

Summary of the Fourth Meeting

Special Committee 203

Minimum Performance Standards for Unmanned Aircraft System and Unmanned Aircraft

The Fourth Meeting of SC-203 was held on September 13 - 16, 2005 at RTCA, Inc. 1828 L Street, NW, Suite 805, Washington, D.C. 20036. The following participants were in attendance:

| Name | Company Name |
|-----------------------|--|
| Thomas Bachman | AAI Corporation |
| Mark Ballinger | Raytheon Systems Company |
| David Barstow | CSSI, Inc. |
| Harold Becker | Aircraft Owners and Pilots Association |
| Yi Bian | Innovative Solutions Int'l, Inc. |
| Robert Boetig | MITRE Corporation/CAASD |
| Arne Bruflat | SRS Technologies |
| Franklin Calkins, Jr. | DCS Corporation |
| Mark Cato | Air Line Pilots Association |
| Ellis Chernoff | Air Line Pilots Association |
| James Conniff | Sagem Morpho Inc. |
| Gary Dehnel | U. S. Coast Guard |
| Sarah Dicke | National Business Aviation Association |
| Daniel Dittenber | U. S. Army |
| Jim Duke | Air Line Pilots Association |
| William Eischens | Modern Technology Solutions, |
| Joe Ethier | Sierra Nevada Corporation |
| Kirk Falk | ARINC Engineering Services,LLC |
| Gregory Frye | Federal Aviation Administration |
| Stephen George | Federal Aviation Administration |
| Doris Hamill | NASA |

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| Henri-Pierre Hirts | Northrop Grumman Corporation-ES |
| Yan-Shek Hoh | MITRE Corporation/CAASD |
| Marca Johnson | JSWalker Group/Aviation Solutions, Inc. |
| Stan Jones | Lockheed Martin Corporation |
| Rose Karolenko | AAI Corporation |
| Kimberly Keeney | The Boeing Company |
| Gene Kelly | Kansas UAV Consortium |
| Randy Kenagy | Aircraft Owners & Pilots Association |
| Thomas King, Jr. | MilSys Technologies, LLC |
| Amy Kransteuber | U. S. Army |
| Dirk Kuegler | DFS Deutsche Flugsicherung GBH |
| Andrew Lacher | The Mitre Corporation |
| Leonard Ligon | U. S. Air Force |
| Greg Loegering | Northrop Grumman Corporation- ES |
| David Maroney | MITRE Corporation/CAASD |
| Raymon McAdaragh | Federal Aviation Administration |
| Mark Micieli | MTSI |
| Bryan Miessler | U. S. Air Force |
| Madeleing Miguel | Federal Aviation Administration |
| Carl Mikeman | Northrop Grumman Corporation- ES |
| John Moore | Rockwell Collins, Inc. |
| Thomas Mulkerin | Mulkerin Associates Inc. |
| Michael Neale | General Atomics Aeronautical Systems |
| Don Nellis | Federal Aviation Administration |
| Nuke Newcome | SRA International, Inc. |
| Lee Nguyen | Federal Aviation Administration |
| Bruce Paul | Mulkerin Associates Inc. |
| Alexander Phillips | National Science and Technology |

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| Phil Potter | Federal Aviation Administration |
| James Ramage | U. S. Air Force |
| Benjamin Ratliff | Remote Recon |
| Rudolph Ruana | RTCA, Inc. |
| Sarbhpreet Sawbrey | Federal Aviation Administration |
| Ryan Schaefer | SRA International, Inc. |
| Michael Schlabach | DARPA |
| Stephen Schmidt | Bell Helicopter Textron, Inc. |
| Ivan Somers, PhD | GTP Associates LLC |
| David Strohm | United Airlines, Inc. |
| Gerald (Jed) Sturman | The Boeing Company |
| Steve Swartz | Federal Aviation Administration |
| John Timmerman | Federal Aviation Administration |
| Jim Troxel | ACSS - L3 Communications |
| Nancy Vachon | Transport Canada |
| John Walker | JSWalker Group/Aviation Solutions, Inc. |
| Michael Wilson | MilSys Technologies, LLC |
| Bette Winer | MITRE Corporation/CAASD |
| Andrew Zeitlin | MITRE Corporation/CAASD |
| Carlos Zengotita | U. S. Navy |

1. Co-Chairman’s Introduction

- a. Mr. Randy Kenagy, SC-203 Co-Chair, presented an overview of the 9/13/04 Special Sessions, which focused on the FAA certification process, UAS operations, and operating in today’s NAS, and a presentation from Mr. Dkye Wetherington, Department of Defense, on the status of sense and avoid technologies.
- b. Mr. Kenagy introduced Co-Chair , Mr. John Walker and the Designated Federal Official, Mr. James Sizemore.
- c. Mr. Rudy Ruana of the RTCA gave administrative remarks
- d. Mr. Sizemore presented an update from the FAA on UAS activities.
 - a. He stated that UAS activities are broad in nature involving DOD, DHS, Local Governments, Industry, International, Certification, plus Guidance and Regulation development. It is a complex problem with many tough questions with no easy answers.
 - b. The participation from the UAV “Community” continues to expand and challenges include:

1. Balancing the establishment of a foundation with development of detailed performance requirements in various functional areas.
 2. Understanding the various perspectives of the participants.
 3. Getting “Products” developed that are timely and of good quality.
 - c. The effort is going in the “Right Direction.”
2. Mr. Kenagy invited the participants to introduce themselves, identify who they were representing and their interest in UASs.
3. A leadership update since the Third Plenary was provided :
 - a. There have been weekly Leadership Steering Group (LSG) teleconferences
 - b. There have been two face-to-face LSG meetings
 - c. There have been two virtual meetings
 - d. Members of the LSG have participated in in the following outreach efforts:
 - a. Attended the UVS International meeting in Paris, France.
 - b. Published an article in the UVS International Year Book.
 - c. Drafted an article for the Aerospace America December 2005 edition.
 - d. Participated in “Airports 2025”
 - e. The LSG facilitated tutorials for certification, UAS operations and airspace.
4. Review of Third Plenary Meeting Summary
 - a. Having received no comments or objections, the meeting summary was approved.
5. The Plenary was adjourned until Friday, September 16, 2005, at 1 PM

1. SC-203 Working Group One (WG1) was convened to review the following:
 - a. Document Progress
 - b. Sub-group update
 - c. WG1 recommendation that the UAS MASPS be divided into two documents
 - d. Sub-group break out sessions
2. WG1 Document Status
 - b. Goal is to have Section 1 completed by end of this meeting
 - c. Sections 2&3 to continue as work in process
3. SG1 (Document Integration) Update
 - d. Have held five meetings since June
 - a. Completed the following papers
 1. Assumptions
 2. Terminology
 3. Introduction
 - b. Section 1 will be posted on the KSN and distributed for WG1 review at the end of this meeting.
4. SG2 (Operations) Update
 - e. Events and Progress
 - a. Have held nine teleconferences since June
 - b. Have had one face to face meeting since June
 - c. NAS description has been completed for Section 1
 - d. The Expanded Scenario Query is almost complete and ready for posting on the KSN
 - e. The Section 2 outline draft is complete
 - f. UAS NAS operational Functions by “Phase of Flight” document was delivered to SG3.
 - f. Completion Plan for SG 2
 - a. The “Expanded Scenario Query” is being finalized and the data collected resulting in:
 1. The operations autonomy scale is being completed and an explanatory text will be provided
 2. The “groupings scheme” based on airspace type access will be completed
 3. Data being incorporated into the “UAS NAS Operational Functions by Phase of Flight” document being completed
 - b. UAS MASPS Section 2 outline to be reviewed and modified
 - c. The “UAS NAS Operational Functions by “Phase of Flight” document will be completed by adding explanatory narrative to the functions.
5. SG3 (Systems) Update
 - g. Working Paper Status
 - a. SG3 Standard Operating Procedures
 1. Original version (rev A) has been posted on the KSN

2. Plan to release a formal update at this meeting
 - b. UAS System Description was approved and delivered to WG1
 - c. Fourth version of the “List of Relevant Standards” posted, no comment papers received to date.
 - d. Role of Pilot in Manned Aircraft
 1. Third Version (rev C) posted, one comment paper against Rev B being considered.
 2. UAV AC Review of FAR 23 Applicability
 - a. Initial version posted and , no comments as of this date
 3. List of Assumptions approved by SG2 and provided to WG1.
 4. Spectrum Issues Overview
 - a. Work in progress, Spectrum Issue is not time-critical to near term sub-group progress
 - e. Tasks/Goals for Fourth Plenary
 1. Update Work Plan in consideration of new document organization direction.
 2. Review Papers
 3. Brainstorm potential approaches to functional decomposition and reference architectures
6. Mr. Greg Logering from SG3 presented a proposal for Working Group 1 consideration .
- h. The proposal recommended that:
 - a. The UAS MASPs be divided into two documents
 - b. Document #1 would be entitled “Guidance Material and Considerations for UAS”
 - c. Document #2 would remain as the UAS MASPS
 - d. Commence formation of Working Group 2 (WG2/Detect, Sense and Avoid (S&A)) and Working Group 3 (WG3/ (Command, Control, Communications, (C3)) in order to support development of the UAS MASPS
 - i. There was a review of SC-203’s Terms of Reference (TORs) to remind members what the committee’s documents are required to accomplish:
 - a. Be useful to designers, installers, manufacturers, service providers and users of systems intended for operational use within a defined airspace
 - b. Describe the system (subsystems / functions) and provide information needed to understand the rationale for system characteristics, operational goals, requirements and typical applications.
 - c. Define the UAS operations being considered for realistic implementation, not necessarily provide a concept for all possible UAS operations in all possible airspace.

- d. Illustrate how UAS will safely operate in the National Airspace System (NAS) in the foreseeable future.
- j. The UAS MASPS is not intended to be a “soup to nuts” UAS certification handbook
 - a. It is only one part of a UA certification basis
 - 1. For airworthiness approval
 - 2. For operational approval
 - b. It will not generally deal with the airframe, brakes, power plants and other vehicle related topics
 - c. It is not a detailed set of performance standards
 - 1. The UAS MASPS will contain some higher level requirements
 - a. These will focus on operational requirements, not allocated system requirements.
 - 2. The TORs identify two lower level MASPS (S&A; C3)
 - a. These are anticipated to contain detailed performance standards
- k. Purpose of the proposed Change
 - a. Provide additional focus needed to move forward
 - b. Provide further guidance to SG3 on work scope and document title
 - c. Enable appropriate level of work planning
 - d. Get a set of “guidance material’ in the hands of the UAS community.
- l. Rational for recommendations
 - a. Recommendation 1: Divide the current UAS MASPS scope into two distinct documents, to be released sequentially
 - 1. The work to fully validate quantitative standards is both necessary and time consuming to fully develop the anticipated UAS MASPS
 - 2. In the near term it is useful to release initial guidance material and qualitative considerations in further development of the detailed quantitative performance standards
 - b. Recommendation 2: Initial document titled “Guidance Material and Considerations for Unmanned Aircraft Systems”
 - 1. Provide key definitions and assumptions to the UAS community
 - a. Definitions to be a consensus statement representing the harmonized views of both piloted and unmanned aircraft communities
 - 2. Describe the National Airspace System (NAS) environment

- a. Includes intended UAS operations, and how these new vehicles and associated systems would be integrated into the existing NAS
- 3. Provide a high level systems-oriented description of the basic taxonomy of UAS
 - a. Based on systems currently in service and projected in the foreseeable future
- 4. Identify unique functional allocations that distinguish UAS implementation from those of manned aircraft
 - a. Focus on understanding how existing functional allocations and associated standards are impacted by either:
 - i. Remotely locating the pilot, or
 - ii. Transferring responsibility from direct human control to automation
 - b. Identify available performance standards and assess their adequacy for use in certification of UAS
 - i. Provide an approach as to how those gaps should be closed
 - ii. Focus on identifying future work to be performed by SC-203
 - iii. More detailed analysis of these standards to follow in order to better quantify the remaining gaps
 - c. Provide the framework for establishing sub-functional teams to continue the future, more detailed work of SC 203.
- c. Recommendation 3: The second document would retain the title “UAS MASPS”
 - 1. This Document to contain quantitative performance standards
 - a. Specific focus on UAS level operational performance
 - b. Would be the natural extension of current work of the Operations Subgroup
 - 2. The UAS MASPS would build on functional allocations identified in the Guidance Material
 - a. Provide guidance for later C3 MASPS and SA MASPS and other potential MASPS as required
- d. Recommendation 4: The C3 & S&A working groups should be initially organized to support the UAS MASPS development
 - 1. These working groups should be formed when the first draft of the Guidance Material is under Working Group 1 consideration

- a. Availability of a complete draft of Guidance Material is a natural and appropriate point in work flow to organize Working Groups 2 & 3
 - 2. When UAS MASPS is under Working Group 1 consideration, the C3 and SA will begin work on their respective functional documents
 - e. A discussion ensued on the product work flow relationships and any changes to the Plenary approved outline for the original UAS MASPS
 - 1. There would be no change to the Plenary approved outline for the “Guidance Material”
 - 2. There would be no change to the Plenary approved Section 1 Introduction
 - 3. There would be no change to the Plenary approved Section 2 Operational Characterization
 - 4. Section 3 would focus a qualitative Standards Development Approach to fundamentally address:
 - a. Functional Allocation Analysis
 - b. Preliminary Requirements Gaps Analysis
 - c. Standards Generation Framework
 - 5. The quantitative work as it relates to the Standards Development Approach would be addressed in Document #2 “UAS MASPS”
7. Proposal from Mr. Loegering was approved by WG1 to forward to the Plenary.
8. WG1 broke out into its sub-groups to work on specific tasks
9. WG1 meeting reconvened on September 16, 2005 at 1 PM
 - a. The SG leads provided summaries from their break out session and near term milestones
 - f. SG 1:
 - 1. Revised the Assumptions, Terminology and compiled Section 1 of the Guidance Material.
 - 2. Guidance Terminology now has:
 - a. Mode of Flight
 - b. Phase of Flight
 - c. Control Links
 - d. Visual Line of Sight
 - e. The SG1 lead requested that all of those present check the KSN and make comments as necessary.
 - 3. In the UAS Guidance Section revisions made to the:
 - a. Introduction which now include:
 - i. NAS Description
 - ii. Moving details to Appendix B and C
 - 4. The Terminology now includes:
 - a. An overview of the Scope

- b. There were minor edits of the assumptions
 - 5. SG1 has completed the UAS Guidance Section 1. It will be posted on the KSN on September 19, 2005 for WG 1 review with comments requested on or before November 1, 2005
 - g. SG 2 Plan
 - 1. Operations will be “Characterization” based
 - 2. Section 2 Outline will be reviewed and revised as required
 - 3. Air Operations will be the main output for Section 2
 - a. It will consist of two documents
 - i. Guidance Material
 - ii. Operational Standards
 - 1. Previous progress will have to be revisited as a result of first MASPS now having two sections.
- h. SG 3 Summary
 - 1. Reviewed materials from sub-group 2
 - 2. Reviewed and updated Work Plan
 - a. SG 3 now has four Sub-Sub Groups to cover various areas
 - 3. Reviewed and sub-group approved two working papers
 - 4. Reviewed communication plan
 - 5. Work Plan Updated and summary provided
 - a. Functional Allocation (Section 3.1)
 - i. Anticipate baseline Operational Function input from SG 2 by 31 October, 2005
 - ii. Goal to complete draft materials by November 22, 2005 telecon
 - b. SG3 will now have a GAP Analysis (Section 3.2)
 - i. Organized by sub-subgroups
 - ii. Complete drafts of individual sections by 10 January
 - iii. Integration / review by 26 January 2006 (end of Plenary 5)
 - 6. Approach to Developing Standards (Section 3.3) SG 3 to be completed by March 15, 2006
 - 7. Final review / complete draft materials to sub-group 1 by 30 March 2006 at the conclusion of Plenary 6

m. Working Group 1 meeting was adjourned

SC-203 Plenary meeting was reconvened

1. Closing remarks:
 - a. Mr. Kenady, Co-Chair:
 1. Plenary #5 will be held January 24 – Jan 26, 2005 in San Diego, CA. Location to be announced at a later which will be communicated via the Secretariat, posted on the KSN, and published in the Federal Register.
 2. Plenary #6 will be the on March 27, 2005 at the RTCA offices in Washington, DC.
 3. Plenary #7 will be scheduled sometime in September 2006 to be disclosed at a later date.
 - b. Mr. Walker, Co-Chair:
 1. There has been much value added as a result of the operational attendees, , who I would like to thank for their contributions.
 2. During this Plenary a lot of work has been accomplished and all are encouraged to continue the cross polinization for the benefit and education of all concerned.
5. There being no more business the Plenary adjourned

/S/ Patrick P. Marsha
Secretary

Certified as a true and accurate summary of the meeting

//Signed//
Randy Kenady
Co-Chairman

//Signed//
John S. Walker
Co-Chairman

//Signed//
James Sizemore
DFO