

SUMMARY OF THE TWENTY-THIRD MEETING
JOINT RTCA SPECIAL COMMITTEE 217
EUROCAE WORKING GROUP 44
2nd through 6th, March 2015
Prague, Czech Republic - Hosted by Honeywell

RTCA Paper No. 090-15/SC217-059

Executive Summary

RTCA SC-217 met jointly with EUROCAE WG-44 for the Twenty-Third Plenary at the Grand Hotel Bohemia in Prague, Czech Republic from March 2nd to 6th, 2015, hosted by Honeywell. The focus for this meeting was resolving the FRAC comments on ED-76A/DO-200B, and continuing the development of revisions to ED-99/DO-272, ED-98/DO-276, ED-119/DO-291. The committee split into two separate working groups between the plenary sessions: WG1 discussed ED-76/DO-200, while WG2 covered the other documents.

In the joint opening plenary session, only basic logistical information was covered, as both WGs had very full agendas and needed as much time as possible in the break-out sessions. There were no joint actions to discuss or new business.

Stéphane Dubet served as the provisional chair of WG1 for this meeting, and Carmen Bonillo-Martinez served as the Secretary. WG1 completed resolution of all 634 Editorial, 250 Low, 136 Medium, 113 High, and 7 Non-concur FRAC comments for DO-200B. The Medium, High, and Non-Concur comments were addressed by theme: scope/data processing chain, data quality requirements, tool qualification, compliance, and general. There were a roughly equivalent number of comments rejected and accepted. Each rejected comment has a rationale for why it was not accepted in a spreadsheet maintained by Jackie. All of the Non-Concur comments were resolved and the resolutions accepted by the submitter.

The work plan for WG1 after the FRAC resolution will encompass three phases:

- The editorial team will ensure correct implementation of the FRAC resolutions by April 13.
- From April 13 to April 20, WG1 members will review the draft DO-200B and FRAC table to perform a sanity check that the comments were implemented correctly.
- The final draft will be submitted to RTCA and EUROCAE by May 4, 2015.

John Kasten served as the provisional chair of WG2 for this meeting, and Brian Gilbert served as the Secretary. There were 53 papers reviewed, of which 41 were approved and are ready for document editor incorporation. Four action items were deferred, including one new action created in this meeting, and two were closed as duplicates of other actions. An editing team meeting at Honeywell in Phoenix, AZ the week of April 13 will prepare the final FRAC versions of DO-272D, DO-276C, and DO-291C. The FRAC review documents will be released by RTCA on April 20 to start the 45 day comment period.

In the closing plenary, the joint committee formally acknowledged and approved completion of the FRAC resolution for DO-200B. The joint committee also formally acknowledged and approved that DO-272D, DO-291C, and DO-276C are ready for FRAC. Stéphane discussed forming a joint European and US group to assess the scope of changes needed for updates to DO-201. A face-to-face joint meeting will be hosted by Eurocontrol in Brussels and be held before June.

The next meeting will be hosted by RTCA in Washington, DC from June 15nd through 19th, 2015. It will be the FRAC resolution meeting for DO-272D, DO-276C, DO-291C, and the associated technical artifacts. The committee will meet as a single group since WG1 is done with DO-200B/ED-76A.

1 Opening Plenary

1.1 Attendance List

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1.2 Administration & Agenda

The joint RTCA SC-217 and EUROCAE WG-44 Twenty-Third Plenary Meeting was opened by John Kasten (RTCA SC-217 co-chairman) and Stéphane Dubet (RTCA SC-217 co-chairman and EUROCAE WG-44 chairman). John welcomed the group and thanked Honeywell for the arrangements provided for the committee meeting. Scott Roesch shared logistical information for the meeting facilities, including some very interesting historical information on the gorgeous room in which the meeting was held.

Mike Burski, as Designated Federal Official, read the Public Meeting Announcement in accordance with the Federal Advisory Committee Act. The RTCA Proprietary Reference Policy information was presented to the group.

John reviewed the agenda and working arrangements for the week. As usual, the committee was split into two working groups: WG1 for ED-76A/DO-200B and WG2 for ED-99D/DO-272D, ED-98C/DO-276C, and ED-119C/DO-291C. The chair for WG1 was Stéphane, and the chair for WG2 was John. Carmen Bonillo-Martinez was the Secretary for WG1, and Brian Gilbert was the Secretary for WG2 and the plenary sessions. WG1 has many FRAC comments to work through, while WG2 has numerous papers to review. The agenda was approved.

Stéphane solicited comments on the minutes from the December 2014 meeting in Washington DC. There were no comments in the meeting, and the minutes were approved.

Around the room introductions were given by each attendee.

2 Working Group 1: ED-76/DO-200A update

Stéphane Dubet opened the WG1 session. He reminded the group that FRAC resolution is the only topic for the meeting this week.

2.1 ED76A/DO200B Open Consultation / FRAC resolution

More than 1000 comments were received, including 7 non-concur comments. Stéphane highlighted that this is significant but not that much different than in previous cases. Successful completion of the FRAC is feasible and only a plan and some formalism are needed. He presented some rules (refer to “rules of the game” from the FRAC presentation), such as the resolution of the comments are not to raise new comments. The following plan was established:

- Resolution of 634 Editorial comments prepared offline by Jackie and posted as a unique package on Workspace to be reviewed by the participants. In absence of comments, this package will be considered accepted.
- 250 Low comments prepared offline by Scott and to be presented to the group.
- 7 Non-concur comments to be reviewed by the whole group.
- Around 400 High and Medium comments, as well as 47 unresolved Editorials, to be discussed in subgroups.

The following subgroups were organized:

- Data processing chain (28 H&M) led by Manfred and Mark
- Data quality (69 H&M) led by Michael
- Tool qualification (35 H&M) led by Reuss
- Compliance (60 H&M) led by David
- General Exec summary (27 H&M) led by Manfred and Carmen
- Dan was appointed to coordinate security aspects

During the week, the Non-concur comments from Thales, FAA, Universal Avionics, and GE were resolved. Results of the subgroup discussions were presented to the full WG1 and posted on Workspace for review as necessary.

Stéphane took an action to write to Ernst Schmidt providing insight into the resolution of his various comments. *Post meeting note: this action was completed on March 9, 2015.*

The following table presents the statistics for the resolution of comments:

	Non-Concur	High	Medium	Low	Editorial	
Accepted	6	43	74	151	598	
Accepted with changes	7	13	32	27	8	
Rejected	8	44	30	71	20	
Withdrawn	0	0	0	1	8	
TOTAL	21	100	136	250	634	1141

3 Working Group 2: DO-272C, DO-276B, and DO-291B

John Kasten opened the WG2 session by going over the WG2 agenda. There are many dozens of Working Papers (WP), Discussion Papers (DP), and Information Papers (IP) additional papers prepared to address action items and raise new topics.

3.1 Action item discussion

John modified the action item spreadsheet to indicate which actions had papers submitted for this meeting. He has read through the papers and dispositioned some as “low-hanging fruit”, which should be relatively quick and simple to discuss, so those were discussed first.

The group decided to defer the following action items to a future revision: 91, 143, and 144.

3.1.1 Action 5: Geometric constraint references

Brian presented WP-5 and explained the strategy and changes. The group reviewed a pertinent sample set of the changes (the entire set of changes was not reviewed in detailed because it is a lot of the same repetitive changes). The group approved the paper and will be incorporated by the document editor.

3.1.2 Action 25: idcross and idinter attributes

The comments submitted by Christian were reviewed by the group. Christian proposed to make the fact that *idcross* and *idinter* attributes apply when TaxiwayElement instances are intersections more explicit by replacing use of the word “element” with “intersection” in the attribute definitions and functional constraint rules. John’s concern was that a taxiway intersection does not exist as a feature type and is

referenced only in descriptive text. The group approved the paper and will be incorporated by the document editor.

3.1.3 Action 111: Conditional ASRN Node attributes

Brian walked through WP-111, including the new attribute discussion paragraphs and the new ASRN Node feature attribute capture rules for conditional attributes. Mike noted a few typos in the ASRN capture rules that were not from this paper's changes, but the updates were made in a revision to WP-111 to take care of those editorial items. The group approved the paper and will be incorporated by the document editor.

3.1.4 Action 123: Taxiway markings

Felix presented the updates to WP-123 that came from the compromise solution reached in the December 2014 meeting. The new definition for Taxiway Intersection Marking is based on the ICAO Annex 14 definition for Intermediate Holding Position. A new capture rules is provided to include non-movement area boundary markings, and other capture rules were clarified. Attributes *holddir*, *marktype*, and *aippub* were added to Taxiway Intersection Marking.

The Taxiway Holding Position feature type definition and description were also updated, clarifying that they are for hold markings that protect a runway, obstacle limitation surface, or ILS interference area. A new capture rule was added to indicate how to capture Pattern A and B markings. The *aippub* attribute was added to Taxiway Holding Position.

In DO-291, new attribute entries for the feature catalog were added, and definitions were made consistent with the new DO-272 definitions. The glossary definitions for Taxiway Holding Position and Taxiway Intersection Marking were deleted from both DO-272 and DO-291.

Patrick advocated not including non-movement area boundary markings in Taxiway Intersection Marking, since they are a FAA-specific item and not the same as intermediate holding position markings. Don agreed that it was a slippery slope if we needed to start considering any. Since this is critical information, it should be captured in the AMDB, whether it is in its own new feature type or as part of Taxiway Intersection Marking. After some discussion, Patrick agreed to leave it as proposed, as long as the reference to the FAA AC defining non-movement area boundary markings is maintained.

A reference to FAA AC 150/5340-1K needs to be added to the Reference Document section. Andrew mentioned that referencing a specific revision of the document might be difficult since it is likely to continue to be updated. John stated that was an editorial issue for RTCA to reconcile.

John noted that the new attributes need to be added to the DO-291 feature catalog definitions. The group approved the paper with this modification and will be incorporated by the document editor.

3.1.5 Action 140: Polygon segmentation capture rules

Brian presented a new DP proposing updates to some figures and capture rules associated with adjacent and overlapping polygon features, namely Taxiway Elements and Service Roads. Jean-Etienne requested keeping a modified version of Figure 4-14 so it can be used to depict how complex taxiway intersection cases are handled. Brian will provide this update in the WP version. The rest of the paper was agreed to.

Later in the week, the group reviewed the update to a WP, in which Brian added an additional figure. The group approved the paper and will be incorporated by the document editor.

3.1.6 Action 135: Functional requirements for *ibase*

Christian presented a DP proposing updates to the functional constraint rules related to the *ibase* attribute. Deicing Area will be removed from Rule 36, since they are redundant with Rules 26, 27, and 28. Also, use of the term “underlying” was changed to “corresponding” in Rules 26-28 and 36. Finally, the term “associated” in Rule 35 was eliminated. The proposed updates make these rules more consistent with the wording of other functional constraint rules.

Geet stated that “corresponding” did not make it clear that it was related to overlapping feature instances, since it could open the door to adjacent polygons, for example. Christian and John explained that these functional rules are not geometry-driven, and there are Deicing Areas where the proper *ibase* name is not derived from physically overlapping polygons. Therefore, the group decided to stay with “corresponding”.

The group agreed with the proposals and Christian updated it into WP format. Later in the week, the group approved the paper with this modification and will be incorporated by the document editor.

3.1.7 Action 136: Overlapping polygon rules

Christian presented a DP proposing a clean-up to the overlapping polygon geometric requirements. Frequency Area and Construction Area will be given their own capture rules in their respective feature type definitions, and R047 will be generalized to state that overlapping polygons aren’t allowed unless otherwise indicated in feature type capture rules.

The DP also proposed to add the possibility of an exception to R046, the rule that polygons of the same feature type can’t overlap each other, since there are cases with Deicing Areas where a de-icing pad overlaps a number of smaller de-icing area. John asked about one of the Deicing Area examples in the paper, wondering whether the de-icing pad should really be a different feature type. Jean-Etienne indicated that overlapping de-icing areas and pads could lead to inconsistent display because there is no way to differentiate between the two. Brian proposed a new attribute for Deicing Area to indicate whether a feature instance was a pad containing areas so that applications could distinguish between the two. Jean-Etienne and Christian supported this idea, and Christian will add this concept the paper.

Later in the week, the group reviewed the update to a WP, in which Christian proposed to add an attribute *deicetyp* to indicate what type of Deicing Area is represented. Jean-Etienne stated that he was not sure if this approach would be appropriate to the Thales developers, so he will check with them.

Patrick questioned the need for the new attribute and asked if the types of situations presented for Type 3 were common. Christian and John said that these cases do exist. Patrick will investigate further.

On Friday, Jean-Etienne reported that Thales was okay with the new *deicetyp* attribute code list. Patrick said that Lufthansa Systems would prefer to take a step back on this paper and not create an overlapping feature type to reflect a collection of deicing areas. Patrick suggested a new attribute that indicates if the Deicing Area is part of a group and what the name of the group is. Jean-Etienne agreed with this approach. Christian liked his proposal better, but said that either way could work. Christian and Patrick debated on which approach was most optimal, but a consensus cannot be reached.

Brian suggested a compromise to add the *featbase* attribute to the Deicing Area feature type. Patrick said this would be acceptable to Lufthansa Systems. Christian agreed that adding *featbase* can work with some additional rules for how to apply *featbase* for Deicing Areas.

Christian will update the paper based on this agreement. The paper is considered approved pending modification.

3.1.8 Action 46: Attributes lighting and marking

Stephen presented the WP version of his paper proposing new definitions for the lighting and marking attributes used for vertical structure feature types. The group approved the paper and will be incorporated by the document editor.

3.1.9 Action 138: Runway designators

Christian presented a DP proposing that runway identifiers always use 2 numerical digits for the *idthr* attribute, including leading zeroes (e.g., “07” rather than “7”). This would make these designators consistent with how runway names are provided in navigation databases, NOTAMs, and other sources. Brian asked about *idrwy*, *idrwi*, and *idp*, since there is no explicit connection between those attributes and *idthr* in the standard.

John asked whether this was necessary, since it could be a big change to existing data sets. Jean-Etienne said he thought it was a good idea to ensure that everybody encoded runway identifiers the same way.

Ultimately, the group decided to proceed with the proposed change, with the addition of rules for other runway name related attributes such as *idrwy* and *idrwi*. Christian will incorporate this as part of conversion to a WP.

Later in the week, the group reviewed the update to a WP, in which Christian proposed to add encoding rules to the DO-291 definitions for *idthr*, *idrwy*, and *idrwi*. The group approved the paper and will be incorporated by the document editor.

3.1.10 Action 141: Multi-use surfaces

Don presented a DP that built on top of DP-136 to identify more situations of overlapping polygons that are not currently addressed in DO-272. Don showed many examples of feature types such as Parking Stand Area, Stopway, and Blastpad overlapping with other feature types, but none of these feature types currently allow for overlapping of polygons. Currently, data providers are cutting out features in undesirable or illogical ways because overlapping is not allowed.

Some of the situations could lead to interesting capture for the ASRN, but on the other hand it could allow capture of ASRN where taxiing is allowed but not currently covered by the standard, such as when guidance lines are provided over features captured as Stopways or Blastpads. The group had a lengthy discussion about potential issues caused by the current rules, and whether the proposed changes would result in the desired outcomes.

The general consensus was that the basic concepts proposed were okay, but there were still some other considerations that need to be addressed, such as whether other metadata such as *featbase* and *idbase* need to be considered, or how to deal with cases in which source may not provide information to define an overlapping polygon even if overlapping was allowed in the standard.

On Friday, the group continued the discussion on how to proceed with the paper. It was agreed to add the proposed new overlap exceptions for Parking Stand Area, but to eliminate the proposed rules for Stopway and Blastpad. The group also agreed to add a new capture rule stating that a movement area (e.g. Taxiway Element) polygon needs to be present wherever Taxiway Guidance Lines exist, which should cover the identified problem areas with Stopways and Blastpads.

Don updated the paper based on group discussion, and the paper was approved pending modification.

3.1.11 Action 90: ASRN functional requirements

Jean-Etienne presented the latest version of WP-90 to define functional requirements for the ASRN. Mike provided some comments that the group resolved with some adjustments to the text. Christian raised some questions about the new figure, and Jean-Etienne will update it so that the abstracted edge is not going to the Taxiway Link node in the example.

The group went through each requirement in the paper and performed some group editing where needed. For some statements, the group discussed who would implement the functional requirement and how they could be verified. Jean-Etienne clarified the intent of the functional requirements. Patrick stated that DQRs could typically be used to cover that intent, but the goal of the functional requirements is to put in requirements in the standard that would be included in every DQR.

On Friday, the group reviewed Jean-Etienne's updates. The group approved the paper and will be incorporated by the document editor.

3.1.12 Action 51: Functional constraint rules

Tom Evans joined via Webex to present the proposed implementation of WP-51 to harmonize where and how requirements for populating feature attributes are presented. Tom stepped through the paper and showed how the attribute requirements have been moved from the global Attributes section to the associated feature type definition sections. He pointed out a couple of implementation decisions that were made, such as keeping the more specific wording that existed in the rules even though it may not be necessary in their new context.

Mike noticed an editorial item to address that was inherited from the latest draft document. The group approved the paper with that change and the WP will be incorporated by the document editor.

3.1.13 Action 115: ASRN Runway Entry/Exit node capture rules

Felix presented WP-115 on behalf of Ange Miklos due to the poor Webex connection in the meeting room. The proposal is to update the capture rules for Runway Entry/Exit ASRN Nodes to utilize the concept of an "extended centerline" to account for the capture of nodes in Runway Displayed Areas, since the Painted Centerline feature does not extend into displaced areas. Jean-Etienne noted that the Runway Entry/Exit node type needs to be added to the new conditional attribute rule defined in WP-111, since currently the rule in WP-111 only covers Runway Exit Line nodes.

The paper also aggregated the different runway feature types into a term called "runway feature" to use in the ASRN capture rules, in order to avoid having to repeatedly list the set of runway-related feature types. John expressed concern about using the term "extended" and worried about the fact that it is not a feature type. It was explained that it was a term defined for use in the ASRN capture rules for the purpose of making the rules more readable. John ultimately accepted the approach given that other approaches could have a much more major impact on the standard (i.e., redefining Painted Centerline or capturing Runway Displaced Areas as Runway Elements).

Jean-Etienne noted that to be consistent with DP-138, the single-digit runway IDs used in examples should have a leading zero. The group approved the paper with that change and the WP will be incorporated by the document editor.

3.1.14 Action 142: Codelist for catstop attribute

Patrick presented a DP proposing to extend the codelist for attribute *catstop*, since the current codelist is incomplete and it is not always possible to determine which is the appropriate codelist value to use. Also,

the introduction of the *marktype* attribute allows for *catstop* to be used for its intended purpose. The resulting codelist would have all of the permutations for Cat I, II, and III combinations. Patrick said he could not find a real-world example of Cat I/III, but the group decided to include it just in case to be exhaustive. The group agreed to the proposal, and Patrick will convert it to a WP with that change.

3.1.15 Action 137: Terrain metrics in Aerodrome Reference Point

Brian presented a DP proposing six new attributes to characterize the terrain at an aerodrome. The attributes include statistics describing the range and average elevations of terrain, and the surface normal angles of the terrain cells based on 3 arcsec data.

The capture rules need to be refined to specify the movement area boundaries from which the terrain metrics are calculated. Formulas for determining the surface normal angles and standard deviations may need to be added, but Jean-Etienne was not sure if this is desired and wanted to study this more. Jean-Etienne cautioned that the definition of the new elevation-related attributes be clearly distinguished from the existing *elev* attribute. Beby requested that the definitions for the gradient-related attributes be more clearly defined.

On Friday, the group reviewed and approved the WP as modified. It is ready for document editor incorporation.

3.1.16 Action 18: Temporality models

Scott presented a DP describing the differences between the temporality models used in DO-276 for Obstacle databases and DO-272 for AMDBs. Scott was not sure why they were different, other than that they were developed at different times. DO-276 uses separate date and time attributes, whereas DO-272 uses combined date/time attributes. Also, DO-272 has attributes characterizing when the data starts and ends to be valid, but DO-276 does not have this (and therefore, it does not have an *interp* attribute either).

The AMDB approach was based on the AIXM temporality implementation. The DO-276 attributes are mapable, but not as close to AIXM. The group expressed a desire to harmonize, and Scott will move forward with applying the AMDB approach to Obstacle databases in DO-276 and DO-291. Travis requested that the date and time references to be used are specified as well. Travis volunteered to help Scott with the implementation.

3.1.17 Action 36: ASRN extension to Deicing Areas

Jean-Etienne presented an update to WP-36 containing new attributes for extending the ASRN into Deicing Areas. New node and edge types will be added for “Deicing”, and a new conditional attribute for ASRN Node named *iddeice* was added. New capture rules for Deicing nodes and edges were also added. The group approved the paper and will be incorporated by the document editor.

3.1.18 Action 37: ASRN extension to Parking and Apron areas

Jean-Etienne presented an update to WP-36 containing new attributes for extending the ASRN into parking and apron areas. The main change since the December 2014 meeting is a change to approach along taxilanes in an apron that do not have a name. Jean-Etienne stepped through the changes, and the group provided feedback on specific capture rules and notes.

A new default value “\$DISCON” will be used to name nodes on an unnamed apron taxilane. Christian raised the point that adding a unique numeric value after “\$DISCON” (e.g., “\$DISCON1) could help with the development of a mapping table that correlates the discontinuity segments to the edges associated with

a path. This mapping table would be provided at the ARINC 816 level. The group developed the wording to describe the numeric suffix for the discon nodes. Jean-Etienne will add a picture illustrating this case.

The group had a long discussion on whether additional rules were needed to prevent undesired edges from being captured between co-located nodes (e.g. when you have a Taxiway Link node co-located with two Parking Entry/Exit nodes, only two edges between the Taxiway Link node and the Parking Entry/Exit nodes should be captured, with no edge between the two Parking Entry/Exit node). The group finally agreed on a new wording for the requirement stating that that when several nodes are co-located, only one Taxiway or Taxiway Link node will have a connection to all of the other nodes, without connections between the other nodes.

On Friday, the group reviewed Jean-Etienne's updates WP based on the group discussion. The group approved the WP and it is ready for document editor incorporation.

3.1.19 Action 110: New ASRN Edge attributes

Jean-Etienne presented an update to the WP proposing six new attributes to ASRN Edge. In prior meetings, a consensus was reached to add *pcn*, *wingspan*, *restactft*, and *length*. In this meeting, it was agreed to use a default method for computing *curvatur*. The attribute *ibase* was also proposed to be added, and the group updated the definition to align with other action item changes.

Jean-Etienne stepped through the rest of the changes in the document, and the group made some edits after discussing topics such as operationally relevant paths, selection of *pcn* value for edges that span multiple polygons, and *ibase* capture rule.

On Friday, Jean-Etienne presented the updates to the WP based on group discussion. The group approved the WP and it is ready for document editor incorporation.

3.1.20 Actions 128 & 130: Line obstacle geometry

Thomas presented updates to the papers covering actions 128 and 130 regarding line obstacle capture rules and coordinate reference systems. The group had a long discussion on what "3D" really meant, which resulting in a common understanding that the term "3D" in this context simply means that each vertex has x, y, and z coordinates (it does not mean that an obstacle is defined such that it can be rendered as a volume similar to its real-world shape). Ultimately, the group agreed to keep the Elevation attribute as the maximum height along the obstacle, and to use the existing content allowing 3D geometry as-is.

A similar discussion was held for the Height attribute. Alex explained that if high resolution terrain information is available for Area 1, that more segmented height information is not needed, although the proposal in the paper for action 128 seemed to request otherwise.

Britta expressed concern about stating the 3D requirements such that they become mandatory. While they are required for some helicopter applications, they are not required for all applications using obstacles. Even for helicopter applications, if only 2.5D data is available, isn't that better than having nothing? A note was added to explain that if the 3D requirement cannot be met, then 2.5D can be provided instead.

The topic of line segments was discussed at length. The current standard supports capturing line segments as individual obstacles, but there is no method to identify that each of these obstacles belongs to the same overall obstacle. There were no DO-291 updates proposed to support the new DO-276 requirements, which caused a lot of confusion among members.

The discussion about whether minimum height (e.g. to record “droop”) is needed was revisited. The helicopter team declared that they did not need the minimum height since below-wire operations are very limited. What is needed seems to be a way of being able to segment line obstacles into sub-components, each with their own height attribute, elevation attribute, and 3D geometry. There are various ways this can be modeled, and the helicopter team needs to propose a method that allows for the implementation of these requirements.

Ultimately, Thomas modified the proposal to add a requirement for 3D geometry for helicopter applications, and rescinded the proposed changes to the Elevation and Height requirements. The requirement for providing a height value for each segment of a line obstacle was withdrawn. Brian raised the point that a 3D requirement specific to line obstacles does not mesh with the current approach that 3D must be applied for an entire data set (including points and polygons), and that if a possible mixture of 2D and 3D geometries are desired, that a change needs to be made in the metadata. It was decided that a mixture of 2D and 3D geometries should be allowed, since the helicopter group only needs 3D for line obstacles. Scott will update WP-67 to define that the CRS metadata is applied at the feature type level. Scott will also draft a paragraph explaining the difference between 2.5D and 3D as part of WP-67.

The capture rules for “wire” line obstacles (transmission lines, cable cars, etc.) were reviewed. Brian requested that a figure be added to explain the requirement that a line obstacle be captured “in total” as opposed to only a portion of the real-world feature. Thomas will add one of the cable car example figures discussed in the December 2014 meeting. The group spent a great deal of time wordsmithing requirements associated with “wire” type obstacles.

The group agreed to the resulting edited version of DP-128. Thomas will convert to a WP with the additional requested content. Action 130 was closed since the paper for action 128 already covered the needs expressed in action 130.

Later in the week, Thomas converted it to a WP with the additional requested content, and these were reviewed on Friday. The group approved the WP with modification and it is ready for document editor incorporation.

3.1.21 Action 129: Obstacle and terrain data quality requirements

Thomas presented the proposed DO-276 changes to incorporate helicopter application requirements in the obstacle and terrain data quality requirements. The 60m collection threshold requirement for obstacles in Area 1 for rotorcraft still needs to be added. Christian requested that the note added in the Terrain Area 2 section be added to Area 1 as well.

The group discussed whether to change the Height attribute for obstacles back to optional instead of mandatory, since use of Height may depend on whether terrain data is provided. The group decided to keep it as Mandatory as proposed, since it can be populated in the obstacle data set independent of whether an end user would have access to a terrain data set.

Later in the week, Thomas converted it to a WP with the additional requested content, and these were reviewed on Friday. The group approved the WP and it is ready for document editor incorporation.

3.1.22 Action 58: Obstacle geometry type capture rules

Thomas presented the proposed updates to the Obstacle geometry data capture rules, which specify the minimum requirements for when an obstacle needs to be captured as a point, line, or polygon. Britta requested that the “shall” statements be stated as “should” recommendations. Christian added that if States

cannot comply with these minimum requirements, then there may be less data available if they do not provide even point obstacles. Thomas agreed to change the requirements to “should” statements.

Alex requested that the definition for minimal bounding box be provided in DO-276 (taken from the TOD Manual).

Later in the week, Thomas converted it to a WP with the additional requested changes, and these were reviewed on Friday. Britta stated that the definition proposed for bounding box did not match the same intent as the bounding box used in the TOD Manual. Thomas agreed that it was different, and explained that defining the box in a way that makes it simple to derive from aerial/satellite photography would be beneficial. This creates a difference from the TOD Manual, but it is recommended that the TOD Manual be updated to match the proposed DO-276 definition for bounding box.

The definition for bounding box was discussed at length. The group finally agreed with, “The horizontal bounding box is the smallest rectangle that contains all points of the obstacle’s geometry based on the latitude and longitude coordinates.” Britta expressed concern that these rules will lead to a lot more obstacles captured in Area 2 as polygons than is necessary. Travis explained that this could make capture easier since collecting one polygon instead of multiple points. Britta said her concern was more about having to capture individual trees as a polygon rather than a point with a radius. A note was added that for circular obstacles like wind turbines and trees, that capturing them as a point with a radius extent may be better than capturing as a polygon.

The group approved the WP with modification and it is ready for document editor incorporation.

3.1.23 Action 59: Obstacle horizontal extent

Alex presented DP-59, which proposes an expansion of the rules for Horizontal Extent for Obstacles. Alex concluded that Horizontal Extent is only needed for point and line obstacles, and not for polygons. A note was added to DO-276 Section 3.3.6 to explain that this attribute should be included when its footprint above the collection surface is significant and has a potential impact on safety. Brian requested that the note be converted to a “should” recommendation. The group agreed, and Brian will make this change and convert it to a WP on behalf of Alex.

3.1.24 Action 61: Vegetation obstacles

Alex presented a proposal to address the note for Obstacle geometry type that adjacent obstacles or groups of obstacles should be captured individually. He concluded that the note relates to man-made obstacles only, and confirmed the need for capturing obstacles such as wind turbines in a wind farm as individual obstacles at a recent TOD WG meeting. A similar approach was proposed for other of man-made obstacles like groups of antennas.

For vegetation, the intent was not as clear. The proposal is to update the note to specify man-made obstacles to clarify that each tree does not need to be captured individually, and add a note that vegetation obstacles that can’t be modeled as a point or line feature because of its size, it should be added on top of the bare earth to ensure it is collected as part of the reflective surface in a terrain database. Brian and Britta expressed confusion about the vegetation note and if/how it relates to terrain data. Alex explained the intent was to clarify that vegetation above the obstacle collection surface can be captured as a polygon obstacle, independent of whether it is considered part of the terrain reflective surface. Ultimately, it was agreed to clarify the vegetation note to take out any mention of collection as part of the reflective surface.

Britta questioned whether the wording for the man-made obstacle capture rule was clear enough to indicate that it applies to obstacles that do not have small separation to other obstacles of the same

property. The group revised the wording to clarify that it applies for all man-made obstacles, and split out the note content from the requirement. Sam asked whether data providers had the ability to capture individual objects to the implied level. Brian suggested adding an example using wind turbines and wind farms to clarify the intent.

Sam noted that Figure 2-2 in DO-276 should be updated to include an example obstacle that is a tree. Jean-Etienne requested that the notes be converted to “should” statements.

The group finally agreed to an updated approach, and Brian made the updates in the conversion to a WP on behalf of Alex. The updates were approved on Friday and WP-61 is ready for document editor incorporation.

3.1.25 Action 117: Miscellaneous DO-276 inconsistencies

John went through WP-117A, which proposes a variety of edits to different sections of DO-276. Most of the changes are editorial, but the group discussed some of the items Alex provided comments on. For reference document listings, it was decided to remove the specific amendment numbers for the ICAO Annexes, and add a comment that the most recent versions apply. The definitions for Horizontal and Vertical Confidence Level were modified to align with the ICAO definition. The numerical values for Integrity were removed from the data quality tables. The terrain data collection section was updated to further explain the terrain data origination.

John also proposed updates to DO-272 to differentiate between information errors, and errors in a database that could be due to corruption, for example. Alex said that the existing text was sufficient. The integrity numerical values were removed in this paper, as well. Therefore, action 52 to remove the integrity values was closed as a duplicate. The paper also proposed updates to better reflect the use of ICAO Annexes.

The editorial issues identified by Amit several meetings ago were also addressed in this paper. The group approved the paper and will be incorporated by the document editor.

Alex also provided a paper for action 117, which proposed new definitions for the Height and Elevation attributes in DO-276 based on consultation with Lufthansa Systems. The main issue is whether Elevation is recorded at the base of the obstacle or at the top of the obstacle (the latter of which would also incorporate height into the elevation). The new definitions are very specific and clarify that the Elevation is distance from MSL to the highest point of the obstacle, and Height is the distance from the base (ground-level) to the top of the obstacle. Scott suggested that it be noted the definitions are specialized from ICAO Annex 14. The group approved the paper as modified and it will be converted to a WP for incorporation by the document editor.

3.1.26 Action 62: Vertical structures and obstacles

John presented a paper to identify the issue that the same object can be captured both in an AMDB as a vertical structure feature, and in an Obstacle database. The new paragraphs will be added to all three WG2 documents. The group approved the paper and it is ready for incorporation by the document editor.

3.1.27 Action 63: Physically overlapping vertical structures

Alex presented a paper addressing how to handle segmentation of complex vertical objects. Alex concluded that the segmentation needs are limited to Areas 3 and 4, where it provides real operational benefits. Text from the TOD Manual was adapted to DO-272 by Patrick. The group made some updates to the proposed text to ensure consistent use of “should” recommendations. Patrick will find a new picture showing an example of a complex vertical object to replace the deleted Figure 3-3.

The main discussion revolved around what the threshold for exceeding vertical accuracy should be to trigger segmentation for line and polygon objects. The group ultimately decided to add a note explaining that the exceedance levels that should trigger segmentation of a vertical structure are left to the data originator. Patrick will update the WP based on group feedback.

On Friday, the group reviewed the figure provided by Patrick. The group approved the paper and it is ready for incorporation by the document editor.

3.1.28 Action 9: Runway Centerline Point capture rules

Beby presented the latest version of WP-9 to finalize the specific capture rules for Runway Centerline Points. The proposal was a refinement of the fixed density, where points are captured every 60 meters from the threshold out to 960 meters, then every 120 meters out to 1920 meters, then every 240 meters beyond 1920 meters. This will result in capturing a set of points in each runway direction, which is a change from DO-272C which uses the same set of points for both directions of the runway. This will result in needing to replace *idrwy* with *idthr*.

Christian noted that with displaced runways, this could result in having three or four profiles for a given runway. Patrick proposed using 60m density across the entire runway, since it would be simpler than trying to capture different profiles in each direction, and would probably not result in that many more points. The 60m density is a minimum requirement - it would be allowed to capture a higher density of points. Travis explained that it should be possible for data providers to collect the needed information remotely. This would allow a single profile suitable for both runway directions, and allow the *idrwy* attribute to stay intact.

The agreement to use a fixed density eliminated the need to have metadata that explains whether profile data is omitted because of lack of data or due to flatness, since the points will be captured for every runway regardless of whether there are any changes in slope.

The group updated the WP together to clarify what the document editor needs to incorporate. The capture rules was set after much discussion about whether to phrase it in terms of density or distance. Jean-Etienne brought up whether the order of points should be identified. Some of the existing capture rules that are now superseded were removed. It was decided to leave that as an optimization defined in ARINC 816.

3.1.29 Action 121: ASRN Node naming and discontinuities

Felix presented a DP addressing the naming of ASRN nodes for complex intersections, considering the discontinuities that may arise with such naming conventions. The issue is very complicated because of the numerous variations of complex intersections and how the unpredictable way that Taxiway Elements are named from airport to airport.

A set of new rules for setting *idnetwrk* were proposed, based on using the *idinter* value of the Taxiway Elements from which a node is derived. Felix walked through examples of how this rule would be applied, and explained that while the new naming rules help significantly, some discontinuities are still unavoidable. However, consecutive discontinuities could have a big impact on applications using ASRN. The Connectivity sub-team decided that only one consecutive edge of discontinuity should be allowed. Felix pointed out some examples where two consecutive edges of discontinuity may result. After some discussion, the group agreed on a restating of the proposed rule and added a new note to indicate that in order to comply with the requirement, the placement of nodes might need to be adjusted. The group agreed that adding a figure to DO-272 would be very beneficial to understanding the new text.

On Friday, the group reviewed the paper with the new figures. The group approved the WP as modified and it is ready for document editor incorporation.

3.1.30 Action 76: Runway wide turns and turnaround pads

Kelly joined via Webex to present WP-76, which proposes to extend the *aprontyp* codelist to include Runway Wide Turn and Runway Turn Around. Christian asked whether these situations really exist, or if they are just theoretical. Kelly cited some examples, and some others were found as well. They are currently captured with an *aprontyp* value of General. Kelly stated that the previous issue causing the action item is no longer a problem, so the need to add Runway Wide Turn to the codelist is not a necessity.

Patrick stated that he thought the wide turns should not be captured as General, because they are not general aprons, but Jean-Etienne said that if there is no application need, the new codelist value should not be added. After a long discussion, it was decided not to include a new value for Wide Turn, since there is no need to uniquely label them and the anticipated main purpose for *aprontyp* was to support labeling of different types of aprons. The resulting paper proposals are limited to editorial markups.

The group approved the paper as modified, and will be ready for incorporation by the document editor.

3.1.31 Action 139: Feature definitions in glossary

Felix presented DP-139, which proposes the elimination of feature type definitions from the glossary on the grounds that they are redundant with the feature definition section in DO-272 and the feature catalog in DO-291. Lists were provided that identified which features had consistent definitions in both places, which had minor inconsistencies, and which had larger inconsistencies.

Jean-Etienne noted that some glossary entries have citations (e.g., to ICAO Annex 4), but not in the feature type definition. Felix noted that the ICAO reference is typically provided in the Description field, so it is not necessary to duplicate that citation. Jean-Etienne agreed with that approach.

In all cases, it was agreed to remove the feature type definitions from the glossary. When the DO-272 and DO-291 definitions were inconsistent, the group agreed on which version to use across both documents. For Service Road, the group agreed to adopt a variation of the ICAO definition for “road”. The definition for Taxiway Guidance Line was modified to indicate the list of objects on which the lines exist are typical, but not an exhaustive list.

The group approved the paper as modified and it is ready for incorporation by the document editor.

3.1.32 Action 118: Codelists and enumerations

Scott presented two options for how to differentiate between a codelist and an enumeration in the model and DO-291. Option 1 is to add a row for the stereotype into the feature catalog, while Option 2 adds a descriptor to the existing Value Data Type. The group chose Option 2, and Scott will convert to a WP to reflect this choice.

3.1.33 Action 131: Feature catalog terminology

Scott presented a proposal to explain that DO-291 feature catalog terminology does not imply a particular formatting or encoding (for example, DO-291 attributes could be converted to XML elements). The group approved the paper as is, and is ready for incorporation by the document editor. Scott noted that the proposed markups were based on an older draft of DO-291, so Geet might need to do some integration

work if that section has since been updated based on other papers (Sam noted that WPs 71 and 116 did update the affected section).

3.1.34 Action 81: Obstacle feature catalog

Scott presented a DP explaining the updates made to meet the original intent of the action, and asking if further work should be done. The Obstacle UML model has been recreated, and Scott has addressed the shortcomings of the prior Obstacle diagrams. There is additional work needed to harmonize the Obstacle UML model with the AMDB model, addition of constraints necessary to allow auto-generation of the feature catalog content for DO-291, and to correct some editorial mistakes in the Obstacle feature catalog.

The group discussed whether to defer the full conversion of the Obstacle UML model to a future version or try to do it now. The feature catalog will be updated, whether it is manual updates to the existing DO-291 content or via auto-generation. It was agreed that the Obstacle UML will not be delivered as a technical artifact with this revision, so the decision of whether to complete the model is purely for DO-291 content generation purposes. Scott will attempt to complete the model to support this by the April document editing meeting.

3.1.35 Action 67: Coordinate dimension metadata

Scott presented a paper proposing updates to DO-291 to clarify coordinate reference system metadata requirements. New paragraphs were added to define 2D, 2.5D, and 3D. ICAO has strict requirements for WGS-84 and EGM-96, but no 3D Spatial Reference System (SRS) exists which satisfies these requirements. The OGC has been developing a document titled “Use of the GML for aviation data”, but all of the SRSs listed in this document are 2D. Therefore, if we want to support 3D geometries, DO-291 will need to create a new compound SRS and get it agreed to at the ICAO, ISO, and OGC levels. The group agreed to not enforce strict adherence to Annex 15 requirements.

For 2D WGS-84 data, there are codes which specify the order as latitude/longitude and longitude/latitude. The proposal is to recommend use of code specifying the latitude/longitude order (EPSG:4326). For 3D, an appropriate SRS code is EPSG:4979. John noted that the ICAO requirement is to use a CRS that can be translated to WGS-84.

For obstacles, the SRS metadata will need to be provided for each feature instance to accommodate the helicopter group requirements for being able to use 3D coordinates for line obstacle, and 2D coordinates for point and polygon obstacles in the same database. For AMDBs, the requirement is still to use a consistent CRS across a data set. Scott showed how to query SRS codes in the European Petroleum Survey Group (EPSG) registry (<http://www.epsg-registry.org/>).

Scott proposed to add available lists of 2D and 3D SRS codes to DO-291, and to update the example XML to use an example of the reference system metadata. It would also be good to add guidance on the use of the EPSG registry to discover SRSs in DO-291. Sam and John suggested that the list of SRS codes is probably not needed if a link to the registry is provided.

Brian noted that this paper was reviewed in the last ARINC ADB meeting, and agreed that it met the needs of that committee to have sufficient information to be able to populate a more straight-forward “number of dimensions” attribute. Scott will mature the proposal to a WP based on the group discussion.

3.1.36 Action 109: New ASRN node types

Ange Miklos joined via Webex to present a proposal to add two new ASRN node types to cover additional locations where an aircraft may be required to stop. It also proposed a new attribute for node types that have a one-to-one mapping to an AMDB feature type to reference the feature instance from which it was

derived (to provide access to additional information from the corresponding AMDB feature). The attribute *featref* will contain the *idnumber* of the corresponding ASRN feature.

The geometric constraint for ASRN Nodes was updated to include Taxiway Intersection Markings and LAHSOs. New capture rules were defined to capture Taxiway nodes at Taxiway Intersection Marking locations, and to capture Runway Exit Line nodes at LAHSO locations. Christian commented that LAHSOs are not always associated with a runway exit line. Brian stated that the original goal of the action item was not being met, since it does not indicate if a node is associated with a stopping location. An application would need to look up the *featref* reference to see if the node is applicable to a stopping location. Jean-Etienne said that adding new node types would cause problems because the naming rules for these nodes is different, and it would result in incorrect edge names. Brian said the strange edge name will result regardless of the type of node, and that the naming rules could be defined to avoid this.

The group could not reach a consensus on whether to add new node types or not. Ange suggested using the Taxiway Holding Position node type for nodes captured at Taxiway Intersection Markings and LAHSOs. Brian and Christian agreed that this would be better than nothing, but still not as good as new node types. Jean-Etienne proposed adding another new attribute that indicates if the *featref* attribute applies for a given node. Scott said that there is nothing to stop the use of attributes to indicate the applicability of other attributes, but it is not common practice. Felix noted that this would grow the size of the database, but Jean-Etienne said it could be optional. With new node *types*, *featref* could be conditional and standalone and would be the most optimal approach in terms of database size.

Christian noted that the stance that new node types should not be added will constrain us in the future, and pointed out that we are adding new node types for Deicing and Parking Stand nodes. Sam stated that if the ASRN Node is considered just another AMDB feature that is not standalone, that adding new node types could be interpreted as redundant information. John stated that the philosophy on which the ASRN was based should be maintained, which would support new node types.

After a long and contentious discussion, a compromise was reached. The *featref* attribute will be a conditional attribute, and will only be included for a given feature instance only when it references a Taxiway Holding Position, Taxiway Intersection Marking, or LAHSO. This way, the presence of the *featref* attribute can be used to determine if the node is associated with a stopping location. The Taxiway Holding Position type will continue to exist as a unique node type, even though the Taxiway Intersection Marking and LAHSO nodes are now using a different approach.

Christian asked about the new capture rules for nodes associated with Taxiway Intersection Markings. In general, nodes at Taxiway Intersection Markings are named after the taxiway the marking is on, unless it is coincident with the side of a taxiway polygon, in which case it follows the existing naming rules of a regular Taxiway node. Jean-Etienne agreed to create a picture to illustrate the intent of the rules.

Ange will update the WP to add the conditionality rule for *featref*, the figure Jean-Etienne will provide, and to add some additional discussion text describing the approach.

Christian noted that this paper may need to be extended to include other locations once the new Position Marking feature type is incorporated.

On Friday, the group reviewed the updates. Ange attempted to address the request for nodes at Position Marking feature instances by adding Taxiway Guidance Line to the Taxiway node capture rule. Brian and John stated that this would not address the need and could generate a lot of unnecessary nodes. John presented some research material on Position Markings. This part of the paper will be reverted back to its

previous form without considering Position Markings. Action 145 was created to include Position Markings in the ASRN, and immediately deferred to a future revision.

The group discussed comments provided by Jean-Etienne via email. The group determined that the needs identified by Jean-Etienne were already supported by the proposal, so no further changes were necessary.

The WP was approved as modified and it is ready for document editor incorporation.

3.1.37 Action 44: Aerodrome Surface Lighting

Andrew presented an update to WP-44 on maturing the Aerodrome Surface Lighting feature type. The changes were to add approach lights back to the *lightuse* codelist and to remove the movement area buffer from the description. A simple description was added in the discussion. The group approved the paper as modified, and is ready for incorporation by the document editor.

3.1.38 Action 48: Signage

Andrew stated that WP-48 was pretty much unchanged from what was presented in the December 2014 meeting. Therefore, there were many comments from that meeting that still need to be addressed.

The group agreed to keep Sign in the Vertical Structure type codelists.

The group agreed to update the definition and description so that is not restricted to the movement area, rather it is for signs related to aircraft movement. Scott suggested adapting the ICAO definition for Fixed Message Sign, and the group settled on, “A sign presenting messages related to aircraft movement.” The description was taken from the WP introduction text. The group agreed to make the feature applicable to vehicle signs as well.

The group agreed to change the location of capture to the centroid of the sign instead of the corner of the sign. The original intent of the corner proposal was to allow for simple right-justification display of the sign content, but the applications can determine where to display the sign information based on the centroid and the content.

Jean-Etienne stated that the paper is not mature enough to be included in this revision. Andrew proposed using the simplified Unicode-based approach proposed by the FAA for Rev D, and then mature it to be more capable or switch to a different syntax in the future. Brian and John stated it is not desirable to standardize on one approach knowing that it may be radically changed in the next revision. Scott suggested leaving it open and providing the string attribute for people to fill in, and perhaps reference a recommended syntax defined outside the standard.

There is likely not enough time to develop the sign content schema for this revision. Without standardizing on the syntax, there is little value to putting the new feature type in this revision of DO-272. John gave the group until Friday morning to come up with a standard syntax proposal. If that cannot be done, it will be deferred to the next revision. Scott cautioned that whatever characters are used in the syntax, that it must be able to be represented as a valid string in XML. He also stated that restricting it to the UTF-8 character set would be ideal.

On Friday, the group reviewed the proposed approach submitted by Felix. The group agreed to the concept, and decided to use Option 2 for the style codes. It was also decided to change the *signtype* attribute to indicate if the sign is related to aircraft, vehicles, both, or none/other. Felix will update the WP based on the agreed direction, and it will be posted by March 13. The group will have two weeks to

review the paper and provide comments over email. A final approved version of the paper will be ready before the April document editing meeting.

3.1.39 Action 114: AMDB XML Schema

Scott reported out on the progress of the XML Schema. Scott took final delivery of the UML model and XML Schema at the end of January 2015, and used a data set provided by Stephane Dubet to test it out. It has been reviewed by Eurocontrol and other parties, but not yet by SC-217/WG-44. Scott will make the artifacts available for review, and the XML Schema will be formally reviewed at by the group at the document editing meeting in April. Scott noted that the UML and XML Schema is up to date with WPs approved up to November 2014, so there are still several WP updates to incorporate between now and the April meeting. The artifacts will be posted to the www.amxm.aero website after approval, and the site will be up before the June FRAC resolution meeting.

3.1.40 Action 86: Terminology harmonization

Sam gave an overview of the exercise to harmonize definitions for terms used across the SC-217/WG-44 document family, which has been updated based on the FRAC version of DO-200B. There are three terms in which WG2 is proposing updates to DO-200B, but the paper identifying the proposed changes was not provided to WG1 until after the deadline for FRAC comments.

Mike suggested that the definition for “database” be modified to clarify what “them” refers to. Sam recommended that the term “database” be removed from the glossary, and Mike agreed to delete it.

Sam stated that WG1 is likely changing some of their definitions as part of FRAC resolution, therefore there will need to be another analysis performed after the final version of DO-200B is available. Sam will provide an update to the spreadsheet collecting the terms and send out for review, and WG2 will have two weeks to review and provide comments. Geet will apply the changes to the WG2 documents from the spreadsheet as opposed to a WP Word document.

3.1.41 Action 23: Figure updates

It was decided to have Geet incorporate the latest version of the figures provided by Beby, but the group did not spend time looking and the modifications since the December 2014 meeting. The main change was to add spaces back into the feature type names. This WP is considered approved, and the group can provide any further comments through the FRAC process.

3.1.42 Action 144: Starter extensions

Beby presented a new IP to introduce the concept of starter extensions, which is a piece of pavement that can be used for takeoff but is not used for the end of a landing rollout from the other runway end. Patrick stated that starter extensions are not always clearly represented in AIP. It is also not consistent whether starter extensions are taken into consideration for *tora*, *toda*, and *asda* lengths. Currently, starter extensions are sometimes captured as Runway Displaced Areas, Stopways, or Taxiway Elements. Christian said that since there is no consistent global definition, States do not always handle them the same way.

Beby proposed to create a new AMDB feature type called Runway Starter Extension that contains all of the same attributes as a Runway Displaced Area. She also proposed to add a new Starter Extension codelist value to the *thrtype* attribute.

Brian asked what the difference was between the data model for Runway Starter Extension and Runway Displaced Area. Beby said that while the data is modeled the same, that they are operationally different

since they can't be used for landings and the meaning of the "threshold" point is different; therefore it is best to consider it a different feature.

John said that starter extensions are not part of ICAO Annex 14, and that they don't meet the regulatory requirements to be part of a runway. They are only used at the discretion of ATC. ARINC 424 does not provide data on starter extensions.

Patrick recommended deferring to the next revision of the standard. John agreed that there is not enough time to complete the paper for this standard. Brian asked whether an interim solution could be provided to at least provide some level of standardization on how they are captured without introducing a new feature type for now. Christian presented some examples to show that it is difficult to even standardize of what type of feature to capture them as, since some cases Taxiway Element may be most appropriate and in other cases Runway Displaced Areas will be more important. Patrick said that if we were to do anything, a new feature would be preferable to an attribute on Runway Displaced Area, since that would imply it is part of the runway.

John asserted that since they are not standard data in industry, they should not be part of the AMDB standard. This could be covered by supplemental data. Jean-Etienne said that there are applications that can utilize the information if it was available and expressed the desire to add it in this revision. There is some overlap between this paper and the multi-use pavement issues identified in DP-141.

After much debate, it was decided to defer action 144 to a future revision. If desired, it can be handled through the supplemental data provisions in the standard.

3.1.43 Action 64: Supplemental metadata provisions for terrain

John suggested that no further action be taken for this issue. There will continue to be no consideration for supplemental terrain data, as nobody could think of an example of what could be added. The group decided to close the action item with no changes to the standards.

3.1.44 Action 88: Blind Spots

John presented the update to WP-88 that incorporated the changes requested in the December 2014 meeting. There were some changes that are superseded by other WPs, so John will remove them from the paper. The group approved the WP as modified and it will be ready for document editor incorporation.

3.1.45 Action 107: Terrain in polar regions

Travis Pike and Ryan Niehaus presented an update to DP-107 to explain how terrain should be captured in the polar regions. Since the December 2014 meeting, Travis worked with Ryan to determine if the recommendation discussed before was sufficient. Travis has reconsidered whether it is desirable to recommend a particular projection to use in the standard. DO-276 already covers the requirements for WGS-85 and EGM-96. It was proposed to add statements to the Post Spacing attribute definition to explain post spacing variance with Polar Regions as an example, and to add some new transformation purposes to Section 6.1.2.

Travis noted that he did not think there was a need to specify particular grid spacing recommendations in DO-276, but a note was added to reference MIL-PRF-89020A as an example of scaling of latitude and longitude post spacing for different latitude ranges. It was agreed not to add any additional information on projections except for a note that was added to state that different projections could be used and a reference to Universal Polar Stereographic as an example.

On Friday, the group reviewed the updates, which included a new appendix to add recommendations for post spacing and projection to use in the polar regions. Comments provided by Ronny Wenzel were discussed, and the group decided not to reject the comments on the grounds that we do not want to deviate from ICAO requirements for WGS-84 and EGM-96. The paper was approved as modified and is ready for incorporation by the document editor.

3.1.46 Action 112: Airport system indicators

John presented a DP that explained the result of looking at Jeppesen charts to identify additional airport systems that are identified beyond what is in the current codelist. Three things were found to consider: Surface Movement Radar (SMR), Remote Tower, and LVO. There is already a codelist value for LVO, and there is a code for ASDE-X that overlaps SMR.

Jean-Etienne identified to other systems that could be added: a) “Follow the green”, in which green lights are used to direct an aircraft during taxi operations, and b) D-TAXI.

On Friday, the group reviewed John’s updates to change ADS-B to SMR, split up LVO and SMGCS into separate codes, and add the other three new suggestions (Remote Tower, Follow the Green, and D-TAXI). The WP was approved as is ready for document editor incorporation.

3.1.47 Action 72: String shortening

Brian presented an update to WP-72 that added a handful of different options for identifying that a string was shortened. John noted that Option 3, which is to terminate the string with a special character, is used in ARINC 424 (a ‘*’ character is the terminator). There is very low risk than an asterisk character would be used in an identifier string. Jean-Etienne said he was okay with either Option 2, 3, or 4. Patrick preferred Option 5 (do nothing), but among the “do something” choices he preferred Option 4. Geet, Mike, and Felix preferred Option 4. Christian could live with Option 3 or 4. Steve liked Option 3.

Jean-Etienne suggested making the new attribute proposed in Option 4 optional as well as conditional, which would be a new category of attribute, but there are so few cases where this would apply that it does not seem worthwhile to make it conditional.

The group agreed to proceed with Option 4, and Brian updated the WP to implement this approach. The question of whether Option 4 was still needed in light of the approval for WP-120 resulting in deciding to stay with the changes, since it may be desirable in certain cases to shorten strings even when they fit within the string length limits. On Friday, the group reviewed the update and the WP was approved. It is ready for document editor incorporation.

3.1.48 Action 143: Obstacle types

An IP provided by Alex was discussed. It gives an analysis of the obstacle types defined in AIXM, and provides a mapping to FAA obstacle types. It also identifies a couple of AIXM codes that are missing from DO-291: Air MAT and agriculture equipment. The group acknowledged the possible pending AIXM activities recommended by the TOD WG, and concluded that there are no changes will be made in DO-291 at this point. Action 143 was deferred.

3.1.49 Action 120: String attribute lengths

John presented a paper proposing to increase the maximum number of characters for a number of string attributes to 254. This change was applied to all string attributes that could be of variable length, or at least which are not constrained based on aeronautical logic (e.g., *idarppt* was not updated). The group agreed to

the proposal. It was noted that *idthr* and *idrwy* were increased to accommodate helipad names. The WP was approved as is ready for document editor incorporation.

3.1.50 Action 106: Definition of *pcn*

John proposed a new definition for the attribute *pcn*. The WP was approved and is ready for document editor incorporation.

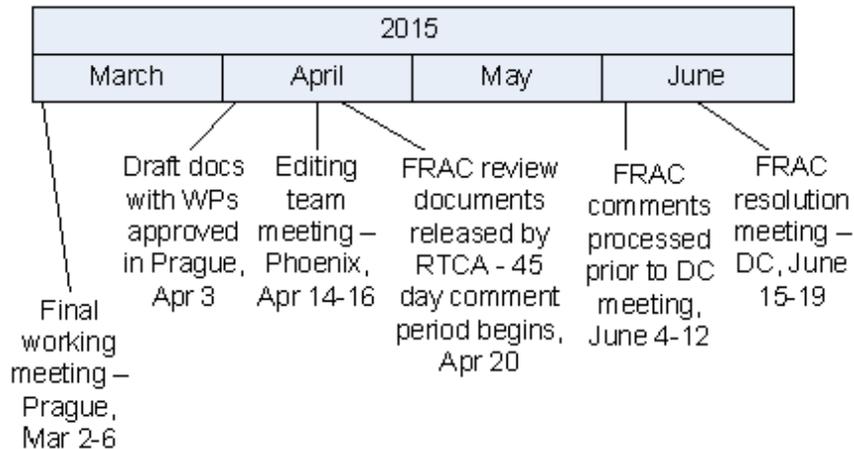
3.1.51 Action 94: Terrain surface code list

The group discussed creating a code list defining terrain surface types. The group decided to use a list based off of the TIXM Surface Type enumeration, and identified the location in DO-291 to add this information. The group approved incorporation of this change.

3.2 Document editing process

A model and editing subgroup will have a face-to-face meeting to finalize the FRAC versions April 13th through April 16th at Honeywell in Phoenix, AZ (April 17 will be reserved as an overflow day). The revision summary at the beginning of the documents will be created at this meeting. Scott, Don, Geet, Brian, John, and Steve will attend.

In order to meet the September 2015 PMC target, the final documents will need to be provided to Sophie by mid-July. During the June 2015 meeting, each of the three documents will have a FRAC leader who will steer the group through the comments. The DO-272D leader will be Brian, the DO-276C leader will be John, and the DO-291C leader will be Scott.



4 Closing Plenary

The group expressed their thanks to Scott and Honeywell for all of their efforts in hosting the meeting.

4.1 Working Group 1 Report

Stéphane presented the results of the WG1 break-out session. There were 634 editorial comments that were reviewed and resolved offline by Jackie. There were 250 Low comments pre-addressed by Scott and re-assessed at the end of the week. There were 136 Medium, 113 High, and 7 Non-concur comments.

The Medium, High, and Non-Concur comments were addressed by theme: scope/data processing chain, data quality requirements, tool qualification, compliance, and general. A table was generated by Jackie that characterized how all of the comments were addressed. There were a roughly equivalent number of

comments rejected and accepted. Each rejected comment has a rationale for why it was not accepted. All of the Non-Concur comments were resolved and the resolutions accepted by the submitter.

The work plan after the FRAC resolution will encompass three phases:

- The first step is for the editorial team to ensure correct implementation of the FRAC resolution in the draft document. The editorial team will consist of Jackie, Carmen, Brad, Johnny, and Scott. The draft document will be complete by April 13.
- Next, there will be a period from April 13 to April 20 where everybody can review the draft document and FRAC table posted on the WorkSpace site to check that the comments were implemented correctly. Stéphane stressed that this is not reopening the FRAC or comment resolution, rather only a sanity check for everybody to make sure the result expected from FRAC resolution was achieved. Sophie requested that distribution of the draft be limited to the FRAC participants since this is not part of the normal FRAC process. Comments from the sanity check will be directed to the editorial team.
- Lastly, the final draft will be submitted to RTCA and EUROCAE by May 4, 2015.

Jackie implored the team to not wait until the last minute to complete the sanity check review, and for all members of the editorial team to contribute as expected.

The joint committee formally acknowledged and approved completion of the FRAC resolution.

Stéphane thanked Scott and Honeywell for all of their efforts in hosting the meeting. He also thanked Jackie for the amazing job she did throughout the week, the WG leads, and everybody for their focus and dedication. WG1 took a constructive approach to resolving the comments. Amanda thanked Stéphane for his leadership of WG1 and his efforts throughout the week.

4.2 **Working Group 2 Report**

John summarized the WG2 progress. This was the last working session for WG2 to be ready for FRAC. The group will continue to meet in a working session after Closing Plenary to reach agreement on a handful of papers that still need to have a final review.

There were 49 papers reviewed prior to closing plenary, of which 31 have been approved and are ready for document editor incorporation. Of the 144 action items in the WG2 list, there are 17 that are still in work. There are a couple of actions that have not reached consensus yet. The goal is to reach consensus in a working session after Closing Plenary. Stéphane advised that the papers either be incorporated or not, but either way the resolution of any outstanding issues can be handled via the FRAC process. He advised to include them as they are now.

The group agreed that the remaining issues will be dispositioned in the working session, and that there are no outstanding scope changes. WPs 136 and 141 were the two for which an agreement still needs to be reached. These papers will be included as currently constituted.

The joint committee formally acknowledged and approved that DO-272D, DO-291C, and DO-276C are ready for FRAC.

John went through the plan for next steps, which includes an editing team meeting at Honeywell in Phoenix the week of April 13. The editing team will consist of Geet, Don, Brian, Steve, Scott, and John. The FRAC review documents will be released by RTCA on April 20 to start the 45 day comment period.

John explained the detail and breadth of the WG2 documents, and the impact they have on the industry, including ICAO and ARINC. This meeting had the largest participation of any WG2 break-out to date. John expressed his thanks for the progress.

4.3 **DO-201 assessment**

Stéphane raised the topic of proposing a revision of DO-201. An assessment of the scope of changes needs to be done by a group comprised of both European and US representatives. A face-to-face joint meeting will be hosted by Eurocontrol in Brussels for Europeans and be held before June. US participants may attend virtually. A number of committee members expressed interest in supporting the DO-201 assessment. Once the required time and expertise for revising DO-201 is analyzed, the group will determine how to proceed.

4.4 **Next Meetings**

RTCA will host the next SC-217/WG-44 meeting in Washington, DC from June 15th through 19th, 2015. This will be the FRAC resolution meeting for DO-272D, DO-291C, DO-276C, and any technical artifacts in WG2.

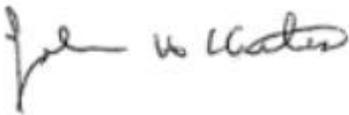
5 **WG2 Action Items**

Since all WG2 action items have been completed, closed with no action, deferred, or have approved WPs ready for document editor incorporation, the tables which normally appear in this section have been removed. All information related to action item status is available in an Excel spreadsheet on the Workspace site.

Certified as a true and accurate summary of the meeting.



Brian Gilbert
Secretary, RTCA SC-217, EUROCAE WG-44



John Kasten
Chairman, RTCA SC-217



Stéphane Dubet
Chairman, EUROCAE WG-4