Summary of the 40th Meeting  
Special Committee 206  
Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Executive Summary
The meeting was held April 13 – 17, 2015, at the National Institute of Aerospace (NIA) in Hampton, VA.

SG-1/6 — MASPS for AIS/MET Data Link Services
- Three use cases have been developed. For each an Operational Safety Assessment (OSA) and an Operational Performance Assessment (OPA) will be developed and included in the MASPS:
  - EDR-Turbulence Service (Crosslink)
  - Special Activity Airspace Alert Service (Uplink)
  - Weather Surveillance Service (Downlink)
- The group began with the OSA for crosslink and good progress was made. Some of this work could apply to the other services.
- The goal for the September meeting is to develop a strawman MASPS, but there are concerns whether this can be completed due to the OSA/OPA effort that needs to be completed before work can start on the other sections of the MASPS.

SG-4 — MOPS for Eddy Dissipation Rate (EDR)
- Work on the MOPS for EDR kicked off at this meeting. The challenges are significant:
  - Aggressive schedule
  - Lack of documented user requirements
  - Proprietary products and methods
  - No measurable “truth” to compare the algorithms against
- SG-4 recommends a 3-6 month slip from the Sept 2016 due date to allow time for the FAA’s SE2020 team to complete their recommendations before SG-4 completes the MOPS.

SG-7 — Guidance for Data Linking Current and Forecast Wind Information to Aircraft
- Goal: “Best practices” guidance for the methodology, reporting, and recommended quality of wind information necessary to enable envisioned applications. Challenges to be dealt with:
  - Wind (and temperature) applications impact flight planning and execution
  - Three other RTCA Special Committees are affected: SC-186, SC-214, SC-227
  - Multiple stakeholders are affected: ATC, AOC, Pilots, Weather providers, OEMs
  - SG-7 needs cross-cutting participation from various domains

Current SC-206 roadmap, barring schedule slips:

<table>
<thead>
<tr>
<th>SG</th>
<th>Deliverable</th>
<th>2015</th>
<th>2016</th>
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<td></td>
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<td>Sept 11-18</td>
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<td></td>
<td>Chicago</td>
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<td>1/6</td>
<td>AIS/MET MASPS</td>
<td>Fapp</td>
<td>Fres</td>
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<tr>
<td>4</td>
<td>EDR MOPS</td>
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<td>7</td>
<td>Winds Guidance</td>
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Fapp = Approve for release for FRAC process  
Fres = Resolve FRAC comments  
PMC = RTCA Program Management Committee document approval decision

Monday
Opening Plenary
Co-chairs Allan Hart and Rocky Stone welcomed the attendees to the 40th meeting of SC-206. The meeting was held April 13 – 17, 2014, at the National Institute of Aerospace in Hampton, VA.

Opening plenary agenda:
- Remarks and announcements
  - Designated Federal Officer (DFO) announcement
  - RTCA proprietary references policy
  - Remarks from the chairmen
  - Remarks from the hosts
- Attendee introductions
- Awards and recognition
- Agenda for the week
- Approve previous meeting minutes
- Review open action items
- Presentations
  - Preliminary winds research
  - AATs / Connected Aircraft
- Revised Terms of Reference for SC-206
- Sub-Groups status and plans for the week

See RTCA Workspace for documents and briefings presented at this meeting:

1. Opening remarks

Pursuant to the Federal Advisory Committee Act, Eldridge Frazier (FAA) was the Designated Federal Officer (DFO) for this meeting.

DFO announcement —
In accordance with the Federal Advisory Committee Act, this Advisory Committee meeting is open to the public. Notice of the meeting was published in the Federal Register on March 23, 2015. Attendance is open to the interested public. With the approval of the Chairs, members of the public may present oral or written statements at the meeting. Persons wishing to present or obtain information should coordinate with the RTCA Program Director and Chairs of SC-206.

RTCA proprietary references policy —
Patented technology and copyrighted material required for compliance with an RTCA standard may be included in the standard if RTCA determines it provides significant benefit. If your company holds a patent relevant to a document being developed, advise RTCA and SC-206.

Remarks from the chairmen —
Major goals for this meeting:
- SG-1/6 — Begin the Operational Safety Assessment (OSA) for the AIS/MET MASPS
- SG-4 — Kickoff work on EDR MOPS
- SG-7 — Kickoff work on Guidance for Data Linking Winds Information to Aircraft

Remarks from the hosts —
Doug Stanley, President and Executive Director of the National Institute of Aerospace (NIA), welcomed the group. The NIA is a nonprofit institute established about 12 years ago to conduct aerospace and atmospheric research. The FAA is NIA’s biggest customer. Lise Schioler, Director of Government Agency Programs at NIA, provided additional information and logistics.

Frank Peri, Deputy Director of the Engineering Directorate at NASA Langley Research Center, welcomed the group. Langley was established in 1917 by the NASA’s predecessor, the National Advisory Committee for Aeronautics (NACA). Langley conducts a broad portfolio of research and has deep technical capabilities. SC-206’s work is key to the future National Airspace System and Langley welcomes opportunities to collaborate.

2. Attendee introductions
1. Allan Hart, Co-chair Honeywell
2. Rocky Stone, Co-chair United Airlines
3. Moin Abulhosn FAA Aircraft Certification
4. Farid Aknine North Star Group
5. Greg Arundale Rockwell Collins
6. Bryan Barmore NASA Langley Research Center
7. Andy Borgyos (telecom) GE Aviation
8. Roland Bowles NASA Distinguished Research Associate
9. Joe Bracken AvMet
10. Bill Carson MITRE
11. Larry Cornman (telecom) UCAR
12. Taumi Daniels NASA Langley Research Center
13. Stephen Darr Dynamic Aerospace
14. Ernie Dash AvMet
15. Tom Evans NASA Langley Research Center
16. Tammy Farrar FAA Aviation Weather
17. John Ferrara John Ferrara Consulting
18. John Fisher FAA Aircraft Certification
19. Eldridge Frazier FAA Aviation Weather
20. William Geoghagan National Air Traffic Controllers Association
21. Izabela Gheorghisor MITRE
22. Chris Haraway (telecom) Honeywell
23. Marc Henegar Air Line Pilots Association
24. Brian Hint (telecom) FAA Flight Standards
25. Karan Hofmann RTCA
26. Amanda Hoprich AvMet
27. Ed Johnson NASA (representing FAA)
28. Robert Klein FAA SWIM
29. Andras Kovacs FAA Technology Development
30. Mark Libant Nav Canada
31. Tenny Lindholm (telecom) Aviation Weather Technologies
32. Clark Lunsford MITRE
33. Gary Marsh Panasonic Avionics
34. Michael McPartland MIT Lincoln Labs
35. Greg Meymaris (telecom) UCAR
37. Andrew Mirza (telecom) UK Met Office
38. Thomas Moore (telecom) USAF Director of Weather
39. Angel Morales  FAA Air Traffic Organization
40. Dan Mulally (telecom)  Panasonic Avionics
41. Mark Mutchler  FAA Small Airplane Directorate
42. Lee Nguyen (telecom)  FAA Aircraft Certification
43. Kevin Niewohner  North Star Group
44. John Pace  North Star Group
45. Darrell Pennington  Air Line Pilots Association
46. Jason Prince  AeroTech Research
47. Tim Rahmes (telecom)  Boeing
48. Tom Reynolds  MIT Lincoln Labs
49. Yauwu Tang (telecom)  MITRE
50. Bill Watts  Delta Air Lines
51. Natee Wongsangpaiboon  FAA Technology Development
52. Steve Young  NASA Langley Research Center

3. RTCA awards and recognition
   • DO-349 “Architecture Recommendations for AI and MET Data Link Services”
     • Matt de Ris, Panasonic Avionics — Outstanding Leadership
     • Bill Carson, MITRE — Outstanding Leadership
     • Izabela Gheorghisor, MITRE — Significant Contributor
     • Vinay Lakshminarayan, MITRE — Significant Contributor
   • DO-252A “Minimum Interoperability Standards for AUTOMET”
     • Tim Rahmes, Boeing — Outstanding Leadership
     • Tammy Farrar, FAA — Outstanding Leadership
     • Tenny Lindholm, UCAR — Significant Contributor
     • Joe Bracken, AvMet — Significant Contributor
   • DO-358 “MOPS for Flight Information Services Broadcast (FIS-B)”
     • John Ferrara, Consultant — Recognition for exceptional dedication and commitment

It was noted that the recently published DO-358 is significant to both industry and the FAA and has been the subject of articles in the aviation press.

4. Meeting agenda:

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<td>Opening plenary</td>
<td>SG meetings</td>
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<td>SG meetings</td>
<td>Closing plenary</td>
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<td>FAA AAtS workshop</td>
<td>NASA tour</td>
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5. Open action items were reviewed.

6. The minutes of the previous meeting (Washington, DC) were approved.

7. Presentations
   a. Taumi Daniels: Preliminary comparison of winds data
      • Dr. Daniels (Langley Research Center) briefly discussed a comparison of winds data from a specific Integrated Terminal Weather System (ITWS) site near Denver versus winds data from a sonde released nearby. This was a preliminary look to get sense of the comparability of the data. While the comparison study is ongoing, Dr. Daniels noted that corrections for rawinsonde drift need to be accounted for - prior to making any further comparisons.
b. Rob Klein & Kevin Niewoehner: Aircraft Access to SWIM / IP Connected Aircraft (CA)
   - New deliverable: MOPS for Eddy Dissipation Rate (EDR) — SG-4
   - The idea: Connecting aircraft to SWIM services via IP will improve block time efficiency and hence save Part 121 operators money.
   - Part 121 operational data show that there are block hour efficiencies to be gained. Shaving off 30 seconds per block hour would yield substantial cumulative cost benefits.
   - Advisory services such as AA-tS have value, and this is where we are today. Exclusive use IP communication services such as Connected Aircraft would have even greater value. This is what industry could get to, and it’s not a technical leap. The technology for moving data and products over IP data links is well understood, and airborne broadband access is readily available. But the case has to be conveyed to the CFO’s.
   - Next steps: Model and simulate operations between city pairs to quantify and compare benefits with and without CA equipage.

Questions:
Airlines are already doing so much to maximize efficiency. What’s your 1-minute pitch to them?
-- Part 121 operators can save $250,000/aircraft/year by shaving ~30 sec off block times via CA.

So, how to achieve CA?
-- The challenge now is to show reductions in block time are achievable. For that we need to identify scenarios that demonstrate the value. Wednesday’s workshop will focus on identifying events that can produce operational impact in the day in the life of an aircraft.

Regarding sending updated winds and temperatures to the aircraft, are there any studies on efficiencies to be gained there?
-- MIT Lincoln Lab studies into Cruise Altitude and Speed Optimization are seeing up to 5% cruise fuel savings with better knowledge of the wind fields around the aircraft, allowing for better selection of cruise altitude and speed profiles.

Comments:
The modeling needs to be multi-dimensional, because savings will ripple to following aircraft.
Accumulated time savings may lead to operators being able to add additional flights.

8. Revised Terms of Reference for SC-206 were approved by the PMC. The key changes:
   - New deliverable: MOPS for Eddy Dissipation Rate (EDR) — SG-4
   - New deliverable: Guidance for Data Linked Winds Information to Aircraft — SG-7
   - Sharper focus for AIS/MET MASPS — SG-1/6
     - Downlink and crosslink of MET info derived on the aircraft
     - Uplink of AIS and MET info

9. Sub-Group plans for the week

   SG-1/6 MASPS for AIS/MET Data Link Services
   - Review the three Service Description Use Cases
     - Weather Surveillance Service (Downlink)
     - EDR-Turbulence Service (Crosslink)
     - Special Activity Airspace Alert Service (Uplink)
Summary of the 39th Meeting
RTCA SC-206 – AIS/MET Data Link Services

- Operational Safety Assessment (OSA) discussion – this will take most of the week
- Operational Performance Assessment (OPA) preview and introduction

SG-4 MOPS for EDR
- Review TOR scope and schedule
- Identify the participants, their expectations, and areas of interest
- Overview of RTCA processes and Workspace logistics
- Review Phase 1 of SE2020 EDR Standards Recommendation Project
- Review project timeline
- Concur on regular SG-4 telecon schedule
- Develop a project plan
- Establish sub-teams as needed, with members and tasks

SG-7 Data Linking Forecast and Real-Time Wind Information to Aircraft
- Baseline who knows what?
- Determine which RTCA Special Committees need what from SG-7
- Establish/categorize SG-7 deliverable(s)
- Determine who we need in order to produce deliverables
- Establish work plan and schedule
- Participate in SC-214 / WG-78 Thursday session (A-IM and winds topics)

This concluded the opening plenary session. Sub-group meetings were held the rest of the day.

Tuesday
Sub-group meetings were held throughout the day.

Wednesday
Sub-group meetings were held the first part of the day. The Aircraft Access to SWIM (AAtS) / Connected Aircraft (CA) workshop was held Wednesday afternoon.

10. AAtS Workshop — Rob Klein, Kevin Niewoehner, John Pace
- John Pace introduced an extensive list of events that could cause operational impacts but also present opportunities to shave off block time. Some were on the ground side, some the airborne side, some overarching (e.g. mechanical failure, weather).
- Block time is measured from push back to gate arrival. Based on the data they looked at, about 87% of block time the aircraft is in the air, the other 13% it’s on the ground.
- SC-206 was asked how they could envision using AAtS/CA to mitigate the list of potential operational impacts to make the NAS is more efficient.

Feedback from the group:

The airline view is pretty much that airlines can only control the ground side, although that’s not 100% true. There are things on the air side that with more information you could do more efficiently. (Knowing when to take a short cut).

There are opportunities for improvements enroute. Look in areas such as weather. Think about trajectory options in flight.
If AAtS/CA can give you better information, you can use it to negotiate a better route for instance. The idea is to save fuel and time. Think of auto-reroute around traffic using the GPS in your car.

The list of ground events seems to be company internal. How does SWIM support internal company activities? --It doesn’t.

There are efficiencies to be gained through common operating environments.

Operators would appreciate transparency into the FAA decision-making process.

You should analyze the delays, relate it to SWIM information, and see where the opportunities lie.

The efficiencies you’re trying to achieve are masked by flotsam in the system (e.g. padded times). Not sure where you find improvement and how to quantify it. The low hanging fruit has been picked.

The question is how to quantify the benefits of coupling information access to operations. But airlines will not readily share their operating information.

ReCat, WTMD, WTMA, etc. are the types of thing we need more of. --This will be a supplemental advisory service.

Don’t saturate the players with data. --Agree. It would be counterproductive.

Thanks for the brief. --We appreciate the discussion, and look forward to future discussions.

Thursday
Sub-group meetings were held the first part of the day. The NASA tour was held in the afternoon.

Friday - Closing Plenary

11. Sub-Group reports

SG-1/6 MASPS for AIS and MET Services – Allan Hart

- The group made good progress on the MASPS
- Reviewed the three service descriptions, which were developed by separate groups
  - EDR-Turbulence Service (Crosslink)
  - Special Activity Airspace Alert Service (Uplink)
  - Weather Surveillance Service (Downlink)
- Discussed at length the crosslink and downlink service descriptions
- Executed an OSA review of the crosslink service description
  - Identified 6 Operational Hazards (OH1 — OH6)
  - Identified 9 Environmental Conditions
  - Identified 5 External Mitigation Means (EMM)
  - Identified the Operational Effects of OH1
  - Identified Internal Mitigation Means (IMM) for OH1
  - Identified 11 Basic Causes of the OHs
• Discussed whether the same OHs and EMMs could apply to the downlink and uplink services
• Agreed to continue the OSA as one group, not as separate groups for each service description
• Each service description will be updated based on this week’s discussions
• SG-1/6 will have four 3-hr telecons between now and the June face-to-face meeting. The first two telecons will focus on finishing the crosslink OSA. The third will focus on the downlink service. The fourth will focus on the uplink service.
• The goal for June 15-19 face-to-face is to begin the Operational Performance Assessment
• The goal for the September SC-206 meeting is a strawman of the actual MASPS
• Concerns exist whether the MASPS can be finished per the current schedule. We will not go back to PMC to request a slip without a clear idea of how much more time will be needed.

SG-4 MOPS for EDR – Tammy Farrar

• Terms of Reference for the EDR MOPS:
  o “Define requirements as necessary for input parameters and computational methodologies to facilitate the calculation of EDR by various algorithms such that the outputs are operationally accurate and comparable.”

• In Scope
  o Part 121, GA, Biz jets, UAS
  o Operational forecast models
  o Aviation R&D

• Out of scope
  o Comm (uplink, downlink, crosslink)
  o Maintenance decisions
  o RMS-g conversions
  o Forward-looking radar
  o Aircraft design
  o Quality control
  o Ride quality / fuel burn

• The challenges are significant:
  o Lack of documented user requirements
    ▪ What does “operationally comparable” mean?
    ▪ How good is good enough?
  o Proprietary products and methods
    ▪ Three developers, three calculation methods
    ▪ All three methods have merits and drawbacks
    ▪ SE2020 Phase 1 effort deliberately masked individual algorithm performance
    ▪ All three algorithm developers are on SG-4
  o There is no “truth” to which to compare algorithms against
    ▪ Could compare algorithms to each other and determine they are statistically comparable, but they could all be equally wrong.
    ▪ If the algorithms are equally bad, and the MOPS is written to their performance, a new developer could come up with a good algorithm and it wouldn’t pass the test

• Success criteria
  o Through work with SE2020 team and SME’s, determine a suitable “truth” field
  o Ascertain user requirements

• Initial work plan
  o Bi-weekly telecons
  o SG-4 face-to-face in Boulder in July?
Summary of the 39th Meeting
RTCA SC-206 – AIS/MET Data Link Services

- Will request that SG-4 leadership be invited to SE2020 EDR team’s regular telecons
  - SE2020 requested SG-4 assistance in obtaining user requirements
- Will draft letter to A4A/NetJets/AOPA and others requesting clarification of
  EDR/turbulence uses and requirements for algorithm accuracy and comparability
- Algorithm developers to produce ROM for determining “truth” dataset
- Forward recommendations to the SE2020 Team
- SG-4 recommends a 3-6 month slip from the EDR MOPS Sept 2016 due date. SE2020 has
  funding and activities identified through Sept 2016. It is highly doubtful SE2020 will
  complete recommendations in time for SG-4 to have a MOPS ready by Sept 2016. A 3-6
  month slip would let SE2020 to publish its work before SG-4 has to have the MOPS ready.

Discussion:
Work will be challenging for several reasons. The schedule is aggressive due to coordination
needed with SE2020. It’s unclear how all of the user community will use EDR data.
With three developers and three proprietary methods, how to bring all this together? (How
developers validate the data will be out of scope.) Determining Truth EDR is a big challenge.
You can’t go out and measure EDR.

Need to decide by the September SC-206 meeting how much of a slip to request (3 or 6 mo).

They will keep Fred Proctor (NASA Langley Research Center) in the loop on their work.

SG-7 Data Linked Wind Information to Aircraft – Ernie Dash & Michael McPartland
- Guidance for Data Linking Current and Forecast Wind Information to Aircraft
  - “Best practices” guidance on use of wind data
  - Guidance for the methodology, reporting, and recommended quality of wind
    information necessary to support X, Y and Z
  - Key question: How good does the winds info need to be to support envisioned apps?
  - The plan is to release the doc for FRAC comments following March 2016 meeting
- Challenges
  - Wind (and temperature) applications impact flight planning and execution
  - Three other RTCA Special Committees are affected
    - SC-186 (ADS-B Applications)
    - SC-214 (Data Comm)
    - SC-227 (FMS Systems)
  - Multiple stakeholders are affected
    - ATM/ATC
    - Airline AOC
    - Pilots
    - Weather providers
    - Aircraft & avionics manufacturers
  - Need cross-cutting participation from various domains; recruiting members
- Results this week
  - Baseline who knows what?
    - Lack set of documents/information for decision making
    - No audit trail on logic for “ATC” Winds solution
  - Determine which RTCA SCs need what
    - No audit trail on need for common information
  - Establish/categorize SG-7 deliverable(s)
Summary of the 39th Meeting
RTCA SC-206 – AIS/MET Data Link Services

➢ A-IM Winds Input to SC-214/WG-78 by July 2015
  o Determine who SG-7 needs in order to produce deliverables
    ➢ Immediate coordination meeting among A-IM stakeholders
    ➢ Dispatchers, ATC, Weather Providers; Lack active participation
  o Establish work plan and schedule
    ➢ In development
  o Participated in SC-214/WG-78 Thursday session (A-IM and Winds topics)
    ➢ Offer to join A-IM Tiger Team declined
    ➢ SG-7 wind input support to be done as separate activity
  o Coordination activity for A-IM winds requirements
    ➢ Need meeting organized with representatives
    ➢ Is coordination done through SG-7 or SC-206?

Comments / questions:
Does Don Walker (DFO of SC-186) have a requirement for winds?
-- Eldridge and Moin took an action to talk with him to determine what is needed from SC-206 / SG-7 regarding winds.

SC-214 is building a message set that would support ATC providing wind/temperature information to aircraft. They intend to be done with their SPR changes by the end of the year; and they don’t want to delay that deliverable date. SG-7 may produce something that may mean future work for SC-214.

It was pointed out that there is already an operational Time-Based Separation (TBS) system at LHR using winds information downlinked via Mode S transponders. That is not reflected here, and SG-7 needs to take that into account. There is also a European mandate to roll this out at more airports. We don’t want to produce a document that doesn’t factor in something that’s already working. Is SG-7’s scope broader than IM and winds?
-- Yes. SG-7’s scope is broader than that. SG-7 will take the TBS system into account.

Who could brief on the TBS system?
-- Ed Johnson took an action to see whether a Lockheed Martin presentation on it could be released.

What are the next steps for SG-7?
-- Bi-weekly telecons Tuesdays at 10AM. Contact Amanda (chambers@avmet.com) for specifics if you would like to participate.

12. Action item status

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<th>Action</th>
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<tr>
<td>263b</td>
<td>Eldridge</td>
<td>Ask Jim Baird to brief SC-206 on the 1090 MHz congestion analysis after the report comes out from FAA Systems Engineering.</td>
<td>Dec 2011 DC</td>
<td>Open</td>
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<tr>
<td>269</td>
<td>Rocky</td>
<td>Coordinate with ARINC re data labels for SG-1 (EDR, weight, wake circulation)</td>
<td>June 2012 Atlantic City</td>
<td>Open Ongoing</td>
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<tr>
<td>282</td>
<td>Moin</td>
<td>Clarify what type of AIS/MET data link MOPS would be needed, if one or multiple MOPS are needed, or one with different sections for different systems.</td>
<td>March 2014 Kansas City</td>
<td>Open</td>
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13. **Industry coordination**

ICAO recently established the Information Management Panel (IMP) to develop a system-wide approach to information management within the air navigation system. The IMP will look at information exchange formats and further development of SWIM. Goals include global interoperability and standardization across data domains, the evolution of MET services towards digital exchange, and a review of the NOTAM system. Allan Hart participated in the Governance working group, led by Stephane Dubet. Considerations for this group include defining what compliance with SWIM means and how to measure it; and guiding principles for data quality and how it can be defined and measured.

14. **Future meetings**

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<tr>
<th>Date</th>
<th>Location &amp; (Host)</th>
<th>Goals on current timeline</th>
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| Sept 14 – 18, 2015 | Chicago (United Air Lines)  
(To be confirmed) | SG progress on their deliverables       |
| Dec 7 – 11, 2015     | Washington DC                      | Approve AIS/MET MASPS for FRAC         |
| March 2016         | TBD                                | Resolve MASPS FRAC comments            |
|                   |                                    | Approve Winds Guidance for FRAC        |
| June 2016          | TBD                                | Resolve Winds Guidance FRAC comments   |
| Sept 2016          | TBD                                | Approve EDR MOPS for FRAC              |
| Dec 2016           | TBD                                | Resolve EDR MOPS FRAC comments         |

15. **Any other business**

Thanks to our hosts and to everyone for their effort. This concluded the 40th meeting of SC-206.

CERTIFIED as a true and accurate summary of the meeting.

_Tom Evans, Secretary_

_Rocky Stone, Co-chair_  
_Allan Hart, Co-chair_