

Aerospace Fluid Power, Actuation & Control Technologies Seminars

Held in conjunction with the 2013 SAE A-6 Aerospace Actuation, Control and Fluid Power Systems Committee Meeting
Broomfield, Colorado, USA

New! Design Considerations for Electrohydrostatic Actuators

September 29, 2013

New! Electrohydraulic Servovalves in Flight Control and Utility Actuators

September 30, 2013

New! Hydraulic Installation Design: Materials, Rules, and Routings

September 30, 2013



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Design Considerations for Electrohydrostatic Actuators

September 29, 2013 ▪ Broomfield, Colorado

I.D. #C1304

SAE International is pleased to offer this professional development seminar in conjunction with the SAE A-6 Aerospace Actuation, Control and Fluid Power Systems Committee meeting September 29 - October 3, 2013 in Broomfield, Colorado.

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 Brian Barker

Dominique van den Bossche is an independent consultant for European and US flight control actuation companies. Mr. van den Bossche was a development engineer in charge of A300B hydromechanical flight control equipment. He was also involved in the A310, A300-600, ATR42/72 and A320 flight control equipment developments. 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.

Brian Barker serves as the Manager for Product Integrity with Moog Aircraft Group. Mr. Barker has worked for almost 30 years in Aircraft Hydraulics and Flight Controls, and was involved with the development of several early demonstration EHA pumps and actuators leading to the flight readiness of EHA technology. He holds three patents for innovations in hydraulic pump and motor technologies. Mr. Barker is the current 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



Fees: List: \$295 ▪ All SAE Members: \$295

CEUs: 0.4

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

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Electrohydraulic Servovalves in Flight Control and Utility Actuators

I.D. #C1303

September 30, 2013 ▪ Broomfield, Colorado

SAE International is pleased to offer this professional development seminar in conjunction with the SAE A-6 Aerospace Actuation, Control and Fluid Power Systems Committee meeting September 29 - October 3, 2013 in Broomfield, Colorado.

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.



Fees: List: \$295 ▪ All SAE Members: \$295

CEUs: 0.4

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

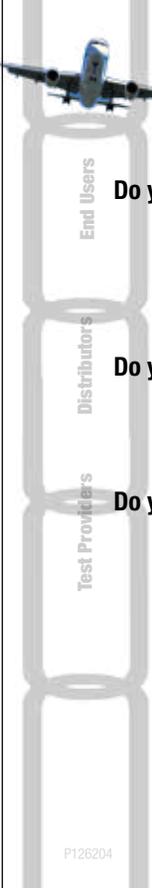
Topical Outline

- 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
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Hydraulic Installation Design: Materials, Rules, and Routings

I.D. #C1305

September 30, 2013 ▪ Broomfield, Colorado

SAE International is pleased to offer this professional development seminar in conjunction with the SAE A-6 Aerospace Actuation, Control and Fluid Power Systems Committee meeting September 29 - October 3, 2013 in Broomfield, Colorado.

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, Northrup-Grumman, and his current employer Spirit AeroSystems. He is the Panel Chairman of A-6A4 Utility 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."



Fees: List: \$295 ▪ All SAE Members: \$295

CEUs: 0.4

For complete seminar content, instructor bio, and to register visit training.sae.org/seminars/C1305

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)

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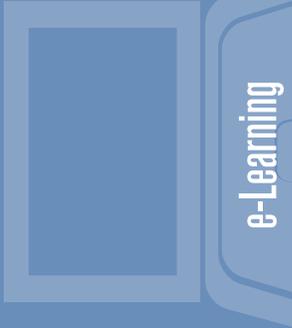
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