

Minutes of 24th Meeting
RTCA Special Committee 227
14th Meeting
EUROCAE WG-85
18, 20 August 2020
Virtual

Agenda

Tuesday

1. Welcome and Administrative Remarks
2. Introduction
3. Agenda Overview
 - a. Timeline & Organization
 - b. Working Discussion of Proposed Tasks
4. Meeting and Schedule

5. Committee Organization Options
6. Working Relationship with EUROCAE WG-85 & 107

Wednesday

1. WG-1 Change Proposal Development

Thursday

1. Discuss & Prioritize Proposed Tasks
2. Next Steps
3. Adjourn

Chairman: Mike Cramer, Mitre
GAR: Barry Miller, FAA
Secretary: Dave Nakamura, Mitre
Program Director: Rebecca Morrison

Wednesday

Welcome and Administrative Remarks

Mike Cramer opened the plenary Webex session at 9:00 AM, Tuesday, August 18. Mike welcomed the participants and reviewed the committee leadership. Alex Engel stood in for Rebecca and reviewed both the RTCA and EUROCAE Anti-Trust, Proprietary, and Committee Membership Participation policies. Alex noted the recent restart of WG-85 and where they are for the moment. Due to the fact this was a virtual meeting, the typical individual introductions were not made. It was noted the workspace can be used by members to indicate meeting attendance

Attendees

Name	Company/Organization
Aaron Jacobson	Boeing
Alex Capodicasaq	CMC
Alex Engel	EUROCAE
Alistair Wyatt	Vertical Aerospace
Andrew McKenzie	Nav Canada
Andrew Riedel	Boeing
Barry Miller	FAA
Brian Hint	FAA
Tiziano Bernard	Garmin
Bill Forstie	Honeywell
Bill Tuccio	Garmin
Bob Gaul	Garmin
Brad Miller	FAA
Brandon Weaver	DLR
Brian Hint	FAA
Christine Clausnitzer	FAA
Dale Courtney	FAA
Daniel Nelson	UK NATS
Darrell Pennington	ALPA
David Jordan	UASC
Dinesh Kumar Kushwaha	Collins
Doug Phifer	FAA
Eric Morse	Delta
Erik Ringnes	Honeywell
Frank Wigold	Lufthansa Systems
Florian Buchmann	Austro Control
Gang Feng	Boeing
Gary McMullin	Southwest Airlines
Gary Petty	FAA
Grant Clow	PSA Airlines
Greg Comstock	STRATMACH
Steve Horvath	Garmin
Jason Hewes	Garmin
Jeff Kerr	FAA
Jeff Meyers	FAA
Jim Cain	SAIC
Joel Dickinson	FAA

John Barry	FAA
Kendal Hershberger	Garmin
Kevin Sivits	Leonardo/Selex
Lesley Weitz	MITRE
Mike Cramer	MITRE
Michelle Yeh	FAA
Mike Jackson	Honeywell
Monica Vafiades	USAF
Dave Nakamura	MITRE
Nico De Gelder	NLR
Nick Tallman	FAA
Okuary Osechas	German Aerospace Center
Rebecca Morrison	RTCA
Rob Hughes	NGC
Ron Renk	United Airlines
Russ Ramaker	GE
Ruth Hirt	FAA
Shivathsan Narayanan	DLR
Silviu Ceparu	Bombardier
Thatch Vandenberg	Jeppesen
Tim Geels	Collins
Tim Padden	USAF
Tom Yochum	Boeing
Valeriu Vitan	EUROCONTROL
Xavier Redondo	General Atomics
Yokota Toyohachi	Japan Air Radio Nav Systems
Wes Googe	American Airlines

Agenda Overview

Mike reviewed the agenda.

Tuesday

- Welcome and Administrative Remarks
- Introduction
- Review and approve minutes
- Agenda Overview
 - a. Plenary, Day 1
 - b. Working Group 1, Day 2 and 3
 - c. Plenary, Day 3
- Review Planning & Schedule
- Issues Voting - Results
- Change Proposal Assignments
- Organization and WG Chairs

Wednesday

- WG 1 Change Proposal Development

Thursday

- WG-1 Continued
- Closing Plenary
 - Other business
 - Review Action Items
- Adjourn

Relationship with EUROCAE WG-85

Mike stated:

- EUROCAE WG-85 has been reactivated as of June 9 and held their first plenary July 18, 2020.
- RTCA SC-227 and EUROCAE WG-85 will work as a joint committee to fulfill the terms of reference as was done for DO-236C Change 1 and ED-75D.
- EUROCAE WG-107 and SC-227 will not operate as a joint committee, but are under advice to coordinate
- Initial discussion with WG-107 indicates coordination at the subgroup level with POC's named for each subgroup
- The target for WG-107 coordination is primarily the assumptions made by each committee regarding the areas the other committee is working

Alex noted that WG-85 chair Okuary is active on WG-107, Valeriu leads WG-107 and he works with both working groups.

Review Planning & Schedule

Plenary Meetings

Mike pointed out:

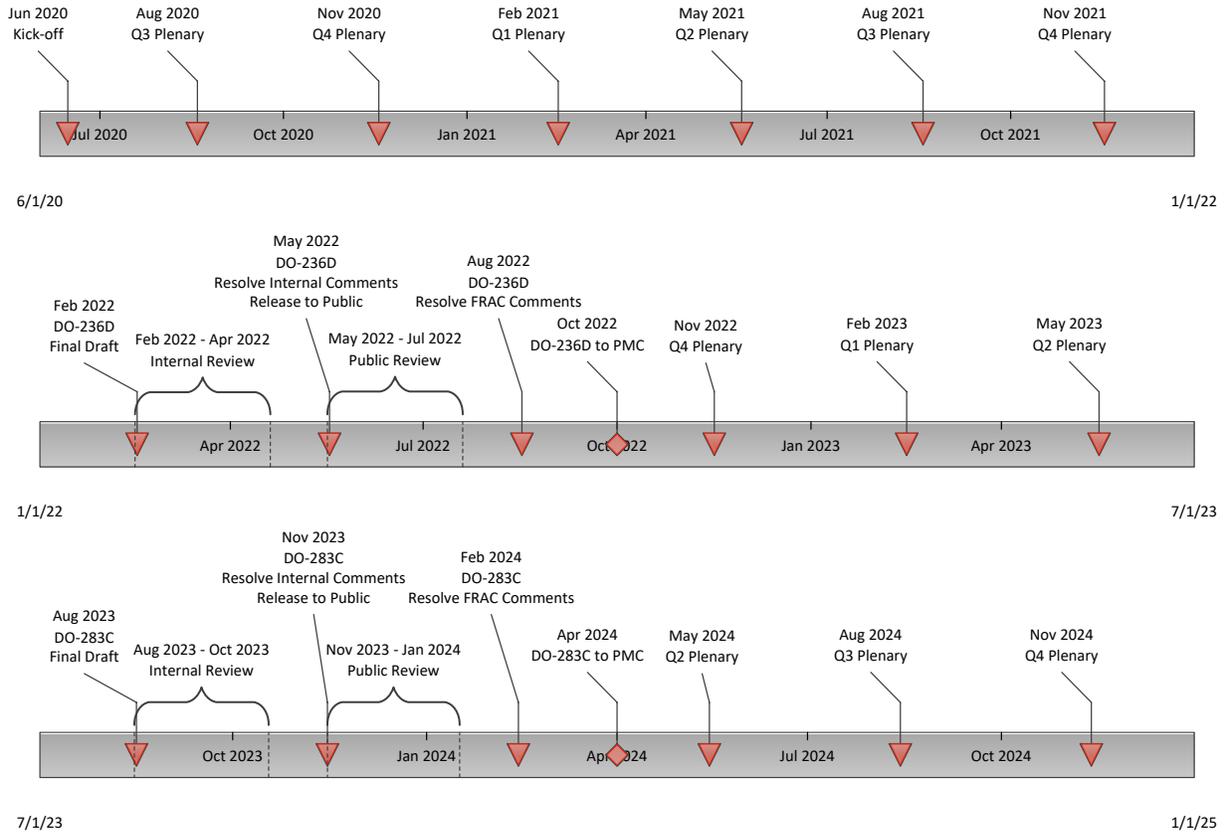
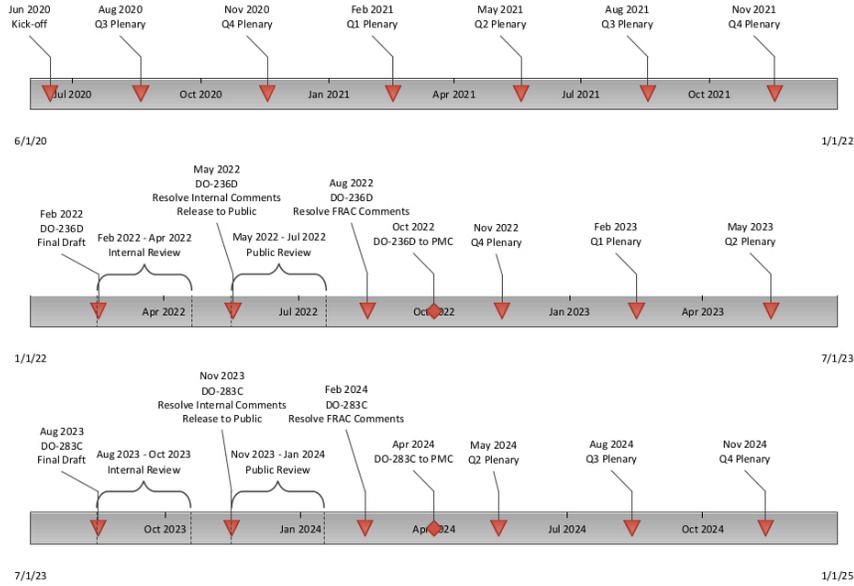
- Meetings will be held quarterly, they may also be concurrent with WGs
- Principle purpose will be to review and approve/amend change proposals that have been completed in working group sessions
- Once final review and comment period is reached for MASPS or MOPS plenary will disposition all comments

For Working Group Meetings:

- Meetings will be scheduled based on workload and schedule deadlines
- Purpose is to develop formal change proposals (new or revised document text) addressing each of the issues

Timeline & Organization

Mike walked through the current timeline.



Issues Voting - Results

Mike noted:

- Members were given ten votes each to allocate to non-TOR issues on the issues list
- The vote tallies will be used to prioritize the non-TOR issues for discussion, issues will not be eliminated based on the vote
- New issues proposed by members will be accepted for plenary discussion
- Plenary consensus will either accept or reject proposed new items

We discussed the possible cutoff of low vote items. TOR items are ones to be acted on no matter what the votes. For the rest, we will just work down the list. New items may come from EUROCAE. The group will decide where items are slotted on the list. Originators for an issue should take ownership of developing change proposals.

Change Proposal Assignments

This will be covered in the Working Group 1 session.

Organization and WG Chairs

Mike reviewed that there will be three Working Groups;

RNP RNAV MASPS (WG1), D. Nakamura lead, and MOPS (WG2), E. Ringnes, lead
Data Driven Charts (WG3), A. Riedel and Brad Miller co-leads

Within WGs, there can be small change proposal teams, or individuals desiring to write change proposals; e.g.,

DME Navigation

Multi-sensor integration, including inertial

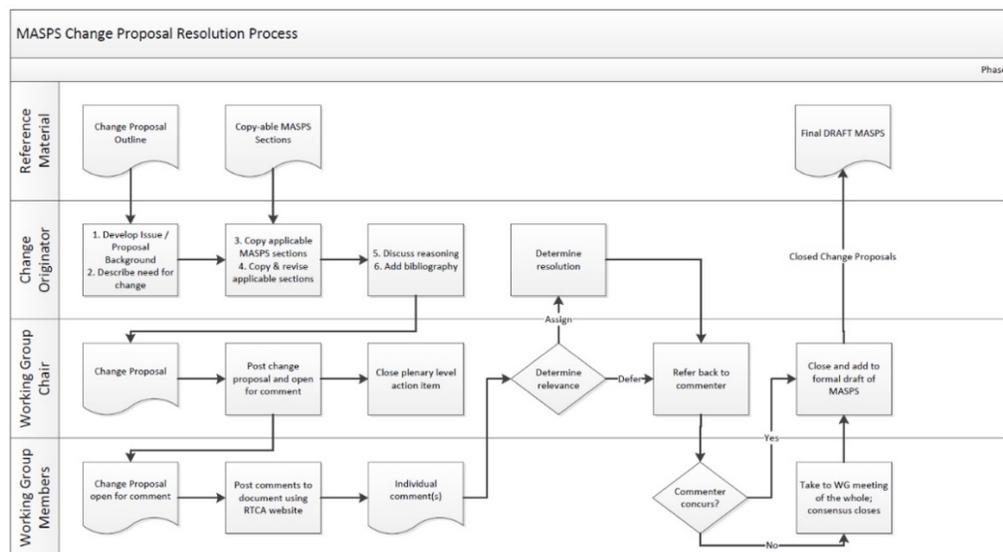
General clarifications (multiple smaller change proposals)

Change proposal teams can work independently, or the full working group can develop and review proposals, working group can decide.

Plenary will meet quarterly to review and approve change proposals.

Proposed Tasks

The change proposal process is depicted in the following diagram:



Meeting and Schedule

The committee meetings and general schedule are as shown on the timeline.

Working Discussion of Proposed Tasks & Issues

Mike reviewed the task list and welcomed any further points or discussion.

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
M1-01		TOR	Merge Change 1 into DO-236C	The Word version will be carefully managed. The PDF will be more openly shared.
M1-02	Appendix C, new sections in main document	TOR	Develop new guidance for the use of DME for position estimation, e.g., use all in view, reasonableness testing requirements, and considerations for assuring the integrity of a DME based solution.	Bob Gaul noted AC20-138D has minimum requirements for DME/DME. Are they more appropriate for the MOPS but also MASPS? The issue is being able to navigate following loss of GNSS. Use the AC material in the MASPS, it's one means of compliance. Valeriu: on reasonableness tests in the AC, is that enough? Are there tests to prove they are adequate. Reasonableness is not integrity, what else is needed. Mike: Is the containment integrity the minimum requirement and is more information helpful with regard to other sensors and integrity. Wes: raised issues with available services and the need to avoid operational disruption. Barry, noted GNSS is basic, minimum, the other sensors are options. So what we are working on is more detail with regard to DME in RNP. Daniel, NATS: a contingency system when GNSS is lost is important.
M1-03		TOR	Develop expanded guidance on multi-sensor navigation and inertial integration	It was noted that UK NATS had submitted comments about this. Again the comments are in regard to contingency operation with credit to use inertial coasting for DME coverage gaps. Do we discuss assumed performance? We must be careful with regard to inertial performance as sensitive technology in the US. Part 121

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
				Appendix G is one basis. It affects alternative uses such as in coasting. Barry noted that we must be careful about inertial integration. It's aircraft level performance. (do we caveat about demonstrated performance and performance credit?)
M1-04	3.9 Datalink Interface	TOR	Develop expanded guidance on datalink considerations for RNP systems	--
M1-05		TOR	Develop expanded guidance for aircraft performance data utilization for RNP and VNAV	UK NATS is interested with regard to 4D performance. Can this be more detailed and broader considering wind models as well. It was noted VNAV and Time are optional. Implementations will vary as will the performance. Noted that our current requirements envelope these aspects of performance.
M1-06		Member Suggestion	Develop guidance for use of GPS altitude in lieu of barometric?	--
M1-07a	1.0 Intro & Scope	TOR	Update the introductory material to better reflect today's PBN operations and how the MASPS/MOPS support them	
M1-07b	1.7 Definitions	Reactivation Proposal	Clarify terms and definitions for RNP TSE to better explain the relationship to other RNP standards and regulatory guidance using NSE and FTE	--
M1-08	2.2 Containment Integrity 2.3 Containment Continuity	Reactivation Proposal	Provide better plain language explanation of RNP containment integrity and continuity requirements as they relate to operational requirements for integrity, continuity and availability,	--

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
	4.3 General Containment Compliance		including what's analyzed, tested and demonstrated	
M1-09	3.8 Navigation Database Requirements	Reactivation Proposal	Update MASPS and MOPS navigation database requirements relative to new guidance and criteria in other documents and ACs today	Question what should be in the nav database because there are many navigation databases with different content. Noted the intent was to address DQR that was addressed in MOPS. Should navigation database capacity be specified since some are constrained. SC-217 Doc 1006 ICAO data catalog has specified data elements for databases which is linked to DO-201B.
M1-10		Reactivation Proposal	Clarify relationship of VNAV functionality and performance to possible allowed means for operational use	Some more operational considerations notes in appropriate places to link the use of VNAV to operational credit. Do we need to add any standards to allow credit for VNAV in all phases of flight? Or should we? No change to VNAV requirements but to operational considerations for allowed use e.g. FAS vs outside. Clarify what is acceptable and where. Or what is allowed/required for VNAV outside of FAS
M1-11	2.x, 3.2.5.4	Change proposal	Update standards for lateral turn performance to reduce protected areas and provide better airspace utilization.	This was addressed previously but not acted on. Mike and David DeSmedt will provide an updated paper. UK NATS has evaluated tracking performance for turns. This can be provided as information.
M1-12a	3.7.2.2.2	Change Proposal	Define requirements for the user-defined course to a fix when used to intercept the extended centerline of an RNP approach after radar vectoring	This is another DeSmedt input. Erik raised the point with regard departure and CF legs, a separate issue
M1-13a		Reactivation Proposal	Where appropriate, clarify association of requirements to RNAV	--

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
			systems as much as possible	
M1-14	2.4, 2.5, 3.4, 3.5	TOR	Coordinate with SC-186/WG-51 to ensure operational compatibility between Flight-deck Interval Management (FIM) and Required Time of Arrival (RTA) / Time of Arrival Control (TOAC) from the RNP system minimum standards in both DO-236C and DO-283B. Develop guidance for managing operational/functional consistency between aircraft speed management/control with and without updated TOAC	A discussion paper is coming. It was noted there was no Ligler paper as noted in the last meeting minutes.
M1-15		TOR	Coordinate with SC-217/WG-44 to develop new minimum standards for DDC. SC-227 would define the minimum requirements for the RNP system interaction with DDC, while SC-217/WG-44 would define the minimum database requirements to support the charts	SC-217 is working this informally. They are on hold and will discuss reactivation at the PMC in September. WG-44 has a meeting planned Sept 1 st . Does the DDC connection with the MASPS need to be clearer?
M1-13b		Reactivation Proposal	Expand to address RNAV. E.g. note that except for containment integrity, continuity, RF, holding and parallel offset, the rest is consistent with RNAV systems. Manufacturers urged to evolve systems to these capabilities.	See the RNAV discussion above.
M1-16		Reactivation Proposal	Simplify Section 4? In some ways it leans toward RNP AR.	Discuss in WG
M1-?		Reactivation Proposal	Should we provide more guidance with regard to the inclusion of aircraft performance models as related to TOAC and	This will be discussed in WG 1 on Wednesday.

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
			FIM? Address functionality and model data?	
M1-13c		Reactivation Proposal	Review RNP holding, make sure that it is clear that size is driven by actual wind. Does RNP on the hold and alerting make sense?	Include with the other proposed holding task.
M1-17		Member Suggestion	<p>Circling Approaches: Ensure standards and/or testing address the manner in which the aircraft and an RNP system respects differences between TERPS-defined circling approaches and PANS-OPS-defined circling approaches. New standards should address the significant circling procedure design differences in the available circling obstruction clearance area to ensure the resulting flight guidance from the RNP is wholly consistent with each design standard. This is an optional function for the aircraft and RNP system. Reference multiple mishaps/incidents where flight crew used FMS advisory guidance during circling approaches and desire to represent circling approaches as “RNAV visual procedures” and include them in the onboard navigation database.</p>	Discuss in WG
M1-13d		Member Suggestion	RNP Holding: Consider updating the RNP holding standards to allow for the first time procedural development and implementation of RNP	--

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
			<p>holding that do not require the expansive airspace provided by today's traditional holding patterns. These new standards can be beneficial by allowing more efficient use of airspace and, in some unique locations, the RNP holding pattern can provide a standardized alignment maneuver for an RNP approach procedure.</p>	
M1-18a		Member Suggestion	<p>Lateral Path Discontinuities & Advisory Vertical Guidance: Provide new standards for the implementation of advisory vertical guidance such that when an RNP system flight plan includes a lateral path discontinuity the new standards require "flagging" or "pulling" the vertical guidance cue (i.e. the vertical deviation indicator) when the flight sequences a fix and a lateral path discontinuity begins (reference NTSB SR A-14-086).</p>	What is the appropriate minimum functionality?
M1-19		Member Suggestion	<p>AIRAC Cycle Changes & Carriage of Multiple Onboard Navigation Database Products: Provide new standards for aircraft and RNP systems carrying multiple onboard navigation database products to ensure the implementation properly respects the differences in the implementation of the AIRAC cycle by individual States and Air Traffic Management authorities. The aircraft</p>	--

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
			and RNP system should not arbitrarily load a new navigation database at an arbitrary, fixed time (e.g. 0000Z). This is an optional function, as is carriage of multiple navigation database products.	
M1-20		Member Suggestion	<p>Reaction to manual flight plan updates by the flight crew: Develop new standard to ensure the aircraft and RNP system retains the definition and turn attributes of an RNP procedure when the flight crew updates the active flight plan with a new ATC clearance. Specifically, the new standards should address how the aircraft and RNP system reacts when the flight crew closes a discontinuity at the end of an active RNP procedure, currently in use by the aircraft and RNP system. The new standards should ensure the aircraft and RNP system do not alter the procedure definition and any attributes associated with any remaining fix attributes (e.g. a fly-over fix attribute). Attention to this requirement should ensure aircraft and RNP system retains the attributes of a termination fix of RNP procedure when the flight closes a lateral path discontinuity beyond the termination fix. Reference recent flight crew violations at PHX.</p>	This has been an in-service issue. Boeing has fixed. Maybe there's nothing left to act on.

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
M1-21		Member Suggestion	Turns in the Final Approach Segment of an RNP Approach: Consider developing new standards to require and support turns in the final approach segment of an RNP approach procedure.	It was pointed out previously that this may not be appropriate detail for the MASPS/MOPS but DO-201B could provide guidance on RF leg application. No action will be taken for MASPS/MOPS. Requiring A-RNP is not desired.
M1-18b		Member Suggestion	Continuous Advisory LNAV and VNAV: Consider developing new standards to better enable a continuous descent final approach (CDFA) operation during nonprecision approach operations and enable continuous presentation of advisory lateral and vertical guidance beyond a visual descent point (VDP) and below a minimum descent altitude (MDA).	Public procedure design standards do not address all situations or locations. What added RNP system capability is possible to enable the desired operation?
M1-12b		Member Suggestion	Direct Clearances: Consider requiring the aircraft and RNP system be able to execute a direct-to clearance to any segment or waypoint of an RNP procedure or route, and automatically sequence onto the procedure or route without the need for flight crew action. This requirement should not attempt to embrace intercept of an RF leg segment, nor the procedural final approach fix (FAFA or PFAF). Also, consider addressing intercepting a straight, intermediate leg segment (at other than a defined fix) and then sequencing onto an RNP	UK NATS is interested in this for free route airspace. More detail on how this should work for the application.

REF #	MASPS REF	SOURCE	ISSUE/TASK DESC	DISCUSSION/ACTION 081820
			procedure in response to an ATC clearance	

Wednesday

Working Group 1 started of with a quick review of the work plan for this meeting, the overall schedule and the vote-ordered task/issue list.

SC-227 Working Group 1 Work Plan

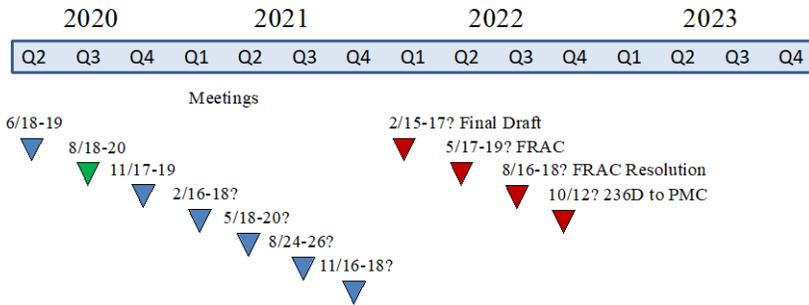
Wednesday – 19th

- Opening Comments
- Recap of WG 1 Schedule
- Change Proposal Process
 - What do we do with low scoring, non-TOR items e.g. park, drop, etc
 - Review/Make CP Assignments
 - Discuss issue as needed to aid drafting CP (one point at a time)
 - Due dates for first drafts or updates
 - WG1 CP Coordination
 - Do as needed
 - Make known if interested
 - WG1 Acceptance
 - Elevate accepted CP to plenary discussion
- Review CP ordered list again
- Start discussion on CP. TOR items have priority over non-TOR items
- FIM/TOAC Discussion 11:00-11:40

Thursday – 20th

- Continue CP discussions
- Follow-on WG sessions (e.g. 2 hours, every two weeks?)
- Wrap up WG 1,
- Resume Plenary

SC-227 Working Group 1 Schedule



Change Proposal Description / Status			
Date	Votes	Item No.	Title
	27	M1-13a	Where appropriate, clarify association of requirements to RNAV systems as much as possible
	19	M1-11	Update standards for lateral turn performance to reduce protected areas and provide better airspace utilization.
	17	M1-12a	Define requirements for the user-defined course to a fix when used to intercept the extended centerline of an RNP approach after radar vectoring
	14	M1-18a	Lateral Path Discontinuities & Advisory Vertical Guidance
	14	M1-20	Reaction to manual flight plan updates by the flight crew
	13	M1-02	Develop new guidance for the use of DME for position estimation
	13	M1-03	Develop expanded guidance on multi-sensor navigation and inertial navigation
	13	M1-07b	Clarify terms and definitions for RNP TSE to better explain the relationship to other RNP standards and regulatory guidance using NSE and FTE
	13	M1-18b	Continuous Advisory LNAV and VNAV
	12	M1-13d	RNP Holding Standards
	12	M1-10	Clarify relationship of VNAV functionality and performance to possible allowed means for operational use
	11	M1-08	Clarify Containment Integrity/Continuity Terminology
	11	M1-14	Flight Deck Interval Management (FIM), Required Time of Arrival (RTA)/Time of Arrival Control (TOAC)
	10	M1-13c	RNP Hold size and alerting
	7	M1-09	Update MASPS and MOPS navigation database requirements relative to new guidance and criteria in other documents and ACs today
	7	M1-13b	Address RNAV in MASPS.
	7	M1-21	Turns in the Final Approach Segment of an RNP Approach
	6	M1-06	Develop guidance for use of GPS altitude in lieu of barometric
	6	M1-19	AIRAC Cycle Changes & Carriage of Multiple Onboard Navigation Database Products
	5	M1-04	Develop expanded guidance on datalink considerations for RNP systems
	5	M1-12b	Direct Clearances
	4	M1-07a	Update the introductory material to better reflect today's PBN operations and how the MASPS/MOPS support them
	4	M1-15	Data Driven Charts.
	3	M1-05	Develop expanded guidance for aircraft performance data utilization for RNP and VNAV
	3	M1-17	Circling Approaches
	1	M1-16	Simplify Section 4? In some ways it leans toward RNP AR.
	0	M1-01	Merge Change 1 into DO-236C
			Aircraft performance models - TOAC/FIM
		TBD	Add minimum requirements for speed constraints in cruise phase.

The change proposals discussed were M1-03, M1-04 and M1-14.

M1-03, Multi-sensor and Inertial Navigation: It was pointed out that the IRS performance described was not appropriate for how IRS is being accepted for RNP operations (reference AC20-138D, Chapter 22, 22-2d). Barry Miller, Jeff Meyers and Dave will revise the text. The revisions will also include guidance on how AHRS use in RNP applications. With regard to GPS/IRS integration, the text will point to the accuracy and integrity coasting guidance that is being finalized in the new update to the SC-159 MOPS. The multi-sensor integration section will better describe the possible mix of sensors in a navigation solution in addition to GNSS. Additionally, the text will clarify the fact that whatever sensor or combination of sensors may be used, they must satisfy the overall all requirement for meeting RNP, assuring integrity for the positioning solution and have monitoring and alerting. This could be accomplished by text linking this paragraph to section 2 in the MASPS. A new note with regard to sensors used, sensors required and a means to quickly and easily know, choose or automate selection/deselection of sensors needs work and must be consistent with Para 3.7.3. **Ron Renk took an action to clarify/explain this part. An update to the paper is planned by September 4th.**

M1-04 Datalink: The informational material added includes references to SC-214's DO-353A and DO-352A, with regard to support for advanced RNP, dynamic RNP, and interval management. A side issue is that the SC-214 documents include requirements to uplink fixed radius transitions for terminal procedures. This was done without coordination with SC227. The MASPS and it's functional requirements cannot support this because of the fundamental incompatibility of the flight plan path terminator concept with enroute data elements that include the FRT. The WG agreed with the change proposal as edited with EUROCAE references, and supported it moving on to the plenary for acceptance and incorporation into the draft MASPS. Mike Cramer took an action for an ICC action between SC-227 and SC-214 on this. **Mike will provide status on the ICC coordination at the next plenary meeting.**

M2-01 Speed Constraints: This was formerly the TBD item on the list. Ron Renk noted that there are instances where speed constraints are ignored by the RNP system. This occurs when what was a descent constraint in the vertical profile becomes a cruise fix with a speed constraint when the cruise altitude ends up lower than planned. It was noted that system have ignored speed constraints in cruise because operations are based on mach. It was suggested that the solution may be to be more specific about the application of speed constraints for SID/DP and STARs, and enroute transitions. **Russ and Ron will develop the change proposal draft by September 4th.**

M1-14 FIM, RTA and TOAC: Mike Jackson walked through the paper, reviewing the incompatibility of FIM and TOAC with regard to the difference in range of speed authority between the SC-186 and SC-227 standards and the resulting operational problems for the interaction between FIM and TOAC aircraft for in-trail spacing and metering e.g. a lead TOAC aircraft could slow down more than the trailing FIM aircraft can. Mike presented three possible text suggestions for the MASPS requirements. The discussion became very broad and touched a number of thoughts including the extent of the proposed speed authority, the automation requirement, impact to non-TOAC aircraft, how to demonstrate compliance and what the operating environment will look like. The group will take more time to review information that will be posted to the workspace to understand the FIM concept of use and how it relates to the MASPS requirements for speed constraints. It was pointed out that there are concerns in industry about FIM and TOAC that haven't been addressed. This proposal will be discussed further in another WG 1 session. **Additional information on the FIM concept of use and how it relates to SC-227 will be provided by SC-186/Lesley Weitz by September 4th.**

Thursday

M1-01: The initial draft for the MASPS Rev D has already been posted. This paper is just administrative to track it.

M1-07a: Clean up the change 1 paragraph re: runway position monitoring and TOAC Separate the statements. Decouple. Update the change proposal.

M1-05 Aircraft Performance Data. The papers states that the current MASPS performance requirements encompass the effects of an RNP system that includes aircraft performance data and model to aid in the determination of lateral and vertical flight performance. Alistair raised a separate point, saying there is a big hole, that Baro VNAV may not work for urban air mobility users. He will develop an issue paper for needs and goals. Otherwise, the WG agreed with the paper and it will be forwarded to plenary

Non-TOR tasks/issues

M1-13a: RNAV systems requirements. The table resulted in some confusion with regard to what was identified as requirements that are met by RNAV systems. It was pointed out that the current published table has confusing parts because the RNP RNAV column which is lateral only has NO for vertical items. These should probably be blank or NA. The same probably hold true for VNAV. The RNAV Common column is confusing because it addressed both lateral and vertical.. It should be made lateral only e.g. no Altitude Constraints **Action to committee to look at more closely before.** There remains the issue, is this addition to the table sufficient and helpful and not take away from the original purpose? One consideration is to change the new column to highlight RNP unique items and have text to explain the RNAV relationship. Or make the RNAV common, lateral only. In a footnote? Consider moving RNAV column to be the first so there is a visual progression in the table.

M1-07b: TSE It was noted that the new note for PDE is confusing. It was pointed out that the PDE is affected by the coordinate systems use in the path definition and in the procedure design. If they are the same PDE is zero TSE. This should be an explicit statement. The paper will be revised with a proposed statement from Mike Cramer, and then provided to the working group.

M1-08 Containment Integrity/Continuity Barry raised a concern that the inclusion of all the regulatory references could result in greater confusion because of the criteria covers so much more than integrity. He felt that plain language would be better. Also, he noted that some material that he and Dave had created at ICAO for the ICAO PBN Manual Volume 1 might be useful. Dave said that the attempt was to provide some clarity with regard to the MASPS terminology. One context is that the MASPS only addresses the RNP aspects, not all of navigation that a system/equipment manufacturer will have to consider and satisfy. **Action to clarify: Mike, Barry, Okuary, Brad and Dave** Jeff Meyers noted there is also a disconnect with AR because of it's 10-7 requirement that might be part of this. He pointed out that SAE 4754 has other guidance

End of WG 1

Plenary

There was no new business or issues. Everyone was reminded to check attendance on the workspace.

Webex Meeting Adjourned