



RTCA Paper No. 254-21/SC222-098
 EUR Reference No EUR. 286-21 / WG82-101

Washington, 28 Sept 2021
 St Denis, 28 Sept 2021

**Minutes of EUROCAE
 WORKING GROUP 82 (WG-82) (Meeting #52) and RTCA SPECIAL COMMITTEE 222
 (SC-222) (Meeting #45)
 “New Air-Ground Data Link Technologies”
 related to SATCOM**

| | |
|------------------|--------------------------|
| Date | 28 September 2021 |
| Place | Virtual Meeting |
| Venue | EUROCAE – Webex |
| Hosted by | EUROCAE |

Participants:

| NAME | COMPANY | 28th (Plenary) |
|-------------|----------------|--------------------------------------|
|-------------|----------------|--------------------------------------|

| NAME | COMPANY | 28th (Plenary) |
|-------------------------------|------------------|--------------------------------------|
| Adam Sarhage | GARMIN | X |
| Ajay Parikh | LIGADO | X |
| Alan Schuster Bruce | INMARSAT | X |
| Andy Morin | IRIDIUM | X |
| Angela Knudson | Rockwell Collins | X |
| Anna Guegan | EUROCAE | X |
| Armin Schlereth | DFS | X |
| Antonio Correias | EUROCONTROL | X |
| Darrell Andregg | Rockwell Collins | X |
| Gonzalo Prieto | ESSP | X |
| Guillaume De Bony De Lavergne | Airbus | X |
| Hans TRAUTENBERG | EASA | X |
| Hiroshi OKOCHI JRANSA | JRANSA | X |
| Jeff Knickelbein | COBHAM | X |

| | | |
|--------------------|-----------|---|
| Karan Hofmann | RTCA | X |
| Martina Angelone | ESA | X |
| Michael Gertsman | Squarepeg | X |
| Michael Hooper | IRIDIUM | X |
| Nick Green | INMARSAT | X |
| Nkululeko Ntombela | ATNS | X |
| Radek Zaruba | Honeywell | X |
| Ravi Jain | FAA | X |
| Richard Tapp | HONEYWELL | X |
| Sachin Chhibber | Ligado | X |
| Sam Weich | Ligado | X |
| Luke Sienkiewicz | IRIDIUM | X |
| Stephen Van Trees | FAA | X |

DOCUMENTS

| Agenda Item | Title | File name |
|-------------|---------------------------------|--|
| 1 | Calling Notice and Agenda | 222WP330_SC-222 (45) and WG-82 (52) Calling Notice Meeting.pdf |
| 2 | Meeting Minutes of last Meeting | 222_44_WG-82_Meeting_50_Final minutes |
| 4 | | |
| 4 | | |
| 6 | | |
| 6 | | |
| 6 | | |

PRESENTATIONS

| Agenda Item | Title | File name |
|-------------|--|--|
| 4 | Iris IOC flight trials preliminary results | Preliminary Iris IOC flight test summary (Honeywell).pptx |
| 5a | Honeywell proposal to insert IPS in the task list for the TORs of WG 82/SC-222 | Addition of IPS to MOPS and MAPS (Honeywell 2021-09-24).pptx |
| 5b | Initial ATN-IPS validation activities - Inmarsat | Inmarsat ATN-IPS (SC-222, 28 Sep 2021) |
| 5c | AES control and monitoring FUNCTION | AES control and monitoring FUNCTION.pptx |
| 5c | Protection of GLONASS GNSS receivers from Iridium Certus Aircraft Earth Stations | Protection of GNSS |

1) Welcome, Introductions, Administrative Remarks by Special Committee Leadership

Armin Schlereth (chair WG-82) welcomed the group and the new co-chairs of the SC-222, Alan Schuster Bruce and Michael Hopper. He led through the whole meeting,.

Karan Hofmann and Anna Guégan informed about the anti-trust policy, IPR policy, and call and participation membership policies for RTCA Special Committees (SC) and EUROCAE Working Groups.

2) APPROVAL OF THE AGENDA

After a round table, Armin Schlereth introduced the proposed agenda of the RTCA SC-222/ EUROCAE WG-82 Plenary meeting. The final agreed agenda looks as follows:

AGENDA

28 September 2021 (9:00 am – 12:00 pm EDT) – (15:00 – 18:00 CEST)

Welcome, Introductions, Administrative Remarks by Special Committee Leadership

- Government Authorized Representative (GAR): Ravi Jain
 - Co-Chair RTCA SC-222: Michael Hooper, Iridium
 - Co-Chair RTCA SC-222: Alan Schuster Bruce, Inmarsat
 - Chair EUROCAE WG-82: Dr. Armin Schlereth, DFS
1. RTCA/EUROCAE Opening Material
 2. Review Agenda
 3. Review Minutes and Actions
 4. Reports from other organizations
 - a. Interim Results from Iris IOC Prototype Pilot Flight Trials (EPP over SATCOM)
 5. Discussion on future work
 - a. Addition of IPS to MOPS and MASPS – Scope and Roadmaps
 - b. INMARSAT status update on ATN/IPS work
 - c. Recommendations on DAL
 - d. Further TOR Discussion
 6. Any Other Business
 - a. LDACS call for interest
 7. Review Action
 8. Set Future Meetings
 9. Adjourn

3) Review Minutes and Actions

The minutes of the last meeting have been reviewed and approved. The action item list has been reviewed focusing on the open actions and their status has been updated. The updated action item list is outlined at the end of the present minutes.

4) Reports from other organizations

a) Interim Results from Iris IOC Prototype Pilot Flight Trials (EPP over SATCOM)

Radek Zaruba presented the Iris IOC flight trials preliminary results on ADS-C and CPDLC performance.

The trials have been performed with Honeywell's Embraer E-170 based in Phoenix, with Honeywell's Epic avionics and an Aspire 400 AES (Class 7). Two flight campaigns were carried out for a total of 19 + 10 flight hours. Tests have been carried out on CPDLC and ADS-C performance in parallel to AISD and PIESD traffic to stress the system.

Results mostly focused on ADS-C downlink campaign, within the SATCOM boundary (RSTP_{SSP}), measured in line with the measurement boundaries defined in ICAO (D1a to D2a).

In both campaigns ADS-C TD95 was met (<5 sec) but only campaign 2 met the ET 99.9% target (12 sec) results so far, even if more data would be needed, due probably also to a wiring problem in one of the flights.

The group commented that indeed more data are needed to derive a conclusion on the 99.9% target; it was noted that MASPS requirement considers a valid measurement with 1 month observation period and a statistically significant number of aircraft.

End-to-end results: even including all the data (including malfunctioning flight), end-to-end ADS-C report meets both the 95% and 99.9% latency requirements for RSTP of the end-to-end datalink (excluding time required for EPP calculation - RSTP_{FMS} for). This shall be also discussed in the framework of the re-activated WG 78 for SPRs update.

Also Ground-Ground delay has also been measured and is negligible w.r.t. other segments.

Results for CPDLC (RCTP_{SSP}) also show good performance which need however to be confirmed by more data.

5) Discussion on future work

a) Addition of IPS to MOPS and MASPS – Scope and Roadmaps

Honeywell presented their view suggesting to add IPS to MOPS and MASPS;

Further to the already existing groups, some aspects potentially impacting MASPS and MOPS have been identified (QoS differentiation, interfaces); the aim would be to start working on IPS next year finishing by end 2023.

The group needs to take a decision but it was argued that already many other standardization fora (e.g. ICAP WG I, AEEC...) cover the topic.

There were some questions on potential impact of Orchestra and Elera, announced for the future by Inmarsat, but it has been concluded that it is too early to report something in the group.

It has been proposed to add to the task sheet of WG-82 and TOR of SC-222 a point for " Potential improvement of the current MOPS".

Also, it is being considered to include work on RPAS: impact on ED-242 and 243 and provide feedback to SC-228 on DO-377 MASPS. Inmarsat has taken the action to provide a presentation on the possible interest in covering UAS C2-link at the next meeting.

On another topic, an action has been agreed on Guillaume De Bony De Lavergne (airbus) to prepare a presentation on the possible impact on MASPS and MOPS of the automated data download for TRFD.

b) INMARSAT status update on ATN/IPS work

Initial ATN-IPS validation activities (INMARSAT, Nick Green)

Within ESA Iris program, Inmarsat early validation of ATN-IPS aims at supporting SESAR PJ 14 Solution 77/107 validation activities (to be conducted in the second half of 2022) and at supporting

the Boeing EcoDemonstrator flights (Jul-Oct 2021).
IPS service is supported over the existing secure SBB Safety 2.0.
SESAR Validation: details of the main end-to-end system architecture aspects of the validation exercise are presented (supporting ATN-B1 and B2 but also AOC applications).
Interoperability between OSI and IPS is also covered as scope of the exercise.

About Boeing EcoDemonstrator: several flights conducted on 737-9 using IP datalink to support the ATM applications, including a Cobham terminal connected to the London Aerorack, further connected to the Boeing Lab in US.

Potential impact on MASPS and MOPS may be clearer at a later stage (when requirements of the A/G subnetworks are clearer, defined by standardization).
An action to provide a feedback on the possible timeline for the IPS standardization maturity that would allow to start the discussion on the MASPS/MOPS impact has been agreed on Inmarsat.

The WG-82 chairman took the action to update the task sheet and circulate it to the stakeholders. At the same time, SC-222 chairmen took the action to incorporate the proposed changes in the SC-222 TORs to be presented in December.

c) Recommendations on DAL

Richard presented the Control and Monitoring function (CMF) for radio compatibility requirements, providing the list of the applicable standards.
CMF requirements were introduced in the MOPS for compatibility with GLONASS equipment.
Recommendation was made to the group to consider a recommendation on appropriate DAL level to the CMF for CERTUS AES.

Darrell Andregg presented a safety risk analysis paper on the protection of the GLONASS as a "minor" risk as appropriate for DAL-D.

It was discussed to maybe consider adding a note in the MOPS to make designers aware of the need for DAL but the group agreed that there is no added value to discuss about including the DAL in the MOPS

d) Further TOR Discussion

Overall, three items are under discussions for the future work:

- 1) " Potential improvement of the current MOPS "
- 2) add ATN-IPS work, to be completed before 2023
- 3) UAS C2-link impact on MASPS and MOPS

6) Any Other Business

a) LDACS call for interest

Armin Schlereth mentioned, that within ICAO PT-T it was discussed that it required EUROCAE WG-82 starts working on MOPS and MASPS for LDACS soon in order to support finalising the ICAO documentation as well. Therefore, next step would be to issue a call for interest to contribute to the work of an LDACS group within WG-82. Armin will further coordinate on this with EUROCAE Technical Program Manager.

7) Review actions

An action items list related to the meeting have been send out for comment just after the meeting and are enclosed as well.

8) Set Future Meetings

RTCA SC-222 and EUROCAE WG-82 have agreed on the following next meetings:

WEBEX's:

- **8-9.02.2021 WG-82/RTCA SC-222: Plenary WEBEX from 3pm to 6pm CET** (WEBEX will be organized by EUROCAE)

Physical Meetings:

- **No physical meeting(s) are planned.**

9) Adjourn – Plenary meeting

Armin thanked the group for the lively discussion.

Action items

RTCA-SC222 / EUROCAE WG-82 30th meeting: 6.02.2018 and 7.02.2018

| Action# | Content | Responsible | Deadline | Status |
|---------|--|---------------|----------|--------|
| A30-09 | <p>Review of SC-228 slides and material (ITU M.2127) to provide feedback on the following items:</p> <ol style="list-style-type: none"> 1) Support of 2000 UA 2) 10 – 100 kbps per UA (Peak!) 3) Voice latency of 390 millisecond maximum 4) Use of protected spectrum (L-Band) <p>Discussion at WG-82/#31: Chuck LaBerge will provide a response on it asap.</p> <p>Discussion at WG-82/#32: Values might change in the MASPS for UAS. MASPS are available end of the year. So no activities required by WG-82/SC-222 until availability of MASPS.</p> <p>Discussion at WG-82/#33: MASPS on C2 link support by SATCOM expected Q1/2019.</p> <p>Discussion at WG-82/#34: Status unchanged.</p> <p>Discussion at Plenary June 2019: Status unchanged.</p> <p>Discussion at Plenary July 2019: Current priority on MASPS and MOPS actual documents. Status unchanged.</p> <p>Status Plenary Sept 2019: Status unchanged. Current publication schedule has higher approval.</p> <p>Status Plenary Nov 2019/Jan 2020: Status unchanged. Current publication schedule has higher approval</p> <p>Discussion at Plenary June 2020: Status unchanged.</p> <p>Discussion at Plenary Nov 2020: Early 2021 SC-228 finishing RPAS MASPS. Restart coordination then.</p> <p>Discussion at Plenary Jan 2021: Early 2021 SC-228 finishing RPAS MASPS. Restart coordination then.</p> <p>Discussion at Plenary Feb 2021: Early 2021 SC-228 finishing RPAS MASPS. Restart coordination then.</p> <p>Discussion at Plenary March 2021: Report expected to be available in May 2021.</p> <p>Discussion at Plenary July 2021: Analysis presented. Further work on details required before sent out paper material to the groups. See further Action Items below.</p> <p>Discussion at Plenary September 2021: First wait for discussion on Paper on Alex Miu investigations.</p> | Chuck LaBerge | asap | Open |

RTCA-SC222 / EUROCAE WG-82 31st meeting: 26.06.2018 and 28.06.2018

| Action# | Content | Responsible | Deadline | Status |
|---------|--|-----------------|----------|-------------|
| A31-03 | <p>Contact EUROCAE WG-105 (RPAS) to ask for requirements on SATCOM Performance Class A</p> <p>Discussion at WG-82/#34: Still open. Armin Schlereth to take care of it soon.</p> <p>Discussion at WG-82/#35: Still open.</p> <p>Discussion at Plenary June 2019: Status unchanged.</p> <p>Discussion at Plenary July 2019: Current priority on MASPS and MOPS actual documents. Status unchanged.</p> <p>Status Plenary Sept 2019: Status unchanged.</p> <p>Status Plenary Sept 2019/Jan 2020: Status unchanged. Current publication schedule has higher approval.</p> <p>Discussion at Plenary June 2020: Status unchanged.</p> <p>Discussion at Plenary Nov 2020: Early 2021 SC-228 finishing RPAS MASPS. Restart coordination then.</p> <p>Discussion at Plenary Feb 2021: Early 2021 SC-228 finishing RPAS MASPS. Restart coordination then.</p> <p>Discussion at Plenary March 2021: Report expected to be available in May 2021.</p> <p>Discussion at Plenary July 2021: Analysis presented. Further work on details required before sent out paper material to the groups. See further Action Items below.</p> <p>Discussion at Plenary September 2021: First wait for discussion on Paper on Alex Miu investigations.</p> | Armin Schlereth | asap | Open |

RTCA SC-222/EUROCAE WG-82 50th meeting: 13.07.2021

| Action# | Content | Responsible | Deadline | Status |
|----------------|---|--------------------------------------|----------------------------|---------------|
| A50-01 | Richard, Darrel and Johan will provide comments to the text inconsistency between the DO 262E text and the table in the FAA TSO. September meeting: Errata has been published | Richard, Daniel, Johan | | Closed |
| A50-02 | Report the outcome of the errata correction to the PMC at the next meeting | Committee | | Open |
| A50-03 | Distribute material (slide presentation and paper on L-Band SATCOM for UAS C2-Link investigations to Iridium (Mike Hopper) and Ravi Jain and Armin Schlereth. September meeting: Chuck sent the presentation just before the meeting. Paper planned for end of September distribution. | Chuck La Berge | ASAP | Closed |
| A50-04 | After feedback from Iridium distribute material (slide presentation and paper) on L-Band SATCOM for UAS C2-link investigations to SC-222 and WG-82 members September Meeting: Important to wait for Iridium feedback and coordination with Chuck La Berge and Alex Miu before publication. | Chairs/Co-chairs of SC-222 and WG-82 | After completion of A50-03 | Open |

RTCA SC-222/EUROCAE WG-82 52th meeting: 28.09.2021

| Action# | Content | Responsible | Deadline | Status |
|----------------|--|--------------------------------|------------------|---------------|
| A52-01 | Michael Hooper to provide his feedback to Chuck La Berge and Alex Miu and initiate discussion if needed on possible rewording before paper on UAS C2-link can be published | Michael Hooper | End October 2021 | Open |
| A52-02 | Inmarsat to provide a presentation on the possible interest in covering UAS C2-link at the next meeting. | Alan Schuster Bruce | Next WG meeting | Open |
| A52-03 | Guillaume De Bony De Lavergne (Airbus) to prepare a presentation on the possible impact on MASPS and MOPS of the automated data download for TRFD. | Guillaume De Bony De Lavergne | Next WG meeting | Open |
| A52-04 | To provide a feedback on the possible timeline for the IPS standardization maturity that would allow to start the discussion on the MASPS/MOPS impact | Inmarsat (Alan Schuster Bruce) | End October 2021 | Open |
| A52-05 | Update task sheet and circulate to the main stakeholders | Armin Schlereth | End October 2021 | Open |

| | | | | |
|--------|--|--|------------------|-------------|
| A52-06 | ACTION Alan and Mike to incorporate the proposed changes in the SC-222 TORs to be presented in December. Specifically consider IRIDIUM CERTUS items. | SC-222 co-chairs | End October 2021 | Open |
| A52-07 | Initiate call for interest process for LDACS. | Armin Schlereth together with support of Anna Guegan | End October 2021 | Open |