SAE International

400 Commonwealth Drive, Warrendale, PA 15096-0001 USA
Toll free: 1-877-606-7323, Outside US and Canada: 724-776-4970, Fax: 724-776-0790
web: http://www.sae.org

SAE COMMITTEE A-6

AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

AGENDA FOR MEETING 155
SEPT 30 – OCT 3, 2013

BOULDER, CO, USA

Renaissance Boulder Flatiron Hotel
500 Flatiron Boulevard
Broomfield, CO 80021

The main features of this agenda are (issue 2 update highlighted in yellow):

- Three short courses on Sunday and Monday :
  - *Design Considerations for Electrohydrostatic Actuators,*
  - *Electrohydraulic Servovalves in Flight Control and Utility Actuators,* Monday afternoon
  - *Hydraulic Installation Design: Materials, Rules, and Routings,* Monday morning

- Working sessions on Monday, see the breakout session organization reminder on page 38

- Symposium "*Commercial Aerospace Actuation and Control*" on Tuesday morning

- Two workshops on Tuesday afternoon:
  - *Requirements consistency between standards*, led by Ian Halley, open to everyone interested
  - *Style manual and document quality*, led by Peter Keenan, open to new comers and all those who have difficulties with the SAE style manual requirements

- Panel and A-6 meetings on Wednesday and Thursday.

- Dorothy will provide a separate sheet with the name of the meeting and meeting room when people come to check in.

AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS
SAE COMMITTEE A-6
Meeting 155

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AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

SAE COMMITTEE A-6

Meeting 155

Agenda Overview

COMMITTEE/	SU 29	MON 30											TUES 1st									WED 2nd									THRS 3rd								
SUBCOMMITTEE/ PANEL	6-9PM	1	2	3	4	L	5	6	7	8	N	R	1	2	3	4	L	5	6	7	8	1	2	3	4	L	5	6	7	8	1	2	3	4	L	5	6	7	8
COMMITTEE A-6																																							
Steering Council (1)	X																									X													
Welcome, opening remarks (8:00 - 8:30 AM)		X																																					
Symposium: Commercial Aerospace Actuation and Control													X	X	X	X																							
Newcomers Welcome											N																												
A-6 Reception												R																											
A-6 Meeting																																						X	X
Workshop : Requirements consistency between standards																				X	X																		
Workshop : Style manual and document quality																		X	X																				
A-6A: SYSTEM/SUBSYSTEM INTEGRATION.																																							
Commercial Aircraft				X	X		X															X	X																
Military Aircraft			X	X	X		X																	X	X														
Flight Control and Vehicle Management Systems			X	X	X		X	X	X	X																	X	X	X	X									
A-6B: ACTUATION & CONTROL																																							
Hydraulic Servo Actuation			X	X																											X	X							
EHA			X	X	X																												X	X					
Mechanical and electromechanical actuation systems			X	X	X		X	X	X	X																									X	X			
A-6C: POWER GENERATION & DISTRIBUTION																																							
Contamination/Filtration			X	X																									X	X									
Seals			X	X	X																						X	X											
Fluids																																			X	X			
Tubing Systems							X	X																	X														
Components							X	X	X																								X	X					
Power Sources			X	X	X		X	X	X	X																					X	X							
SHORT COURSES (2)																																							
Design Considerations for Electrohydrostatic Actuators 1:30 - 5,30	X																																						
Electrohydraulic Servovalves in Flight Control and Utility Actuators							X	X	X	X																													
Hydraulic Installation Design: Materials, Rules, and Routings		X	X	X	X																																		

NOTES: L = 12:00 AM - 1:30 PM
R = Reception 6:00 - 8:00 PM
N= Newcomers Welcome 5:30 - 6:00 PM
Times: 1 - 4 = One hour blocks 8:00 - 12:00 AM with 15 minute breaks every 2 hours
Times: 5 - 8 = One hour blocks 1:30 - 5:30 PM with 15 minute breaks every 2 hours
(1) = Attendance by invitation
(2) = Attendance requires specific registration

X X Break out sessions

X X Panel & A-6 meetings

FOR INFORMATION :

AMS-CE Elastomer workshop													X	X	X	X		X	X	X	X																		
AMS-CE Elastomer meeting																						X	X	X	X		X	X	X	X									
AMS-P Polymer meeting																															X	X	X	X					

STEERING COUNCIL

Meeting No. 94
Sunday Sept 29
6:00 - 9:00 PM
& Wednesday Oct 2nd
12:00 – 1:30 PM

S1 Introduction, Attendance, Meeting 90 Minutes Approval
Chairman Jeffery, Secretary Dave Flavell

S2 Operational and Organization Issues

- S2.1 Symposium
  - S2.1.2 Fall 2013 symposium
  - S2.1.2 Spring 2014 symposium
- S2.2 Review and Action on Current Issues
  - S2.2.1 Inconsistent Requirements Across Specs
  - S2.2.2 Joint Projects with A-5 and AE-7 (All)
  - S2.2.3 Short courses (All)
  - S2.2.4 A-6 Policy Decision - referencing duplicate ISO documents
- S2.3 Committee A-6 Structure, Appointees, and Membership
  - S2.3.1 Structure (All)
  - S2.3.2 Appointees (All)
  - S2.3.3 Membership
    - A-6 Liaison Membership (All)
  - S2.3.4 Addition of new attendees to the Roster (Alan)
- S2.4 Leadership
- S2.5 Communication
- S2.6 Performance Recognition (Curt)
- S2.7 SAE Staff Report – Ms.Dorothy Lloyd
- S2.8 Academia
- S2.9 ISO Liaison (Ron)
- S2.10 Agenda (Dominique)
- S2.11 Policies & Procedures (Ron)
- S2.12 Subcommittee Reports
  - S2.12.1 A-6A System/Subsystem Integration (Ian)
  - S2.12.2 A-6B Actuation and Control (Scott)
  - S2.12.3 A-6C Power Generation and Control (Ron)
- S2.13 New Projects
- S2.14 Document Status
- S2.15 Future Meetings - Ms. Dorothy Lloyd

S3 Strategic Issues

S3.1 Strategic Objectives

S3.2 Focus - Near/Long Term

S4 Other Business

S4.1 Please contact Chairman Jeffery to request additions to this agenda.

AEROSPACE ACTUATION, CONTROL
AND FLUID POWER SYSTEMS
SAE COMMITTEE A-6

Welcome and Introduction To Committee A-6

Meeting 155
Monday Sept 30
8:00 - 8:30 AM
Chairman Jon Jeffery

- 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
  - Workshop : Style Manual and Document Quality
  - Workshop : Requirements consistency between standards
- Focus on Lessons Learned
- Social Events
- Upcoming meetings

AEROSPACE ACTUATION, CONTROL
AND FLUID POWER SYSTEMS
SAE COMMITTEE A-6

New Comer Welcome

and Introduction to Committee A-6 Steering Council

Monday Sept 30
5:30 PM -6:00 PM

A-6 Reception

Monday Sept 30
6:00 PM - 8:00 PM

SAE A-6 AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

SYMPOSIUM

Tuesday Oct 1st
8 AM – 5:30 PM
Symposium Organizer : Joe Lundquist

Commercial Aerospace Actuation and Control

This includes regional, business, military transport, as well as rotorcraft. Items of interest include, but are not limited to, aircraft actuation, control and fluid power:

- Advanced systems R&D
- Modeling and analysis
- Specifications
- Iron bird testing
- Components
- New materials, processes, coatings, fluids
- Manufacturing
- Testing, specifications and performance
- Maintenance
- Flight testing
- Certification
- Supply chain issues
- Lessons learned
- Design and performance optimization
- System architecture and analysis
- Prognostics
- Fluid and component life extension (MTBF)
- In-service experience
- Future trends

	Introduction by Joe Lundquist
1	PHM Methodology for Primary Flight Control Servoactuators, Prof. Giovanni Jacazio, Politecnico Torino, Italy
2	Overview of Actuator End Stop Designs and Criteria Including Lessons Learned, Dave Lange, Thomas Instrument
3	Roller Screws – Performance and Packaging Benefits for Future Electromechanical Actuators (EMAs), Bill Zerull, Exlar
4	Types of Wear and galling process in Hydraulic pumps, Magdy Kandil, UTAS
5	B747-8 hydraulic system alignment and architecture, Bob Fisher, Boeing
6	Development of a Light Weight Hydraulic Valve Manifold by Selective Laser Melting Technology, Volke Airbus
7	
8	
9	
10	
	Wrap-up by Joe Lundquist

(More presentations to come)

SAE A-6 AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

WORKSHOPS

Style manual and document quality

Tuesday Oct 1st
1:30 – 3:30 PM

We have a continuous flow of new comers, young engineers most of the time, and people willing to become a document sponsor for the first time. All these people need help and education given the relative complexity of the style guide. It may be found even more complex by non US people. Feedback is that it is very disappointing to experience negative ballots for technically correct documents, just because of (justified) style mistakes in front of which people are left alone with no help. It is also boring to spend the Monday workshops discussing never ending style issues.

This workshop led by Peter Keenan is aimed to help to be a good sponsor, how to initiate and release documents, how to write good standards, etc.

Open to new comers and all those who have difficulties with the SAE style manual requirements**.**

Requirements consistency between documents

Tuesday Oct 1st
3:30 – 5:30 PM

Dan Zierten presented to the Steering Council issues with consistent requirements and where they should belong. The SC decided to form a working group, lead by Ian Halley and to include Scott Schaefer, Ron Zelinski, Peter Keenan, and Dan Zierten and others to research the issue and to develop a requirements roadmap such that corrections can be made when standards come up for their five year review.

Open to anyone interested.

SAE A-6 AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS

BREAKOUT AGENDAS

COMMERCIAL AIRCRAFT ~ PANEL A-6A1

Monday Sept 30
9:30 AM – 2:30 PM

Document #	Title	Sponsors	Scheduled Time
ARP6200	Test Requirements and Methods for Commercial Aircraft Hydraulic Systems	Heer	9:30 – 10:30
ARP6175	Definition, Recognition, Troubleshooting and Repair of Hydraulic System Leakage	Nist	10:30 - 11:30
ARP4925	Aerospace Design and Installation of Commercial Transport Helicopter Hydraulic Systems	Covington	1:30 – 2:30

MILITARY AIRCRAFT ~ PANEL A-6A2

Monday Sept 30
8:30 AM – 2:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP1383	Impulse Testing of Aerospace Hydraulic Actuators, Valves, Pressure Containers, and Similar Fluid System Components	Keenan	8:30 – 10:30
	A-6A2 Lessons Learned discussion	Anderson	10:30-12:00
AS5440B	Hydraulic Systems, Military Aircraft, Design and Installation	Rieder	1:30 – 2:30

FLIGHT CONTROL AND VEHICLE MANAGEMENT SYSTEMS ~ PANEL A-6A3

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
AS94900	Aerospace - Flight Control Systems - Design, Installation and Test of Piloted Military Aircraft, General Specification	Flavell	8:30 – 9:30
			9:30 – 10:30
A5B-08-01	ARP5569 Gear Extend / Retract System Design	Juergens	10:30 - 12:00
ARP5769	Dielectric Strength and Insulation Resistance Testing	Stachniak	1:30 – 3:00
ARP6265	Fly by Wire Rudder and Brake Pedal Unit General Requirements	Bettini	3:30 – 5:30

HYDRAULIC SERVO ACTUATION ~ PANEL A-6B1

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP5554	Guidelines for Specifying LVDTs and RVDTs.	Einarsson/ Schaefer	8:30-10:15
ARP1281	Actuators, Aircraft Flight Controls, Power Operated, Hydraulic, General Specification for	Ian Halley	10:30-12:00

EHA/IAP ~ PANEL A-6B2

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARPXXXX	Electrohydrostatic Module (EHM)	J. Socheleau	8:30-9:00
ARP6025	Duty Cycle Considerations for EHAs	R. Bringas	9:00-9:30
ARP5772	EHA Reservoirs	J. Perry	9:30-10:00
AIRXXXX	EHA/EBHA Application on Aircraft Programs	B. Barker	10:00-10:30
ARP XXXX	EHA Thermal Management	S. Nist	10:30-11:00
ARP XXXX	Sizing Considerations for EHA Pumps and Motors	B. Barker	11:00-11:30

MECHANICAL AND ELECTROMECHANICAL ACTUATION SYSTEMS PANEL A-6B3

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP5384	Aircraft Power Driver Unit (PDU) General Specification For	Besliu Zatloff	8:30 – 9:30
ARP6131	Maintenance and Inspection Procedures for Rotary and Linear Actuators	Babinski	9:30 – 10:30
AIR6226	THSA primary load path integrity monitoring principles	van den Bossche	10:30 - 11:30
ARP5754	Electromechanical Actuator General Description For	Baker	1:30 – 2:30
AIR6016	High Lift Systems Description	Perrin	2:30 – 3:30
ARP5724	Testing of Electro-mechanical Actuators, General Guideline For.	Polcuch	3:30 – 4:30
AIR6074	Material Selection and Design Practices for Gear and Jackscrew Actuation Systems	Borgarelli	4:30 - 5:30

CONTAMINATION AND FILTRATION ~ PANEL A-6C1

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP219	Procedure and Method for Conducting Test of Hydraulic Components in Contamination Controlled System	Mothersbaugh	8:30 – 10:30

SEALS ~ PANEL A-6C2

Monday Sept 30
8:30 AM – 12:00 PM

Document #	Title	Sponsor	Scheduled Time
AIR6010	Recommended Surface Finishes for Seals	Garcia	8:30 – 9:15
ARP1802	Selection of PTFE Back-up Rings	Andersen	9:15 – 10:00
ARP5312	Scraper Comparative Test Method	Rao	10:15 – 11:00
AS6235	Project A6C2-00-2 Groove Dimensions and Recommended Seal Design for face Mounted Applications	Kholeefa	11:00-11:45
-	Any Other Business	-	11.45 – 12.00

FLUIDS ~ PANEL A-6C3

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
	No session planned		

TUBING SYSTEMS ~ PANEL A-6C4

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP994B	Recommended Practice for the Design of Tubing Installations for Aerospace Fluid Power Systems	Neff	1:30 - 3:30

COMPONENTS ~ PANEL A-6C5

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
ARP4946	Aerospace Valves Check	Wadsworth	1:30 – 2:00
AS4835	Aerospace Hydraulic Expansion Relief Valves	Dickey	2:00 – 2:30
ARP4763	Pressure Relief Valves	Loftis	2:30 - 3:00
AS5467	Hydraulic Flow Rate Fuse	Tschauner	3:00 – 3:30
ARP8775	Hydraulic System Components	Russell	3:30 – 4:00
ARP4987	Shuttle Valves	Dickey	4:00 – 4:30

POWER SOURCES ~ PANEL A-6C6

Monday Sept 30
8:30 AM – 5:30 PM

Document #	Title	Sponsor	Scheduled Time
AIR4940	High Pressure/Performance Hydraulic Motors for Aerospace/Defense Applications	Stricker / Olthof / Orgnon	8:30 – 9:30
AS19692A	Pumps, Hydraulic, Variable Flow, General Specification for	Skinner	9:30 – 10:30
ARP 6249 ?	Determining Inlet Characteristics of Hydraulic Pumps	Devan / Kandil	10:30 – 11:30
AS7997	Motors, Aircraft Hydraulic, Constant Displacement, General Specification For: Recommend disposition only	Fisher / Devan	11:30 – 12:00
AIR4994	High Pressure Pneumatic Compressors Users Guide for Aerospace Applications, this document is being reviewed by the AE5 committee (Mary Cross), and an updated will be given in the fall.	Jeffery	1:30 – 2:00
AIR560	Missile Hydraulic Pumps, Phil should proceed with minor corrections/clarifications, and submit for a limited scope ballot.	Galloway	2:00 – 2:30
ARP4379	Aerospace-Accumulator, Hydraulic, Cylindrical, Piston Separated, 5 Year review, make recommendation	Loftis	2:30 - 3:00
ARP 4904	“Capability Guidelines for Computer Controlled Test Equipment for Hydraulic Components” – Cliff Orgnon will review and provide a recommendation at the next meeting for this new 5-year review	Orgnon	3:00 – 3:30
ARP 4943	“Ground Support Equipment Hydraulic Systems, Design and Installation, Recommended Practices For” – Cliff Orgnon will review and provide a recommendation at the next meeting for this new 5-year review	Orgnon	3:30 – 4:00
NEW ?	Review the need for a document that helps provides the OEM’s with more guidance in selecting the appropriate type of electric motor pump		4:00 – 5:00

COMMERCIAL AIRCRAFT ~ PANEL A-6A1

Wednesday Oct 2nd
8:00 – 10:00 AM

A1.1 Opening Remarks – Chairman

A1.2 Attendance and Membership Review – The secretary will conduct the roll call and new attendees will be asked to introduce themselves. The Chairman will report on the panel membership.

A1.3 Approval of Previous Meeting Minutes

A.1.4 Project Charter
P. Keenan to report on status of the revised current charter

A1.5 Project Status – Works in Progress

A1.5.1 Project A6A1-08-01: AIR6034 - Airborne Monitoring of Commercial Transport Aircraft, Fluid System and Equipment Performance – V. Baumbach

A1.5.2 Project A6A1-08-02: ARP6175 - Definition, Recognition, Troubleshooting and Repair of Hydraulic System Leakage – S. Nist

A1.5.3 Project A6A1-08-03: ARP4925B - Aerospace Design and Installation of Commercial Transport Helicopter Hydraulic Systems - J. Pongratz

A.1.5.4 Project A6A1-11-02: ARP6200 -Test Requirements and Methods for Commercial Aircraft Hydraulic Systems - D. Heer

A1.5.5 Project A6A1-11-01: AIR6185 - Lightning Effects on Hydraulic Transport Elements on Composite Aircraft – Liaison with AE-2 - N. Novakovic

A1.5.6 Project A6A1-13-01: ARP6277 - Sizing of Hydraulic Systems - R. Fisher/R. Juergens

A1.5.7 Project A6A1-13-02: ARP4752B - Aerospace - Design and Installation of Commercial Transport Aircraft Hydraulic Systems – P. Keenan

A1.5.8 Project A6A1-13-03: AIR 5696A - Aerospace Fluid Power – FAA Regulatory History – Transport Airplane Hydraulic Systems – C. Harang

A1.5.9 Project A6A1-13-04: ARP1084A - Hydraulic External Leakage for In-Service Components – P. Keenan

A1.6 Project Status – New Projects

A1.6.1 Members are encouraged to propose new projects.

A1.7 5 Year Document Review

A1.7.1 None – all are covered in 1.5

A1.8 Lessons Learned
Panel members are invited to present new Lessons Learned - Validation of any new Lessons Learned.
Two lessons presented by:
1) S. Krane
2) D. Heer

(Continued next page)

(Continued)

A1.9 Liaison Reports

A1.9.1 Aircraft Manufacturer Updates – Representatives from Aircraft and Helicopter manufacturers are requested to provide updates on recent developments.

A.1.10 Presentations
Panel members are invited to provide a short presentation

A1.11 New Business

A1.12 Adjournment

MILITARY AIRCRAFT ~ PANEL A-6A2

Wednesday Oct 2nd
10:00 AM– 12:00 PM

A2.1 Opening Remarks, Attendance and Membership Review

Chairman Levek will open the meeting and Secretary Rieder will conduct a roll call. New attendees will be asked to introduce themselves. He will request if there are any comments on the previous Panel minutes and ask for a vote to approve the minutes.

A2.2 Lessons Learned

A2.2.1 Vice Chairman Anderson will report the status of the Panel Lessons Learned.

A2.2.2 Presentation and validation of new Lessons Learned

A2.3 Document Project Status and Voting

A2.3.1 AS5440B "Design and Installation Requirements for Aircraft Hydraulic Systems", Mr. Rieder

A2.3.2 AIR 1899A (Project A6A2-07-1), "Aerospace Military Aircraft Hydraulic System Characteristics", Mr. Neff.

A2.3.3 ARP 1383C "Impulse Testing of Aerospace Hydraulic Actuators, Valves, Pressure Containers and Similar Fluid System Components", Mr. Keenan will report on the workshop discussion.

A2.3.4 AIR1657B (Project A6A2-08-3), "Handbook of Hydraulic Metric Calculations", Mr. Garnick and Mr. Nist.

A2.4 Five Year Review

A2.4.1 AIR867A Long Term Storage for Missile Hydraulic Control Systems - Design & Operational Practices Guide, Dec 16, 2002
This document is listed as cancelled and should be listed as stabilized, as voted by the panel membership at the Valley Forge meeting. Mr. Halley will report on the stabilization vote for this document.

A2.4.2 AIR4725A, "Long-Term Storage Reliability of High Pressure Gas Containers for Pneumatic Actuation Systems", Mr. Halley will report on the stabilization vote for this document.

A2.4.3 ARP24E, "Determination of Hydraulic Pressure Drop", Mr. Halley will report on the stabilization vote for this document.

A2.4.4 AIR4002, "8000 Psi Hydraulic Systems: Experience and Test Results" Mr. I Halley will report on the status of this document.

A2.4.5 ARP5891, "Achieving Cleanliness Standards for Aircraft Hydraulic Systems During Manufacture" Issued Jan 07, 2008 Mr. Reynolds will report on his review and recommendation for this document.

A2.4.6 AIR974B, "Long-Term Storage of Missile Hydraulic Systems" Mr. Halley will report on the stabilization vote for this document.

A2.5 New Projects

A2.5.1 Vice-Chairman's Report - Vice Chairman Anderson
A2.5.2 Liaison Reports
A2.5.3 Presentations – None Planned.
A2.5.4 New Business - Panel members are requested to identify other items for discussion and action.

FLIGHT CONTROL AND VEHICLE MANAGEMENT SYSTEMS ~ PANEL A-6A3

Wednesday Oct 2nd
1:30 PM– 5:30 PM

A3.1 Opening Remarks - Chairman Fazi

A3.2 Attendance and Membership Review - Secretary Covington will call the roll and new attendees will be asked to introduce themselves. Chairman Fazi will review the panel charter and report on recent changes to panel membership.

A3.3 Review and Approval of Minutes from Meeting of May 8 – Secretary Covington will call upon members to approve the published minutes of the May 8 meeting in Memphis.

A3.4 Project Status

A3.4.1 AIR4094A (Project A6A3-94-2) "Aircraft Flight Control System Description" Sponsors Levek and Fuchs will report on the status of the 5-year update to this document.

A3.4.2 ARP5769 (Project A6A3-07-01) "Dielectric Strength and Insulation Resistance Testing of Flight and Utility Control Systems and Components" Sponsors Stachniak and Fuchs will report on the status of this new document.

A3.4.3 ARP5775 (Project A6A3-07-03) "Skew and Disconnect Detection in High Lift Systems" Sponsors Perrin and Mr. Harang will report on the status of this new project.

A3.4.4 A4386D (Project A6A3-11-01) "Terminology and Definitions for Aerospace Fluid Power, Actuation and Control Technologies" Sponsor Runkel will report on the initiation of work on this document revision.

A3.4.5 AIR4543/2 (Project A6A3-12-01) "Aerospace Hydraulics and Actuation Lessons Learned" Sponsor Krane will report on the preparation of the material for this new document.

A3.4.6 AS94900 (Project A6A3-12-02) "Aerospace - Flight Control Systems - Design, Installation and Test of Piloted Military Aircraft, General Specification." Mr.Flavell and Subcommittee Chair Halley will report on the status of the 5-year update of this document.

A3.4.7 AIR5273A (Project A6A3-12-04) "Actuation System Failure Detection Methods" Sponsor Perrin and Mr. Harang will report on the status of this revision.

A3.4.8 AIRXXXX (Project A6A3-13-01)"Aircraft Thrust Vectoring Flight Control" Sponsor Wooddell will report on the scope and plan for this new document

A3.4.9 ARP6252 (Project A6A3-13-02) "Aerospace - Rudder and Brake Pedal Unit General Requirements for Fly by Wire Transport and Business Aircraft" Sponsor Bettini will report on the status of this new document.

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(Continued next page)

(Continued)

FLIGHT CONTROL AND VEHICLE MANAGEMENT SYSTEMS ~ PANEL A-6A3

Wednesday Oct 2nd
1:30 PM– 4:00 PM

A3.5 Lessons Learned

A3.5.1 Many ideas have been suggested, but we need people to offer up complete lessons learned.

A3.6 Five Year Review

A3.6.1 ARP4895 "Flight Control Actuators - Dynamic Seals, Collection Of Duty Cycle Data" Subcommittee Chairman Halley will report on the revisions to this document.

A3.6.2 AS100081 "Terminal Shank-Swaging, Dimensions For" This document was issued in 1999 and is due for five year review.

A3.6.3 AIR4982 "Aerospace Fly-by-Light Actuation Systems" This document was last reaffirmed in January 2007 and is due for five year review.

A3.6.4 AIR4922 "Primary Flight Control Hydraulic Actuation System Interface Definition" This document was last reaffirmed in 2008 and is due for five year review.

A3.7 Liaison Reports

A3.7.1 Government Agencies
No reports planned.

A3.7.2 SAE A-5, Mr. Juergens
Mr. Jurgens will provide an update on AIR5569 "Landing gear Extend / Retract System Design"

A3.7.2 SAE ASG - Avionic Systems Group, Mr. Fazi
Chairman Fazi will provide an overview of Vehicle System Networks developed by ASG.

A3.8 Vice Chairman Report

Vice Chairman Clements will discuss upcoming document reviews, new technology trends, ideas for technical presentation for next panel meeting, and potential new projects for panel consideration.

A3.9 New Business

No new business yet scheduled.

A3.10 Presentations

None Planned.

HYDRAULIC SERVO ACTUATION ~ PANEL A-6B1

Thursday Oct 3rd
8:00 - 10:00 AM

B1.1 Opening Remarks – Chairman Dan Zierten

B1.2 Attendance and Membership Review – Secretary Roman Simkin

B1.3 Project Status

B1.3.1 ~~ARP5796 (Project A6B1-06-01), "ARP on Critical Flight Control Valves." Mr. Dan Zierten will provide the status of this new document.~~

~~B1.3.2 Project A6B1-06-02, "Hydraulic Damping Control of Steering Servo Systems." Mr. Marin Besliu will present the status of this new document.~~

B1.3.4 ARP5554 (Project A6B1-07-01), "Guidelines for Specifying LVDTs and RVDTs." Mr. Rikk Einarsson or Mr. Scott Schaefer will present and discuss the status of this new document.

B1.3.5 ARP1281, Rev D (Project A6B1-07-02), "Actuators, Aircraft Flight Controls, Power Operated, Hydraulic, General Specification for." Mr. Ian Halley will report on the status of the revision to this document.

B1.3.6 ARP988, Rev B (Project A6B1-XX-XX) "Electrohydraulic Mechanical Feedback Servoactuator." Mr. Dan Zierten will report on the status of the revision to this document.

B1.3.7 AIR1855A (Project A6B1-XX-XX) "Actuation System Data Summary for Missiles and Launch Vehicles" Mr. K.Wooddell will report the status of the revision to this document. Keith to report on project number status.

AIR4066C "Aerospace Fluid Power - Materials and Characteristics of Flight Control Servoactuators of Various Aircraft" Mr.M.Williams will report on the status of the revision to this document.

B1.4 Lessons Learned

Choked Flow" by Dan Zierten

"Face Seal Leakage" by Tom Greetham

B1.5 5-Year Document Review Status

B1.5.1 ARP490F "Electrohydraulic Servovalves" revised Feb 8, 2008. Mr. R. Simkin will report on update recommendations for this document.

B1.5.2 ARP5941 "Aerospace Fluid Power – Contamination Sensitivity –Considerations for Establishing Test Procedures for Flight Control Actuators" issued Mar 18, 2008. Mr. W. S. Schaefer will report on update recommendations for this document.

B1.5.3 ARP739 Gas Power Servos and Reaction Control Systems Jul 16, 2008 Reaffirmed

B1.5.4 ARP777 Gas Actuators (Linear and Vane Rotary Type) Jul 16, 2008 Reaffirmed

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HYDRAULIC SERVO ACTUATION ~ PANEL A-6B1

Thursday Oct 3rd
8:00 - 10:00 AM

B1.6 Liaison Report

B1.6.2 U.S. Army Aviation Engineering

B1.6.3 U.S. Navy Aviation Engineering

B1.7 Presentations
No presentations are planned for this panel meeting.

B1.8 Vice Chairman Report

Vice Chairman Tom Greetham will emphasize and discuss potential Hydraulic Servo Actuation topics for the panel consideration.

B1.9 New Business
Panel attendants are encouraged to present specific matters pertinent to Hydraulic Servo Actuation technologies.

EHA ~ PANEL A-6B2

Thursday Oct 3rd
10:00 AM- 12:00 PM

B2.1 Opening Remarks - Chairman Brian Barker

B2.2 Attendance and Membership review - Secretary Uwe Perrin

B2.3 Fall '12 meeting minutes review and approval - Secretary Uwe Perrin

B2.4 Lessons Learned - Vice Chairman J. Socheleau
Presentation and validation of new Lessons Learned

B2.4.1 Chairman B. Barker will discuss the conversion of Lessons Learned presentations from the Fall 2012 meeting into approved Lessons Learned.

B2.5 Project Status

B2.5.1 Review of and comments for ISO 22072 "EHA Characteristics to be defined in procurement specifications" Mr. G. Zwicker or Chairman B. Barker will report the status of this activity.

B2.5.2 Project A6B2-03-3 "Electrohydrostatic Module (EHM)" Mr. J. Socheleau will report the status of this activity.

B2.5.3 Project A6B2-07-1, ARP 5772 "EHA Reservoirs" - New sponsorship is requested

B2.5.4 Project A6B2-08-1, ARP 6025 "Duty Cycle Considerations for EHAs" Mr. Scott Shafer will report the status of this activity.

B2.5.5 Project A6B2-XX-X ARP XXXX "EHA Thermal Management" – Mr. S. Nist will report the status of this activity.

B2.5.6 Project A6B2-XX-X ARP XXXX "Sizing Considerations for EHA Pumps and Motors" – Chairman B. Barker will report the status of this activity.

B2.5.7 Project A6B2-XX-X AIR XXXX "EHA/EBHA Applications on Aircraft Programs" – Chairman B. Barker will report the status of this activity.

B2.6 EHA Activity Update

B2.6.1 Airbus: Mr. Michel Todeschi

B2.6.2 Goodrich: Mr. Jérôme Socheleau

B2.6.3 Liebherr: Mr. Uwe Perrin

B2.6.4 Moog: Mr. R. Anderson/Mr. B. Barker

B2.6.5 Parker: Mr. Glenn Zwicker

B2.6.6 F-35 JSF: Mr. Floyd Fazi (Lockheed) or Mr. R. Borgas (Navair)

B2.6.7 Gulfstream: Mr. S. Nist

B2.6.8 Any other updates by meeting attendees

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EHA ~ PANEL A-6B2

Thursday Oct 3rd
10:00 AM- 12:00 PM

B2.7 New Business

B.2.7.1 Panel attendees are invited to discuss or present items related to EHA/IAP technologies and ongoing projects or programs.

B2.8 Vice Chairman Report

Vice Chairman J. Socheleau will lead a discussion on other specific matters pertinent to EHA technologies and invite input from the panel attendees on the future activity of the panel.

MECHANICAL AND ELECTROMECHANICAL ACTUATION SYSTEMS PANEL A-6B3

Thursday Oct 3rd
1:30 PM- 3:30 PM

B3.1 Opening Remarks – Chairman Marin Besliu

B3.2 Attendance and Membership Review – Secretary Jim Babinski

B3.2.1 Spring '13 meeting minutes review and approval - Jim Babinski

B3.3 Project Status

Projects workshop summary – Vice Chairman Errol Zatloff

B3.3.1 ARP 5384 (Project A6B3-87-1)
"Aircraft Power Driver Unit (PDU) General Specification For"
Mr. Besliu and Mr. Zatloff will report on status of this project.

B3.3.2 ARP6131 (Project A6B3-02-1)
"Maintenance and Inspection Procedures for Rotary and Linear Mechanical Actuators"
Mr. Babinski will report on this project..

B3.3.3 AIR6074 (Project A6B3-02-2)
"Material Selection and Design Practices for Gear and Jackscrew Actuation Systems."
Mr. Borgarelli will report.

B3.3.4 ARP (TBD), (Project A6B3-05-2)
"System Safety Assessment Methodology As It applies to Mechanical Systems"
Mr. Besliu will report.

B3.3.5 AIR6226 (Project A6B3-11-X)
"THSA Primary Load Path Integrity Monitoring Principles"
Mr. Van den Bossche will report.

B3.3.6 ARP5724, (Project A6B3-05-3)
"Testing Of Electromechanical Actuators, General Guideline For"
Mr. Polcuch will report

B3.4.7 AIR6016, (Project A6B3-06-1)
"High Lift Systems Description"
Mr. Perrin and Mr. Anderson will report.

B3.3.8 ARP5754 (Project A6B3-06-3)
"Electromechanical Actuator General Description For"
Mr. Baker will report

B3.4 Lessons Learned - Vice Chairman Errol Zatloff
Presentation and validation of new Lessons Learned

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MECHANICAL AND ELECTROMECHANICAL ACTUATION SYSTEMS PANEL A-6B3

Thursday Oct 3rd
1:30 PM- 3:30 PM

B3.5 Liaison Reports – Mr. Besliu to invite reports as applicable from:

B3.3.1 Hydraulic Pump/Motor Panel – Mr. Peter Stricker
B3.3.2 Flight Controls Panel – Mr. Dave Flavell
B3.3.3 EHA/IAP Panel – Mr. Brian Barker
B3.3.4 Academia and Research - Prof. Giovanni Jacazio

B3.6 Panel Presentations

"Roller Screws-Performance and Packaging Benefits for Future Electromechanical Actuators (EMAs)"
By **Bill Zerull** Chief Technology Officer, Exlar-Curtiss-Wright

B3.7 New Business

B3.7.1 Review of documents up for 5 year review. ARP4058A – Mr. Besliu

B3.7.2 Discussion of EMA Prognostics and Health Monitoring – Mr. Besliu and Mr.Alexander

- Liaison with the SAE IVHM Steering Group for direct work on the EMA PHM.

B3.7.3 Discussion of Volcanic Ash on Flight Safety– Mr. Besliu

-Request from the SAE Aerospace Standards to technically address the volcanic ash effects on mechanical and electro-mechanical systems and components.

B3.7.4 Control of environment inside closed housings of equipment – AIR Proposal.

B3.7.5 Open forum for new discussion items.

FILTRATION ~ PANEL A-6C1

Wednesday Oct 2nd
3:30 PM- 5:30 PM

C1.1 Opening Remarks and Membership Review – Chairman Mothersbaugh

C1.2 Attendance and Roll Call and Approval of Previous Minutes - Secretary Ellis

C1.3 Project Status

C1.3.1 MIL-F-8815 (Project A6C1-94-3)
"Filter Housings and Elements"
Mr. Lundquist to advise on US Navy updating MIL-F-8815 per SAE recommendations.

C1.3.2 ARP785A
"Procedure for the Determination of Particulate Contamination in Hydraulic Fluids by the Control Filter Gravimetric Procedure"
Mr. Rao will report on the progress of this document

C1.3.3 ARP 901
"Bubble Point Test Method"
Mr. Luther will report on evaluation of this document.

C1.3.4 ARP1302
"Filter Patch Testing Procedure for Aerospace Hydraulic Non-Rotating Equipment"
Mr.Cherry will report on evaluation of this document.

C1.3.5 ARP219
"Procedure and Methods for Conducting Test of Hydraulic Components in Contamination Controlled System"
Mr. Mothersbaugh will report on evaluation of this document.

C1.3.6 ARP4205
"Hydraulic Filter Elements – Method for Evaluating Dynamic Efficiency with Cyclic Flow"
Mr Brown will report on evaluation of this document.

C1.3.7 AIR787
Filter Element Cleaning Methods
Mr. Mothersbaugh will report on evaluation of this document.

C1.3.8 AIR844
Sensitization and Corrostion in Stainless Steel Filter Elements
Mr. Mothersbaugh will report on evaluation of this document.

C1.3.9 AIR1918
Comparison of Hydraulic System Cleanliness Procedures and Requirements for Ten Aerospace Companies
Mr. Mothersbaugh will report on evaluation of this document.

C1.3.10 ARP4285
Evaluation of Particulate Contamination in Hydraulic Fluid – Membrane Procedure
Mr. Gao will report on evaluation of this document.

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FILTRATION ~ PANEL A-6C1

Wednesday Oct 2nd
3:30 PM- 5:30 PM

C1.3.11 ARP725
Evaluating Effectiveness of Filter Element Cleaning Methods
Mr. Nicholson will report on evaluation of this document.

C1.3.12 AIR887
Liquid Filter Ratings, Parameters and Tests
Mr Young will report on evaluation of this document.

C1.3.7 ARP599
Dynamic Test Method for Determining the Relative Degree of Cleanliness of the Downstream Side of Filter Elements
Mr. Mothersbaugh will report on evaluation of this document.

C1.4 Lessons Learned
Presentation and validation of new Lessons Learned

C1.5 NFPA/ISO Reports
Chairman Mothersbaugh to provide updates on NFPA and ISO documents.

C1.6 Vice Chairman Report
Vice Chairman Brown will update the panel on the status of new lessons learned.

C1.7 Presentations

C1.8 New Business
Chairman Mothersbaugh will call for new business items

SEALS ~ PANEL A-6C2

Wednesday Oct 2nd
1:30 PM- 3:30 PM

C2.1 Opening Remarks - Chairman Torben Andersen

C2.2 Roll Call and Membership - Vice-Chairman Magdy Kandil / Secretary Morgan Gilbert

C2.3 Approval of Minutes – Secretary Morgan Gilbert

C2.4 Project Status

C2.4.1 AIR1244B (Project A6C2-94-4) "Selection of Slipper Seals for Hydraulic-Pneumatic Fluid Power Applications". Mr Andersen will report on the document status.

C2.4.2 ARP5312 (Project A6C2-95-1) "Scraper Comparative Test Method".
Mr. Rao will report on the document status.

C2.4.3 ARP1802B (Project A6C2-00-1) "Selection of PTFE Back-up Rings".
Mr. Andersen will report on the document status.

C2.4.4 AS6235 (Project A6C2-00-2) "Groove Dimensions and Recommended Seal Design Practices for face Mounted Applications". Mr. Kholeefa will report on document status.

C2.4.5 AS83485 (Project A6C2-04-01) "O-Ring Size Standard for AMS-R-83485 Elastomer".
Dr. Shaw will report on the document status.

C2.4.6 AS27196B / 27197B / 27198B (Project A6C2-05-01) "Molded Plate Gaskets".
Mr. Heppe will report on the document status.

C2.4.7 ARP5555 (Project A6C2-06-03) "Recommendations on Installation of Seals in Standard Glands". Mr Gilbert will report on the document status.

C2.4.8 ARP 6010 (Project A6C2-07-01) Proposed Project to develop a document "Surface Finish Guidelines for Sealing Systems". Mr Garcia will report on the document status.

C2.4.9 AS27195A (Project A6C2-07-09) "Seal, Plain Rubber (-65 to +275°F Fuel Resistant), -Mold in Groove".
Mr Heppe will report on the document status.

C2.4.10 AS27194A (Project A6C2-07-10) "Seal, Plain, Synthetic Oil Resistant, Oils, (-65 to +275°F Fuel Resistant), -Mold in Groove". Mr. Heppe will report on the document status.

C2.4.11 AS5616 (Project A6C2-13-03) "O-RINGS MOLDED FROM AMSXXX _____ MATERIAL", Mr Fletcher to report on the document status.

C2.4.12 AMSR83412/1A (Project A6C2-08-02) Rubber, Ethylene-Propylene, Hydrazine Resistant, O-Ring and Sealant Selection. Dr Shaw to report.

C2.4.13 AS29513B "Packing, Preformed, Hydrocarbon Fuel-Resistant, "O"Ring".
Dr Zielinski to report on progress towards publication of this document

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SEALS ~ PANEL A-6C2

Wednesday Oct 2nd
1:30 PM- 3:30 PM

C2.4.14 AS5860B "Retainers (Back-Up Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Single Turn, Static Gland" Mr Lindahl to report on revisions to this document following last ballot.

C2.4.15 AS5861A "Retainers (Back-Up Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Solid, Static Gland" Mr Lindahl to report on revisions to this document following last ballot.

C2.5 Lessons Learned

C2.5.1 None received to date

C2.6 Five years reviews

C2.6.1 AIR786B Elastomer Compatibility Considerations Relative to O-ring and Sealant Selection
Dr Zielinski to report on the ballot to stabilize this document

C2.6.2 AMSR83248/1 "Rubber, Fluorocarbon Elastomer, High Temperature, Fluid and Compression Set Resistant (O-Rings, Class 1, 75 Hardness)" Dr. Zielinski will report on progress of ballot to cancel this document. To be replaced with AS83248/1

C2.6.3 AMSR83248/2 "Rubber, Fluorocarbon Elastomer, High Temperature, Fluid and Compression Set Resistant (O-Rings, Class 2, 90 Hardness)" Dr. Zielinski will report on progress of ballot to cancel this document. To be replaced with AS83248/1

C2.6.4 AMSR83485/1 "Rubber, Fluorocarbon Elastomer, Improved Performance at Low Temperatures, O-Rings, Sizes and tolerances" Dr. Shaw will report on progress of ballot to cancel this document. To be replaced with AS83485

C2.6.5 ARP4727A "Gland Design, Computation of Seal Squeeze and Gland Volume".
Dr Zielinski to report on the ballot to stabilize this document

C2.6.6 AS5782 "Retainers (Backup Rings), Hydraulic and Pneumatic, PTFE Resin, Solid, Un-Cut, For Use in AS 4716 Glands". Mr Schofield will report on criteria required to stabilize this document following Mr Lindahl's objection.

C2.6.7 AS5781 "Retainers (Backup Rings), Hydraulic and Pneumatic, PTFE Resin, Single Turn, Scarf-Cut, For Use in AS 4716 Glands". Mr Schofield will report on criteria required to stabilize this document following Mr Lindahl's objection

C2.6.8 AS5798A "Aerospace Size Standard for Oversize O-Rings".
Dr Zielinski to report on the ballot to stabilize this document

C2.6.9 ARP1833A "Sealing Techniques for Missile Applications". Dr. Zielinski to report on progress to update this document following transfer from committee A-6B

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SEALS ~ PANEL A-6C2

Wednesday Oct 2nd
1:30 PM- 3:30 PM

C2.6.10 AS568C "Aerospace Size Standard for O-Rings".
Sponsor required for five year review

C2.6.11 AS28775A "Packing, Preformed, Hydraulic, +275°F ("O" ring)".
Sponsor required for five year review

C2.6.12 AS5860A "Retainers (Back-Up Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Single Turn, Static Gland"..Mr Lindahl is already sponsoring five year review

C2.7 Liaison Reports.

C2.7.1 ISO Liaison Report
ISO/TC20/SC10 – WG1 Liaison Report.

C2.8 Presentations

C2.8.1 None received to date

C2.9 New Business

FLUIDS ~ PANEL A-6C3

Thursday Oct 3rd
1:30 PM- 3:30 PM

C3.1 Opening Remarks

C3.2 Review and Approval of the Minutes from Milwaukee

C3.3 Roll Call and Membership Review

C3.4 Lessons Learned Presentations
Presentation and validation of new Lessons Learned

C3.5 Project Status –

- C3.5.1 AS1241 (Project A6C3-98-1) "Fire Resistant Phosphate Ester Hydraulic Fluids for Aircraft"
- C3.5.2 AIR810D "Degradation Limits of Hydrocarbon-Based Hydraulic Fluids, MIL-PRF-5606, MIL-PRF-83282, MIL-PRF-87257 Used in Hydraulic test Stands"
- C3.5.3 AIR1362C "Aerospace Hydraulic Fluids Physical Properties"

C3.6 Five Year Review

C3.7 Old Business

C3.8 New Business

Next Meeting

TUBING SYSTEMS ~ PANEL A-6C4

Wednesday Oct 2nd
11:00 AM- 12:00 PM

C4.1 Opening Remarks David Heer

C4.2 Membership Review Tim Neff

C4.3 Approval of Previous Minutes Tim Neff

C4.4 Liaison Report From Committee G-3

Briefing by Patrick Heppe

C4.5 Project Status

C4.5.1 No open projects

C4.6 New Business

C4.6.1 ARP994B, requested by Tim Neff

C4.7 Lessons Learned

Presentation and validation of new Lessons Learned

C4.8 Five-Year Document Review

C4.8.1 Currently no five-year review items

C4.9 Meeting adjournment

COMPONENTS ~ PANEL A-6C5

Thursday Oct 3rd
10:00 AM- 12:00 PM

C5.1 Opening Remarks – Chairman Jeff Dickey

C5.2 Attendance and Membership Review – Secretary Dan Novak

C5.3 Spring 2013 (meeting 154) minutes review and approval – Secretary Dan Novak

C5.4 Project Status

C5.4.1 ARP 4763 (Project A6C5-91-4) "Pressure Relief Valves"
Mr. Gerry Loftis will present the status of this document.

C5.4.2 ARP 4987 (Project A6C5-91-1) "Shuttle Valves"
Mr. Jeff Dickey will present the status of this document.

C5.4.3 AS 5467 (Project A6C5-97-2) "Fuse, Hydraulic Flow Rate Measuring"
Mr. Tracy Tschauner will present status of this document.

C5.4.4 AS 8775 (Project A6C5-09-1) "Hydraulic System Components, Aircraft and Missiles, General Specification For"
Mr. Keith Russell will report on the status of this document.

C5.4.5 ARP4946 (Project A6C5-11-1) "Aerospace-Valves, Check, Hydraulic, Aircraft and Missile"
Mr. Jordan Wadsworth will report on the status this document.

C5.4.6 AS4835 (Project A6C5-11-2) "Aerospace Fluid Power – Hydraulic Thermal Expansion Relief Valves"
Mr. Jeff Dickey will report on the status of this document.

C5.5 Five Year Reviews

C5.5.1 AS6026 "Control Unit, Pressure Generating, Manually Operated, Aircraft Hydraulic Brake System"
Mr. Richard Juergens will report on re-affirmation of this document.

C5.5.2 AS5586 "Aerospace-General Requirements for Hydraulic System Reservoirs"
Mr. David Scranton will report on the status of this document.

C5.5.3 AS4941 "General Requirements for Commercial Aircraft Hydraulic Components"
Mr. Peter Keenan will report on the status of this document

C5.5.4 AS 4741 "Aerospace – Hydraulic Switching Valve, Pressure or Pilot Operated"
Mr. Mark Garnick will report on the status of this document

C5.5.5 AS40401 "Solenoid, Electrical, General Specification for"
Mr. Jeff Dickey will report on his review of this document

C5.5.6 ARP4945A "Aerospace – Solenoid Valve, Hydraulic, Three Way, Two Position, Direct Acting"
Mr. Dan Novak will report on his review of this document

C5.5.7 ARP1297A "Reducers, Pneumatic Pressure, Missile"
A report will be made on the review of this document

C5.6 Lessons Learned
Members and participants are encouraged to submit new lessons learned.

C5.7 New Business
Panel members and guests are encouraged to introduce items of general interest for panel action.

POWER SOURCES ~ PANEL A-6C6

Thursday Oct 3rd
8:00 AM- 10:00 AM

C6.1 Opening remarks & membership review
Chairman G. Warner

C6.2 Attendance and membership review
Secretary T. Olthoff

C6.3 Approval of minutes from last meeting
Secretary T. Olthoff

C6.4 Project status

C6.4.1 AIR4940 (Project A6C6-88-1), "High Pressure/Performance Hydraulic Motors for Aerospace/Defense Applications" Messrs. Stricker, Olthoff and Orgnon to report.

C6.4.2 AS19692A (Project A6C6-03-01) "Pumps, Hydraulic, Variable Flow, General Specification for." Mr. Skinner to report.

C6.4.3 ARP6249 (New Project) "Determining Inlet Characteristics of Hydraulic Pumps" Messrs. Devan and Kandil to report.

C6.4.6 AS7997 "Motors, Aircraft Hydraulic, Constant Displacement, General Specification For" Mr. R. Fisher to report on disposition.

C6.4.5 AIR560 "Missile Hydraulic Pumps", Mr. Phil Galloway to report.

C6.4.6 ARP4379 "Aerospace-Accumulator, Hydraulic, Cylindrical, Piston Separated", Mr. Gerry Loftis to report.

C6.5 Lessons learned
Presentation and validation of new Lessons Learned

C6.6 Liaison reports

C6.6.1 AE-6
C6.6.2 ISO – Mr. Peter Keenan
C6.6.3 USAF, Navy, FAA, etc.

C6.7 Old business

C6.7.1.1 ARP 4904 "Capability Guidelines for Computer Controlled Test Equipment for Hydraulic Components" – Cliff Orgnon will review and provide a recommendation at the next meeting for this new 5-year review.

C6.7.1.2 ARP 4943 "Ground Support Equipment Hydraulic Systems, Design and Installation, Recommended Practices For" – Cliff Orgnon will review and provide a recommendation at the next meeting for this new 5-year review.

C6.8 New business

C6.8.1 "Discuss industry interest in a document that helps provides the OEM's with more guidance in selecting the appropriate type of electric motor pump"

C6.8.2 New 5-Year Reviews

ARP4553 "Aerospace - Accumulator, Hydraulic, Self-Displacing"

C6.8.3 Other New Business

C6.9 Presentations (none)

AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS SAE COMMITTEE A-6

Meeting 155
Thursday Oct 3rd
3:30 – 5:30 PM

1. Welcome and Introduction To All A-6 Members and Guests
   Chairman Jon Jeffery.

   1.1 Committee A-6 Structure and Leadership
   1.2 Meeting 155 Feedback/Reminders .

2. Committee A-6 Roll Call and Review of Membership
   Secretary Dave Flavell

3. Approval of Minutes of Meeting No. 154
   Secretary Dave Flavell

4. Membership Changes
   Secretary Dave Flavell

5. Steering Council Summary Report
   Secretary Dave Flavell

6. SAE Report
   Ms. Lloyd will report. There will be information on arrangements in progress for future meeting.

7. Liaison Reports

   7.1 EASA
   7.2 FAA
   7.3 Military Services
   7.4 Other SAE Committees
   7.5 Other Technical Committees

8. Recognition/Awards
   Chairman Jon Jeffery

   Spring 2013 Lessons Learned Award :
   - Lessons Learned Award criteria : Vice Chairman Dominique van den Bossche
   - Presentation of the Spring 2013 winning Lesson Learned by the Award winner

9. Sub-committee and Panel Reports
   9.1 A-6A Report - Subcommittee Chairman Halley
   9.2 A-6B Report - Subcommittee Chairman Schaefer
   9.3 A-6C Report - Subcommittee Chairman Zelinski

10 Panel presentations
   Panel presentations of special or general interest :

10. New Business/Chairman's Summary

SHORT COURSES

Design Considerations for Electrohydrostatic Actuators

Sunday Sept 29
1:30 PM – 5:30 PM

This four hour short course will provide an overview of design considerations for electrohydrostatic actuation for transport and business aircraft applications. The instructors will present the critical topics of electrohydrostatic actuation (EHA) from a systems development perspective (V-Approach). Beginning with aircraft system requirements, the instructors will then guide participants through EHA subsystem requirements, component design, component verification test, aircraft integration, and use. Also included will be a short history of the evolution
of EHA technology, and an overview of the advantages and system tradeoffs for selection of electrohydrostatic actuation on aircraft.

Learning Objectives

By attending this seminar, you will be able to:
• Describe the evolution of EHA for aircraft flight controls
• Evaluate the unique advantages/disadvantages of EHA in flight control applications
• Establish an awareness of high level aircraft system and requirements for EHA
• Explain basic design considerations for EHA
• Identify unique test and verification methodologies for EHA
• Describe important considerations for aircraft integration
• Evaluate key lessons learned about EHA development and aircraft usage

Who Should Attend

This seminar is intended for engineers and other key personnel involved in the design and specification of hydraulically powered flight and utility control actuation systems including fluid power, electrical, and systems engineering disciplines and those involved with aircraft certification. In addition, this seminar will benefit other key personnel desiring an understanding of aircraft electrohydrostatic actuation systems.

Instructors: Dominique van den Bossche and Jérôme Socheleau

Dominique van den Bossche is presently an independent consultant for European and US flight control actuation companies. Mr. van den Bossche was the Head of of the Flight Control Actuation and Hydraulics departments at Airbus, covering all models including A380, A400M, A350, and research activities. Holding four patents involving flight control actuation equipment design and application, Mr. van den Bossche has also been recognized with an award by the French Academy of Technology for his achievements on electrohydrostatic actuation technology. He has been the first chairman of the SAE A6B2 A6B2 Electrohydrostatic Actuation Panel and the sponsor of ISO 22072 Aerospace — Electrohydrostatic actuator (EHA) — Characteristics to be defined in procurement specifications

Jérôme Socheleau currently serves as the Head of Systems Group at UTAS Actuation Systems in France. He has been in charge of the development of several primary flight control actuation systems for new aircraft involving the state of the art "Fly By Wire" technology on A340-500/600 and the introduction of first EHAs on A380. Additionally, he also led the design of R & T projects, these include hybrid Electrically Assisted Hydraulic Actuator (EAHA), which enables hydraulic and electric power summing in a single actuator hydraulic power ram, and also the TRL5 demonstration of an EMA for Primary Flight Control Actuation. He is currently responsible of Systems activities development for UTAS in France, his teams are involved in R&T activities including Power Drive Electronics and Flight Control electronics as well as EMA, they are additionally in charge of products development for new platforms such as Embraer KC-390 and Irkut MC-21. At last, Mr. Socheleau is the current vice chairperson for the SAE A6B2 Electrohydrostatic Actuation Panel aimed at providing guidelines and recommended practices for EHA design and use.

Topical Outline

- Introduction and History of EHA for Flight Control applications
- Aircraft System Requirements and System Safety
- Types of Electrohydrostatic Actuation
- EHA
- EBHA
- IAP
- System Architectures
- EHA Specification Unique Requirements
- EHA Performance Attributes
- Duty Cycle and Thermal Management
- EHA Components
- EHA Design Considerations
- EHA Verification Testing and Qualification
- EHA System and Aircraft Integration
- Lessons Learned
- Future Trends
- SAE International and ISO specific documents

Fee: $295

For complete seminar content, instructor bio, and to register visit training.sae.org/seminars/C1304

SHORT COURSES

Electrohydraulic Servovalves in Flight Control and Utility Actuators

Monday Sept 30
1:30 – 5:30 PM

This four-hour short course intends to present an overview of electrohydraulic flow control servovalves commonly used in flight control and utility actuators. The scope of this course covers the history and design of servovalves, as well as their most common performance characteristics. This course will provide participants an understanding of the application of electrohydraulic servovalves in hydraulically powered actuators and preparation of the servovalve procurement specification.

Learning Objectives

By attending this seminar, you will be able to:
• Recognize differences between various types of electrohydraulic servovalves
• Understand terminology specific to electrohydraulic servovalves
• Identify key performance characteristics
• Evaluate effects of the servovalve characteristics on performance of a control actuator
• Prepare design specification for electrohydraulic servovalve

Who Should Attend

Engineers and other key personnel involved in the design and specification of hydraulically powered flight and utility control actuation systems including fluid power, electrical, and systems engineering disciplines and those involved with aircraft certification. This seminar will benefit other key personnel desiring an understanding of power distribution through electrically powered valves and aircraft actuation systems.

Instructor: Roman Simkin

Mr. Simkin has been involved with the design and development of electrohydraulic servovalves for more than thirty years. Mr. Simkin is employed at Abex and Parker Aerospace working in electrohydraulic servovalves design. He has held key positions in the development of the servovalves for Airbus A330/340 and A380, Boeing 717, 777 and 747-8, EMB 170/190 and 505, DHC8-400, ARJ-21, MRJ and more. He has been a part of the SAE A-6 committee since 1998 and is the Secretary of the A-6B1 Hydraulic Servo Actuation panel. Mr. Simkin sponsored the latest revision of the SAE ARP490-Electrohydraulic Servovalves.

Topical Outline

• Overview of Electrohydraulic Servovalves
• History of development of servovalves
• Control function (flow vs. pressure control)
• Architecture (single vs. two-stage)
• Servovalve Specific Terminology
• Electrical characteristics
• Steady-state performance characteristics
• Dynamic performance characteristics
• Specification Considerations
• Typical Requirements
• Effects of tolerances
• Test methods and equipment
• Quality assurance considerations

Fee: $295

For complete seminar content, instructor bio, and to register visit training.sae.org/seminars/C1303

SHORT COURSES

Hydraulic Installation Design: Materials, Rules, and Routings

Monday Sept 30
8:00 AM – 12:00 PM

This four hour course provides an overview of hydraulic tubing installations, principles, and design criteria. Although the primary focus is airplanes, the requirements and principles covered are valid for use in other types of flight vehicles and industries.

Learning Objectives

By attending this seminar, you will be able to:
• Select materials and connections appropriate for the desired usage
• Develop routing strategies that minimize the impact of costs, weight, maintenance, and structure
• Provide installations that ensure manufacturability, reliability and safety
• Reference standards, recommended practices, and information reports to support the design decision

Who Should Attend

Personnel involved in the design and selection of fluid transport routing, installation, and material selection for hydraulically powered aircraft systems including design and fluid power engineers, system engineers, and those involved with certification.

Instructor: Timothy Neff

Timothy Neff has been involved with the design and maintenance of aircraft hydraulic systems for over 35 years. After his ten years as an active duty U.S. Army pilot and Aircraft Maintenance Officer, he held engineering positions with Beach, Cessna, Gulfstream, Northup-Grumman, and his current employer Spirit AeroSystems. He is the Panel Chairman of A-6A4 Ulility Control Systems and Panel Vice Chairman of A-6C4 Tubing. Mr. Neff sponsored the latest revision of the SAE Aerospace Recommended Practice ARP994 “Recommended Practice for the Design of Tubing Installations for Aerospace Fluid Power Systems”.

Topical Outline

• Overview of aircraft fluid installations
• History
• Environments that impact installation designs
• Fluid Transport Design
• Materials selection (past and present)
• Couplings and end fittings (common and special use)
• Application for non-hydraulic uses
• Fluid Transport Routing
• Lessons learned
• Tube restraint systems
• Specials designs (drains, vents, and reservoirs

Fee: $295

For complete seminar content, instructor bio, and to register visit training.sae.org/seminars/C1304

AEROSPACE ACTUATION, CONTROL AND FLUID POWER SYSTEMS SAE COMMITTEE A-6

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 issuesto 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

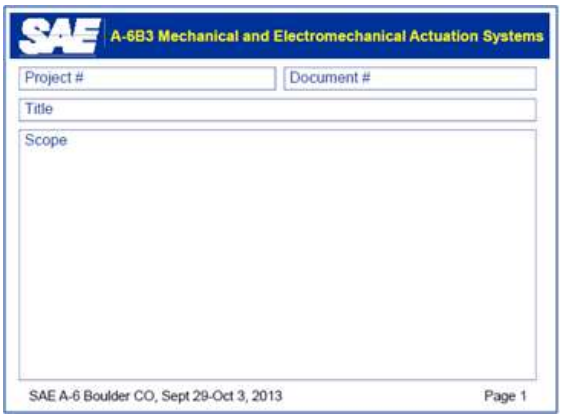
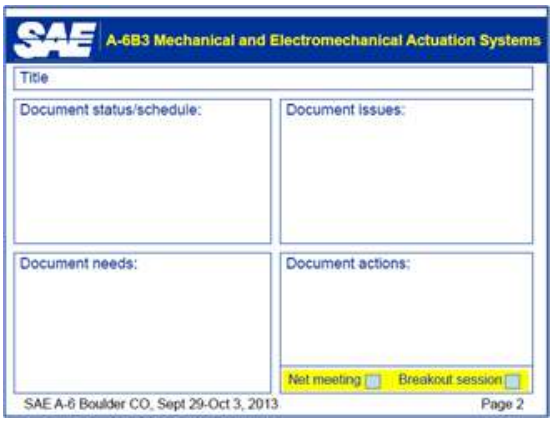
Will be invited to select the project meetings of their choice on the basis of the information displayed at the Welcome meeting, or details given by sponsors, panel or sub committee chairs

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 change proposed in these slides is intended to encourage net meetings between our biennial committee meetings, or to better plan working sessions ahead of time.