**Carl G. Witthoft**

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# Dynamic Systems Engineer

**Experiment Design, Implementation and Statistical Analysis  
Reliability and Availability Analysis | Systems Modeling and Simulation**

Experienced and highly competent in software and hardware specification, design, test, and analysis tasks. Proven record of fast adaptability to new programs, tasks, and technologies. Excellent communications skills, both in written reports and documents and in oral presentations. Expert at identifying risk / problem areas and achieving solutions to same.

**Technical Skills**

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| **Languages:** | R, MatLab, bash, Visual Basic for Microsoft Office, Python, DOORS-DXL |
| **Platforms:** | Windows, OS X, Linux, Unix |
| **Applications:** | Office, DOORS, Subversion, LaTeX |
| **Tools:** | ImageJ, MODTRAN, GitHub |
| **Clearance:** | Former Top Secret |
| **Documentation:** | Strong grasp of English language, writing style, and technical documentation structures. Ability to communicate concepts, proposals, and results in a clear and compact manner |
| **Other:** | Expert in Lean/5S/6Sigma/Continuous Improvement process management operations. Basic knowledge in the mechanical design / CAD area, including dimensioning and tolerancing, design robustness, etc. |
| **Scientific fields:** | Strong background in the fields of quantum optics, ray optics, optical sources and sensors technologies, fiber optics and optical communications-related hardware. Experience with radar systems, antenna design rules, pulsed systems, and related analyses. Conversant with analog and digital electronics design rules and performance limits. |

# Experience

**Veoneer/ active electronics Lowell**, Lowell, MA (formerly Autoliv) **2015 — present**

**Senior Systems Engineer**

Senior member of the 77GHz radar systems group, responsible for design analyses, test design, test implementation, as well as Requirements Engineering for integrated radar systems to be used in automotive safety and control systems.

* Led integration and test efforts on sensor fusion and other advanced systems, software simulation and modeling applications. Generated test and analysis hardware and code, data reduction tool suite.
* Designed, specified, and evaluated improvements to existing test systems and radar products.
* Wrote system requirements, utilizing full “top-down” process flow from customer requirements to low-level hardware and software requirements. Generated a suite of DOORS-DXL macros for general use.
* Managed and maintained multi-level requirements system in DOORS, including full link traceability, architecture and ICD integration with performance requirements.
* Managed requirements task tracking thru system development and Configuration Control (CCB) change process via an Agile-based system, using Atlassian Jira and other control management systems.

**United Technologies Aerospace Systems / ISR Systems**, Westford, MA **2012 – 2014**

**Senior Systems Engineer**

Served as senior member of Systems Engineering Group, performing on both contract and R&D work. Led development of new imaging hardware systems, software simulation and modeling applications. Generated test and analysis hardware and code. Designed, specified, and evaluated improvements to existing contract reconnaissance systems.

* Provided test and analysis of hyperspectral camera, organizing initial flight test for imagery verification.
* Wrote system and component requirements, ICDs, and test procedures for variety of imaging systems and subsystems, ensuring successful design and integration of hardware and software elements of final deliverable system.
* Wrote specifications for next-generation multispectral TDI (time delay and integration) cameras. This included writing detailed code to simulate optics throughput, spectral responses, interaction with MODTRAN atmospheric modeling software, and image quality analysis.
* Authored color correction and translation software, converting custom multispectral camera imagery to equivalent RGB color planes.
* Analyzed performance capabilities of “black-body” uniform light sources for use in absolute radiometry system calibrations, driving successful specification and procurement of high-accuracy test equipment.
* Designed and implemented code which enabled application of spectral emissions properties to 3D object models for use in scene simulators.

**Adaptive Optics Associates, Inc.**, Cambridge, MA **1984 – 2012**

**Senior Systems Engineer**

Held Systems Engineer, R&D Design Engineer, and Program Manager roles. Executed development both of new imaging hardware systems and software simulation and modeling applications to support test and analysis. Composed contract proposals which led to successful award of several new contracts.

* Innovated and built solid-state camera with 2kHz frame rate, supporting SLC Phase II program.
* Conducted systems analysis of detector and analog processing requirements for the Lincoln Lab (LLWFS) and Field Scale (FSWS) programs and developed standard signal processing modules. The resulting system met or exceeded requirements.
* Headed FSWS breadboard development team; designed and developed multi-array detector system and associated data acquisition hardware and software for feasibility study, leading integration team as systems test and engineering advisor.
* Spearheaded test and analysis of competing scan designs and optical geometries for package scanning systems, contributing to successful upgrade to faster and cheaper products.
* Designed, modeled, analyzed, and crafted component specification for ultra-compact multichannel optical communications control and distribution system, exceeding customer requirements while staying within cost.
* Developed code to simulate free-space wavefront propagation, analyze rms errors, Zernike decompositions, aiding new wavefront sensor optical designs for Joint Strike Fighter (JSF) upgrade programs.

**System design and analysis achievements include:**

* Produced specifications for new generation of high-speed 2-dimensional IR detector arrays for government programs, leading research on and procurement of such arrays.
* Development of variations of Hartmann sensing algorithms, extending system performance limits.
* Simulations analysis of performance limits of "FatSpots" sensing algorithm. (see referenced paper)
* Wrote analytic and stochastic models of signal acquisition and processing systems. These models successfully matched operational data.
* System configuration, control, and communications (C-cubed) design and analysis.
* Wrote hardware and software validation test specifications, leading to successful acceptance testing and delivery to customers.
* System specification documentation and methodology for accurately and efficiently flowing requirements down to component level.

**Program management experience includes:**

* As PACSBB-WFS Proposal Team Leader, managed generation of all subsystem performance requirements and final material and manpower cost estimates, handling all program re-planning and re-scoping efforts between RFP and contract start date.
* MAWS: Proposal and Contract Manager. Led system design, cost analysis, system spec, production scheduling, resulting in successful completion and delivery of system to Starfire Optical Range.
* GBFEL-TIE WCA WFS: Subsystem Program Manager (for entire AOA effort). Cost, schedule, feasibility analysis and contractor support during contract negotiations phase. Leader, systems analysis and algorithms analysis.
* Other Projects: Systems Analysis and Systems Engineering efforts for all phases of other company programs.

# Education

**Sc.M.**, Physics, Brown University, Providence, RI

**A.B.**, Math and Physics, Colby College, Waterville, ME

# Publications and Patents

"Wavefront sensor noise reduction and dynamic range expansion by means of optical image intensification,"   
Optical Engineering v.29 (10) Oct. 90

Patent 5083015, "Optical Centroid Processor Wavefront Sensor,"

Patent 5164578, "Two-Dimensional OCP Wavefront Sensor Employing One-Dimensional Optical Detection"