2023 IEEE INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY, SIGNAL & POWER INTEGRITY

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IEEE EMC SOCIETY TC-8

Technical Committee on Aerospace EMC

Welcome!

This is the annual meeting of the Institute of Electrical and Electronics Engineers (**IEEE**) Electromagnetic Compatibility (**EMC**) Society Technical Committee on Aeronautics & Space EMC (**TC8**) Meeting on August 1st, 2023, in Grand Rapids, Michigan.

Our official website is https://www.emcs.org/tc8-aeronautics-and-space-emc.html

Find us on LinkedIn at https://www.linkedin.com/groups/8685221

All members and interested parties are welcome!

Meet the Officers

Chair: **Jen Dimov**, Jacobs Technology / NASA GSFC

Vice-Chair: **Jim Lukash**, Lockheed Martin Space

Secretary: **Manny Soriano**, NASA JPL

Officers At Large: Adrian Sun (Aerospace Corp), Bob Scully (NASA JPL), Charles Jullien (Safran Group), Cheyne Scoby (Rivian), Ed Gonzales (NASA JPL), Gabe Vazquez (NASA KSC), Leonardo Malburg (University of Twente), Melissa Schwager (NASA MSFC), Nathan Moyer (Mica Mountain Engineering), Nika Amralah (Raymond EMC), Pablo Narvaez (NASA JPL), Randy Jost (IEEE), Ray Perez (NASA JPL), Stephanie Zajac (NASA JPL)

Agenda

- Welcome & Virtual Meeting Mechanics
- Scope of TC-8 (elections, charter, roles & responsibilities)
- Roundtable Introductions
- News & Activities
- Long-Range Planning / Future Years
- Old Business
- New Business / Roundtable Discussion

Welcome to this Hybrid-Virtual Meeting!

- Modern problems, modern technological solutions
- Secretary will monitor meeting chat for raised hands, questions, and any technical issues
- Please send an email to secretary (msoriano@jpl.nasa.gov) so we can get an accurate attendee count & introductions:
  - Include both your NAME and your ORGANIZATIONAL AFFILIATION

Elections

- This is not a voting officer election year (2024 will be)
- Officers at Large may be nominated (or self-nominate) every year
- There is no limitation on the number
  - “Officers at large” participate in officers meetings in a non-voting capacity
  - Great opportunity to learn about the roles of the officer slots if you have interest without making a large commitment of time (Leadership Training)
  - Intended to allow people to learn about and “Test Drive” the functions of committee leadership with no actual responsibilities
  - Also excellent role for people to more fully participate w/o commitment

Charter Review

- This committee is concerned with EMI/EMC issues in aircraft, spacecraft & space launch vehicles, robotic and crewed
  - The aerospace environment provides unique challenges in the design, development, test and operation of space systems to avoid EMI and achieve EMC
  - Aeronautics & Space EMC covers a wide range of topics on the part, board, box, system, multi-system, planetary and interplanetary levels
  - The harshness of the atmospheric, launch and space environments necessitates a broader view of EMC issues than traditional terrestrial projects, often leading to creative methods and solutions that can benefit our society's efforts elsewhere on Earth

Scope of TC8

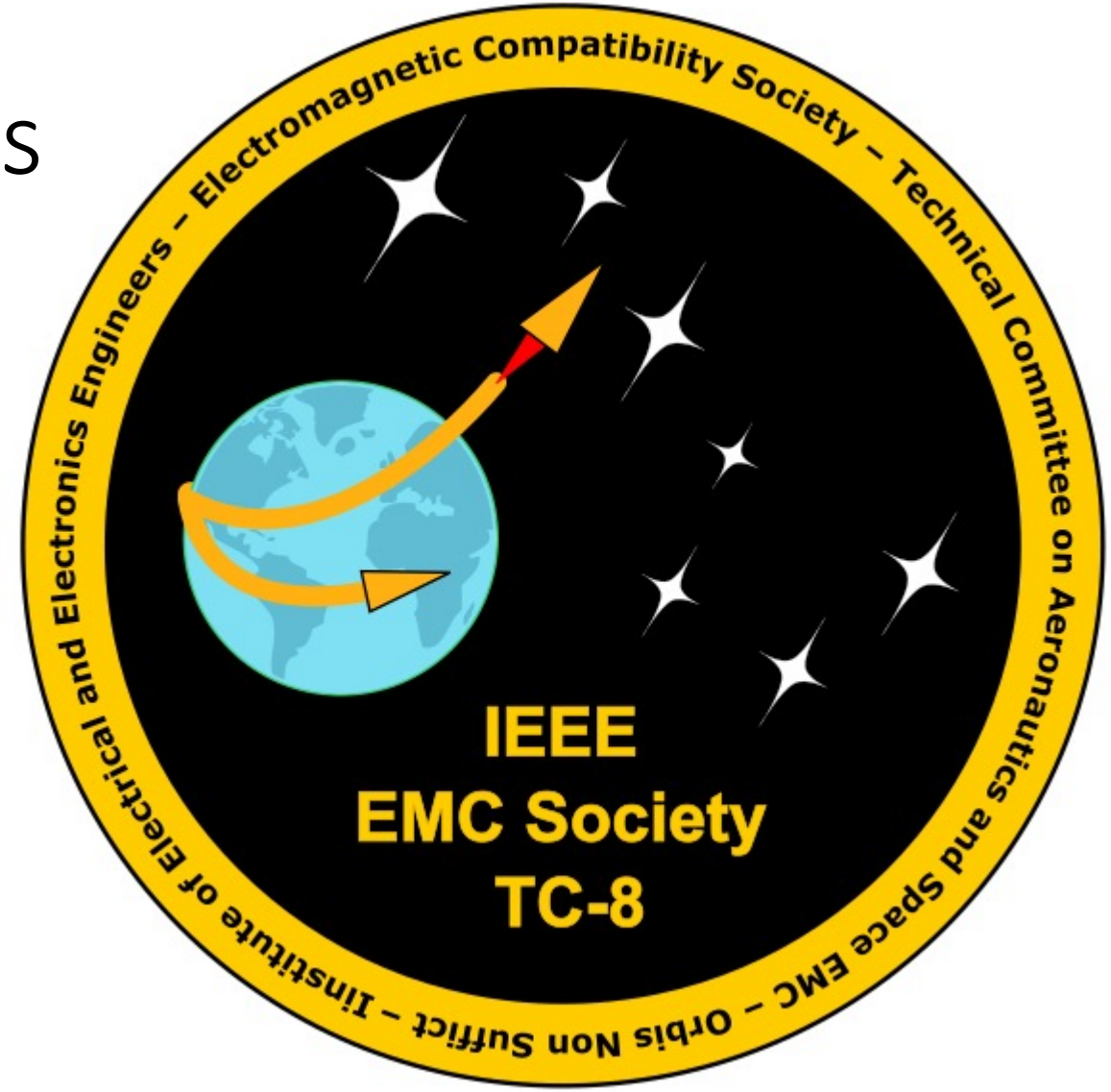
- This committee serves as a resource for the Board of Directors of the EMC society on all matters associated with Aeronautics and Space EMC
- This committee helps recruit authors for papers, poster papers at the annual symposium as well as articles for our society's journal and newsletter
- This committee initiates and/or contributes to standards activity in our technical area
- This committee helps to organize special sessions of invited papers and workshops for the annual symposium
- This committee provides subject matter experts to review papers submitted for publication at the annual symposium
- This committee provides subject matter experts for discussion panel sessions at the annual symposium
- Monitors and informs the larger membership of new developments in our technical area

Diversity & GOLD (Graduates of the Last Decade)

- TC-8 has been a groundbreaker on this and will continue to try to be
  - Officer-at-Large program
  - Diverse membership and leadership
  - Openness to new ideas
- TC-8 remains committed to encouraging and supporting the participation of all its members of all backgrounds
  - Unique voices strengthen the Society and the greater IEEE community
  - If you need support, advice, or help of any kind, we're here for you!

Roundtable Introductions

- Everyone is welcome!
- Tell us your name and organizational affiliation



2023 News – The Symposium

- Papers:
  - 3 papers presented (Thursday 4:00 PM – 5:30 PM)
  - Stochastic Simulations special session with TC9 (Tuesday 1:30 – 4:30 PM)
- Workshops:
  - Leading EMC Fundamentals w/ EdCom (Monday 8:00 AM – 6:00PM)
  - Lessons Learned from NASA EMC (Wednesday 8:00 AM – 12:30 PM)
- Demos:
  - NASA GSFC “Cabling and Shield Terminations” (Tuesday 2:00 PM – 4:00 PM)
  - Raymond EMC “Multiplying Competency: Remote and Autonomous Chamber Validation” (Tuesday 2:00 PM – 4:00 PM)

2023 News – Outside The Symposium

- Big Sky aerospace conference in Montana
- MIL-STD-461H is in work
- AIAA-S-121A-2017 pending rev B
- Officers at Large representing TC8 to ISO (SC-14), AE4
- Outreach to universities

Future Planning

Room to volunteer!

IEEE EMCS TC8 FIVE-YEAR PLAN						
Activity	2023 (THIS YEAR)	2024 (NEXT YEAR)	2025	2026	2027	2028
	Grand Rapids, MI	Phoenix, AZ	TBD	TBD	TBD	TBD
TC Meeting @ Symposium	X	X	X	X	X	X
Technical Topic Session	X	X	X	X	X	X
Special Session	X					
Workshop Sponsored	X					
Demonstrations	X					
Other Activity						
SC Charter Review	X	X	X	X	X	X
Leadership Succession		X		X		X
Leadership Training	X	X	X	X	X	X

Old Business

- Subcommittee proposal for voting

The TC-8 policy on subcommittees is as follows:

Subcommittee Policy

Subcommittees wishing to be part of TC8 will adhere to the following policies:

1. Proposal must be submitted to TC8 leadership describing the scope, structure, and intended membership of the desired subcommittee.
2. Proposal is voted upon by TC8 membership at the next annual meeting (if submitted less than a month before the annual IEEE EMC Symposium at which the committee meeting is held, TC8 leadership may at its discretion postpone voting until the next year).
3. If approved by a majority of TC8 members in good standing, the subcommittee will be chartered as part of the meeting at which it was approved.
4. Once approved, the subcommittee will provide written reports to TC8 leadership on an annual basis, summarizing the activities it has performed that year and providing notice of any changes in officer positions.

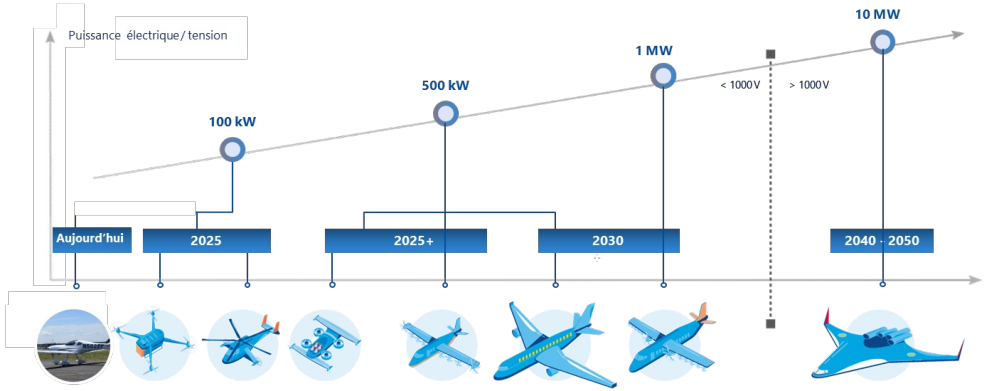
Proposal Details

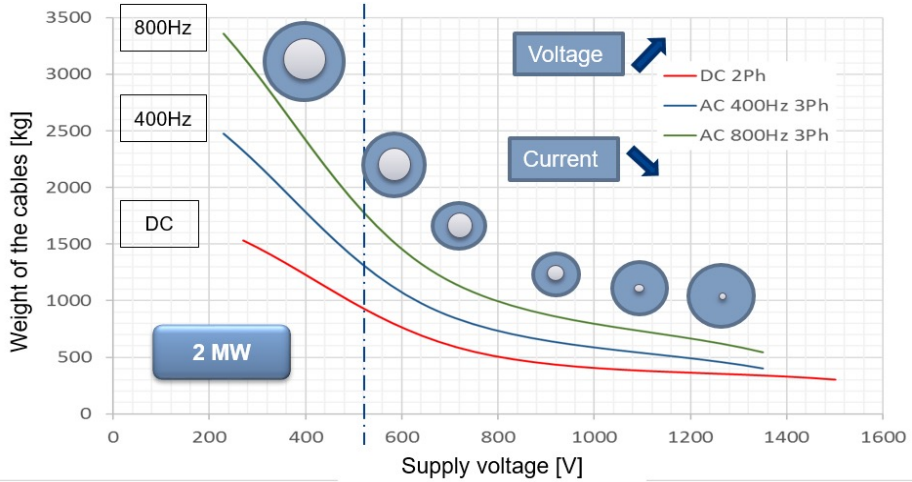
- Proposed Name: "High Voltage EMC problems Space VS Aeronautics"
- Proposed Officers:
  - Chair – Charles Jullien (Safran Electrical & Power)
  - Vice-Chair – Daren Nerad (WiskAero)
  - Secretary – Laurent Patier (CNES) &/ Cong Li (GE)
  - Prospective Non-Officer Members
    - Johannes Wolf (ESA)
    - Cédric Roche (ATR)
    - Marc Meyer (Airbus Helicopter)
    - Victor Dos Santos (Safran Tech)
    - Coralie Chatard (Safran Electrical & Power)
    - Mohamed Beddiyouh (Safran Electrical & Power)

Why a new subcommitee?

Ecopulse - DAHER

- Aeronautical Context: More to Full electric aircraft
  - Highly exposed equipment: Electric braking, De-icing, etc.
  - More composite aircraft: Great reduction in electromagnetic protection
  - Coupling between systems: definition and installation of harnesses, filtering, etc.
- Aeronautical Context: Problem application example





- Go to HV (HVDC, MLI, HVAC) → Start to work to replace actual insulation by **PFA 2019**

Why a new subcommitee?

- Aerospace Context: The New space (Philosophy linked to the emergence of a space industry of private initiative at the beginning of the 21st century
  - Low cost → increase power consumption margin + Increase in production rate + Public access to space exploration + Quick V time (from design to launch)
  - More function on board need more power !!!
- Example of HV work in space :
  - H2020 High Voltage Electrical Power System Architecture Project: “researchers from the Swiss Plasma Center (SPC) of EPFL and Beyond Gravity, have successfully developed a slip ring assembly that allows higher voltages in satellites, raising the range from the current 28-100 Volts to 300-600 Volts, resulting in improved performance of the satellite and increased robustness against electrical failures.” Tackling the high-voltage needs of next-gen satellites (wevolver.com)
  - Goal → 40kW **BUT** from very low pressures (10^{-5} mbar) to the most critical pressure values (~1 mbar) in harsh environment
- Aerospace Context: Problem application example
- Example:
  - NASA Workshop **2012** on High Voltage Engineering Techniques For Space Applications
  - HV insulation cable

Property	FEP	PFA	Silicone
Specific Gravity Nom	2.15	2.14	1.15-1.38
Dielectric Strength (V/mil)	500	500	575 - 700
Dielectric Constant- Nom	2.1	2.0	3.6
Abrasion Resistance	Excellent	Excellent	Fair
Flame Retardant Properties	Excellent	Excellent	Excellent
Flexibility	Very good / size	Very good / size	Excellent
Temperature*	-70C to +200C	-70C to +200C	-65C to +200C
Resistance to Chemicals	Excellent	Excellent	Fair to good

Aeronautics and Space need to discuss !!!

This is the goal of this subcommittee

Voting Instructions

Majority vote results will be as follows, vote for which one you prefer:

- Majority votes YES:
  - TC-8 subcommittee on HV is officially chartered today and will report to TC-8 next year with a summary of its meetings and activities
- Majority votes NO:
  - TC-8 subcommittee on HV is not created and future subcommittee proposal will be asked to be substantively different.
- Majority votes ABSTAIN:
  - TC-8 subcommittee on HV is not created but may be submitted again for consideration next year with minor revisions as needed.

New Business

- Outreach to new aerospace companies
- AIAA-S-121 starting reaffirm/revise cycle Fall 2023 – Lukash
- MIL-STD-461H discussion – Walton, Javor
- G46-alike news update – Moyer, Scully
- Other topics if time permits

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Adjourn

- Next in-person meeting will be in August 2024
- Thanks for joining us and we hope to see you again in Phoenix!

Contact the officers at

jennifer.dimov@nasa.gov

emiguy@gmail.com

msoriano@jpl.nasa.gov