RTCA Paper No. 097-23/SC242-010 April 20, 2023
EUROCAE Paper No. 201-23/WG124-010

Summary of the 5th Meeting
Summary of the 5th Meeting
Spectrum Compatibility

RTCA Special Committee 242 (SC-242)
EUROCAE WG-124

Executive Summary

The joint RTCA SC-242 / EUROCAE WG-124 Plenary #5 meeting was held on April 20, 2023. The meeting was held in hybrid format with both in-person at Airbus Toulouse facilities and virtual attendees.

- Briefings were presented on the following topics:
  - Risk Register
  - Subgroup 1 Output to SC-242/WG-124 Plenary
  - Subgroup 2 Plenary Summary – SC-242/WG-124
  - Report 2 Outline
  - FCC Spectrum Efficiency Policy

  Meeting materials are available as follows (link may need to be copied into browser):
  - See RTCA AerOpus April 20, 2023 Plenary Meeting #5 folder for the Risk Register, Subgroup 1 Output to SC-242/WG-124 Plenary, and Subgroup 2 Plenary Summary – SC-242/WG-124: https://aeropus.i3cloudservices.com/Group/GroupLanding/10010?tab=Documents&folder=Plenary+Sessions%2F2023+Sessions%2F5-April+20%2C+2023
  - See RTCA AerOpus Report 2 folder for the Report 2 Outline (see specifically Document Revision 2.0): https://aeropus.i3cloudservices.com/Group/GroupLanding/10010?tab=Documents&folder=Report+2+-+Aviation+Systems+and+Their+Use
  - See EUROCAE Workspace April 20, 2023 Plenary Meeting #5 folder for all but the FCC Spectrum Efficiency Policy: https://eurocae.sharepoint.com/sites/strato/143ce6de-838d-ec11-b400-000d3ab41693/a837c9d7-95d4-ed11-a7c7-000d3adea432/SitePages/Documents.aspx
  - See the published FCC Spectrum Efficiency Policy at: https://www.fcc.gov/ecfs/search/search-filings/filing/104211841619616

- Next Meeting:
  - Joint RTCA SC-242 / EUROCAE WG-124 Plenary #6
    - July 25-27, 2023 at RTCA headquarters in Washington, DC

Joint Plenary Meeting Summary

The joint RTCA SC-242 / EUROCAE WG-124 Plenary #5 meeting was held on Thursday April 20, 2023. The meeting was held in hybrid format with both in-person at Airbus Toulouse facilities and virtual attendees.

Meeting materials are available as follows (link may need to be copied into browser):

- See RTCA AerOpus April 20, 2023 Plenary Meeting #5 folder for the Risk Register, Subgroup 1 Output to SC-242/WG-124 Plenary, and Subgroup 2 Plenary Summary – SC-242/WG-124: https://aeropus.i3cloudservices.com/Group/GroupLanding/10010?tab=Documents&folder=Plenary+Sessions%2F2023+Sessions%2F5-April+20%2C+2023
- See RTCA AerOpus Report 2 folder for the Report 2 Outline (see specifically Document Revision 2.0): https://aeropus.i3cloudservices.com/Group/GroupLanding/10010?tab=Documents&folder=Report+2+-+Aviation+Systems+and+Their+Use
- See EUROCAE Workspace April 20, 2023 Plenary Meeting #5 folder for all but the FCC Spectrum Efficiency Policy: https://eurocae.sharepoint.com/sites/strato/143ce6de-838d-ec11-b400-000d3ab41693/a837c9d7-95d4-ed11-a7c7-000d3adea432/SitePages/Documents.aspx
- See the published FCC Spectrum Efficiency Policy at: https://www.fcc.gov/ecfs/search/search-filings/filing/104211841619616

Thursday, April 20th Plenary
The Plenary convened at approximately 0700 EDT / 1300 CEST

1. Host and Co-Chairs Welcome and Introductions
- Ed Hahn and John Micallef welcomed participants.
- Ed managed the participant introductions.
- Attachment A lists the combined participants for the Plenary and subgroup meetings that occurred on April 18-20, 2023.

2. Administrative matters – RTCA & EUROCAE Policies
- Rebecca Morrison and Anna Guegan presented the RTCA and EUROCAE mandatory slides on anti-trust, proprietary/intellectual property, committee participation membership, and GDPR privacy policies.

3. Review of Meeting Agenda
- Ed Hahn presented the meeting agenda. Ed asked if there were other agenda items, and none were offered.

4. Approval of Plenary #4 Meeting Minutes
- Clay Barber presented the draft November 10, 2022 plenary minutes.
- Clay asked if there were any amendments to the minutes and none were offered.
- The minutes were approved.

  Post meeting note: The final minutes were posted to the November 10, 2022 Plenary Meeting #4 folder on AerOpus and Workspace.

5. Review of Prior Actions and Risk Register

- Review of Actions: The open actions from the November 10, 2022 plenary minutes were reviewed.
  - March 20, 2022 plenary #1:
    - Action 1: It was noted that efforts continue to be made to identify a WG-124 Secretary. It was agreed to keep Action 1 open and extend the due date to Plenary Meeting #6.
    - Action 2: It was agreed to keep Action 2 partially open and extend the due date to identify document editors to Plenary Meeting #6.
  - September 9, 2022 plenary #3:
    - Actions 14, 15, and 17: Agreement to close.
  - November 10, 2022 plenary #4:
    - Actions 18, 19, 20 and 21: Agreement to close.

- Risk Register: John Micallef presented the risk register.
  - John provided an update on each risk and noted the changes to some of the risk impacts and probability of occurrence.
  - John will maintain the risk register and requests any additional risks be communicated to him and Ed.

6. Internal Coordination and Subgroup Reports to Plenary

a. Status of Work by Subgroup Leads

- Subgroup 1 (SG1):
  - Andy Roy led the discussion of the SG1 slides (attached).
  - There was discussion of:
    - Per EUROCAE processes, approval of Report 1 must be by the committee during a plenary, which could be virtual.
    - Potential for multiple weekly sessions to move the work forward more quickly.

- Subgroup 2 (SG2):
  - Capucine Amielh led the discussion of the SG2 slides (attached).
  - ENAC Participation
    - Appreciation was expressed for the participation and contribution by El-Mehdi Djelloul and Alexandre Chabory during the subgroup sessions.
    - Remi Douvenot introduced himself and offered assistance to furthering the SG2 Guidance document.
  - DGAC Participation
    - Appreciation was expressed for the participation of Christian Fleury and Guillaume Novella throughout the sessions.

- Report 2:

- Ed Hahn briefed the TOR tasking for Report 2 RF systems and their regulatory framework and operational considerations and the outline that was discussed during the SG sessions.
- John Micallef noted that while the primary audience for Report 2 is non-aviation stakeholders, it will also be used for aviation stakeholders, so it will be important to ensure that it addresses both audiences.

b. Tasks Allocation Discussion
   - Not discussed

7. External Coordination

a. Correspondence and Announcements on Input Material from Other RTCA/EUROCAE SCs/WGs (Review of Survey Tracker)
   - A summary of the survey responses received and efforts to obtain further responses was provided by Andy Roy during the SG1 briefing, so it wasn't repeated during this agenda item.
   - SC-236/WG-96 WAIC MOPS Discussion
     - Uwe Schwark and Dave Redman joined as guests and provided an introduction to the history of the WAIC system ITU allocation, ICAO SARPs, MASPS, and MOPS development.
     - WAIC MOPS purposely does not specify some typical RF characteristics (e.g., channelization, etc.). Instead, it is focused on security and non-interference with radar altimeters, with which WAIC shares the 4200-4400 MHz frequency band. Off-board compatibility is addressed through the SARPs while on-board compatibility is addressed by the MOPS.
     - The WAIC MOPS is currently undergoing RAC in SC-242/WG-124 until May 15, 2023.
     - Uwe and Dave request SC-242/WG-124 feedback on only the RF related:
       - Requirements,
       - Equipment test procedures, and
       - Installation compatibility portions of the MOPS.

       About 15-20 pages.
     - Request is to consider whether the WAIC MOPS approach will be useful for spectrum compatibility sharing studies concerns are being met. This will assist SC-236/WG-96 with updating the MOPS before proceeding to FRAC.
     - RAC closes May 15, 2023.
     - The MOPS is available through the AerOpus Shared Documents tab but also can be distributed to members as necessary. Comments can be submitted through the AerOpus tool.
     - Sai Kalyanaraman brought up the potential need for coordination between WAIC and radar altimeter manufacturers.
     - Kim Kolb supported the review request as a potential example of good spectrum compatibility RF characteristics.
   - **ACTION**: SC-242/WG-124 membership to review RF-specific areas of WAIC MOPS by May 15, 2023.

b. Status from Other External Groups (e.g., CEPT, ICAO, FCC, etc.)
- It was noted that John Micallef provided a briefing on SC-242/WG-124 tasking and status at the February ICAO FSMP.
- Andy Roy briefed the committee on the proposed FCC Spectrum Efficiency Policy that was being considered by the Commission today. The briefing focused on the need for this policy to be considered during the development of the SG2 Guidance document.

  Post meeting note: The FCC approved the Spectrum Efficiency Policy at its April 20, 2023 Open Meeting. The published FCC Spectrum Efficiency Policy is available at: https://www.fcc.gov/ecfs/search/search-filings/filing/104211841619616.

- Loftur Jonasson provided a summary of the ICAO ICNS Task Force efforts related to its CNS modernization roadmap and efforts to identify what should be included in ICAO Annexes for SARPs.
- Andy Roy provided a summary of the ICAO FSMP efforts including its ICAO WRC23 position. It was noted that the WRC23 efforts have delayed the FSMP planned updates to ICAO Handbook. The FSMP has also discussed a working paper on SARPs for radar altimeters. Andy also expressed appreciation for the briefing presented on SC-242/WG-124 and requested a semiannual briefing. The next FSMP meeting is in August 2023.
- **ACTION**: Ed Hahn and John Micallef to provide semiannual briefings on SC-242/WG-124 to FSMP.

8. Approve Entry of Review and Comment (RAC) Period by SCs/WGs for Report 1
- The committee agreed that Report 1 was not ready for approval to enter RAC and the need to notify the RTCA PMC and EUROCAE TAC. The following actions was recorded.
  - **ACTION**: Ed Hahn to provide update on the Survey Report delay at the Jun 2023 PMC meeting.

9. Documentation of Actions
- Clay Barber provided the list of actions he had captured from the April 20 Plenary. The actions were amended as suggested by the committee and are captured in the following table.

- Current SC-242/WG-124 Plenary Action Item list
  - Action Items closed during this Plenary are shaded in grey in the following table.
  - New Action Items identified during this Plenary are shaded in green in the following table.
  - Actions closed in previous Plenary sessions are not listed.

#	Owner	Action	Date	Due Date	Status
1	Anna Guegan / John Micallef	Identify WG-124 Secretary	Mar 10, 2022	Jul 27, 2023	Open
2	Ed Hahn / John Micallef	Identify subgroup leads and document editors • Subgroup leads identified Apr 20, 2022	Mar 10, 2022	Jul 27, 2023	Partially Open

#	Owner	Action	Date	Due Date	Status
14	Ed Hahn / John Micallef	SC-242/WG-124 to prepare a presentation for the February ICAO FSMP (ensuring coordination with RTCA/EUROCAE)	Sep 9, 2022	Feb 1, 2023	Closed
15	Anna Guegan	Bring proposed report title changes to EUROCAE TAC for consideration	Sep 9, 2022	Nov 23, 2022	Closed
17	John Mettrop / Anna Guegan	Determine April 2023 Plenary 5 location	Sep 9, 2022	Jan 15, 2023	Closed
18	Ed Hahn	Change SC-242 TOR to update report title changes	Nov 10, 2022	Dec 15, 2022	Closed
19	All	Contribute to identifying risks that should be included in risk register	Nov 10, 2022	Nov 29, 2022	Closed
20	Ed Hahn / John Micallef	Send another reminder to other SCs/WGs about survey due dates	Nov 10, 2022	Nov 30, 2022	Closed
21	Ed Hahn	Start Report #2 outline	Nov 10, 2022	Apr 20, 2023	Closed
22	All	Review RF-specific areas of WAIC MOPS	Apr 20, 2023	May 15, 2023	Open
23	Ed Hahn / John Micallef	Provide semi-annual briefings on SC-242/WG-124 to FSMP	Apr 20, 2023	Per FSMP Meeting Schedule	Open
24	Ed Hahn	Provide update on the Survey Report delay at Jun 2023 PMC meeting	Apr 20, 2023	Jun 22, 2023	Open
25	Ed Hahn / John Micallef	Determine document identifier nomenclature for reports available through the RTCA Store	Apr 20, 2023	Jun 22, 2023	Open
26	Ed Hahn / John Micallef	Add SC-242 & WG-124 TOR amendment on the Plenary #6 agenda	Apr 20, 2023	Jul 27, 2023	Open

10. Pending TOR Changes

- Rebecca Morrison requested that SC-242 update to Jun 2023 PMC note that the way Reports are published in RTCA Store will be with a new nomenclature as well as notifying them of Report 1 schedule slip.
- **ACTION**: SC-242/WG-124 Leadership to determine document identifier nomenclature for reports available through the RTCA Store.
- **ACTION**: Add SC-242 & WG-124 TOR amendment on the Jul 2023 plenary agenda.

11. Date and Venue of Next Meeting

- The committee agreed to resume subgroup weekly meetings on April 25, 2023.
- The committee agreed to meet for Plenary #6 on July 25-27, 2023 at RTCA headquarters in Washington DC. There will be a hybrid option.
- The committee discussed the potential for a virtual plenary to approve Report 1 in Sep or Oct 2023. A date will be decided at Plenary #6.

- The committee agreed the next in person plenary would be in January 2024 in Europe. Dates will be decided at Plenary #6.

Meeting Dates	**Locations (Hosts)**	**Meeting Goal**
July 25-27, 2023	Washington DC (RTCA) (hybrid)	1. Finalize and approve Report #1 for RAC 2. Progress Guidance document and Report #2 3. Discuss TOR amendment

12. Any Other Business

- Capucine Amielh noted that she has been asked to take a different position within Airbus and will not be able to continue as SG2 leader.
  - Capucine noted the plan is for her colleague Olivier Pellay to replace her pending Airbus management approval.
  - John Micallef and Ed Hahn thank Capucine on behalf of the committee for her leadership and for the vision for the Guidance document.
  - Ed and John also welcome Olivier to the committee.
- John and Ed also thanked Capucine and Valentin Le Mire for the Airbus hospitality.

13. Adjournment

- The Plenary adjourned at approximately 0905 EDT / 1505 CEST on Thursday April 20, 2023.

CERTIFIED as a true and accurate summary of the meeting.

Clay Barber, SC-242 Secretary

TBD, WG-124 Secretary

Ed Hahn, SC-242 Chair

John Micallef, WG-124 Chair

Attachment A – Participants

Leadership

Name	**Organization**
Ed Hahn SC-242 Chair	ALPA
John Micallef WG-124 Chair	EUROCONTROL
Clay Barber SC-242 Secretary	Garmin
Chris Tourigny, SC-242 Government Authorized Representative	FAA
Rebecca Morrison SC-242 Program Director	RTCA
Anna Guegan WG-124 Technical Programme Manager	EUROCAE
Andrew Roy Subgroup 1 Lead	ASRI
Capucine Amielh Subgroup 2 Lead	Airbus

Membership

Name	**Organization**
Bernhard Haindl	Frequentis AG
Clint Quesenberry	FAA
Dave Redman	AVSI
Donny Morrow	ALPA
Earle DePass	TCCA
Greg Orell	Mitre
Guillaume Novella	DGAC/DSNA
Jessie Turner	Boeing
Jose Luis Chinchilla Garcia	Indra Sistemas
Josep Ginè	ATR
Kathryn Bernazzani	DOT Volpe Center
Kim Kolb	Boeing
Loftur Jónasson	ICAO
Mauro Pagliarini	EASA
Miguel Munoz	IFP Energies
Naruto Yonemoto	Electronic Navigation Research Institute (ENRI), Japan
Nick Rico	Textron
Olivier Pellay	Airbus
Sai Kalyanaraman	Collins Aerospace
Sam Weich	Ligado Networks

Name	**Organization**
Sasa Jankovic	Bundesaufsichtsamt für Flugsicherung, Germany
Sergio Bovelli	Airbus
Stephen Van Trees	FAA
Steve Giles	Mitre
Uwe Schwark	Airbus
Wes Googe	American Airlines
Xavier Esneu	Collins Aerospace

Guests

Name	**Organization**
Alexandre Chabory	ENAC
Christian Fleury	DGAC/DNSA
El-Mehdi Djelloul	ENAC
Piet van den Berg	KLM
Ravi Jain	FAA
Rémi Douvenot	ENAC
Valentin Le Mire	Airbus

RISK MANAGEMENT LOG	
Column	**Instructions For Completing This Document**
	Complete the Project Name, NC, Project Manager Name, and Project Description fields
	For each risk identified, complete the following:
A	**ID**: A unique ID number used to identify the risk in the risk tracking log.
B	**Current Status**: This column should be populated with the risk's current status. **o Open**: The risk is currently open but is not yet an issue. **o Closed**: The risk is no longer considered an active project threat and can be closed with or without resolution.
C	**Risk Impact**: This column should be populated with the potential impact of the risk if it did become a project issue. Valid options include the following: High, Medium, Low. These are defined as follows: **o High**: Risk that has the potential to greatly impact project cost, project schedule or performance. **o Medium**: Risk that has the potential to slightly impact project cost, project schedule or performance. **o Low**: Risk that has relatively little impact on cost, schedule or performance.
D	**Probability of Occurrence**: This column should be populated with the estimated probability that the risk will at some point become a project issue.
E	**Risk Map**: This is a calculated field based on the values selected for both Risk Impact and Probability of Occurrence. **o Green**: LL (Low Probability, Low Impact), LM (Low Probability, Medium Impact), ML (Medium Probability, Low Impact) **o Yellow**: LH (Low Probability, High Impact), MM (Medium Probability, Medium Impact), HL (High Probability, Low Impact) **o Red**: MH (Medium Probability, High Impact), HM (High Probability Medium Impact), HH (High Probability, High Impact)
F	**Risk Description**: This column should be populated with a description of the risk.
G	**Project Impact**: This column should be populated with a description of the potential project impact as a result of the risk.
H	**Risk Area**: This column should be populated with the appropriate risk area.
I	**Symptoms**: This column should be populated with the symptoms of risk that may eventually lead to the execution of a risk contingency plan.
J	**Trigger**: This column should be populated with the triggers that would indicate the requirement to execute contingency plans.
K	**Risk Response Strategy**: This column should be populated with the preferred risk response strategy.
L	**Response Strategy**: This column should be populated an appropriate response strategy to prevent the risk from becoming an issue.
M	**Contingency Plan**: This column should be populated with a description of the risk contingency plan.

Column	**Instructions For Changing the Contents of Drop-Down Menus**
C, D, H	Highlight the cell of which you wish to change the content of the drop down menu. From the file menu click "Data" -> "Validation" and change the content of the source field

Column	**Instructions For Filtering Data**
Any	Highlight the header of the cell you wish to filter data on From the file menu click "Date" -> "Filter" ->"Auto Filter" Then select your filter criteria from the drop down menu that appears on your header cell

RISK MANAGEMENT LOG

Project Name:	SC242/WG124
Project Manager Name:	Chair
Project Description:	Spectrum efficiency

RISK MANAGEMENT LOG

Project Name:	SC242/WG124
Project Manager Name:	Chair
Project Description:	Spectrum efficiency

ID	Current Status	Risk Impact	Probability of Occurrence	Risk Map	Risk Description	Project Impact	Risk Area	Symptoms	Triggers	Risk Response Strategy	Response Strategy	Contingency Plan
P3	Open	Medium	High	Red	Survey outcome ineffective or late.	SG1 report delivery timescale slippage, with spillage onto SG2 timescales.	Schedule	Lack of timely responses, or no responses from committee chairs	Four weeks prior to scheduled start date if no resource is identified with required skill set implement contingency plan.	Mitigation	(i) Guidance clarifying instructions for survey respondees (ii) Segmentation of responses into compulsory and optional entries	Agree a sequential delivery of responses.
P3	Open	Medium	Low	Green	Lack of internal (SG) expert resource	SG1 and SG2 delivery slippage.	Resources	Lack of committee member contributions		Avoidance	Sequential sequencing of tasks. Allocation of experts' time through resource register managed at SG level.	Find resource that meets required skill set through external hiring sources.
P3	Open	Low	Low	Green	Lack of system expertise to cover gaps in survey	Inability to substantiate gaps for specific systems, leading to incomplete SG2 guidance.	Expertise	Incomplete survey submissions		Contingency		
P4	Open	Low	Low	Green	Impact of WRC23 preparations on committee's calendar	Busy spectrum calendar in 2023 impacting on availablity of key experts	Schedule	Key experts inability to attend meetings or to contribute to deliverables in a timely manner.	Meeting clashes with other spectrum committees related to ICAO and to ITU WRC23	Contingency	active tracking of external spectrum committee meetings vs key experts	

Update to SC-242/WG-124 Plenary

SG1

20 Apr 2023

Objectives for Apr 2023 WG-W SG1 Activities

- Review status of RF survey responses
  - What has been received
  - What is outstanding
- Report #1 drafting activity
  - Reviewed current text in report main body
- Review timelines/workplan
  - Future meetings/timeline planning

RF Survey Statistics

- Updated survey status tracker
- 73 Documents identified
  - 7 are currently removed as they have no relevant RF component
- 66 documents total (currently) for responses
  - 8 are completely written up in the report
  - 16 have notes in the report (need to be written up)
  - 3 have been reviewed but are missing notes
  - 39 documents have yet to have a response
    - 10 from SC-159 which will be a consolidated into a single response
- Review process
  - 27 high priority outstanding
    - Incls the 10 from SC-159
  - 31 documents need introductions

High priority documents still outstanding

DO-155 – MPS Airborne Low-Range Radar Altimeters

DO-160G/ED-14G with Change 1 – Environmental Conditions and Test Procedures for Airborne Equipment - Sections 19 and 20

DO-210D with Changes 1, 2, 3, 4 & 5 – MOPS for Geosynchronous Orbit Aeronautical Mobile Satellite Services Aircraft Earth Station Equipment

DO-235B/C – Assessment of Radio Frequency Interference Relevant to the GNSS L1 Frequency Band

DO-307B/ED-239A – Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

DO-362A – Command and Control (C2) Data Link MOPS (Terrestrial)

DO-363A/ED-130B – Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft

DO-378A/ED-260A - MASPS for Coexistence of Wireless Avionics Intra-Communication Systems within 4200-4400 MHz

ED-030 – MPS for Airborne Low-Range Radar Altimeter Equipment

ED-115 – MOPS for Light Aviation Secondary Surveillance Radar Transponders

ED-116 – MOPS for Surface Movement Radar Sensor Systems for use in A-SMGCS

ED-117A – MOPS for Mode S Multilateration Systems for use in A-SMGCS

ED-129B – Technical Specification for a 1090MHz Extended Squitter ADS-B Ground Station

ED-142 – Technical Specification for Wide Area Multilateration Systems

ED-235 – MASPS for Foreign Object Debris Detection Systems

ED-259 – MOPS DFMC and SBAS

ED-265 - Minimum Operational Performance Standard for RPAS Command and Control Data Link (C-Band Satellite)

ED-266 – Guidance on Spectrum Access, Use and Management for UAS

Report Review Progress

- Current draft report
- Reviewed majority of main body
  - Work through majority of document front to back
  - Identified additional drafting work
- Focused on:
  - Accuracy
    - Answering the TORs
    - Meeting the needs of SG-2
  - Readability
    - Understandable to aviation and non-aviation audiences
    - Remove ambiguity (i.e. are we all understanding what the questions are asking)
  - Continuity
    - Any additional work needed

Timelines/Workplan

- Apr
  - 18-20 – 242/124 full Plenary to progress reports
  - 25 – Continue to incorporate other responses
- May
  - Weekly sessions - Continue to incorporate other responses
- June
  - Weekly sessions - Continue to incorporate other responses and update report main body text
- July
  - 25-27 – Plenary – Full review of report ready for SC/WG review
- Aug
  - Focus on SG2/holidays
- Sep
  - 12 – Review feedback from SCs/WGs
  - 19 – Review feedback from SCs/WGs
  - 26 – Final document released?

SG2 report to plenary 20 April 2023

RTCA SC-242 / EUROCAE WG-124
Spectrum Compatibility

SG2 activities

Tuesday, 18 April 2023

- 13:00 - 16:00
  - Review of work plan and planning
  - ENAC PhD presentation on antenna models
  - Go through IP3 Receiver contribution

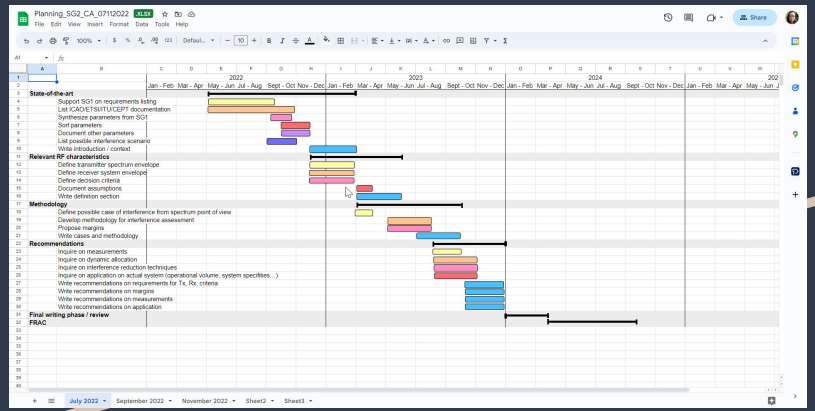
Wednesday, 19 April 2023

- 13:00 - 17:00
  - Contribution on IP1 RF survey & recommendations (AIRBUS)
  - Contribution on IP2 Transmitter (FAA)
  - Contribution on IP5 Interference scenarios (BOEING)

Thursday, 20 April 2023

- ~13:30
  - Report to plenary

Work plan and planning



- Reminder on Information Papers process
- Reminder on how Information Papers will feed the standard process
- First batch of IPs (1 to 5) advances well
- IP1 dependency to the RF survey report is not critical yet

Objective for the next plenary:

- Advance on IP1 to 5 concepts
- Identify an editor as IP1 to 5 will have enough content to start filling the new standard

ENAC PhD presentation

Contributors:

- El-Mehdi DJELLOUL, ENAC

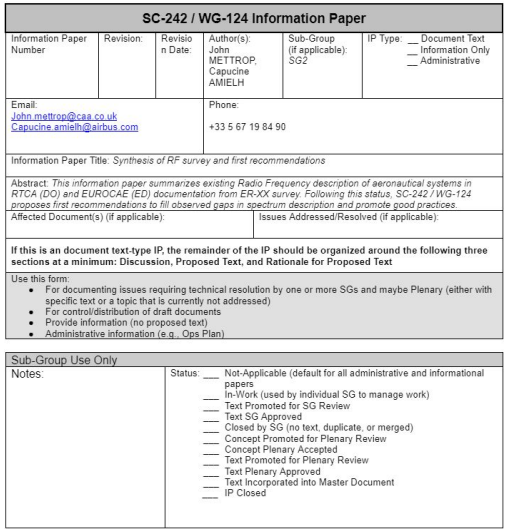
Antenna mounted on aircraft model

- Deterministic-statistical pattern to render antenna behavior in all directions to account for various antenna configurations and aircraft classes
- Potential application for RA/5G, GNSS/Jamming & Spoofing
- Chosen examples so far:
  - GNSS
  - RA
  - VHF
  - DME

IP1: Synthesis of RF survey and first recommendations

Contributors:

- Capucine AMIELH, Airbus
- Olivier PELLAY, Airbus



SC-242 / WG-124 Information Paper

Information Paper Number	Revision:	Revision Date:	Author(s): John METTROP, Capucine AMIELH	Sub-Group (if applicable): *SG2*	IP Type: __ Document Text __ Information Only __ Administrative
Email: John.mettrop@caa.co.uk Capucine.amielh@airbus.com			Phone: +33 5 67 19 84 90		

Information Paper Title: *Synthesis of RF survey and first recommendations*

Abstract: *This information paper summarizes existing Radio Frequency description of aeronautical systems in RTCA (DO) and EUROCAE (ED) documentation from ER-XX survey. Following this status, SC-242 / WG-124 proposes first recommendations to fill observed gaps in spectrum description and promote good practices.*

Affected Document(s) (if applicable):	Issues Addressed/Resolved (if applicable):

If this is an document text-type IP, the remainder of the IP should be organized around the following three sections at a minimum: Discussion, Proposed Text, and Rationale for Proposed Text

Use this form:

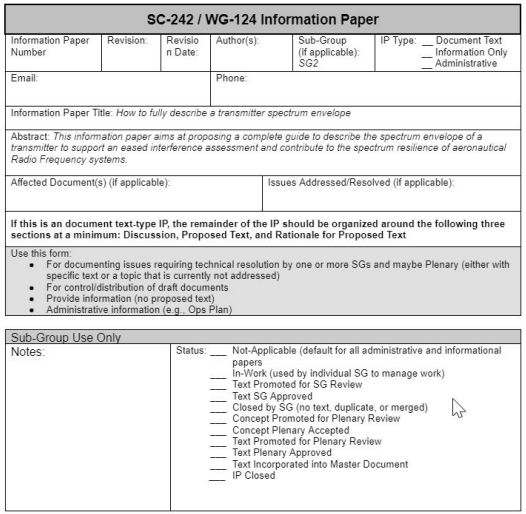
- For documenting issues requiring technical resolution by one or more SGs and maybe Plenary (either with specific text or a topic that is currently not addressed)
- For control/distribution of draft documents
- Provide information (no proposed text)
- Administrative information (e.g., Ops Plan)

Sub-Group Use Only	
Notes:	Status: ___ Not-Applicable (default for all administrative and informational papers) ___ In-Work (used by individual SG to manage work) ___ Text Promoted for SG Review ___ Text SG Approved ___ Closed by SG (no text, duplicate, or merged) ___ Concept Promoted for Plenary Review ___ Concept Plenary Accepted ___ Text Promoted for Plenary Review ___ Text Plenary Approved ___ Text Incorporated into Master Document ___ IP Closed

Proposal of a scoring of documents with respect to the adequacy of RF parameters definitions

➢ In a factual point of view to support other committees to review the RF sections of their document

IP2: How to fully describe a transmitter spectrum envelope



SC-242 / WG-124 Information Paper

Information Paper Number:	Revision:	Revision Date:	Author(s):	Sub-Group (if applicable): *SG2*	IP Type: __ Document Text __ Information Only __ Administrative
Email:			Phone:		

Information Paper Title: *How to fully describe a transmitter spectrum envelope*

Abstract: *This information paper aims at proposing a complete guide to describe the spectrum envelope of a transmitter to support an eased interference assessment and contribute to the spectrum resilience of aeronautical Radio Frequency systems.*

Affected Document(s) (if applicable):	Issues Addressed/Resolved (if applicable):

If this is an document text-type IP, the remainder of the IP should be organized around the following three sections at a minimum: Discussion, Proposed Text, and Rationale for Proposed Text

Use this form:
- For documenting issues requiring technical resolution by one or more SGs and maybe Plenary (either with specific text or a topic that is currently not addressed)
- For control/distribution of draft documents
- Provide information (no proposed text)
- Administrative information (e.g., Ops Plan)

Sub-Group Use Only

Notes:	Status: ___ Not-Applicable (default for all administrative and informational papers ___ In-Work (used by individual SG to manage work) ___ Text Promoted for SG Review ___ Text SG Approved ___ Closed by SG (no text, duplicate, or merged) ___ Concept Promoted for Plenary Review ___ Concept Plenary Accepted ___ Text Promoted for Plenary Review ___ Text Plenary Approved ___ Text Incorporated into Master Document ___ IP Closed

Proposal of a detailed transmitter RF processing

- Good educational content
- Approach agreed

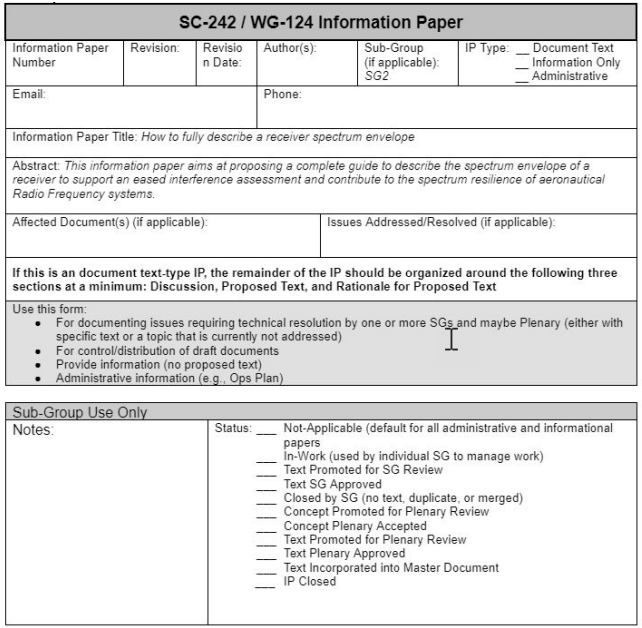
Contributors:

- Clint QUISENBERRY, FAA

IP3: How to fully describe a receiver spectrum envelope

Contributors:

- Valentin LE MIRE, Airbus
- Capucine AMIELH, Airbus



SC-242 / WG-124 Information Paper

Information Paper Number	Revision:	Revision Date:	Author(s):	Sub-Group (if applicable): SG2	IP Type: __ Document Text __ Information Only __ Administrative
Email:			Phone:		

Information Paper Title: *How to fully describe a receiver spectrum envelope*

Abstract: *This information paper aims at proposing a complete guide to describe the spectrum envelope of a receiver to support an eased interference assessment and contribute to the spectrum resilience of aeronautical Radio Frequency systems.*

Affected Document(s) (if applicable):	Issues Addressed/Resolved (if applicable):

If this is an document text-type IP, the remainder of the IP should be organized around the following three sections at a minimum: Discussion, Proposed Text, and Rationale for Proposed Text

Use this form:

- For documenting issues requiring technical resolution by one or more SGs and maybe Plenary (either with specific text or a topic that is currently not addressed)
- For control/distribution of draft documents
- Provide information (no proposed text)
- Administrative information (e.g., Ops Plan)

Sub-Group Use Only

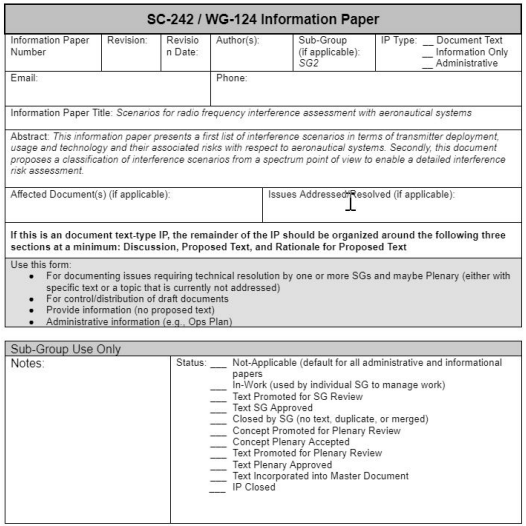
Notes:	Status: ___ Not-Applicable (default for all administrative and informational papers ___ In-Work (used by individual SG to manage work) ___ Text Promoted for SG Review ___ Text SG Approved ___ Closed by SG (no text, duplicate, or merged) ___ Concept Promoted for Plenary Review ___ Concept Plenary Accepted ___ Text Promoted for Plenary Review ___ Text Plenary Approved ___ Text Incorporated into Master Document ___ IP Closed

AIRBUS progress presented including: introduction, noise, sensitivity

IP5: Interference scenarios

Contributors:

- Jessie TURNER, BOEING



SC-242 / WG-124 Information Paper

Information Paper Number	Revision:	Revision Date:	Author(s):	Sub-Group (if applicable): SG2	IP Type: __ Document Text __ Information Only __ Administrative
Email:			Phone:		

Information Paper Title: *Scenarios for radio frequency interference assessment with aeronautical systems*

Abstract: *This information paper presents a first list of interference scenarios in terms of transmitter deployment, usage and technology and their associated risks with respect to aeronautical systems. Secondly, this document proposes a classification of interference scenarios from a spectrum point of view to enable a detailed interference risk assessment.*

Affected Document(s) (if applicable):	Issues Addressed/Resolved (if applicable):

If this is an document text-type IP, the remainder of the IP should be organized around the following three sections at a minimum: Discussion, Proposed Text, and Rationale for Proposed Text

Use this form:

- For documenting issues requiring technical resolution by one or more SGs and maybe Plenary (either with specific text or a topic that is currently not addressed)
- For control/distribution of draft documents
- Provide information (no proposed text)
- Administrative information (e.g., Ops Plan)

Sub-Group Use Only	
Notes:	Status: ___ Not-Applicable (default for all administrative and informational papers ___ In-Work (used by individual SG to manage work) ___ Text Promoted for SG Review ___ Text SG Approved ___ Closed by SG (no text, duplicate, or merged) ___ Concept Promoted for Plenary Review ___ Concept Plenary Accepted ___ Text Promoted for Plenary Review ___ Text Plenary Approved ___ Text Incorporated into Master Document ___ IP Closed

Discussion on the operational and RF scenarios
This document will develop recommendations for committees to establish precise interference scenarios

RTCA, Inc.
1150 18th Street NW, Suite 910
Washington, DC 20036
USA

Report on Aeronautical Radio Frequency Systems, their Regulatory Framework, and Operational Considerations

RTCA DO-999
January 24, 2018

Prepared by: SC-777

Copies of this document may be obtained from
RTCA, Inc.
Telephone: 202-833-9339
Facsimile: 202-833-9434
Internet: www.rtca.org
Please visit the RTCA Online Store for document pricing and ordering information.

OUTLINE

TOR Scope:

"The committee shall develop high-level material to assist non-aviation stakeholders to understand how aeronautical RF systems are used and the performance necessary (e.g., availability, reliability, continuity, latency, etc.) for safety-of-life functions and how they fit into the overall management of airspace. Additional material that discusses aviation lifecycles and the timeframes necessary for design, testing, certification, manufacture, and installation of new or updated equipment also shall be developed."

(a) Introduction

(b) Scope

(a) High Level Aviation Concept of Operations - RF systems used for Safety and Regularity of Flight: Safety Management and Mission Critical communications. Mission Critical can escalate to safety of life quickly (e.g. medical emergency, aircraft malfunction, aircraft tracking); treat them as one.

  (i) ATC

  (ii) Airspace Design and Charted Procedures

    1. Separation from ground / "obstacle clearance"

  (iii) Flight Operations

    1. Flight Planning - including role of AOC throughout the flight
    2. Preflight - Taxi Out
    3. Takeoff - Climb
    4. Cruise
    5. Descent - Approach
    6. Landing - Taxi In

  (iv) New Entrants

    1. UAS/UAM
    2. Commercial Space

(c) Design, Certification and Installation of Aviation Systems

  (i) Aviation Safety Management System(s)

  (ii) Aircraft System Safety Assessment (SSA, FHA, Fault Trees/FMEA) - historically equipment, but now cyber, external threats (other wireless sytems)

  (iii) Development Assurance Levels

    1. integrity + continuity (enroute) / availability (approach) - broken down by phase of flight. e.g. as it applies to interference dwell time.

      a. E.g. radalt dual installs to meet performance, but common failure mode breaks purpose of dual install: Unavailability due to interference

  (iv) Equipment Performance

  (v) RF Performance

(v) Operational tolerance for unavailability (individual flight vs. operation)

(vi) Process and timelines - OSED, SPR, MASPS, MOPS, TSO, TSOA, TC/STC, Installation

(d) High Level Classification of Aviation RF Systems

(i) Communications

1. Voice - HF, VHF, SATCOM
2. Data - ATS Data Link, AOC Data Link, Maintenance Data
    a. VHF ACARS/VDL2, HF Data Link, SATCOM, UAS C2, AeroMACS, WAIC
    b. Future LDACS (also fits under navigation)

(ii) Navigation

1. Terrestrial RF Navigation Aids - NDB/ADF, VOR, ILS, Marker, DME/TACAN, GBAS, (LDACS)
2. Space Based RF Navigation Aids - GNSS (GPS + other constellations, SBAS systems)
3. RF Sensors used for navigation (e.g. WXR, RadAlt, EFVS, etc.)
4. Non RF (e.g. Inertial, Attitude Heading Reference Systems, Air Data) - very short / just to mention they exist

(iii) Surveillance

1. Primary Surveillance Radar (just to mention the bands they use)
2. Secondary Surveillance Radar
    a. ATCRBS and Mode S Transponders
3. ADS-B
4. UAS ground and airborne surveillance radars
5. Forthcoming UAS V2V
6. UAS CNPC

(iv) Safety Systems Using Inputs (could be integrated with the feeding system descriptions instead)

1. TCAS/ACAS (including variants)
2. TAWS (including landing configuration, etc.)
3. Predictive/Reactive Windshear (?)
4. Envelope Protection (general)
5. Autoland (general)
6. Takeoff configuration (general)
7. (others?)

(e) Avionics Lifecycles

(i) When Does Avionics get Added or Upgraded?

(ii) Typical installation timelines (echoing section c.vi.)

(f) Description of Aviation Radio Frequency Systems

(i) System 1 (follow the same order as in section (d))

1. Name
2. Frequency Band and Channelization
3. Description and Operation (how system is used)
4. Criticality (e.g. TSO DAL) in typical use

(ii) System 2

(iii) …

(iv) System N

(g)