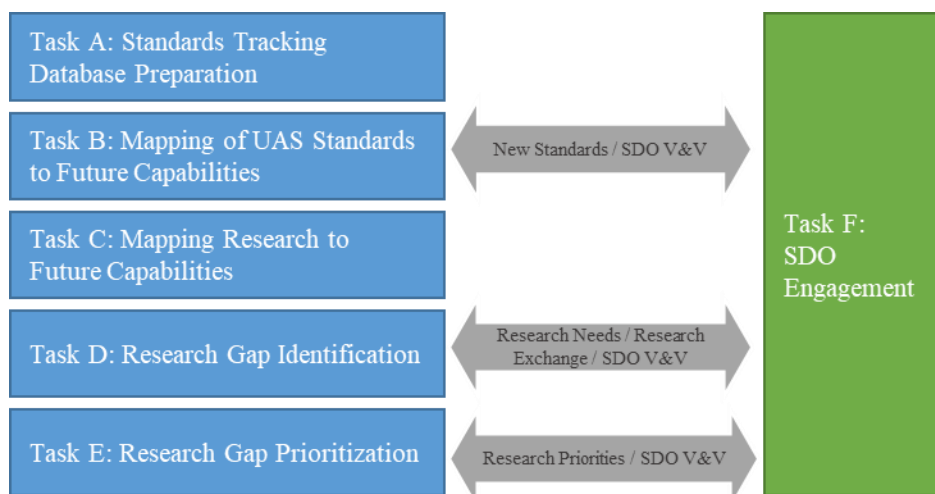
- Validate the set of IEEE standards tracked by the A37 research team (via spreadsheet) to confirm completeness and correctness ensuring all UAS-relevant IEEE standards are tracked,
- Discuss new and forthcoming UAS standard development activities within IEEE, and
- Discuss research gaps impacting IEEE UAS standard development, which can potentially be resolved through FAA research,
- Prioritize research gaps based upon level of importance to the IEEE's success in timely delivery of its supported standards activity(ies), and
- Learn from the A37 research team about past, ongoing, and planned FAA/ASSURE research activities that could inform IEEE standards work.

The identified standards and research gaps shall be mapped to future UAS operational capabilities as defined in the FAA's UAS Integration Research Plan (UIRP) and its publicly accessible "Integration to Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS)" roadmap.

### **3.2 Related Work**

Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

The ASSURE A37 project seeks to identify and prioritize research tasks for the FAA to ensure standards development and validation activities are achieved to enable the integration of new UAS capabilities within the national airspace system (NAS). The team shall articulate requirements for standards based upon the FAA's UIRP's list of future UAS integration capabilities. Standards (published, in development, or planned) addressing these needs shall be identified and mapped to the requirement it supports. Likewise, research activities (past and ongoing) enabling the required standards development or validation shall be tracked. The team shall identify gaps where current research is insufficient to enabling standard requirements. Utilizing a multi-criterion metric, the team shall report to the FAA the set of prioritized research gaps. Figure 1 presents the major research tasks of the A37 project with their relationship to SDO engagement, which this proposal seeks to fulfill for IEEE.



**Figure 1: A37 Tasks**

The FAA published the UIRP with annual updates to summarize the FAA’s research strategy to achieve UAS integration into the NAS. As of the 2020-2025 edition<sup>1</sup> of the UIRP, six capabilities remain an active domain for research and development efforts: expanded operations, small UAS package delivery, integrated operations, routine/scheduled operations, large carrier cargo operations, and passenger transport operations. Standards help enable the realization of the capabilities contained in the UIRP within the domains of airworthiness, operations (flight safety and air traffic), and training.

In September 2017, American National Standards Institute (ANSI) launched the Unmanned Aircraft Systems Standardization Collaborative (UASSC). The UASSC was established to coordinate and accelerate the development of the standards and conformity assessment programs needed to facilitate the safe integration of UAS into the NAS of the United States, with international coordination and adaptability. The UASSC was not chartered to write standards.

In December 2018, the UASSC published the Standardization Roadmap for Unmanned Aircraft Systems, Version 1.0 ("roadmap"). In it, UASSC identified existing standards and standards in development, assessed gaps, and made recommendations for priority areas where there is a perceived need for additional standardization and/or pre-standardization R&D. Since standards development is an ongoing work, and there is an urgent need in their development to enable UAS operations in the NAS, in September 2019, UASSC was commissioned to produce version 2.0 of the "roadmap," which was published in June 2020.

**3.3 Previously Published Material**

Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity.

<sup>1</sup> For this effort, the team shall focus on the 2020-2025 draft of the UIRP only.

- ANSI. “Unmanned Aircraft System Standardization Collaborative (UASSC),” <https://www.ansi.org/standards-coordination/collaboratives-activities/unmanned-aircraft-systems-collaborative>, last accessed 2021-10-19.
  - Published Reports available:
    - “Standardization Roadmap for Unmanned Aircraft Systems V2.0”
    - “Tracking Standardization Gaps”
- FAA. “Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap,” [https://www.faa.gov/uas/resources/policy\\_library/media/2019\\_UAS\\_Civil\\_Integration\\_Roadmap\\_third\\_edition.pdf](https://www.faa.gov/uas/resources/policy_library/media/2019_UAS_Civil_Integration_Roadmap_third_edition.pdf), last accessed 2021-10-19
  - Publicly released version of the FAA’s UIRP

### **3.4 Potential Markets Served**

Indicate the main beneficiaries of this work, and what the potential impact might be.

Through the progressive deployment of new UAS operational capabilities, enabled by standards, growth of the unmanned aviation sector shall likely contribute a positive impact across markets including, but not limited to: aviation/aerospace, UAS, urban air mobility (UAM), robotics, vehicle transportation systems, and supply chain and logistics.

### **3.5 How will the activity benefit the IEEE, society, or humanity?**

The technological, operational, and safety advancements of UAS and their integration into the National Airspace System serve a broad swath of IEEE-relevant domains. Relevant IEEE societies include, but are not limited to:

- Aerospace and Electronic Systems Society
- Antennas and Propagation Society
- Communications Society
- Control Systems Society
- Electromagnetic Compatibility Society
- Electronics Packaging Society
- Industry Applications Society
- Intelligent Transportation Systems Society
- Power Electronics Society
- Product Safety Engineering Society
- Reliability Society
- Robotics and Automation Society
- Systems, Man, and Cybernetics Society
- Vehicular Technology Society

The benefit to the IEEE and participating members shall be the establishment of a relationship between its standards development efforts and the ASSURE Center of Excellence. It provides a mechanism for the standards developers to communicate to the FAA their research needs. By informing the FAA of research needs early within the process, new research tasks can be created to fill those gaps in time to fulfill those needs. It also enables those standard developers to be aware of existing ASSURE projects that can aid or complement their standards development activities. By having a better awareness of FAA-sponsored ASSURE projects, the standard development committees can better leverage existing work and coordinate with past research performers.

More broadly, if the proposed effort aids the integration of UAS capabilities following the plan presented in its roadmap, society and humanity shall benefit. In addition to the economic impact of the emerging UAS and UAM industry, these capabilities shall enable improvements to supply chain and logistics, public safety, infrastructure inspection, aerial photogrammetry, and transportation.

#### **4. Estimated Timeframe**

Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

**Expected Completion Date:** 04/30/2022

This effort shall extend from its start date to April 30, 2022, which is the end date for the A37 project's period of performance. The FAA can only support individuals to participate in this effort through this date. The IC participants shall decide if the IC activity shall continue with a newly elected chair / vice-chair.

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICCom and the responsible committee of the IEEE SA Board of Governors. Should an extension be required, please notify the ICCom Administrator prior to the two-year mark.

#### **5. Proposed Deliverables**

Outline the anticipated deliverables and output from this IC activity, such as documents (e.g., white papers, reports), proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

From the A37 team, the IC shall receive, review, and validate two documents:

- IEEE standard tracking spreadsheet
- IEEE research gap tracking spreadsheet (with gaps prioritized)

The project timeline with milestone deliverables are as follows:

##### **Task 0: Kick-off**

Members of the ASSURE A37 research team shall brief the IC on their project, the inputs needed from the IC members, and answer questions. The IC team members shall discuss the project timeline and milestones. Task 1 shall be assigned to the group.

##### **Task 1: Individual Validation**

Leveraging the standards committee memberships of the various IC members, each member shall review the A37 team's spreadsheets. The IC member shall specify any corrections due to error or omission.

**Milestone 1: Individual Validation of Tracked Standards and Research Gaps.** IC committee members shall validate the A37 team's spreadsheets of IEEE UAS-related standards and research gaps. Each shall leverage their own role and expertise within IEEE standards activities to support their inputs. [January 31, 2022]

##### **Task 2: Consolidate Validation**

Following the individual validation reviews of the spreadsheets by the IC team members, a meeting shall be held to review and consolidate those inputs. Conflicts shall be resolved or noted.

**Milestone 2: Consolidated Validation Inputs (consolidated).** The IC shall consolidate inputs to produce a validated spreadsheet for IEEE UAS-related standards and a validated spreadsheet of research gaps. [February 28, 2022]

**[OPTIONAL] Task 3: Bi-monthly (every other month) Updates**

After Task 2, if the team wishes to continue, it will move into a bi-monthly meeting schedule beginning May 1, 2022.

Every other month, the team shall meet to discuss any new standards activities within IEEE, any new research gaps that have been identified by its members, and new ASSURE research activities that could potentially inform standards development within IEEE.

**Milestone 3: Periodic Updates to Tracked Standards and Research Gaps.** From each bi-monthly meeting, the spreadsheets for standard tracking and research gap tracking shall be updated based upon committee inputs during the bi-monthly meeting. A bi-monthly briefing from ASSURE will be presented summarizing new research activities. [Every two months starting May 1, 2022]

**5.1 Open Source Software Development**

*Indicate whether this IC Activity will develop or incorporate open source software in the deliverables. All contributions of open source software for use in Industry Connections activities shall be accompanied by an approved IEEE Contributor License Agreement (CLA) appropriate for the open source license under which the Work Product will be made available. CLAs, once accepted, are irrevocable. Industry Connections Activities shall comply with the IEEE SA open source policies and procedures and use the IEEE SA open source platform for development of open source software. Information on IEEE SA Open can be found at <https://saopen.ieee.org/>.*

Will the activity develop or incorporate open source software (either normatively or informatively) in the deliverables?:

**6. Funding Requirements**

*Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICom.*

N/A

**7. Management and Procedures**

**7.1 Activity Oversight Committee**

*Indicate whether an IEEE Standards Committee or Standards Development Working Group has agreed to oversee this activity and its procedures.*

Has an IEEE Standards Committee or Standards Development Working Group agreed to oversee this activity?:

*If yes, indicate the IEEE committee's name and its chair's contact information.*

IEEE Committee Name:

Chair's Name:



**Chair's Email Address:** who@where

Additional IEEE committee information, if any. Please indicate if you are including a letter of support from the IEEE Committee that will oversee this activity.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

### **7.2 Activity Management**

If no Activity Oversight Committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc).

The IC chair shall schedule meetings for the kickoff meeting, validation meeting, and bi-monthly (every other month) meeting.

The chair and vice chair shall serve as points-of-contact/representatives to the ASSURE Center of Excellence, generally, and its A37 project, specifically.

Given committee size, the IC shall have no secretary. Those duties typically assigned to the secretary shall be divided between the chair and VICE chair.

A shared online workspace such as Microsoft Teams or suitable alternative shall be used for document storage, team communication between meetings, and shared calendar.

### **7.3 Procedures**

Indicate what documented procedures will be used to guide the operations of this activity; either (a) modified baseline *Industry Connections Activity Policies and Procedures*, (b) Standards Committee policies and procedures accepted by the IEEE SA Standards

Board, or (c) Working Group policies and procedures accepted by the Working Group's Standards Committee. If option (a) is chosen, then ICCom review and approval of the P&P is required. If option (b) or (c) is chosen, then ICCom approval of the use of the P&P is required.

The abridged Industry Connections Activity P&P for individuals.

## **8. Participants**

### **8.1 Stakeholder Communities**

Indicate the stakeholder communities (the types of companies or other entities, or the different groups of individuals) that are expected to be interested in this IC activity, and will be invited to participate.

The committee seeks members with an active role within one of IEEE's standards development committees relevant to UAS for (a) system/sub-system/component certification or (b) operational safety.

Relevant IEEE societies include, but are not limited to:

- Aerospace and Electronic Systems Society

- Antennas and Propagation Society
- Communications Society
- Control Systems Society
- Electromagnetic Compatibility Society
- Electronics Packaging Society
- Industry Applications Society
- Intelligent Transportation Systems Society
- Power Electronics Society
- Product Safety Engineering Society
- Reliability Society
- Robotics and Automation Society
- Systems, Man, and Cybernetics Society
- Vehicular Technology Society

External stakeholders for this effort include, but are not limited to: regulators, manufacturers, research institutes, government organizations, aircraft manufacturers, OEMs, software manufacturers, supply chain and logistics companies, UAS end-users, etc.

**8.2 Expected Number of Participants**

Indicate the approximate number of entities (if entity-based) or individuals (if individual-based) expected to be actively involved in this activity.

5-8 Individuals

**8.3 Initial Participants**

Provide a number of the entities or individuals that will be participating from the outset. It is recommended there be at least three initial participants for an entity-based activity, or five initial participants (each with a different affiliation) for an individual-based activity.

Use the following table for an entity-based activity:

Entity	Primary Contact	Additional Representatives
Entity Name	Contact Name	Name

Use the following table for an individual-based activity:

Individual		Employer	Affiliation
Richard Stansbury	Chair	Embry-Riddle Aeronautical University	ASSURE
Sreejith Vidhyadharan	Vice Chair	University of North Dakota	ASSURE
TBD AEES participant	Member		
TBD Comm Soc participant	Member		
TBD RAS participant	Member		
TBD VTS participant	Member		



TBD EPS participant	Member		
TBD Controls Soc participant	Member		
TBD Software Engineering Soc participant	Member		

Note on recruitment: Our research team is presently working with IEEE SA to recruit IEEE members whom participate in standard development activities related to UAS and can speak to (a) current and planned UAS standards activities, (b) assist in validating the IEEE standards currently tracked by the A37 team, and (c) inform the A37 team on what FAA sponsored-research could be proposed to aid IEEE’s success in developing future UAS standards.

**8.4 Activity Supporter/Partner**

Indicate whether an IEEE committee (including IEEE Societies and Technical Councils) has agreed to participate or support this activity. Support may include, but is not limited to, financial support, marketing support and other ways to help the Activity complete its deliverables.

**Has an IEEE Committee agreed to support this activity?:** No

If yes, indicate the IEEE committee’s name and its chair’s contact information.

**IEEE Committee Name:** Committee Name

**Chair’s Name:** Full Name

**Chair’s Email Address:** who@where

Please indicate if you are including a letter of support from the IEEE Committee.