IEEE Aerospace Electronic Systems

Tech Ops Committee Report

Michael Braasch, VP-Tech Ops

AESS Spring 2023 Board of Governors Meeting

San Antonio, Texas, USA

- Michael Braasch
- Steve Butler
- Marina Ruggieri
- George Schmidt

▶Technical Operations is responsible for oversight of the Technical Panels for the AESS Board of Governors.

- Currently we have six panels
  - Avionics Systems
  - Cyber Security
  - Glue Technologies for Space Systems
  - Gyro and Accelerometer (GAP)
  - Navigation Systems
  - Radar Systems
- Also have Vision & Perspectives (V&P) committee

‣ Strengths
  – Most of the panels are responsible for an important conference
  – Most have contributed state-of-the-art articles to SYSTEMS
  – Many articles submitted to TAES
  – GAP has overseen the development and publication of more than a dozen standards

‣ Weaknesses
  – Although all of the panels play a role, there is no panel specifically devoted to unmanned/autonomous systems [V&P intended to fill this gap]

‣ Opportunities
  – Supertopic: "Autonomy for Sustainability" [V&P]
  – Seeking new initiatives from the panels (workshops, chapter presentations, other)

‣ Threats
  – Most of the people involved in the V&P Committee are extremely busy; it took V&P nearly two years to get the article ready for SYSTEMS

- NSP still attempting to start the new IEEE Navigation Conference
  - Potential collaboration with ASP
- V&P committee submitted the Supertopic paper to SYSTEMS on April 20, 2023
- Contacted all Panel chairs regarding potential for supporting Nov 2023 radar conference
- Attempts to revise the process for selecting Best Panel of the Year has met with some disagreements within the Tech Ops committee

Reports from the Panels

The Avionics Systems Panel (ASP) is composed of IEEE Associate or higher level members who are representatives of industry, government laboratories, educational institutions and professional societies, and who are active in the domain of Avionics. Its main objectives are:

– Promote and support collaborative research initiatives in the domain of Avionics

– Develop and disseminate high-quality IEEE publications in the domain of Avionics

– Promote and support educational activities in the domain of Avionics

– Sustain and oversee the programs of the IEEE/AIAA Digital Avionics Systems Conference (DASC) and the Integrated CNS Conference; and contribute to other conferences and dissemination initiatives

– Manage the nomination and selection of candidates for IEEE Awards in the domain of Avionics

– Encourage submission of nominations for IEEE Fellows and Senior Members in the domain of Avionics

– Recommend and support new IEEE avionics standards or revisions of existing standards

- The ASP held monthly meetings (with participants from the US, EU, UK and Asia) addressing the following topics:

  - **Research and Innovation (R&I).** Participation to NASA UTM and AAM activities; connections/collaborations with NextGen in the US and SESAR in the EU; other national and international Avionics/ATM/UAS programs; Collaboration with JARUS, ICAO and IFATCA (UAS/UTM)

  - **Publications.** Editorial Committees and Reviewer contributions to the Transactions on Aerospace and Electronic Systems and AESS Systems Magazine; Special Issues on Avionics, UTM/UAM and Space Systems; joint journal publication initiatives (e.g., Avionics Systems for Trusted Autonomy, Multi-Domain Traffic Management, Avionics Education)

  - **Conferences.** IEEE/AIAA Digital Avionics Systems Conference (DASC); IEEE/AIAA Integrated Communications, Navigation and Surveillance Systems (ICNS) Conference; IEEE/AIAA/PHM Aerospace Conference; other conferences

  - **Education Activities.** AESS Distinguished Lecturers/VDL Program updates; Webinars, Tutorials and Short Course initiatives

  - **Industry Engagement and Standards.** UAS/Autonomy, AI, V2X Communications, Cyber Security, etc.

- Joint meetings with the Cyber Security Panel are held on a bi-monthly basis.

Research and Innovation

1) **Communication, Navigation and Surveillance for Air Traffic Management (CNS/ATM):**
   - Evolution of the certification framework for integrated CNS +Avionics
   - Civil and military airspace integration and CNS+A systems interoperability;

2) **Avionics Systems Integration and Security:**
   - Fault-tolerant avionics design and Integrated Vehicle Health Management (IVHM) systems;
   - Cyber-physical security of avionics and CNS/ATM systems;

3) **Multi-Domain Traffic Management (MDTM):**
   - UAS integration in all classes of airspace and UTM;
   - Avionics for space transport, Space Traffic Management (STM) and intelligent satellite systems;

4) **Automation and Autonomy:**
   - Development of Avionics Human-Machine Interfaces and Interactions (HMI[2]); and
   - Artificial Intelligence (AI)/Machine Learning (ML) in avionics systems design and operations (including the challenges of certification and the role of explainable AI).
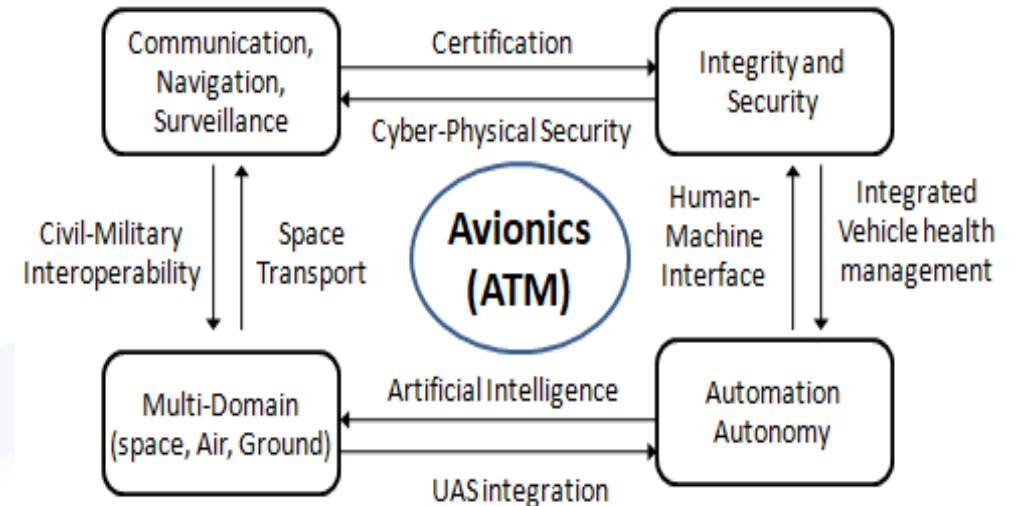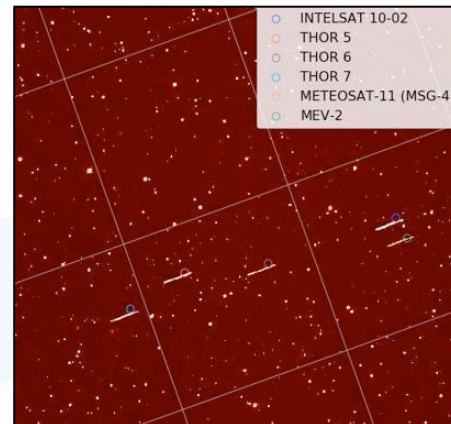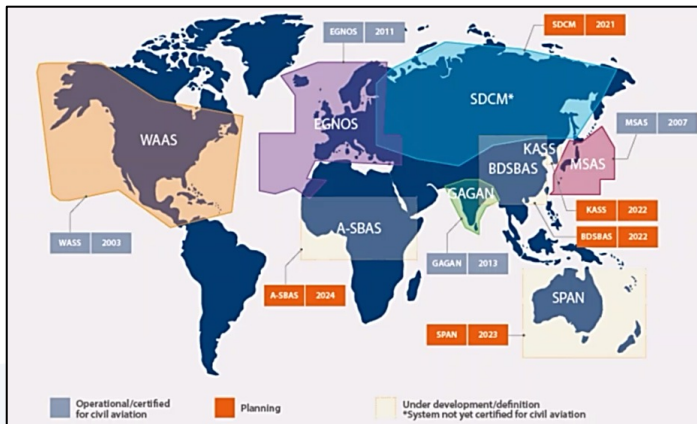
Research and Innovation (cont.)

- The ASP is collaborating with ICAO, IFATCA, EASA, EUROCAE and SESAR initiatives to promote avionics research/innovation, education and the evolution of certification standards for UAS Traffic Management and Advanced Air Mobility

- ASP members contributed to weekly meetings of the JARUS (Joint Authorities for Rulemaking on Unmanned Systems) Working Group 7 – Automation Concept of Operations. Current activities focus on:

  – ATM and UTM Automation

  – Flight Rules for Autonomous Operations

  – Infrastructure, Aerodromes and Ground Equipment

  – Considerations for Technology Maturity

  – Automation and Trusted Autonomy Use Cases

  – Multiple Simultaneous Operations

Research and Innovation (cont.)

- The ASP developed a collaboration with the European Union (EU) Global Action on Space, an initiative of the European Commission that aims to promote international partnerships with the EU Space Program.

- Following the fruitful interactions in April and September 2022, an industry-focused R&I event was held in March 2023. Main areas of focus:

  - Galileo and GNSS/SBAS services and associated space business opportunities

  - Distributed space systems for Earth observation, telecoms, space transport, and space surveillance

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# Research and Innovation (cont.)

- The ASP is actively working with various industry and government partners to address the future challenges of air-and-space traffic management integration (both technological and regulatory framework evolutions)
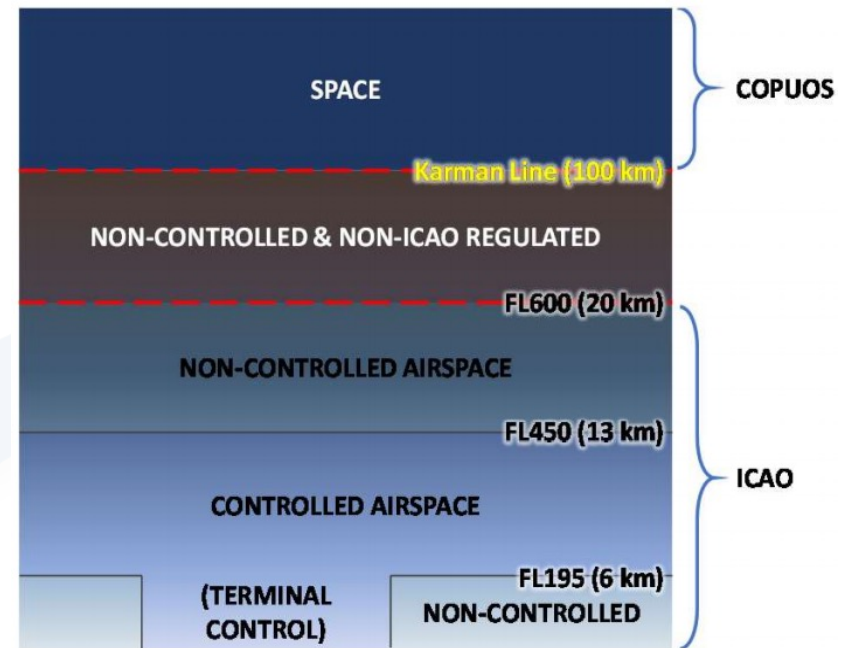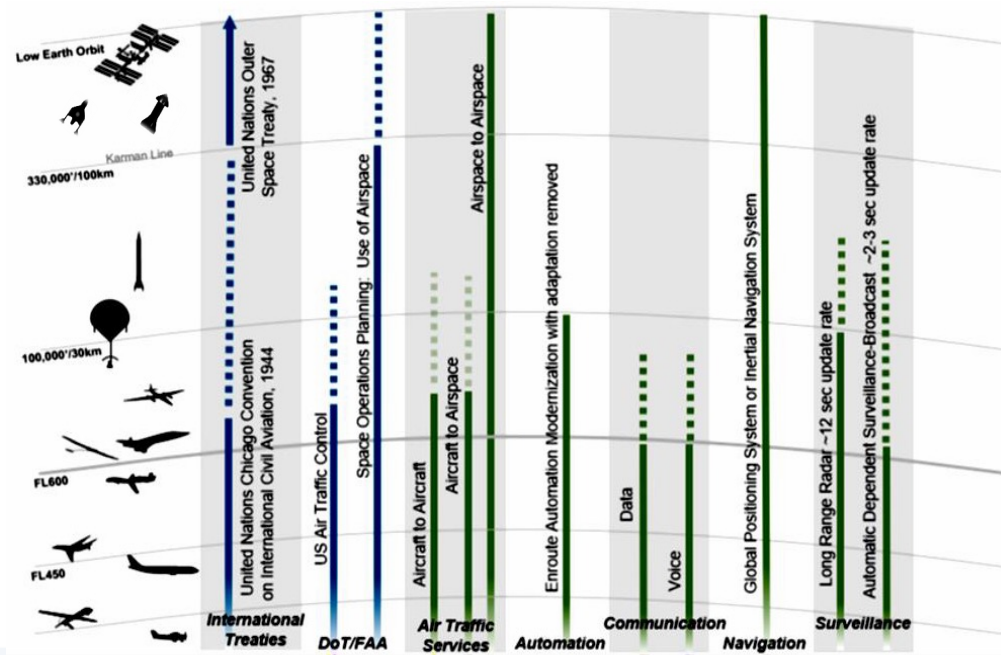
Research and Innovation (cont.)

- The concept of Multi-Domain Traffic Management (MDTM) has emerged and various AI-based Cyber-Physical System (iCPS) architectures are being studied to support CNS/ATM and Avionics (CNS+A) system evolutions for trusted autonomous air and space transport operations
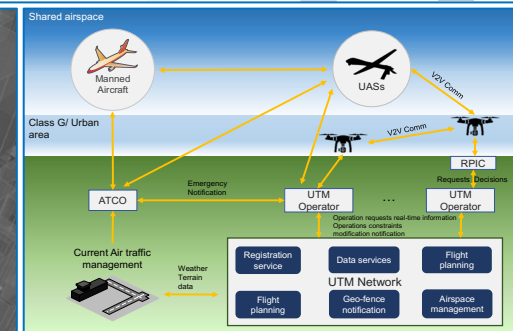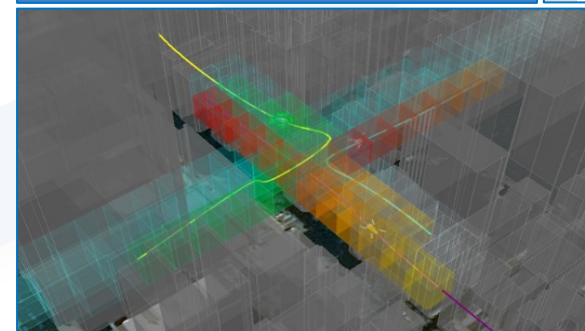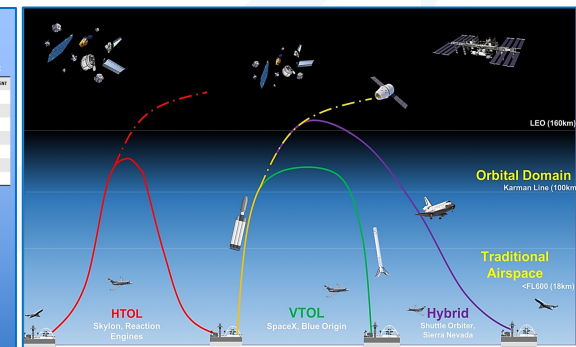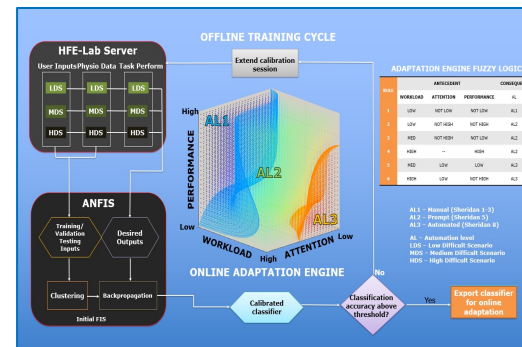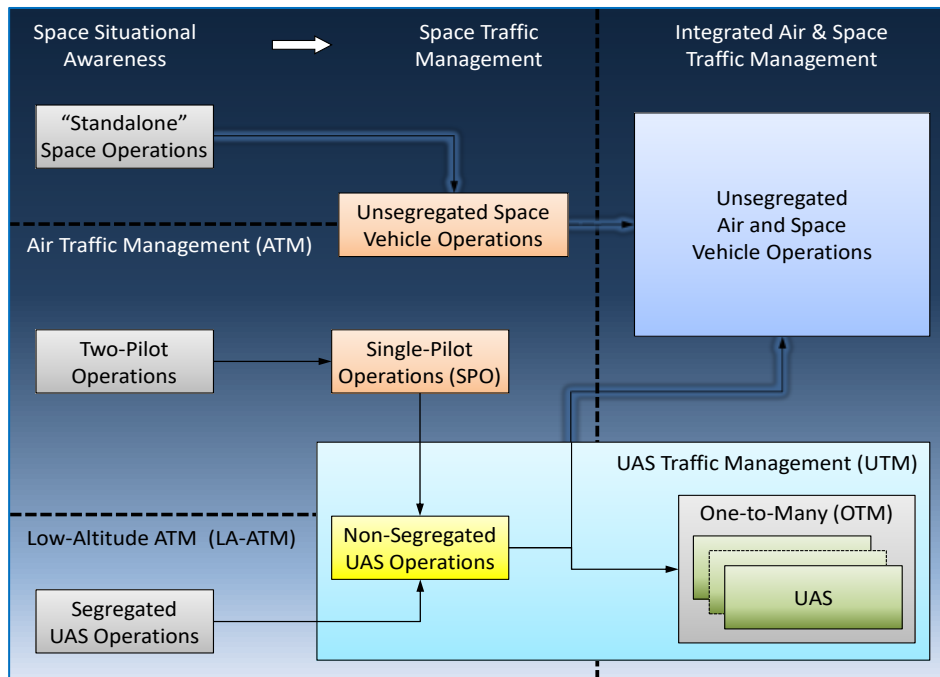
Conferences

- The ASP is actively contributing to the organization of the 42nd IEEE/AIAA Digital Avionics Systems Conference, to be held in Barcelona, Spain, on 01-05 October 2023

- ASP members are contributing to the UAS and student paper competitions, and will give some tutorials (Avionics, Spaceflight and Autonomous Systems) as well as chairing various track and sessions

- Following the successful experience of last two editions, the ASP is currently developing a free-of-charge tutorial at DASC 2023, focusing on the panel ongoing R&I activities: *"Intelligent Cyber-Physical Systems for Multi-Domain Traffic Management."*

- ASP members also had a leadership role in the organization of IEEE/AIAA ICNS 2023 and contributed to the Avionics and Sensor Fusion Sessions of the IEEE/AIAA/PHM AeroConf 2023

Publication Activities

- The ASP is contributing to the AESS editorial activities in the area of Avionics Systems. These activities include:

  - Editor-in-Chief, IEEE Series – Progress in Aeronautics and Astronautics Systems, Roberto Sabatini

  - Senior Editor (Avionics), IEEE Transactions on Aerospace and Electronic Systems, Giancarmine Fasano

  - Associate Editor, IEEE Transactions on Aerospace and Electronic Systems, Roberto Sabatini

  - Associate Editor, IEEE Aerospace and Electronic Systems Magazine, Erik Blasch

  - Associate Editor, IEEE Aerospace and Electronic Systems Magazine, Roberto Sabatini

  - ASP members are also reviewers for TAES and the AESS magazine

- In 2023, the ASP has led to successful completion an AESS Systems Magazine Special Issues on "UAS Traffic Management and Urban Air Mobility", focusing on low-level ATM/U-Space

- An additional Magazine Special Issue is currently under development: "Space Domain Systems", focusing on Space Domain Awareness

Education Activities

- Various ASP members serve as Distinguished Lecturers (DL) and are actively contributing to the Virtual DL (VDL) Webinar Series:

  - Roberto Sabatini – Aerospace Cyber-Physical Systems and Trusted Autonomy

  - Erik Blasch – Multisensor Systems and Data Fusion

  - Kathleen Kramer – Navigation and Cyber-Security in Avionics

  - Giancarmine Fasano – Unmanned Aerial Vehicles

  - Carlos Insaurralde – Modelling and Decision Making for ATM

Industry Engagement and Standards

- ASP members are contributing to the advancement of ICAO, RTCA, EUROCAE/SAE and AEEC avionics standards.

ICAO	RTCA / EUROCAE	AEEC
• Established by the 1944 treaty at Chicago Convention • Operates as a United nations constituency • Caters to prime objectives of global interoperability, uniformity & equitable service of aircraft over all UN countries • Defines system functional and interoperability requirements	• Specifies services, system & avionics concept of operations, safety and performance requirements • Specifies methods for requirements verification • FAA uses RTCA standards for US airworthiness certification • EASA/Europe uses EUROCAE standards for the same purpose • Other countries mostly follows either RTCA or EUROCAE standards	• Established by aircraft operators to specify avionics form, fit and functions supporting airline operations • Primary goal is for avionics vendors and aircraft manufacturer to have uniform equipment standards for line replacement

Avionics Standards (cont.)

- ASP members are contributing to the **Joint Authorities for Rulemaking in Unmanned Systems (JARUS) – Automation WG**

  - The Automation WG has been tasked with defining a framework for assessing the different notions of autonomy and developing a framework for evaluating automation in proposed UAS operations.

  - The framework includes definitions, assumptions, levels of automation, methods of assessing and describing operations, and considerations for broad incorporation in aviation standards.

  - The roles of the manufacturer, operator, pilot, service providers, and regulators are also assessed for each level of automation.

- Previous ASP contributions have been in the area of **Trusted Autonomy** (i.e., human-autonomy teaming) with a focus on integrity metrics definition to support safe and efficient airspace operations.

- In 2023, the ASP contributions have expanded to data-centric ATM and associated impacts on CNS/ATM automation, especially in the context of Low-Altitude Airspace Management (LAAM), i.e., addressing both UTM TCL3/4 and AAM requirements.

Avionics Standards (cont.)

Current challenges:

- Develop a CONOPS for LAAM (encapsulating UTM and emerging AAM requirements), which clearly specifies the human role for various levels of automation

- Develop adaptive HMI solutions suitable for integration in LAAM DSS, specifically addressing sensing requirements and cognitive state estimation

- Develop new LAAM DSS functionalities to enhance human-machine teaming (current focus is on performance-based airspace modelling and traffic clustering)
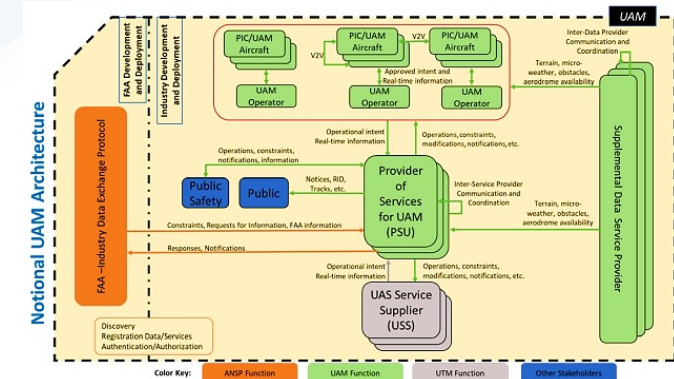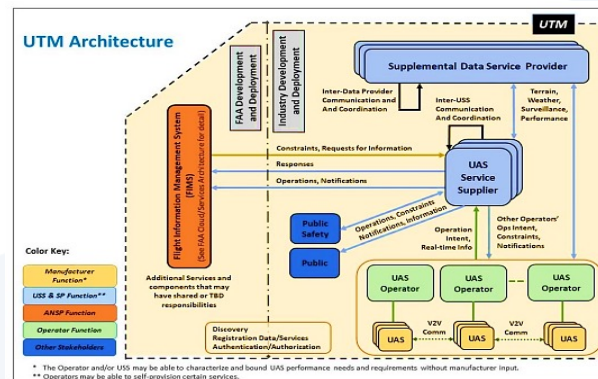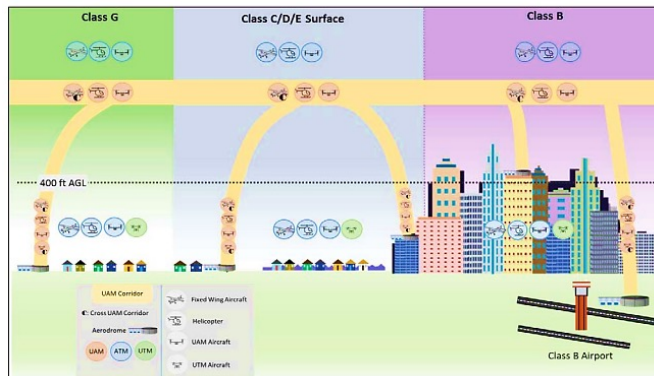
Avionics Standards (cont.)

In addition to JARUS Automation/Autonomy, recent ASP contributions have focused on AI/ML certification (SAE G-34/EUROCAE WG-114), which was also the topic of DASC 2022 ASP tutorial:

- **SAE G-34/EUROCAE WG-114, Artificial intelligence in Aviation** - Reviews current aerospace software, hardware, and system development standards used in the certification/approval process of safety-critical airborne and ground-based systems, and assesses whether these standards are compatible with a typical Artificial Intelligence (AI) and Machine Learning (ML) development approach.

- Published Standard: AIR6988 / ER-022 Artificial Intelligence in Aeronautical Systems: Statement of Concerns (2021).

- Works In Progress:

  - AS6983 / ED-xxx Process Standard for Development and Certification / Approval of Aeronautical Safety-Related Products Implementing AI;

  - AIR6987 / ER-xxx Artificial Intelligence in Aeronautical Systems: Taxonomy;

  - AIR6994 / ER-xxx Artificial Intelligence in Aeronautical Systems: Use Cases Considerations.

Avionics Standards (cont.)

▶ A core premise of AI (ML) is the ability of learning, where the system learns and adapts its behavior to achieve the optimum, desired outcome

– The AI system responses for a given set of excitations in a given environment are not necessarily the same (i.e., deterministic, unique and predictive)

  – In AI System response, there is always a delta error from the target response

  – An AI System learns from every encounter to reduce & optimize the error delta

– For aviation systems, the regulator expectation is that for every scenario (i.e., a set of excitations in a given environment), the expected system response MUST be the same

  – The safety-of-life risks and liabilities associated with an uncertain outcome is too large for aviation

– An approach for AI standards and certification could be to provide an acceptable error tolerance for each expected system response

  – Need to have high confidence (10^{-6} to 10^{-9}) or lower probability that response will be outside the tolerance

  – Standards MUST also define a fail-safe option, to mitigate unexpected AI system behavior

The AESS Cyber Security panel supports cyber security technical activities, including conference activities and events, publications, and educational activities that promote developments, awareness and understanding of cyber security applications and issues in complex systems for space, air, ocean, or ground environments, and particularly those that apply to aviation and aerospace. These technical areas include:

- Cyber security for aircraft and avionics
- Secure navigation and GPS threats
- Cyber security for aviation and other transportation systems
- Information security for complex systems
- Identification and modeling of cyber-related vulnerabilities

New Chair:

Aloke Roy took on the role of chair of the panel in March 2023. Aloke is past chair of the Avionics panel.

Panel Meetings

- Meetings, beginning last year, are using Avionics Systems Panel's monthly timeslot, alternative months, and jointly work with Avionics Panel on some items.

Vision and Perspectives

Panelist Joe Dauncey chaired the AESS Tech Ops VP Committee on Vision and Perspectives in 2022.

Distinguished Lectures

- DLs with related topics, and several lectures on new tutorial topic, including for IEEE Day in Turkey.

Conference Activities

- IEEE Education Week – DL

- 2022 Digital Avionics Systems Conference – Panel Joint Tutorial (Avionics) (October 2023- Barcelona)

- 2023 IEEE International Carnahan Conference on Security Technology (October 2023 – Pune, India)
  - Tech Ops Panel Meeting at conference

- Promote the coordination of the technical activities related to the technologies that constitute the necessary common platform for innovative Space Systems;

- Promote and support publications concerning the panel topics;

- Organize panels and special sessions in featured-topic conferences;

- Promote educational activities;

- Encourage the submission of nominations for IEEE Fellows and Senior Members in the fields of interest of the panel;

- Manage the nomination and selection of candidates for IEEE Awards in the fields of interest of the panel;

- Creation of communities and forums cooperating in the development of panel technical activities.

- **Member affiliation, geographical distribution and research interests**

MEMBER AFFILIATION

- Research and Innovation Centers 5%
- Space Research Centers 10%
- Space Agencies 5%
- Industry 18%
- Academy 62%

GEOGRAPHICAL DISTRIBUTION

- Asia; 5%
- Extra EU; 8%
- USA/Canada; 31%
- EU; 56%

Members number: **39**

Fields of interest

- Electronics and Metrology for Space, 2%
- Computer engineering, 3%
- Space system engineering, 23%
- Signal processing / remote sensing, 8%
- Space communications and networking, 64%
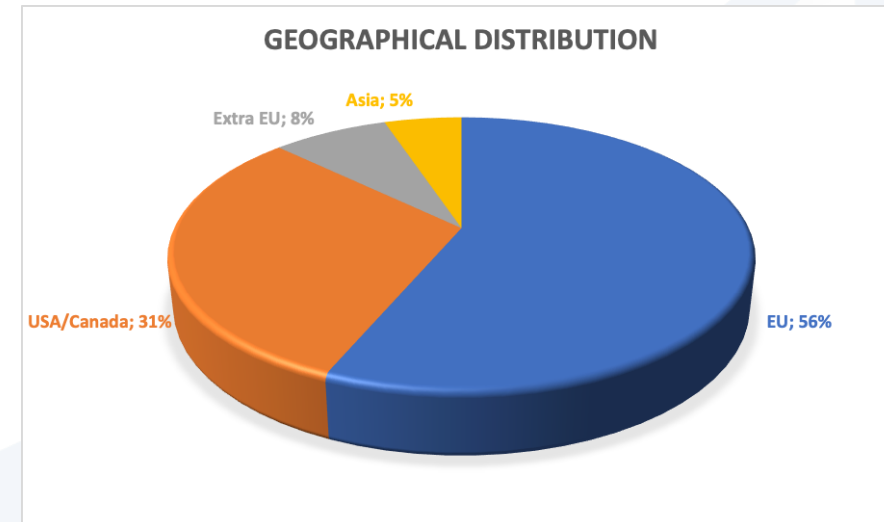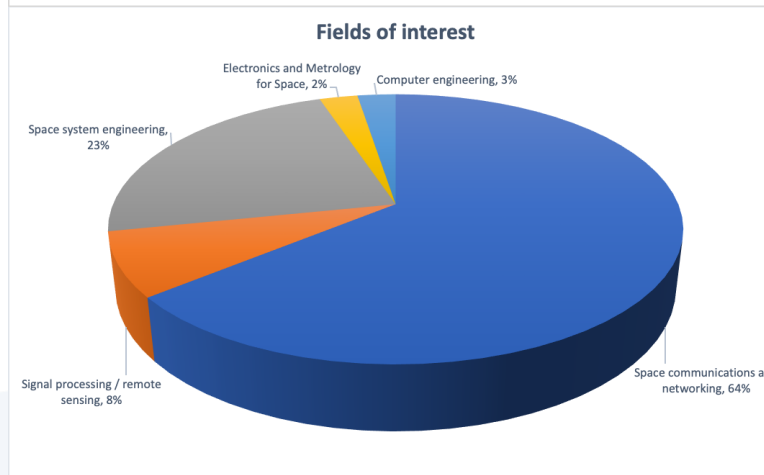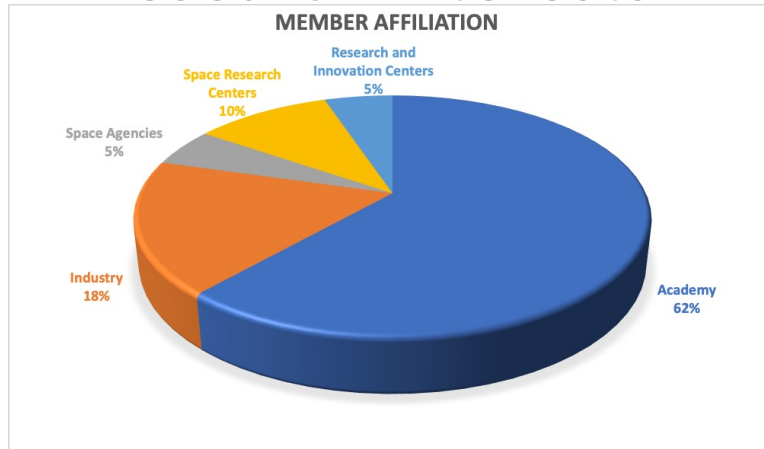
- Some papers <u>have been published</u> (or are in press) under the acknowledgment of the GlueTech panel on IEEE international conferences, IEEE journals and other valued international journals in the period Nov. 2022/Apr. 2023. Here they comes the titles:

  - S. Bonafini, C. Sacchi, F. Granelli, S.T. Harzo, M. Devetsikiotis, K. Kondepu, "HW/SW Development of Cloud-RAN in 3D Networks: Computational and Energy Resources for Splitting Options," **IEEE Aerospace Conference 2023**, Big Sky (MT), 4-11 March 2023.

  - H. Kokkinen, A. Piemontese, L. Kulacz, F. Arnal, C. Amatetti, "Coverage and interference in co-channel spectrum sharing between terrestrial and satellite networks," **IEEE Aerospace Conference 2023**, Big Sky (MT), 4-11 March 2023.

  - S.K. Nande, O. Lhamo, M. Paul, R. Bassoli, F.H.P. Fitzek, "Quantum Time Synchronization for Satellite Networks", **IEEE Aerospace Conference 2023**, Big Sky (MT), 4-11 March 2023.

  - T.F. Rahman, V. Marojevic, C. Sacchi, "Multicarrier Waveforms for Moon-to-Earth RF Transmission, **IEEE MetroAeroSpace Workshop 2023**, Milan (I), 18-21 June 2023 (in press).

- The edited book: **"A Roadmap to Future Space Connectivity"** is in press!

- The Book editors are <u>Claudio Sacchi</u> (panel chair), <u>Fabrizio Granelli</u> (panel founder member), <u>Riccardo Bassoli</u> (panel secretary), Frank H.P. Fitzek, <u>Marina Ruggieri</u> (panel founder member).

- **12 edited chapters** will be published with significant contributions of some valued panel members! On April 27, the proofs of the edited chapters have been sent to authors for correction.

- Organization of the Special Session 4.03: *«Next Generation Space Systems – AESS Glue»* **at the IEEE Aerospace Conference 2023**, dealing with the «Glue Tech» panel topics. The session was chaired by the Panel Chair Claudio Sacchi and co-chaired by the panel member Tommaso Rossi. Four papers have been presented at the session (3 oral presentation and 1 EPH presentation).

- Organization of a special session at the **2023 IEEE 10th International Workshop on Metrology for AeroSpace (MetroAeroSpace)**, Milan, Italy, 18-21 June 2023.
  - Session title: *«Interplanetary Exploration: Mars and Moon»*
  - Session organizers: Claudio Sacchi (panel chair) and Cosimo Stallo (panel member).
  - 3 papers accepted for presentation in the special session.

- Organization of a workshop at the **11th IEEE International Conference on Wireless for Space and Extreme Environments** (IEEE WISEE 2023), Aveiro (Portugal), 6-8 Sept. 2023. Workshop title: *"Glue Technologies for Extreme Application Scenarios (GTExt)"*. Workshop organizers: Alessandro Guidotti (panel member) and Claudio Sacchi (panel chair). Deadline for paper submission: May 30, 2023.

- **TUTORIAL**
  - The tutorial entitled: *"Toward a New Vision of Space Communications: Design Philosophy and Technologies"* will be presented at the **2023 IEEE International Conference on Communications (ICC 2023)**, Rome, Italy, 28th May-1st June 2023 by the panel chair Claudio Sacchi, the panel member Ernestina Cianca and by the panel secretary Riccardo Bassoli.

  - The tutorial will be presented in person on June 1st, 2023, afternoon session (2.30 p.m. – 6.00 p.m. CEST)

- **ADVANCED COURSES AND SEMINARS**
  - A 4-hour short course for graduate and PhD students: *"The Space as Global Information Ecosystem: A technology overview"* has been taught by the panel chair Claudio Sacchi at the COSMIAC of University of Albuquerque (NM) on March 1st, 2023.

  - A seminar: *"3D NTN for Extreme Environment Applications"* has been held by the panel chair Claudio Sacchi at the University of Albuquerque (NM) on March 3rd, 2023.

- **Next panel meetings:**
  - Spring 2023 meeting: June 20, 2023 (to be confirmed) during IEEE MetroAeroSpace Workshop.

  - Autumn 2023 meeting: October 2023 (to be confirmed).

- **Summer Schools:**
  - EUSPACE 2023 (?)
  - Frontier Technologies for Space 2.0 Communications (3rd edition), September 2023 (TBC)

- Promulgate the understanding of components and systems for detection or measurement of linear or angular motion

- Develop inertial standards with industry consensus
  - Specification format guides
  - Test procedures
  - Terminology
  - Recommended practices

- Provide periodic revision of the standards developed by the GAP
  - 15 published standards

The panel established the following objectives at the January 2023 meeting

- Get working group policies and procedures approved
- Complete revision of 1431 requirements portion by the end of the year
- Submit a PAR for Std 836 revision
- Complete 836 revision by the end of the year
- Create INS draft outline

Where,

1431 is "IEEE Standard Specification Format Guide and Test Procedure for Coriolis Vibratory Gyros"

836 is "IEEE Recommended Practice for Precision Centrifuge Testing of Linear Accelerometers"

836 and 1431 are two of the 15 standards the GAP maintains.

- The GAP held TBD meetings since October 2022

Dates	Location	Host	Attendance
Nov 14/15, 2022	Albuquerque, NM	Sandia National Laboratories	11
Jan 23/24, 2023	Virtual	Google Meet	11
Mar 6/7, 2023	Phoenix, AZ	Ideal Aerosmith	15

- Future GAP meetings

Dates	Location	Host
May 8/9, 2023	Picatinny Arsenal, NJ	US Army
Jul 10/11, 2023	Redmond, WA	Honeywell
Sep 18/19, 2023	San Antonio, TX	Southwest Research Institute
Nov 6/7, 2023	Albuquerque, NM	Sandia National Laboratories

- Revision of 836, "IEEE Recommended Practice for Precision Centrifuge Testing of Linear Accelerometers"
  - The GAP has begun revision of this standard

- Revision of 1431, "IEEE Standard Specification Format Guide and Test Procedure for Coriolis Vibratory Gyros"
  - The GAP continues to revise this standard

- Revision of 1559, "Standard for Inertial Systems Terminology"
  - **Has been published**

- INS draft outline
  - Continued organizing results of brainstorming into an outline

- Presentations
  - "Gyro and Accelerometer Panel - 60 Years of IEEE Standards" at IEEE Inertial 2023

- Primary panel responsibility is support of the Position, Location and Navigation Symposium (PLANS) conference
- PLANS 2023 was held April 24-27 in Monterey, California
  - Good turnout (~ 325 attendees)
- Planning for PLANS 2025 will commence this summer
- New panel leadership elected
  - Chair, Zak Kassas (Ohio State University)
  - Vice Chair, Fabio Dovis (Politecnico di Torino)
- IEEE Navigation Conference: Although the new conference collaboration with the Australians did not work out, there is renewed interest in potential collaboration with existing European navigation conferences

Radar Systems Panel (RSP)

QEB Update May 2023
Activities & Achievements

Laura Anitori
RSP Chair (2023)

Radar Systems Panel
Objectives

- Sustain and oversee the program of IEEE Radar Conferences;

- Manage the nomination and selection of candidates for IEEE Awards in the domain of radar;

- Promote and support publications in the domain of radar;

- Promote educational activities in the domain of radar;

- Encourage the submission of nominations for IEEE Fellows and Senior Members in the domain of radar;

- Provide periodic revision of IEEE Standards pertaining to the domain of radar.

Radar Systems Panel
Organization

- 8 committees:

    1. Radar Conference Committee

    2. Awards Committee

    3. Standards Committee

    4. Education Committee

    5. Nomination and Appointments Committee

    6. Spectral Innovation Committee

    7. Civilian Radar Committee

    8. Publications Committee

- AESS ISAC Working Group (WG) representatives

    - 6 (of 7) members from RSP in the ISAC WG

RSP overall activities 2023

- The RSP is currently working to update/create "best practice" reference documents for all committees;

- RSP is currently setting up the RSP Google drive (based on IEEE email) to archive and share RSP documents;

- Next to the 8 committees, RSP appointed RSP members as representatives for the AESS ISAC WG, and they will provide an article for the AESS magazine in 2023.

Radar Conference Committee
Activities & Achievements

- 2023 IEEE Radar Conference: May 1-5, 2023 in San Antonio
  - General Chairs: Anthony Martone, Bill Melvin, and Kelly Sherbondy
- RADAR 2023: Nov. 6-10, 2023 in Sydney, AUS
  - General Chairs: Luke Rosenberg and Joe Fabrizio
- 2024 IEEE Radar Conference: May 6-10, 2024 in Denver
  - General Chairs: Justin Metcalf & Braham Himed
- RADAR 2024: Rennes, France
  - General Chair: Myriam Nouvel
- 2025 IEEE International Radar Conference: May 3-9, 2025 in Atlanta, GA (rescheduled with hotel in agreement to hold 2021 IEEE Radar Conference as virtual)
  - General Chairs: Ryan Hersey and Nathan Goodman
- 2025 IEEE Radar Conference: October 4-9, 2025, in Krakow, POL
  - General Chairs: Mateusz Malanowski & Piotr Samczynski
- 2026 IEEE Radar Conference: call for bids open now.

Awards Committee
Activities & Achievements

▪ The RSP regrets the passing of RSP member and long-time radar community friend & colleague: Dr. Graeme Smith

– 2023 IEEE Radar Conference is commemorating Graeme by naming the 2023 student paper award (run by RSP, independent of conference committee) first prize in Graeme's honor and holding a Special Session in his memory;

▪ Publicized nominations for and selected winners of Nathanson and White Awards;

▪ Suggested three potential new members from RSP for the AESS Picard Medal committee.

Standards Committee
Activities & Achievements

Standards Lifecycle
https://standards.ieee.org

- 1. Initiating the Project
- 2. Mobilizing the Working Group
- 3. Drafting the Standard
- 4. Balloting the Standard
- 5. Gaining Final Approval
- 6. Maintaining the Standard

- ▣ SASC: Went from #1 to #2 in last year
- ▣ P4002: Will move to #4 in about a year
- ▣ 686-2023: Will move to #4 soon
- ▣ 521-2019: Will remain at #6 for a while

Synthetic Aperture Standards Committee (SASC)

- ▣ Operating since January 2022
- ▣ RSP is well-represented at many levels:
  - – SASC Leadership: Kumar Vijay Mishra (US Army Research Laboratory, Vice Chair)
  - – SA-TWG: Kumar Vijay Mishra (Chair), Shobha Sundar Ram (IIIT Delhi, member)
- ▣ SASC Study Group on "Synthetic Aperture Radar Study Group (RSG)":
  - – Established: 06 April 2022
  - – Comprises ~40 members drawn from across the globe
  - – 11 sub-groups
  - – Chair: Kumar Vijay Mishra
  - – Secretary: Shobha Sundar Ram
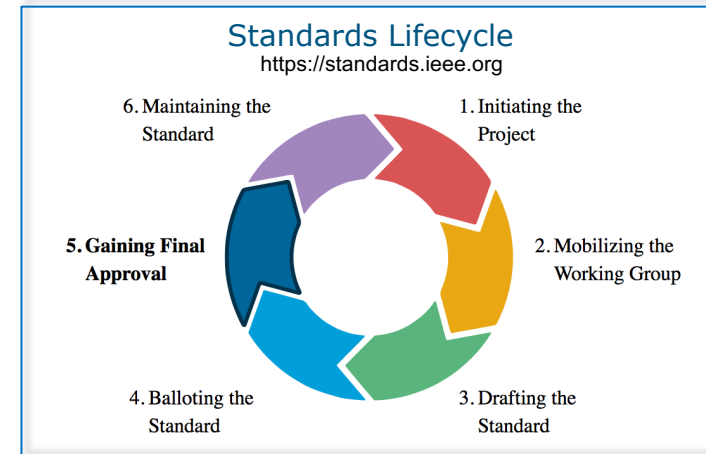
Education
Activities & Achievements

- ◩ Radar Boot Camp (RBC) @ RadarConf23
  - 2023 RBC held in-person in San Antonio @ RadarConf on 29-30 April 2023
  - Registration status (4/14/2023) ~40
  - 8 lectures by noted experts
  - Hands-on demonstrations at the end of each day

- ◩ Radar Challenge @ RadarConf23
  - Due to a multitude of issues emerging over the course of the last few months, e.g. location, hardware, safety, performance, the event this year will be more of an interactive demo
  - Tello drones and TI 77 GHz FMCW radars will be used to show participants radar drone data/signatures as a guided hands-on even during the Young Professionals Reception.
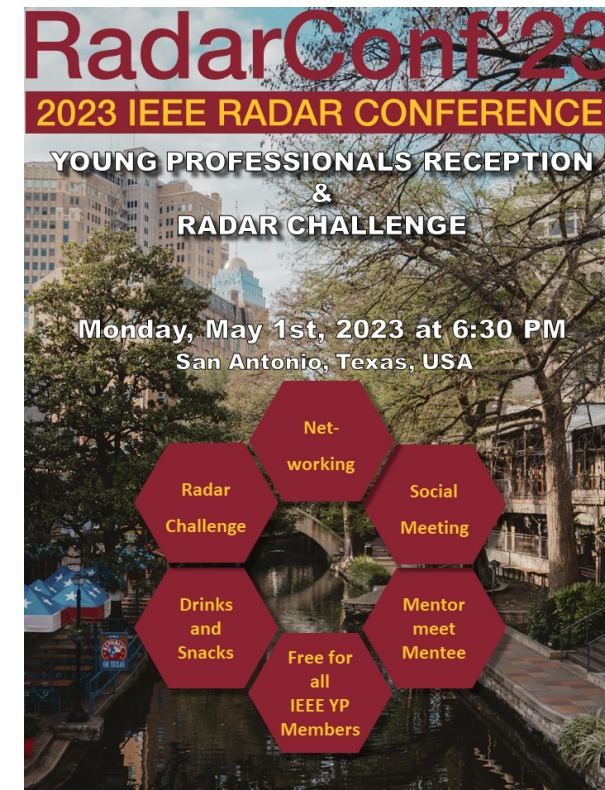
Nominations and Appointment Committee (N&A)
Activities & Achievements

- Completed nomination and voting of new members to the panel for 3-year terms;

- Completed nomination and voting of new Chair and Vice Chair for 2-year terms;

- Current revision of the RSP Charter to align with current committee activities;

- Current revision of the N&A Committee Terms of Reference to better document the approach for:

  - Establishing new Chair/Vice Chair

  - New members election

  - New/updated committees membership

  - Ensure active participation by the full panel membership

Spectral Innovation Committee
Activities & Achievements

- 2022 highlights:
  - COMSOC/AESS special sessions at 2023 IEEE Radar Conference
  - IEEE AESS Integrated Sensing and Communication (ISAC) Workshop at International Radar Conference in Edinburgh, Scotland
    - Committee member K.V. Mishra provided talk on "Emerging technologies for distributed ISAC systems"
  - Proposed TAES journal special section
    - On hold for present due to T-RS special section on spectrum sharing
  - Contacted organizers for IEEE International Communications Conference about special sessions
- Potential activities for 2023:
  - Standing up AESS ISAC working group
  - Potential ISAC working group activity in India or Australia prior to the 2024 International Radar Conference
  - Increasing collaboration with COMSOC to build on the special session at the 2023 Radar Conference

Civilian Radar Committee
Activities & Achievements

- Large number of activities on Civilian Radar by RSP committee members, including:
  - Conference presentations (8 in 2022, 9 in 2023)
  - Publications (12 Special Issues, 1 Book)
  - Tutorials (8)
  - Seminars (15)

Publications Committee
Activities & Achievements

- New journal: Transactions on Radar Systems (T-RS) launched in October 2022;
- T-RS now has similar no. of submissions to T-AES (20-30 / month)!
- Two special sections now closed for T-AES
  - Deep Learning for Radar Applications
  - Automotive Imaging and Super-Resolution Radar Systems
- Two special sections open for T-RS
  - Fully Digital Arrays for Radar: From Architectures to Algorithms
  - Innovations in Radar Spectrum: Deconfliction, Containment, Sharing, and Multifunction

IEEE Transactions on
Radar Systems (T-RS)

Publications Committee
Publication Summary (past 7 months)

TAES Submissions

Month	Original	Revised	Total
August 2022	1	0	1
October 2022	14	7	21
November 2022	28	20	48
December 2022	21	24	45
January 2023	24	20	44
February 2023	23	29	52
March 2023	35	14	49
April 2023	11	6	17
Total	157	120	277

TRS Submissions

Month	Original	Revised	Total
November 2022	12	0	12
December 2022	10	0	10
January 2023	16	3	19
February 2023	22	1	23
March 2023	25	7	32
April 2023	11	4	15
Total	96	15	111

Topic Areas
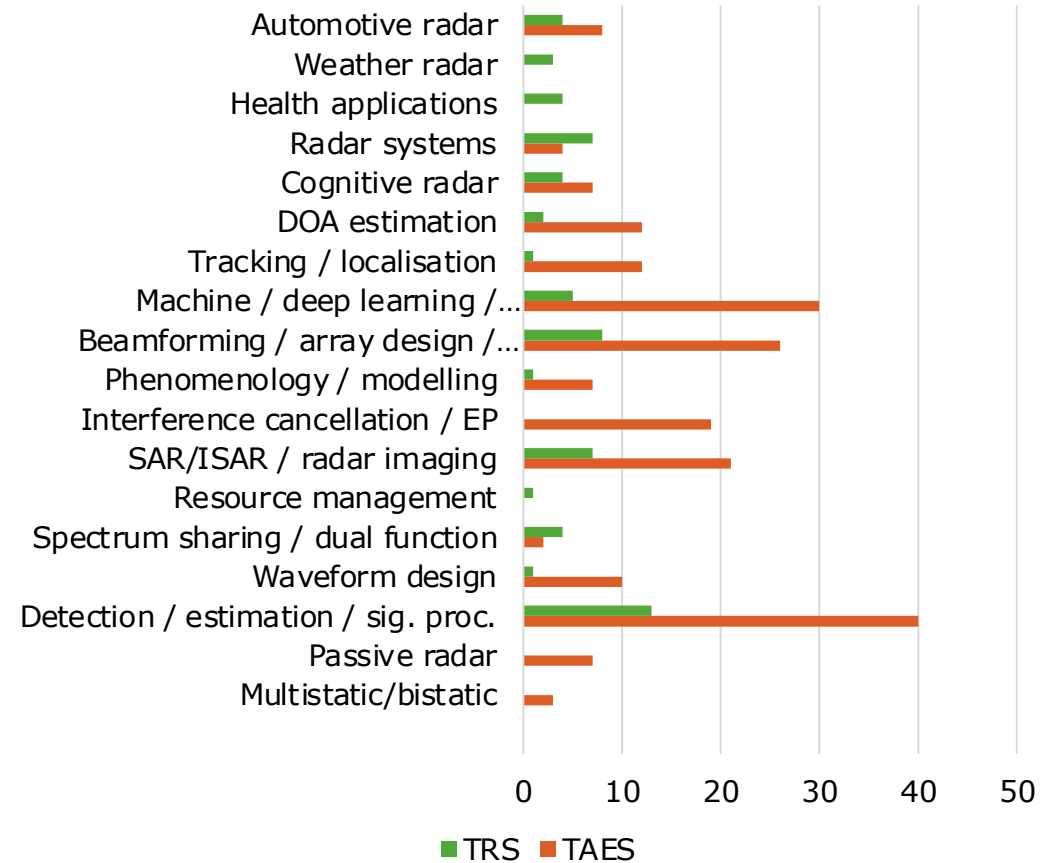
Integrated Sensing and Communications (ISAC) WG
Activities & Achievements

- ◪ AESS ISAC Technical Working Group
  - Confirmed members: Marco Lops (Italy), Patrick M. McCormick (USA), Ravi Adve (Canada), Justin G. Metcalf (USA), Kumar Vijay Mishra (USA/India), Fotis Koubiadis (Lockheed Martin , USA), M.S. Greco (Italy)
- ◪ Activities 2022
  - First AESS ISAC workshop in Edinburgh, 23 October 2022
- ◪ Plans for 2023
  - Second AESS workshop
  - Paper in the AES Magazine
  - Co-sponsored Summer School with SPS
  - 2 Special Issues in IEEE magazines
  - Definition of ISAC Standards

Visions and Perspectives Committee (ad hoc)

Joe Dauncey, Chair

April 2023

Autonomous Aerospace Technology

Sustainability

- 2022/23:
  - Supertopic finalised and communicated to Technical Operations panels
  - Paper submitted to Systems Magazine on April 20, 2023

- 2023:
  - Monitor response to paper
  - Develop interventions to support Supertopic across AESS FoI
  - Consider future support for Supertopic