

## AEROSPACE ENGINEER - PROPULSION SYSTEMS

Resourceful and agile engineer with 12+ years of diverse engineering experience with propulsion and powerplant systems on military and commercial air vehicle applications (manned and unmanned). Experience includes: research, solution-space optimization, vehicle conceptual, preliminary, and detailed design, low-TRL/MRL engine development, engine-to-airframe integration, uninstalled and installed engine (cycle) performance analysis, engine developmental and performance testing, flight test support and data analysis, requirements and engineering documentation, product acquisition and supplier management, airworthiness, certification/qualification processes, maintenance, repair and overhaul (MRO), and lifecycle support (sustainment). Additional 10 years of previous experience as a technician on military and commercial fixed and rotary-winged aircraft and flight operations. This collective 20 + years of aviation/aerospace background results in a superlative combination of practical and analytical skills with a holistic understanding of gas turbine engines, heavy fuel/diesel and gasoline reciprocating engines, powertrains, drives, accessories, and related subsystems for future, modern, and legacy air vehicles and products.

### AREAS of EXPERTISE

Engine (Cycle) Performance Analysis	Requirements/ICD Definition	Component Repair Methods
Engine Selection and Cycle Optimization	Development/Performance Testing	Engineering Investigations/MRB
Engine-to-Airframe Integration/Installation	Environmental Testing/Certification	Manufacturing & Maintenance Processes
R&D, Trade Studies, and Technical Assessment	Technical Writing/Process Documentation	Precision Measurement & Instrumentation

### PROFESSIONAL EXPERIENCE

University of Texas at San Antonio <b>Graduate Research Assistant</b>	San Antonio, TX	<b>2020 - Present</b>
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#### Description:

Graduate Research Assistant under the direction of Dr. Christopher S. Combs from the UTSA Mechanical Engineering department. Primary responsibilities are to conduct academically significant research in experimental High-Speed Aerodynamics while pursuing a Ph.D. in Mechanical Engineering with a dissertation emphasis on hypersonic Shock-Wave/Boundary-Layer Interactions (SWBLI). The Combs Research Group at UTSA explores high-speed aerodynamic phenomena using cutting-edge optical diagnostic experimental techniques, image processing, and data analysis. Measurements are made in supersonic, hypersonic, and reacting flows with broad applications for the aerospace and energy sectors of industry. Projects and experimentation support research efforts towards advancing the aerothermodynamics to realize next-generation high-speed air vehicle systems through collaboration with NASA, U.S. Air Force, U.S. Navy, and DARPA.

Lockheed Martin Aeronautics Co. <b>Sr. Staff Mechanical Engineer</b>	Fort Worth, TX	<b>2019 - Present</b>
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#### Responsibilities:

Advanced Development Projects (ADP) Propulsion Engineering IPT lead for research, design, and development of tactical, attritable and expendable unmanned air vehicle systems. Company subject matter expert on small and expendable turbine engines and integration. Provide expertise and engineering consultation to support internal and external air vehicle technology development activities as well as new business development and pursuit. Support planning of new business funds (NBF)/Internal Research & Development (IRAD) projects and perform independent engineering reviews across various efforts and product lines.

#### Delivered results-

- Company representative for NASA/ONR-led consortium for improving CFD codes for Supersonic Inlet Dynamic Distortion modeling.

Lockheed Martin Missiles and Fire Control <b>Staff Aeronautical Engineer</b>	Grand Prairie, TX	<b>2016 - 2019</b>
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#### Responsibilities:

Air-breathing Propulsion Engineering IPT lead and turbine engine subject matter expert for Tactical Missiles-Advanced Programs group. Experience included research and design of various medium-to-long range air and surface-launched expendable cruise missiles and attritable unmanned aerial system concepts operating in subsonic, supersonic, and hypersonic speed regimes. Supported routine propulsion engineering efforts of missile/UAS programs throughout: conceptual design, award capture, flight test, and initial production. Primary engineering liaison between customers, airframe/systems IPT, engine OEM, and sub-tier suppliers throughout vehicle lifecycles. Responsible for technical leadership, task assignment, and mentorship of junior propulsion engineers in design and development of propulsion, fuel, and related auxiliary fluid/mechanical systems. Responsible for conducting airbreathing engine technology research and assessment and supporting engine-to-vehicle design, development, integration, and mission/system trade studies. Regularly contributed to and advised on airframe, fuel, and power distribution system designs and directly responsible for successful engine sizing, engine selection, propulsion (inlet/engine/nozzle) integration, power generation, accessory layout, and fuel system architectures. Defined, reviewed, and/or approved propulsion system documentation such as: IRAD/CRAD statements of work (SOW), engine development test plans, engine performance specifications, and interface control documents (ICD) as they related to propulsion and fuel systems of air vehicles. Participated in vehicle design reviews and synthesis process by providing recommendations on engine performance, integration, cost, and system optimization. Led and instructed junior engineers on performing system and component level trade studies and assessing supplier cost and capability. Provided technical briefings and presentations in support of business development efforts and promoted company advocacy of turbine engine technology and manufacturing development to government customers. Provided technical guidance, design, and engineering analysis for proposal responses (RFI/RFP/RFQ) of subsonic, supersonic, and hypersonic, air and surface-launched weapons concepts. Published technical reports and white papers on air-breathing propulsion topics including: low-cost manufacturing of

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expendable/attractable turbine engines and accessories, compact turbo-generators and micro-APU for high power-density weapon applications, and use of highly-augmented expendable turbine engines for high-speed weapons.

## Delivered results-

- Received 15 distinct awards from 2016-2018, totaling over \$10,000 and recognized as a 'critical business asset'.
- Established strong working relationships with over 10 engine OEM and an expert reputation with internal and external customers.
- On time, successful execution of an 18-month engine technology and capability study for USAF; managed \$500,000 budget & 3 engineers.
- Provided innovative and influential support towards proposal and capture of a \$110 Million DoD cruise missile S&T program.

Lockheed Martin Aeronautics Co. <b>Senior Systems Engineer</b>	Fort Worth, TX	2015 – 2016
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## Responsibilities:

Propulsion subject matter expert for F-35 Lightning II (JSF) Prognostics and Health Management (PHM) capability integration team. Provided engineering and integration support towards development and maturation of Lockheed Martin air vehicle system and Pratt & Whitney F135 propulsion system diagnostics software for all three variants of 5<sup>th</sup> generation F-35 aircraft. Coordinated support with propulsion IPT, Propulsion System Contractor (PSC/OEM), and field services to ensure fault detection and diagnostics data was being gathered and processed properly. Analyzed data and system files to ensure proper PHM software function for propulsion system and tie-in to air vehicle. Reviewed and updated engineering data, databases, and interface control documents. Provided technical support to software development teams and project management for Propulsion PHM integration to Autonomic Logistics Information System (ALIS).

## Delivered results-

- Implemented solutions which reduced sympathetic faults, nuisance work, and premature maintenance actions on all 3 F-35 variants.
- Delivered analysis of Propulsion PHM data to improve mean time between failure (MTBF) metrics by correcting categorization on 47% of reported failures against air vehicle data systems.

Gulfstream Aerospace Corp. <b>Technical Specialist</b>	Savannah, GA	2013 - 2015
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Propulsion/Thermodynamics/Acoustics IPT

## Responsibilities:

Served as an Engine Performance Engineer in the Advanced Aircraft Program (AAP) Propulsion team. Performed installed cycle modeling of Pratt & Whitney Canada PW800 series turbofan engines to predict aircraft and engine performance throughout all mission segments, verify power settings, and flight envelope limitations for development and certification of new large-cabin business jet aircraft (G500/G600). Using Estimated-Engine-Performance-Programs (engine cycle decks), built and ran cycle models for arrays of flight conditions to deliver steady-state performance estimates and validate OEM data, modeling methods, and engine control software fixes. Using specification and status cycle models, performed case studies and analysis to assess spool behaviors (N1, N2), fuel efficiency (TSFC), fuel/air mass flows, thrust ratings, schedule verification, throttle sensitivity, and thrust lapse (climb performance). Analyzed EBU integration and installation effects such as horsepower extraction from accessory gearboxes (AGB) and pumps, bleed air demand/schedules, inlet pressure recovery, and leakage/loss effects in bypass ducts and jet pipes (nozzles). Provided analysis to support technical coordination and discussion with engine OEM. Used case study results to assist with flight test technical planning, instrumentation preparation, and performance corrections due to distortion (rakes, etc.) effects. Maintained interface control documents, updated status models, and design review documentation.

## Delivered results-

- Provided analysis and solution to correct a substantial deficiency in OEM models for idle/thrust settings in engine control software.
- Generated engine performance database for 2 engine variants of over 100 simulations (each) for flight envelope performance validation.

Powerplant/ECS/Fuel IPT

## Responsibilities:

Served as a Cognizant Engineer in the Advanced Aircraft Program (AAP) Powerplant/ECS team towards development and certification of new family of large-cabin business jet aircraft (G500/G600); having responsibility for all aspects of design, integration, qualification and acceptance testing, certification, production support, retrofit, modification, and continued airworthiness of the PW800 engine-based Integrated Powerplant/Propulsion System (IPPS) installation including the engine, nacelle, thrust reverser, and related EBU components. Responsibilities included generation of FAA airworthiness, compliance, qualification, and certification documents including test plans and reports. Propulsion system ground and flight test planning, test coordination, witnessing, and reporting. Provided Powerplant/IPPS system vendor and sub-tier supplier coordination and technical oversight as needed. Expected to maintain high level of proficiency in technical writing and produce documents such as acceptance test plans (ATP), qualification plans (QP), qualification test plans (QTP), qualification test reports (QTR), certification plans, requirements documents, safety of flight, product lifecycle management, and other FAA certification and airworthiness documents. Continuously expected to be well-versed in component qualification test procedures and methodology per RTCA/DO-160. Maintained extensive working knowledge and experience with regulations applicable to aircraft powerplant installations including 14 CFR Part 25 and EASA CS.25 to include aircraft fuel systems, nacelle structures and ventilation and cooling, thrust reversers, engine performance, engine control systems, engine mounting, and engine icing and fire protection. Maintained working knowledge of installation and operational aspects of propulsion related system including aerostructures, engine fuel systems, engine bleed air/ECS systems, and aircraft/engine electrical, hydraulic, and avionics systems. Generated and updated Discrepancy Reports (DR) and Problem Reports (PR), reviewed and updated FRACAS reports; to track and correct integration issues, component problems and test failures. Attended PDR/CDR, systems engineering, and product lifecycle management meetings to provide design, safety of flight, and engineering recommendations.

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## Delivered results-

- Compiled a detailed analysis of Powerplant, ECS, and Fuel systems highlighting deviation of prescribed testing requirements from RTCA DO-160 requirements. Analysis led to an in-depth review of program-wide testing and resulted in various corrections or justifications.
- Produced over 90 test reports (requirements, plans, procedures, results) and successful in receiving timely FAA/ODA/DER approval.

Naval Air Systems Command (NAVAIR)  
**Aerospace Engineer**

Havelock, NC

2011 - 2013

## Responsibilities:

Served as engineer with Turbofan Engine Controls and Diagnostics group on Rolls Royce (F402) Pegasus engine and Fleet Support Team/IPT for USMC AV-8B Harrier aircraft. Provided on-aircraft and in-house testing, advanced troubleshooting, system analysis/diagnostics, and performed engineering investigations on failed/problematic turbine engines, drivetrains, fuel controls, engine controls, and accessory components.

## Delivered results-

- Implemented cost-effective component improvements using available manufacturing processes and resources to Variable Inlet Guide Vane (VIGV) mechanisms and control system on the F402 Turbofan engine. Improvements led to increased on-airframe engine times and reduced premature overhauls. This problem had plagued the fleet of USMC AV-8B Harriers for over 5 years.
- Improved F402 auxiliary gearbox (AGB) overhaul and troubleshooting procedures by detecting several errors in maintenance manuals and discovering incorrect gear mesh-wear limits; corrections resulted in decreased rejection rates of AGB submitted for noise and vibration.
- Established training and qualification process for advanced propulsion system troubleshooting using FLIR/IR imaging equipment.

Computer Sciences Corp.  
**Engineering Technician III**

Norco, CA

2008 - 2011

- Analyzed standards, requirements, and engineering drawings for calibration of U.S. Navy aircraft systems and test equipment.
- Developed testing and calibration process documents to conform to industry testing/traceability standards and customer requirements.
- Prepared supplemental engineering analysis, test plans, drawings, reports, and presentations to support engineering decisions.
- Established 16 new calibration and verification test procedures for an aircraft Electro-Optical weapons system.

GE Aircraft Engines (contracted via Adecco Technical)  
**Instrumentation Technician**

Victorville, CA

2007 - 2008

- Provided support to engineering teams on ground performance and flight testing of advanced, high-bypass turbofan GE aircraft engines.
- Assisted engineering teams with engine data acquisition, instrumentation and telemetry system installation and maintenance.
- Engine development/testing supported: GE GEnX-1b (B787 & A350 aircraft) and CFM Intl. CFM56-7 (P-8A aircraft) turbofan engines.

General Atomics Aeronautical Systems, Inc.  
**Avionics Technician III**

Palmdale, CA

2007

- Engine and FADEC integration, ground and flight test of heavy-fuel, reciprocating engine (Thielert Centurion) for Warrior ERMP UAV.
- Installation, sensor troubleshooting, and ground testing on EFI & Carbureted, turbocharged-reciprocating engines (Rotax 914 series).
- Performed integration, testing, installation, software/firmware upgrades, maintenance and repair of UAV avionics/weapons systems.
- Assisted with UAV flight test and operations by analyzing aircraft, engine, avionics and payload performance during and post flight.

United States Navy (Enlisted)  
**Avionics Technician (E-5)**

Multiple Locations

1998 - 2007

- Maintainer experience with F-14, F-18, F-5, AV-8B, H-53, H-60, and H-1 aircraft including diagnosis, repair, and flight operations.
- Formal training and experience in Calibration/Metrology. Maintained precision and accuracy of turbine engine test cell and hush house to include: fuel flow meters, pressure gages & transducers, temperature transducers & thermocouples, torque transducers, load cells, vibration and force (accelerometer) systems and instrumentation for testing of military GE J85 turbojet, F110 and F404/414 turbofan engines.

## EDUCATION & CERTIFICATION

**Ph.D., Mechanical Engineering**, The University of Texas at San Antonio (*In Progress*)

**M.S., Aeronautical Science**, Embry-Riddle Aeronautical University (2012)

**B.S., Aerospace Engineering**, California State Polytechnic University-Pomona (2011)

**B.S., Aeronautics**, Embry-Riddle Aeronautical University (2004)

**Airframe & Powerplant (A&P) Certificate**, Federal Aviation Administration

## COMPUTER/SOFTWARE SKILLS

- Fully proficient in PC use and Microsoft Office products and presentations: Word, PowerPoint, Excel, Outlook, and Visio.
- Working knowledge in: Engine Performance 'Cycle Decks', GasTurb, NPSS, NASA CEARUN, SolidWorks, and MATLAB/Simulink.
- Professional exposure to: CATIA V5, PTC Creo 3.0, Enovia PLM, Serena Business Manager, DOORS, FRACAS, and MS Project.

## PROFESSIONAL AFFILIATIONS

American Institute of Aeronautics and Astronautics (AIAA) – Senior Member (2017 – Present)

Member of Standing Committee on Higher Education (2019 – Present)

Member of Gas Turbine Engine Technical Committee (2020 – Present)