Further to the health situation the face to face meeting planned in Niagara Falls Ontario is cancelled. Meeting 169 will take place as a virtual event essentially focused on document development.

The main features of this agenda are:
- Breakout sessions to be completed prior to the meeting, time slots to be defined by panel chairs.
- Panel and A-6 committee meetings from Tuesday Sept 29 to Wednesday Oct 7, 8:00-10:00 AM Pacific Daylight Time (UTC -7) / 5:00-7:00 PM Central European Summer Time (UTC +2).
- Short course: “Introduction to Aircraft Hydraulic System Design and Certification” in two parts, on Thursday Oct 8 and Friday Oct 9, same hours as above.

A $100 discount applies for short course registration prior to Aug 28, 2020.

To members who are unable to attend

Voting members who are unable to attend a meeting in person may appoint an alternate in their place if:
- The absent Committee and/or Panel member has notified in writing (email) to the relevant Committee and/or Panel Chairman in advance of the meeting, providing all contact information for the alternate
- The absent member has pre-briefed the alternate on all topics, documents, and actions planned to be covered during the meeting so that the alternate is prepared to act in the absent member’s stead
- The alternate is only representing the Committee/Panel member who made the appointment (i.e., a Committee/Panel member may not ask another Committee/Panel member to represent both himself and the member unable to attend, which means no person can have more than one vote, or in other terms, a Panel member cannot be represented by another member of the same Panel)
- A liaison member can be designated as an alternate for a specific meeting when a member is unable to attend or send another person from the organization.

Alternates are counted towards committee/panel quorums and allowed to vote in the original member’s place.
# AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

## SAE COMMITTEE A-62

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### Schedule

1. **#1**: 11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr
2. **#2**: 12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr
STEERING COUNCIL
Monday Sept 28
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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S1. Introduction, Attendance, Meeting 167 minutes approval

S1.1 Introduction – Chairman Halley
S1.2 Roll Call – Secretary Dickey
S1.3 Meeting 168 Minutes Approval - Secretary Dickey
S1.4 Review of Actions - Secretary Dickey

S2. Overall A-6 and Panel Meeting Agenda

S2.1 Any issues/improvements for future meetings – Vice-Chairman van den Bossche

S3. Operational and Organization Issues

S3.1 Leadership
S3.2 Committee A-6 Structure, Appointees, and Membership
S3.2.1 A-6 Structure
S3.2.1.1 Any changes suggested to A-6 structure – All
S3.2.2 Appointees
S3.2.2.1 Any new appointees required – All
S3.2.3 Membership
S3.2.3.1 Confirmation of members proposed from Meeting 168 - Chairman Halley
S3.2.3.2 Identification of potential new members – All

S4. Strategic Issues

S4.1 How A-6 adapts to and positions itself relative to new technologies - Chairman Halley

S5. Symposium

S5.1 Fall 2020 Symposium – Professor Maré
S5.2 Future Symposiums - All

S6. Review and Action on Current Issues

S6.1 Inconsistent Requirements across Specs – Chairman Halley
S6.2 Joint Projects with Other SAE TCs – All
S6.2.1 Follow up with joint activities with A-5 - All

S7. A-6 Charters

S7.1 Review of A-6 and Panel Charters – Chairman Halley/Dr. Zielinski

(Continued on next page)
STEERING COUNCIL
Monday Sept 28
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

S8. Short courses
S8.1 Proposals for future meeting short courses – Vice-Chairman van den Bossche

S9. A-6 Documents
S9.1 Any Proposals for New Documents of General Interest – All
S9.2 A-6 Document Status
S9.2.1 AS1290 – “Graphic Symbols for Aircraft Hydraulic and Pneumatic Systems” – Mr. Keenan
S9.2.2 AIR737 “Aerospace Hydraulic and Pneumatic Specifications, Standards, Recommended Practices, and Information Reports” – Chairman Halley/Mr. Covington
S9.2.3 ARP1383 – “Aerospace - Impulse Testing of Hydraulic Components” – Mr. Rieder
S9.3 A-6/A-5 Document List – Secretary Dickey

S10. Document Quality – Mr. Keenan

S11. SC Technical Topics – All

S12 Communication – Secretary Dickey

S13. Performance Recognition – Mr. Schofield
Lessons Learned Appreciation Certificates

S14. SAE Staff Report – Ms. Lloyd

S15. Treasurer’s Report

S16. ISO Liaison - Dr. Zielinski

S17. Policies & Procedures - Dr. Zielinski

S18. Subcommittee Reports
S18.1 A-6A System/Subsystem Integration - Mr. Covington
S18.2 A-6B Actuation and Control - Mr. Besliu
S18.3 A-6C Power Generation and Control - Dr. Zielinski

S19. Future Meetings
S19.1 Spring 2021: - Ms Lloyd
S19.2 Fall 2021 & 2022 Meetings - All

S20. Other Business
Please contact Chairman Halley to request additions to this agenda.

S21. Meeting Adjournment
Welcome and Introduction to Committee A-6

Chairman Ian Halley

Video, TBC

- Role and Mission of A-6
- Committee A-6 Structure and Leadership:
- Organization and responsibilities of the Subcommittees and Panels.
- Summary of Meeting Agenda and Logistics
- Breakout sessions : objective is to take benefit of the full day for working together
- Symposium, - Focus on Lessons Learned
- Short courses: an opportunity to fulfill learning needs and to bring new comers to A-6
- Social Events
- Upcoming meetings
### COMMERCIAL AIRCRAFT ~ PANEL A-6A1

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<td>Achieving Cleanliness Standards for Aircraft Hydraulic Systems During Manufacture</td>
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<td>Aerospace, Passive Side Stick Unit, General Requirements for Fly-By-Wire Transport and Business</td>
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### HYDRAULIC SERVO ACTUATION ~ PANEL A-6B1

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### SEALS ~ PANEL A-6C2

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<td>Gilbert</td>
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<td>PTFE Cap strip seal lesson learned</td>
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<td>AIRXXXXX</td>
<td>Rotary Seals Document - plan / roadmap</td>
<td>Movahead</td>
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<td>O-ring Dynamic Seal testing and rigs</td>
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## COMPONENTS ~ PANEL A-6C5

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</table>
COMMERCIAL AIRCRAFT ~ PANEL A-6A1
Tuesday Sept 29
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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A1.1 Opening Remarks, Attendance and Membership Review – Chair Todeschi

A1.1.1 Attendance and Membership Review – Secretary Huynh will conduct the roll call. Secretary Huynh will report on the panel membership.

A1.1.2 Review and Approval of Previous Meeting Minutes – Secretary Huynh

A1.2 Project Status – Works in Progress

A1.2.1 ARP6277 (Project A6A1-13-01) - Commercial Aircraft Hydraulic System Sizing – Sponsor, M. Plamondon

A1.2.2 ARP6175A (Project A-6A1-19-02) – Commercial Aircraft Hydraulic System External Leakage (also ARP1084 External Hydraulic Leakage for In-Service Components) – Sponsor, S. Nist

A1.3 5 Year Document Review

A1.3.1 ARP4752B - Aerospace - Design and Installation of Commercial Transport Aircraft Hydraulic Systems – Mr. L. Engstrom will present the results of his review and propose any updates

A1.3.2 ARP6200 - Test Requirements and Means for Commercial Aircraft Hydraulic Systems – Mr. N. Huynh will present the results of his review and propose any updates

A1.3.3 ARP4925B Aerospace - Design and Installation of Transport Helicopter Hydraulic Systems – Mr. R. P. Reynolds will present the results of his review and propose any updates

A1.3.4 ARP4941B Aerospace - General Requirements for Commercial Aircraft Components – Mr. Y. Bergfeldt will present the results of his review and propose any updates

A1.3.5 AIR6185 Aerospace - Lightning Effects on Hydraulic Transport Elements on Aircraft – this document is due for five-year review on 28 Aug 2020. A volunteer is sought to conduct the review.

A1.3.6 AIR5005A Aerospace - Commercial Aircraft Hydraulic Systems – this document is due for five-year review on 21 Sept 2020. A volunteer is sought for the review.

A1.4 Project Status – Documents in Development

None planned.

(Continued on next page)
A1.5. Lessons Learned

Lessons learned from past meetings to be advanced:

A1.5.1 Uncommanded Surface Motion due to Magnet – M. Todeschi

A1.6. Liaison Reports

Postponed to next meeting

A1.7. Presentations

Postponed to next meeting

A1.8. Vice-Chair’s Report

Postponed to next meeting

A1.9. Chairman’s Report

Postponed to next meeting

A1.10. Unfinished Business

A1.11. New Business

A1.12. Adjournment
MILITARY AIRCRAFT ~ PANEL A-6A2
Tuesday Sept 29
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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MILITARY AIRCRAFT ~ PANEL A-6A2
Tuesday Sept 29
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

A2.1 Opening Remarks, Attendance and Membership Review

A2.1.1 Attendance and Membership Review
Chair J. Rieder will open the meeting and Secretary Marini will conduct a roll call

A2.1.2 Approval of Virtual Spring 2020 Meeting Minutes
Vice-Chair S. Lohe will request if there are any comments on the previous Panel minutes and ask for a vote to approve the minutes

A2.1.3 Chair’s Report.
Chair Rieder will provide a presentation on news and updates within the Military Aviation community since the last A-6A2 Meeting

A2.2 Project Status – Work in Progress

A2.2.1 AS5440B (Project A6A2-14-2), Design and Installation Requirements for Aircraft Hydraulic Systems – Sponsors Mr. C. Marini and Mr. J. Rieder

A2.2.2 AIR1899B (Project A6A2-07-1), Aerospace Military Aircraft Hydraulic System Characteristics - Sponsor R. Reynolds

A2.2.3 AIR1657C (Project A6A2-08-3), Handbook of Hydraulic Metric Calculations - Mr. J. Sztul and Mr. P. Keenan on Sponsor Marini behalf. Panel needs to designate a sponsor

A2.2.4 ARP8447 (Project A6A2-17-1), Methodology for Testing Pump Pulsation in Aircraft and Iron Birds - Sponsor S. Lohe

A2.2.5 ARP5891A (Project A6A2-19-2), Achieving Cleanliness Standards for Aircraft Hydraulic Systems During Manufacture – O. Mr. Collet

A2.2.6 AS8775A (Project A6A2-19-3), Hydraulic System Components, Aircraft and Missiles, General Specification For - Sponsors B. Perry and R. Lim

A2.3 Five Year Review

Four documents are up for five-year review:

A2.3.1 AS5440A Design and Installation Requirements for Aircraft Hydraulic Systems (In Work)

A2.3.2 AIR1899A Aerospace Military Aircraft Hydraulic System Characteristics (In Work)

(Continued on next page)
A2.3.3 AIR1657B Handbook of Hydraulic Metric Calculations (In Work)

A2.3.4 AIR5891 (Project A6A2-19-2) Achieving Cleanliness Standards for Aircraft Hydraulic Systems During Manufacture (In Work)

A2.3.5 AS8775 (Project A6A2-19-3) Hydraulic System Components, Aircraft and Missiles, General Specification For (In Work)

A2.4 Project Status – Documents in Development

A2.4.1 Project A6A2-19-1 Methodology for Testing Modal Characteristics in Tubing Mr. J. Rieder

A2.5 Lessons Learned

A2.5.1 “Hydraulic System Failures Resulting from Environmental Forcing Frequencies” - Mr. J. Rieder

A2.5.2 “Uncommanded Ground Roll Event Due to Yaw Pedal Design” – Mr. J. Rieder

A2.6 Liaison Reports

Postponed to next meeting

A2.7 Vice-Chair’s Report

Postponed to next meeting

A2.8 Presentations

Postponed to next meeting

A2.9 Unfinished Business

A2.9.1 ARP1084 vs. ARP6175 - A-6A1 Liaison to give status of documents

A2.10 New Business

A2.11 Adjournment
FLIGHT CONTROL AND VEHICLE MANAGEMENT SYSTEMS
PANEL A-6A3
Wednesday Sept 30
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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A3.1 Opening Remarks, Attendance and Membership Review - Chair H. Beaton

A3.1.1 Attendance and Membership Review - Secretary L. Engstrom will call the roll. Panel Chair Beaton will review the panel charter and report on recent changes to panel membership.

A3.1.2 Review and Approval of Minutes from the Spring 2020 Meeting – Secretary Engstrom

A3.1.3 Chair’s Report – Panel Chair Beaton will provide an overview of panel activities.

A3.2 Project Status – Work in Progress

A3.2.1 AIR5273A (Project A6A3-12-04) Actuation System Failure Detection Methods. Sponsor U. Perrin will report.

A3.2.2 AIR5875 (Project A6A3-17-04) Methodology for Investigation of Flight Control System Anomalies. Sponsor M. Boas will report.


A3.2.4 ARP6001 (Project A6A3-17-06) Aerospace, Passive Side Stick Unit, General Requirements for Fly-By-Wire Transport and Business. Sponsor P. Bettini will report.

A3.2.5 ARP94910 (Project A6A3-18-01) VMS Flight Control Design, Installation and Test for Military, Unmanned Aircraft, Specification for. Vice-Chair F. Fazi will report.

A3.2.6 ARP5770 (Project A6A3-18-02) Mechanical Control Design Guide. Sponsor T. Maeda will report.

A3.2.7 AIR5428 (Project A6A3-18-02) Utility System Characterization, an Overview. Secretary Engstrom will report.

A3.3 Five Year Review

A3.3.3 AIR5992 Descriptions of Systems Integration Test Rigs (Iron Birds) For Aerospace Applications. Chair Beaton will report.

A3.4 Project Status – Documents in Development


A3.4.2 ARP5775 (Project A6A3-07-03) Skew and Disconnect Detection in High Lift Systems. Sponsor U. Perrin will report.

(Continued on next page)
FLIGHT CONTROL AND VEHICLE MANAGEMENT SYSTEMS
PANEL A-6A3
Wednesday Sept 30
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

A3.5 Lessons Learned
A.3.5.1 (Project A-6A3-19-03) Digital Signal Wrap-Around Integrity Checks – Mr. F. Dones

A3.6 Liaison Reports
Postponed to next meeting

A3.7 Presentations
Postponed to next meeting

A3.8 Vice-Chair’s Report
Postponed to next meeting

A3.9 Unfinished Business
None

A3.10 New Business

A3.11 Adjournment
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HYDRAULIC SERVO ACTUATION ~ PANEL A-6B1
Wednesday Sept 30
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

B1.1 Opening Remarks – Chairman Dan Zierten

B1.1.1 Attendance and Membership Review – Secretary Simkin
B1.2.2 Approval of June 2020 Meeting Minutes - Chairman Zierten
B1.2.3 Chairman’s Report – Zierten

B1.2 Project Status – Work in Progress

B1.2.1 ARP5554 (Project A6B1-07-01), “Guidelines for Specifying LVDTs and RVDTs.” Mr. Baranovskis will present and discuss the status of this new document.


B1.2.3 ARP-TBD (Project A6B1-18-01) “Modeling and Simulation Considerations for Actuation Systems”. Mr. DeFusco and Mr. J. Sztul will report on the status of this new document.

B1.2.4 ARP-TBD (Project A6B1-19-01) “Guidelines for Specifying Synchro/Resolvers”, Mr. Baranovskis will present the status of this new document.

B1.2.6 ARP5796A (Project A6B1-19-03) “Flight Critical Control Valves, Military Aircraft” Mr. Zierten will report on the status of this document revision.

B1.2.7 ARP4493B (Project A6B1-19-05) “Aerospace – Direct Drive Servovalves”. Mr. Greetham will present results of his review and proposal for this document.

B1.3 Five-Year Document Review


B1.4 Project Status – Documents in Development

B1.4.1 ARP-TBD (Project A6B1-19-02) “Dynamic Seal Comparative Test and Qualification Methods”. Mr. Zierten will report on this new project

B1.4.2 ARP-TBD (Project A6B1-20-01) “Servoloop Pressure Feedback Transducer”. Mr. Greetham will report on this new project.

(Continued on next page)
B1.5 Lessons Learned
B1.5.1 “System Modeling” by Dave DeFusco
B1.5.2 Solicitation for future Lessons Learned

B1.6 Liaison Report
None

B1.7 Vice Chairman Report
Postponed to next meeting

B1.8 Presentations:
None planned.

B1.9 Unfinished Business
B1.9.1 Servoactuator Interface ARP, Mr. Greetham

B1.9.2 ARP TBD (Project A6B1-17-01) Utility System Linear Hydraulic Actuator, Mr. D. Zierten

B1.10 New Business
Postponed to next meeting

B1.11 Adjournment
EHA ~ PANEL A-6B2
Thursday Oct 1st
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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EHA ~ PANEL A-6B2
Thursday Oct 1st
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

B2.1 Opening Remarks - Chairman Brian Barker
B2.1.1 Attendance and Membership review - Secretary Perrin
B2.1.2 Spring 2020 meeting minutes review and approval - Secretary Perrin
B2.1.3 Project Status – Works in Progress

B2.2 Five Year Document Review – Chairman Barker will present the status of documents requiring a five year review.

B2.3 Project Status – Documents in Development
B2.3.1 Project A6B2-07-1, ARP 5772 “EHA Reservoirs” – Mr. Bacchiocchi will report the status of this activity.
B2.3.2 Project A6B2-15-3, ARP 6354 “EHA Thermal Management” – Mr. Nist will report the status of this activity.
B2.3.3 Project A6B2-15-1, ARP 6352 “Sizing Considerations for EHA Pumps and Motors” – Vice Chairman Socheleau will report the status of this activity.
B2.3.4 Project A6B2-15-2, AIR 6353 “EHA/EBHA Applications on Aircraft Programs” – Chairman Barker will report the status of this activity.
B2.3.5 Project A6B2-16-1, ARP 7490 “General Guidelines for Motor Control Electronics for Electrically Powered Actuation” – Mr. E. Polcuch and/or Mr. M. Todeschi will report the status of this activity.
B2.3.6 Project A6B2-15-4, ARP XXXX “Recommended Trade Considerations” – Mr. Dillenger will present the status of this activity.

B2.4 EHA Activity Update
Postponed to next meeting

(continued on next page)
EHA ~ PANEL A-6B2
Thursday Oct 1st
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

B2.5 Lessons Learned
Postponed to next meeting

B2.6 Presentations
Postponed to next meeting

B2.7 Liaison Reports
Postponed to next meeting

B2.8 Vice Chairman's Report
Postponed to next meeting

B2.9 New Business

B2.9.1 New Business Items pertaining to Electrohydrostatic Actuation may be presented at this time.

B2.10 Adjournment
MECHANICAL AND ELECTROMECHANICAL ACTUATION SYSTEMS
PANEL A-6B3
Thursday Oct 1st
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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B3.1 Opening Remarks, Attendance and Membership Review – Chairman Jim Babinski

B3.1.1 Attendance and Membership Review – Secretary David Manzanares
B3.1.2 Spring '20 meeting minutes review and approval – Secretary David Manzanares
B3.1.3 Chairman’s Report – Chairman Jim Babinski

B3.2 Project Status – Work in Progress

B3.2.1 AIR6074 (Project A6B3-02-2) “Material Selection and Design Practices for Gear and Jackscrew Actuation Systems.” Mr. Beffa will report.

B3.2.2 AIR6016 (Project A6B3-06-1) “High Lift Systems Description” Mr. Perrin and Mr. Anderson will report.

B3.2.3 AIR8442 (Project A6B3-17-1) “Considerations for Prevention of Moisture Damage in Aircraft Electromechanical Actuation Equipment” Mr. Manzanares will report.

B3.2.4 ARP Proposal (Project A6B3–19-05) “General Guidelines for Specifying Motor Requirements for Electrically Powered Actuation” Mr. Black will report.

B3.3 Five-Year Document Review

B3.3.1 AIR6052 (Project A6B3–16-01) “Trimmable Horizontal Stabilizer Actuator Descriptions” Mr. Todeschi will report.

B3.3.2 ARP5724 (Project A6B3–19-01) “Aerospace – Testing of Electromechanical Actuators, General Guidelines For” Sylvain Alarie will report.

B3.3.3 ARP6131 (Project A6B3–19-02) “Maintenance and Inspection Procedures for Rotary and Linear Mechanical Actuators” Mr. Babinski will report.

B3.3.4 AIR6226 (Project A6B3–19-06) “Trimmable Horizontal Stabilizer Actuator structural load path integrity monitoring principles” Mr. Todeschi will report.

B3.4 Project Status – Documents in Development

B3.4.1 AIR Proposal (Project A6B3-19-03) “Failure Modes for High Lift Actuation Load Paths” Ms. Beaton will report.

B3.4.2 AIR Proposal (Project A6B3–19-04) “Seals and Wipers for Electromechanical Actuators” Mr. Babinski will report.

B3.5 Lessons Learned - Vice Chairman Errol Zatloff

Postponed to next meeting

(continued on next page)
MECHANICAL AND ELECTROMECHANICAL ACTUATION SYSTEMS PANEL A-6B3
Thursday Oct 1st
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

B3.6 Liaison Reports – Mr. Babinski to invite reports as applicable from:
B3.6.1 Power Sources Panel – Mr. Tom Olthoff
B3.6.2 Flight Controls Panel – Mr. Floyd Fazi
B3.6.3 EHA/IAP Panel – Mr. Brian Barker

B3.7 Vice Chairman’s Report – Vice Chairman Errol Zatloff
Postponed to next meeting

B3.8 Presentations
Postponed to next meeting

B3.9 Unfinished Business

B3.10 New Business

B3.11 Adjournment
JOIN WEBEX MEETING
Meeting number: 126 371 5049
Meeting password: Monday5

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C1.1  Opening Remarks, Attendance and Membership Review

C1.1.1  Attendance and Membership Review
C1.1.2  Approval of Spring 2020 Meeting Minutes
C1.1.3  Chairman’s Report

C1.2  Project Status – Work in Progress

C1.2.1  MIL-F-8815 (Project A6C1-94-3) “Filter Housings and Elements”. Mr. Rieder to report on US Navy updating MIL-F-8815 per SAE recommendations.

C1.2.2  ARP785B (Project A6C1-07-2) “Procedure for the Determination of Particulate Contamination in Hydraulic Fluids by the Control Filter Gravimetric Procedure”. Mr. P. Rao will report on the progress of this document.

C1.2.3  ARP5376B (Project A6C1-17-11) “Methods, Locations and Criteria for System Sampling and Measuring the Solid Particle Contamination of Hydraulic Fluids”. Mr. N. Brown will report on evaluation of this document.

C1.2.4  AIR787 (Project A6C1-19-1) “Filter Element Cleaning Methods” Mr. N. Brown will report on progress of the evaluation of this document.

C1.2.5  ARP4205A (Project A6C1-19-2) “Hydraulic Filter Elements – Method for Evaluating Dynamic Efficiency with Cyclic Flow” Mr. N. Brown will report on progress of the evaluation of this document.

C1.2.6  AS4059 (Project A6C1-19-3) “Aerospace Fluid Power – Contamination Classification for Hydraulic Fluids” Mr. N. Brown will report on the progress of the evaluation of this document.

C1.3  Five-Year Document Review - WIPS Older Than 5 Years

C1.4  Project Status – Documents in Development

C1.5  Lessons Learned

Postponed to next meeting

(Continued on next page)
(Continued)

CONTAMINATION AND FILTRATION ~ PANEL A-6C1
Monday Oct 5
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

- C1.6 Liaison Reports
  Postponed to next meeting

- C1.7 Vice Chairman's Report
  Postponed to next meeting

- C1.8 Presentations
  Postponed to next meeting

- C1.9 Unfinished Business

- C1.10 New Business

- C1.11 Adjournment
JOIN WEBEX MEETING
https://sae.webex.com/sae/j.php?MTID=md918bf7ac734f1dbf0d95a90fa23f4d4
Meeting number: 126 874 9610
Meeting password: Monday5

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C2.1 Opening Remarks, Attendance and Membership Review

C2.1.1 Chairman's Opening Remarks – Chairman Morgan Gilbert
C2.1.2 Roll Call – Secretary Devin Prate
C2.1.3 Attendance and Membership Review – Chairman Morgan Gilbert
C2.1.4 Approval of Minutes from Spring virtual meeting – Secretary Devin Prate

C2.2 Project Status – Work in Progress

C2.2.1 AIR1244B (Project number A6C2-94-4) “Selection of Slipper Seals for Hydraulic-Pneumatic Fluid Power Applications”. Mr. Andersen to report on the document status.

C2.2.2 ARP7204 (Project number A6C2-17-2) “Polymeric Bearings for Linear Actuators”. Mr. Prate to report on document status.


C2.2.4 ARP1231C, ARP1232C, ARP1233B, ARP1234C, MAP3439, MAP3440, MA2010 (Project number A6C2-18-7a thru g) Various E-25 gland and metric o-ring standards transferred to A6C-2 to be updated to include technical and editorial changes. Dr. Zielinski to report on status of documents.

C2.2.5 AS668F (Project number A6C2-20-3) “Aerospace Size Standard for O-Rings”. Dr. Zielinski to report on status.

C2.2.6 AS860C, AS861B, AS5781B and AS5782B (Project number A6C2-19-10a thru d) Various Back-up Ring standard updates to delete reference to dimensional stability tests and harmonize formatting. Mr. Schofield to report on status.

C2.2.7 AIR786C (Project number A6C2-19-9) “Elastomer Compatibility Considerations Relative to Elastomeric Sealant Selection”. Mr. Gage to report on status of 5 year review and recent ballot.


C2.2.9 ARP1833B (Project number A6C2-20-1) “Sealing Techniques for Missile Applications”. Mr. Gilbert to report on project to status.

C2.2.10 AS35769A (Project number A6C2-20-2) “Gasket, Metallic, Encased, Annular, Copper”. Mr. Gilbert to report on project to status.

C2.2.11 AS29561B (Project number A6C2-20-4) “O-ring, Synthetic Lubricant Resistant Molded from AMS-R-7362 Rubber”. Mr Gage to report on document status.

C2.2.12 AS28772B (Project number A6C2-20-5) “D” Ring Seal for Shock Struts Molded from AMS-P-25732 Material”. Mr. Schofield to report on document status.


(Continued on next page)
C2.3 Five Years Document Review

C2.3.1 AS6235A (Project A6C2-20-6) “Face Seal Gland Design, Static, O-ring and Other Seals for Aerospace Hydraulic and Pneumatic Applications”. Mr. A Schofield will conduct 5 year review.

C2.3.2 ARP5555 (Project A6C2-20-8) “Recommendations for Installation of Seals in Standard Glands”. Mr. M Gilbert will conduct 5 year review.

C2.4 Project Status – Documents in Development

C2.4.1 AIR6079A (Project number A6C2-15-4) “Selection of Metallic Spring Energized Seals for Aerospace”. Mr. Schofield to report on status of document and work session discussion.

C2.4.2 ASxxxx (Project number A6C2-19-1) “O-ring Molded from AMS7361 Material”. Mr. Lindahl to report on status of document and material standard approval in AMS-CE.

C2.4.3 AIRxxxx (Project number A6C2-19-5) Rotary Seals Document – Mr. Movahed to report on the development status of this document and work session discussion.

C2.4.4 ARP6010 (Project number A6C2-19-6) “Surface Finish Guidelines for Sealing Systems”. Mr. Gilbert to report on the document status and work session discussion.

C2.5 Lessons Learned

C2.5.1 Cap Seal Lesson Learned – TBC

C2.6 Liaison Reports

Postponed to next meeting

C2.7 Presentations

C2.7.1 Development of NAS1613 rev 7 – Mr. P. Sharpe

C2.8 Vice-chair Report

Postponed to next meeting

C2.9 Unfinished Business

C2.9.1 AS871B (Project A6C2-19-3) - “Manufacturing and Inspection Standards for Preformed Packings (O-Rings)”. Mr. Prate to update on status of NAS1613 rev 7 to determine action required for AS871.

C2.9.2 Seal Template updates – Mr. Keenan to update panel on progress of these revisions.

C2.9.3 Dynamic Test Rigs. Continued discussion on need for document to define dynamic test rig definition.

C2.10 New Business

C2.11 Adjournment
FLUIDS ~ PANEL A-6C3
Tuesday Oct 6
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

JOIN WEBEX MEETING
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Meeting password: Tuesday6

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C3.1. Opening Remarks, Attendance and Membership Review

C3.1.1 Attendance and Membership Review
C3.1.2 Approval of Spring 2020 Meeting Minutes
C3.1.3 Chairman’s Report

C3.2 Project Status – Work in Progress

A6C3-18-1 AIR810D – “Degradation Limits of Hydrocarbon-Based Hydraulic Fluids MIL-PRF-5606, MIL-PRF-83282 and MIL-PRF-87257 Used in Hydraulic Test Stands” – D. Racke

C3.3. Five-Year Document Review

AIR810D – “Degradation Limits of Hydrocarbon-Based Hydraulic Fluids, MIL-PRF-5606, MIL-PRF-83282, and MIL-PRF-87257 Used in Hydraulic Test Stands” – D. Racke

C3.4. Project Status – Documents in Development

None

C3.5. Lessons Learned

Postponed to next meeting

C3.6. Liaison Reports

C3.7. Vice Chairman’s Report

Postponed to next meeting

C3.8. Presentations

Postponed to next meeting

C3.9. Unfinished Business

The revision of the stabilized document AIR1116B was discussed. Mr. B. Payne agreed to review the document to determine if it should be cancelled.

C3.10. New Business

The harmonization of AS1241 and ISO 9940. Comparison of the two showing differences.

C3.11. Adjournment
POWER SOURCES ~ PANEL A-6C4
Tuesday Oct 6
12:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

JOIN WEBCAST MEETING
https://sae.webex.com/sae/j.php?MTID=md44db642ce66f2063cef600c9998f934
Meeting number: 126 355 5797
Meeting password: Tuesday6

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C4.1 Opening remarks, Attendance and Membership Review

C4.1.1 Attendance and membership review
C4.1.2 Approval of minutes from last meeting- Secretary Mr. B. Gardner
C4.1.3 Chairman's Report- Chairman Mr. T. Olthoff

C4.2 Project Status – Work in Progress

C4.2.1 ARP6249 (Project A6C4-13-01) - “Hydraulic Pump Minimum Inlet Pressure Test”, Mr. S. Devan to report.

C4.2.2 AIR560 (Project A6C4-13-3) - “Missile Hydraulic Pumps”, Mr. S. Devan to report.

C4.2.3 ARP4943 (Project A6C4-14-1) - “Ground Support Equipment Hydraulic Systems, Design and Installation, Recommended Practices for”, Mr. C. Orgnon to report.

C4.2.4 AIR6855 (Project A6C4-14-3) - “Application Guide for Electric Motors, which Drive Hydraulic Pumps”, Mr. J. Peters to report.

C4.3 Five Year Document Review

C4.3.1 ARP4940 - "Application Guide for Aerospace Hydraulic Motors"
C4.3.2 ARP1280 - "Application Guide for Hydraulic Power Transfer Units"

C4.4 Project Status – Documents in Development

C4.5 Lessons Learned
Postponed to next meeting

C4.6 Liaison reports
Postponed to next meeting

C4.7 Vice Chairman's Report
Postponed to next meeting

(Continued on next page)
POWER SOURCES ~ PANEL A-6C4
Tuesday Oct 6
12:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

C4.8 Presentations
Postponed to next meeting

C4.9 Unfinished Business
Other unfinished business as needed.

C4.10 New Business
Review stabilized documents and determine status.

C4.11 Adjournment
COMPONENTS ~ PANEL A-6C5
Wednesday Oct 7
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

JOIN WEBEX MEETING
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Meeting password: Wednesday7

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COMPONENTS ~ PANEL A-6C5

Wednesday Oct 7
11:00 am | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

C5.1 Opening Remarks, Attendance, and Membership Review

C5.1.1 Opening Remarks – Chairman Mr. M. Borla
C5.1.2 Attendance and Membership Review – Secretary Mr. D. Novak
C5.1.3 Approval of Previous Meeting Minutes – Secretary Mr. D. Novak
C5.1.4 Chairman's Report – Chairman Mr. M. Borla

C5.2 Document Status – Works in Progress

C5.2.1 AS 4741 (Project A6C5-14-01) “Aerospace – Hydraulic Switching Valve, Pressure or Pilot Operated”, Mr. G. Loftis will report on the status of this document

C5.2.2 AS4835 (Project A6C5-11-2) “Aerospace Fluid Power – Hydraulic Thermal Expansion Relief Valves”, Mr. J. Dickey will report on the status of this document.

C5.2.3 ARP4945 (Project A6C5-18-3) “Aerospace Solenoid Valve, Hydraulic, Three Way, Two Position, Direct Acting”, Mr. T. Cleveland will report on the status of this document.

C5.2.4 ARP4946 (Project A6C5-11-1)” Aerospace-Valves, Check, Hydraulic, Aircraft and Missile”, Mr. C. Aunchman will report on the status of this document.

C5.2.5 ARP8450 (Project A6C5-18-2) “Aerospace-Recommended Design and Test Requirements for Quantity Measuring Hydraulic Fuses”, Mr. P. Keenan will report on the status of this document.

C5.2.6 C5.2.7 AS5466 (Project A6C5-18-1) “Aerospace-General Requirements for Hydraulic Fuse – Quantity Measuring”, Mr. P. Keenan will report on the status of this document.

C5.2.7 ARP4987 (Project A6C5-17-1) “Aerospace-Hydraulic Shuttle Valves”, Mr. E. Johnson will report on status of this document.

C5.3 Document Status - Five Year Review

C5.3.2 AS40401 “Solenoid, Electrical, General Specification For”
Mr. J. Dickey and Mr. M. Borla will report on the status of this document.

(Continued on next page)
C5.4 Documents in Development
   None at this time

C5.5 Lessons Learned
   Postponed to next meeting

C5.8 Vice Chairman’s Report– Vice Chairman Mr. G. Loftis
   Postponed to next meeting

C5.9 Unfinished Business
   Other unfinished business as needed.

C5.10 New Business
   Panel members and guests are encouraged to introduce items of general interest for panel action.

C5.11 Adjournment
AEROSPACE ACTUATION, CONTROL
AND FLUID POWER SYSTEMS
SAE COMMITTEE A-6

Wednesday Oct 7
12:00 pm | Eastern Daylight Time (New York, GMT-04:00) | 1 hr

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Meeting password: Wednesday7

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1. **Welcome and Introduction To All A-6 Members and Guests** - Chairman Halley
   1.1 Committee A-6 Structure and Leadership
   1.2 Meeting 169 Feedback/Reminders

2. **Committee A-6 Roll Call and Review of Membership** - Secretary Dickey

3. **Approval of Minutes of virtual Meeting No. 168** - Secretary Dickey

4. **Membership Changes** - Secretary Dickey

5. **Project status**
   5.1 AIR4543 - Aerospace Hydraulics and Actuation Lessons Learned - C. Marini
   5.2 AS1290B - Graphic Symbols for Aircraft Hydraulic and Pneumatic Systems – P. Keenan
   5.3 AIR737 – “Aerospace Hydraulic and Pneumatic Specifications, Standards, Recommended Practices, and Information Reports” – I. Halley

6. **Steering Council Summary Report** - Chairman Halley

7. **Short courses** - Vice Chairman van den Bossche
   Presentation of the Spring 2021 selected short courses:
   - Design Considerations for Hydraulically Powered FBW Flight Control Actuation Systems by Tom Greetham
   - Aerospace Hydraulic Components by Jeff Dickey

8. **SAE Report** - Ms. D. Lloyd

9. **Liaison Reports**
   9.1 EASA
   9.2 FAA
   9.3 Other SAE Committees
   9.4 Academia and research Prof G.Jacazio

10. **Recognition/Awards** - Chairman Halley

11. **Sub-committee and Panel Reports**
    10.1 A-6A Report - Subcommittee Chairman E. Covington
    10.2 A-6B Report - Subcommittee Chairman M. Besliu
    10.3 A-6C Report - Subcommittee Chairman R. Zielinski

12. **Presentation**
    None so far

13. **New Business/Chairman’s Summary** - Chairman Halley
Breakout session organization reminder

Background

The Steering Council has concerns that the breakout sessions are not working in the best interest of the Committee (as experienced in the Milwaukee meeting)... and would like to remind the Panels that these sessions are meant to provide the opportunity for the panels to more efficiently develop their documents in a more timely manner to better meet the needs of the industry.

Objectives of the breakout sessions

The breakout sessions consist of a succession of approx. 1 hour individual project working group meetings, generally following the format defined below. The objective is to provide the opportunity for the working group members to more efficiently plan, schedule, review, and address issues so get documents approved and released in a more timely manner. Progress and issues need to be tracked and reported to the Panel.

Document sponsors

Document Sponsor assess the need for, and proposes, a working session for the next A-6 meeting, ahead of time, i.e. at the panel meeting or at the latest, 2 months prior to the meeting, to be mentioned in the meeting agenda. Net meetings between A-6 meetings shall also be considered.

Document Sponsor runs the project meeting

Sponsor contacts key document participants ahead of meeting, open to any others
Sponsor makes sure that electronic/hard copies of the document to be discussed are available at the meeting
Sponsor follows Project Meeting format:
- Document Status/Schedule
- Document Needs
- Document Issues
- Document Actions including net meetings or a break out session at the next A-6 meeting

Sponsor prepares Panel Meeting presentation according to the attached Project Reporting slides to be provided to Panel Vice Chair before the panel meeting. These two slides are required for all panel documents, whether there has been a breakout meeting or not. Ideally, these are the only slides needed. If other slides are needed to obtain a voice vote during the panel meeting, they can be added. The technical issues should be resolved prior to vote at the panel.

Sponsors planning not to attend the A-6 meeting make sure ahead of meeting that either co-sponsors or specifically delegated persons will run the project meeting and let the Panel Chair know prior to the meeting.

Panel chair

Panel chair makes sure prior to the meeting that all documents in progress that deserve a project meeting are addressed
- either the sponsor or an identified co-sponsor will be available for running the project meeting
- Provides to the Subcommittee Chair prior to the meeting a list of the proposed project meetings with the names of the sponsor in charge and of the key participants
- Makes sure throughout the day that the project meetings are running well, helps where necessary, and directs panel members and new comers if necessary
In the event that there is no working session proposed by document sponsors, or not enough to take benefit of available time, it is the duty of the panel chair to propose activities for the full day like collectively looking at the 5 year review candidates, or discussing impact of emerging technologies, or discussing industry concerns, or discussing need for short courses, or reviewing lessons learned, or thinking about contribution of the panel to future symposium etc...

**Subcommittee chair**

The subcommittee chairman has the visibility on 3 to 6 panel workshop agendas, he is then in a position to:

- Balance attendance and time dedicated to each project meeting
- Prepare time allocation for the project meetings taking into account as far as possible availability of sponsors and key participants throughout the day
- Provide ahead of meeting a table presenting the data above (projects, sponsor, key participant, time). These tables are to be shown as part of the A-6 meeting agenda, at the Welcome meeting and to be posted during the day
- Make sure throughout the day that the projects meetings are running well, helps where necessary, and directs panel members and new comers if necessary

**Panel members**

Those identified as “key participants” by the sponsors will be invited to attend the associated meetings. Others will be invited to select the project meetings of their choice or may be directed by the Sub committee or panel chair if attendance needs to be balanced.

**Newcomers**

Will be invited to select the project meetings of their choice on the basis of the information displayed at the Welcome meeting, or details given by sponsors, panel or sub committee chairs.

**Facilities**

Rooms will be available for each panel, to run meetings in parallel, digital projectors will be provided.

**Between meetings**

Sponsor are encouraged to continue working through e-mail, or arrange net meetings if appropriate.

**Reporting slides**

The 2 boxes in the yellow section of slide 2, to be checked by the sponsor, are intended to encourage Web meetings between our biennial committee meetings, or to better plan working sessions ahead of time.
AEROSPACE ACTUATION, CONTROL
AND FLUID POWER SYSTEMS
SAE COMMITTEE A-6

Appendix 2

Short course

C1205 - Introduction to Aircraft Hydraulic System Design and Certification

Thursday Oct 8 – Friday Oct 9
8:00-10:00 AM PDT / 5:00-7:00 PM CEST

OVERVIEW

This four hour short course provides an overview of hydraulic system design of typical business and commercial aircraft. Topics will include the principles, system architectures, power sources, and the main components and technologies of hydraulic systems including hydraulic power generation, filtration, fluid storage, distribution, sensing and control. The step by step process of designing a hydraulic system will also be reviewed. Additionally, future trends in hydraulic systems will be discussed.

Learning Objectives

By attending this seminar, you will be able to:

- Explain the operating principles and design process of an aircraft hydraulic system
- Identify system architectures attributes, including those that affect aircraft safety
- Identify power sources for hydraulic systems and how they operate
- Identify the various components of hydraulic systems
- Describe the hydraulic system design and certification process

Who Should Attend

This seminar is designed for engineers, program managers, executives, and other key personnel with little or no previous hydraulic system knowledge or experience.

Prerequisites

None

TOPICS / OUTLINE

General Introduction to Aircraft Hydraulic Systems
Hydraulic System Terminology and Standards
A Brief History of Aircraft Hydraulic Systems
System Engineering - Principles and Practice
Requirements Quality
Hydraulic System Design and Certification
Proposal Phase
Preliminary Design Phase
Detail Design Phase
Aircraft Production Build and Test Phase
Flight Test and Certification Phase
Hydraulic Interface with Utility Systems
Fluid Conveyance System Design
Introduction to Hydraulic Fluids
Market Trends and Future Technologies
INSTRUCTORS: Jon Jeffery and Steve Lohe

Jon Jeffery has been involved with the design and certification of more than 15 military and commercial aircraft hydraulic systems during a 34 year career.


Parker (Hydraulic Systems Div): 1993 – 2015 (22 years)

Jon is currently working for Hummingbird Aero LLC, an engineering services firm, as President & CEO. He was Chairman for SAE A-6, the Aerospace Actuation, Control and Fluid Power Systems standards committee from 2009 - 2015.

Steve Lohe has been in subsystems design at McDonnell Douglas/Boeing for thirty two years, mostly working hydraulic system design and analysis. He has worked hydraulics design for A-12, AV-8B, F/A-18E/F, F-15 Fly-by-Wire upgrade, MQ-25, T-7A and several proprietary programs. He has been responsible for the architecture and specification of several clean sheet hydraulic systems, including primary flight control actuation procurement. In addition, he had primary responsibility for the fuel system on X-45C and the environmental control systems on a proprietary proposal effort. He is currently Vice-Chair of the SAE A-6A2 Military panel.

He received his B.S. in Mechanical Engineering from University of Missouri – Columbia, and his M.S. in Mechanical Engineering from Washington University.

Fees: $425.00; Discount rate for registration before Aug 28, 2020: $325.00

.4 CEUs

You must complete all course contact hours and successfully pass the learning assessment to obtain CEUs.

To register on line: https://www.sae.org/learn/content/c1205/

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SAE COMMITTEE A-6

Appendix 3

Statements

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