

TAMMY REEVE

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Summary: Thirty years' experience real-time embedded hardware, software and systems, authorized as a FAA DER in 1998 and been a FAA DER involved in level A – E Systems, software and complex hardware approvals (DO-178B/C & DO-254). President of Patmos Engineering Services, Inc for since 2000 when the company was founding as a small, women-owned business in Washington State and President of Airworthiness Certification Services, LLC a small women-owned business in Seattle Washington started in January 2017 supplying DO-178C, DO-254, ARP4754 compliance tools, online training and templates.

Work

Experience: **FAA Independent DER, Seattle ACO** 8/98 – present

Authorization:

Systems & Equipment (electrical), Part 23,25,29 Chart C1 & C2 Areas A-H, J, K&L software (DO-178B/C), ASICs and PLDs Level A (DO-254); Special- JAA/EASA delegation, TSO approval level A

FAA Advisors (past and present):

Mr Varun Khanna, Mr, Will Struck, Mr Nelson Sanchez/ John Hill, Julio C Alvarez, Kathy Dang (Seattle ACO)

FAR Compliance Authority: Parts 23, 25, 27, 29 & 33 Systems and Equipment/Mechanical Full Level A SW and AEH all charts

Military Project work: MSO, Patmos US FCL- cleared facility and personal, TLA approvals

Work includes:

- FAA Forum for Aeronautical Software (FAS) committee member 2017-present
- FAA DO-254 Workshop breakout session coordinator- 2015-2016
- FAA Overarching Properties committee member -2016 to present
- Airborne Hardware FPGA/ASIC COTS IP certification approach utilizing AC20-148 coordination with FAA TAD and FAA ACO offices; presented at the FAA SW/AEH conference with LogiCircuit Sept 2014
- SAE AEROTECH – Technical presenter, Panel member diversity in engineering 2021, Aerotech conference Session coordinator 2013-present
- SAE WG34 2021- present Artificial Intelligence and Machine Learning SG4 US lead working group
- SAE S18 2020 –present Systems Development Assurance and Safety WG participant
- RTCA WG-117 2020- present Low risk software working group Secretary/Editor for SG1
- USA DO-254 Users group Chair <http://www.do254.com>
 - Coordinating topics related to AEH certification for DO-254 such as COTS IP, Simple vs Complex, HDL design standards, Verification, COTS device classification, tool qual
- Contract Awarded by FAA for development of FAA Academy Complex Electronic Hardware/DO-254 Training course development and FAA Academy trainer in Oklahoma for the course
- Participation in SC-205 working Group, group co-secretary (DO-178C -Model Based Design)
- Participation in the SC-190 working group and Object-Oriented Technologies Working Group
- Presented at several National Software DER conferences on “DO-254 users group” 2011, “DO-254 Verification Pitfalls” 2007, “DO-254 experiences” and “Pro-Active vs. Re-active Traceability” 2006, “ DO-254 Verification Techniques and Tools” 2005
- Presented at Certification Together Conference Toulouse France, 2010, 2020, 2023

- Presented at the FAA Software Tools Forum at Embry Riddle University, 5/2004
- Reviewed and participated in draft policy and clarification surrounding Order 8110.49, Tool qualification, reusable certification, decision coverage and DO-254
- Software Conformity Inspections in support of company DMIRs per FAA notice 8110-86 and Order 8110-49
- Deliver training for ARP4754A, DO-254; DO-178B/C and Certification processes for companies around the world

FAA/ODA/DTAS

Related Training:

- Ongoing FAA required renewal training yearly
- Safety- FHA and FMEA Training 2016- Boeing
- FAA self-study course (#25816), “Complex Electronic Hardware”
- FAR Part 21 Training Seminar 8/23/2001
- JAA compliance findings 7/24/2003 by Mr. Kanji K. Patel
- Introduction VHDL, Xilinx 4/2004
- EASA Training, Boeing 2/2006
- ODA related training as AR 2004- present (Part 25 and Part 29)
- Directorate of Technical Airworthiness 2011- Present
(Canadian Military authorization/training)

Examples of project work (*this is only a sample of some project work*):

Aircraft Type	System Description	Assurance Level	Certificate	ACO/Certification Authority
Part 25	ASIC and PLD approvals for Global Navigation Satellite System (GNSS) and Integrated Multi-Mode Radio (IMMR) system. Includes TSO-C145d, TSO-C146d, TSO-C161a and TSO-C196b	DAL A	STC TSO	FAA LAACO Boeing ODA
Part 23, 25, 33	Time Triggered Protocol End system ASIC used as a Switch module core as well as “End system”.	DAL A	STC TSO	GE ODA EASA
Part 23, 25	Tire Pressure ASIC	DAL B	STC	FAA Seattle
Various	AEH COTS IP library reusable certification examples: • MicroBlaze • ARINC 429 • AXI Uart • FIFO • ZIPcores I2C Master Serial Interface Controller • AXI General Purpose Input/Output (GPIO)	DAL A	TSO/ TC	FAA Atlanta ACO – Myles Jalalian
Military Helicopter	Flight controls, Display control Unit, Embedded GPS/IRS AEH and SW	DAL A-C	Military	Canadian DTAS Loren Klimchuk, P.Eng.
Part 33	Engine Controller- Piston Engine	DAL A	TC	FAA New York- Wing Chan
Part 33	IRF FADEC ECU - Jet	DAL A	TC	FAA Chicago ACO- Brenda.Ocker

Aircraft Type	System Description	Assurance Level	Certificate	ACO/Certification Authority
Part 25	Various (Braking Systems, Flight Controls, Fuel Pump, Hydraulics) AEH and SW	DAL A-C	TC	COMAC and CAAC certification activities for C919 and ARJ21 projects.
Part 25	Environmental Control system; Electrical power systems; Braking systems, Nose wheel steering systems; Fight Control systems; Audio Systems; Rain Removal systems; Systems utilized AFDX Arinc 664 protocol, reviewed AEH aspects DO-254- AFDX ASIC as part of integration into these systems.	Level A-C	TC	FAA ACO various projects for Boeing ODA as an AR for 787 and 747-8
Part 25	Fuel control system	Level B	TC	EASA Airbus project with Parker Elyria
Part 23	APU Engine Programs	Level B (Tool Qual)	STC	LAACO- Chinh Vuong
Part 21	MCDU	Level B – SW & PLDs	TSO C113	LAACO
Part 21	Display Switching Unit	Level C – SW & PLDs	TSO C105	Seattle ACO- Varun Khana & Susan Letcher
Part 25 Boeing	Head-up Guidance system	Level A- PLD	STC	Seattle
Part 23	Primis CDS DU1080	Level A – SW	STC	LAACO
Part 25 Boeing	Gauging Transient Suppression Unit	Level A – PLD	STC	Seattle ACO
Part 25 Boeing	Common Core Modules	Level A-C Tool Qual	STC	LAACO
Part 21 & 29	Aural Warning Generator	Level C SW	TSO C50c	Seattle ACO
Part 21 & 25	Display Switching Unit	Level C PLDs & SW	TSO/JTSO C105	Seattle ACO
Part 21 & 23	PA and Cabin Interphone Controller	Level C PLDs & SW	TSO C50c	Seattle ACO
Part 23	WSI In-Flight Receiver	Level D SW	STC	Wichita ACO
Part 21 & 25	Communication Management System	Level C SW and PLDs	TSO C113	Seattle ACO
Part 23	Smart Stem	Level C- ASIC	STC	LAACO -Thom Pham
Part 21	Adaptive Flight Display	Level A-C Tool Qual	TSO's various	LAACO
Part 21	Flat Panel Display System 15 “	Level B- PLDs	TSO C113	Boston ACO – Doug Wagner
Part 21	Display Link Controller	Level C – SW	TSO C113	Seattle ACO
Part 25 Boeing	Electronic Elevator Feel Controller	Level A – PLD	STC	Wichita DAS
Part 25	Flat Panel Display System 10 “	Level B-	TSO C113	Boston ACO

Aircraft Type	System Description	Assurance Level	Certificate	ACO/Certification Authority
Boeing		PLD		
Part 29	Flight Controls	Level A – SW	TC	NY ACO Dennis Wallace-Specialist
Part 23, 25	Data Base DO-200A	Level C	STC	Seattle ACO
Part 29	HUMS	DAL A	TC	NY ACO
Part 29	Flight Controls- Sikorsky	DAL A	TC	NY/Boston ACO/ Fortworth ACO
Part 29	Flight Controls Windshield wipers, RIU, MCC	DAL A	MSO	Army
Part 25, 29	E- GPS systems and ASIC	DAL A	MSO	Army, Airforce, Navy
Part 25	Fuel system, fuel pump	DAL A	TC, STC, TSO	Seattle ACO
Part 25, 23	Radio	DAL C	TC, STC, TSO	Seattle and LA ACO
Part 25	Nav systems TCAS	DAL A	TC, STC, TSO	Seattle and LA ACO

President and manager for Patmos Engineering Services Inc and Airworthiness Certification Services, LLC Washington State 2000 – Present

Tammy Reeve formed Patmos Engineering Services, Inc in 2000 and Airworthiness Certification Services, LLC as a women owned businesses. Patmos provides engineering and consulting services, and ACS LLC provides tools, templates and online training for DO-254, DO-178B, DO-178C, ARP 4754A and general certification. ACS acquired FAA Consulting in 2016 along with a compliance management tool, QCMS which is now owned and operated by Tammy Reeve under ACS LLC. This tool supports many projects and companies in support of compliance to DO-254 and DO-178 for both military and commercial projects. Tammy is responsible for managing the staff and resources for both Patmos Inc and ACS LLC. Responsibilities include; Business management, contracts management and tool deployment and support.

Research and development: Tammy is the IP owner and visionary for a development and verification tool to support safety critical applications called PACT – Process and Artifact Compliance Tool. This includes integrated templates and tools to support avionics and safety critical program development under DO-178C, DO-254 and ARP4854A.

Project Manager and Certification specialist – Avionics Company 2016-2024

Patmos Engineering Services Inc. - Supplier

For a Avionics company - Development of a single board computer card which would meet the DO-254 DAL D level objectives for the PCB and DAL A level objectives for the FPGA. Responsible for full design and development of the FPGA to DAL A AC20-152 and DO-254. Patmos Engineering Services was contracted to provide DO-254 services as well as certification specialist oversight services for the design and process assurance support for successful approval of the FPGA as part of this system. Successfully passed customer and internal SOI #1 - #4 audits.

Project Development Manager and Quality Assurance Engineer 10/2009-2015

Patmos Engineering Services Inc. - Supplier

For **Parker Hannifin Corporation, Fluid Systems Division (FSD)** Elyria, OH -
Fuel Systems- Fixed Frequency Supply Unit

Awarded contract in partnership with XtremeEDA to develop the Fixed Frequency Supply Unit FPGA for the Airbus A350. Patmos Engineering Services was contracted to provide DO-254 services for the design and process assurance support for successful approval of the FFSU FPGA as part of this system. Successfully passed EASA and Airbus SOI #1 and SOI #2 & #3 with no findings and minor actions.

Senior Embedded Software Engineer
Certification Focal/FAA Company DER

10/92 – 2/2005

Avtech Corp. Seattle, WA

Company **Certification Focal and DER**. Company focal for software, complex hardware, certification issues and policy surrounding onsite repair station regulation and MIDO regulation. Independently created a TSO and PMA company policy for management of TSO and PMA data. Author of a Partnership for Safety Plan with the FAA for streamlining TSO applications. TSO and JTSO coordination and application with FAA and JAA. Responsible for review and approval of Service Bulletin, Service Letters and related material for major/minor change determination. Leader of a six-member team that establishes engineering procedures, company policies and procedures specifications for all levels of software design/code/test.

System software engineer for the Rockwell/Collins Display Control Panel (DCP) a Motorola 68332 embedded processor with ARINC 429 I/O (implemented utilizing TPU functions), encoder knobs and NVM. Responsible for the Plan for Software Aspects of Certification (PSAC), Software Accomplishment Summary (SAS), customer interface, and allocation of customer requirements to the Software Requirements Document per DO178B. Responsible for compliance to DO-254 related issue paper for complex hardware development. Responsible for PHAC and HAS related deliverables and review and approval of life cycle data associated with FPGAs. Developed and oversaw Software and Hardware Verification Testing, traceability and the associated documentation. Worked with COTS vendors and in house tool development group for tool qualification per DO178B requirements

Effectively managed eight microprocessor logic modules for the electrical system of the Cessna Citation X aircraft. Work included PSAC development, re-work of customer existing assembly source code to meet DO-178B and company software development standards, all levels of software documentation, traceability and verification.

Principle software systems design engineer for a Station Card Controller, one of four processors in the Audio Control System for the Boeing 777 Aircraft (DO-178B). The Station Card Controller embedded system consists of an Intel 87C51FA microcontroller, DSP serial interface, RS485 serial interface, ARINC 429 bus interface with FPGA I/O and power fail protect functions. Effectively allocated customer system requirement specifications into all levels of software documentation and confidently presented software design to customer. Performed system latency analysis, Built-In test system analysis/design, DSP and RS485 serial bus definitions which were outside of assigned responsibilities.

Development Engineer

7/88 - 10/92

G.E. Aerospace Bellevue, WA

Project lead and principal software designer for a Ground Proximity Warning system, a real time embedded dual redundant system consisting of two Intel 87C51FB microcontroller's, cross channel data links, ARINC 422/429 & 1553 bus interface and an optical encoded knob. Code written in MCS-51 assembly. Designed, developed, and coordinated all phases of testing per MIL-STD 2167; SW integration testing implemented on HP64000 UNIX based 8051 emulation, successfully performed HW/SW integration phases of testing utilizing a PC based Intel 8051 ICE. Project lead responsibilities include: design presentations for customer, staffing, scheduling, off site support, all levels of documentation, preparing technical proposals related to design/code/test and support equipment.

Effectively led and organized a team of 6 engineers for SW integration level testing of outer-loop control

laws for a quad redundant 1750 based flight control computer. Worked with flight control systems including CsLEOS RTOS software development and integration. Successfully completed the SW design/code/test for the Input Signal Management portion on an Autopilot Air Data System, a 1750A JOVIAL based software program. Reduced schedule slippage and program cost by performing tasks outside of assigned responsibilities.

Education: **Seattle University**
Seattle, WA Masters in Software Engineering 4/93 - 6/98
Thesis work: WWW based software engineering environment.
California State University Fullerton 8/85 - 5/88
Fullerton, CA BSEE
Emphasis in digital electronics, microprocessors and computer architecture.
Tau Beta Phi – Engineering honor society
Pre-Engineering work at University of Washington 83’-85’

Skills: Model Based design, Assembly, C, FORTRAN, JOVIAL, SmallTalk, Ada training, OOD training, Intel ICE, AMD, Microtec & Intel ARM, 8051 assembler/linker, HP64000, VMS & DEC station UNIX, PCAD, ABC flowcharter, MS-projects, ARINC 653, 629 & 429, MIL-STD 1553B, MIL-STD 2167A, ISO9000, DO178A/B, Data I/O 29B, ACT toolset, Interleaf, AutoCode, ABEL, Verilog, VHDL Effective Communicator, Self motivated, Assertive.

Activities & Achievements: Awarded SAE 2020 J. Cordell Breed Award for Women Leaders. FAA recognition as presenter; Managerial Award & Outstanding Achievement Awards (GE), Society of Women Engineers, Tau Beta Pi, Recreation committee chairperson, gardening, Kayaking, cooking, traveling.