

Exponent®
Engineering & Scientific Consulting

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Professional Profile

John Pye, Ph.D., P.E., is a principal engineer and president of Exponent with over 25 years of experience in technology innovation and integration of complex systems, with a particular focus on robotics design and development and wearables systems for command and control as well as human performance and health monitoring. He advises defense agencies, commercial manufacturers, and industrial clients on the rapid development and prototyping of high-consequence, high-reliability systems where safety, performance, and mission success are non-negotiable.

Technology Innovation & Integration

Dr. Pye specializes in the technology innovation lifecycle — from early-stage conceptual design and technology landscaping to rapid prototyping for readiness assessments, all the way through integration and fielding of complex systems. His work focuses on the insertion of new and emerging technologies into high-consequence, high-reliability applications, including military systems, commercial off-the-shelf (COTS) adaptation, and advanced industrial products where conventional development timelines are compressed and performance margins are tight.

Dr. Pye has served as principal investigator and chief engineer on multiple rapid development programs, integrating advanced commercial technologies and components into the unique operational environments of military and industrial customers. His approach combines disciplined systems thinking with hands-on engineering judgment, enabling clients to manage innovation risk while accelerating capability delivery.

Complex Systems Engineering

Dr. Pye provides systems engineering leadership for complex product and program development efforts where safety and reliability are primary design drivers. His experience spans ground and air robotics, networked surveillance systems, wearable soldier systems, aerospace structures, and downhole oilfield tools — with a consistent focus on delivering integrated systems that perform reliably under extreme operational conditions.

Dr. Pye has served as chief engineer for the U.S. Army's Human Machine Integrated Formation (HMIF) program, bringing together resilient networks, autonomy, ground robots, air robots, and modular mission payloads into a coherent system architecture. His systems engineering approach integrates analysis, test, and technology evaluation to help ensure that safety and reliability requirements are met from concept through fielding.

Model-Based Systems Architecture

Dr. Pye applies architectural design principles and model-based systems engineering (MBSE) methods to manage interfaces, analyze system behavior, and optimize the design of complex, multi-component systems. His experience includes defining system architectures for networked military platforms, soldier-worn electronics ensembles, and robotic systems with multiple interacting subsystems — environments where interface management and system-level integration are as critical as component-level performance.

Dr. Pye has led architecture definition efforts for major U.S. Army soldier system programs, applying structured systems engineering methodologies under accelerated timelines and in parallel with rapid prototyping and continuous feedback from the field to manage the complexity of integrating commercial and military technologies into coherent, extensible system designs.

Robotics Design & Development

Dr. Pye has designed, developed, and fielded ground and air robotic systems for military and commercial applications, serving as program manager and lead engineer on multiple robotics programs from initial concept through production and deployment. His robotics work spans unmanned ground vehicles (UGVs), unmanned air vehicles (UAVs), micro air vehicles (MAVs), and robotic conversion kits for existing military systems — with a particular focus on man-portable, operationally rugged platforms designed for use in high-threat environments. He has managed the development and production of systems deployed in operational theaters, giving him direct insight into the engineering tradeoffs between portability, reliability, and mission capability that define successful robotic systems for real-world use.

Wearables & Commercial Adaptation

Dr. Pye has more than two decades of experience adapting commercial wearable technologies and consumer electronics for use in demanding military and industrial measurement environments. His work focuses on the translation of commercial products — sensors, networks, displays, human interface controls, and edge computing platforms — into operationally hardened systems that meet the unique performance, durability, and situational awareness requirements of military and industrial customers. He served as test and evaluation lead and later in multiple engineering leadership roles on the Land Warrior, Objective Force Warrior, and Nett Warrior programs — the U.S. Army's flagship wearable soldier system programs spanning two decades — giving him unmatched experience in the design, evaluation, and fielding of wearable systems for continuous information connectivity, human performance and health monitoring in extreme environments.

Academic Credentials & Professional Honors

Ph.D., Aerospace Engineering, Stanford University, 1999

M.S., Aerospace Engineering, Stanford University, 1993

B.A.Sc., Engineering Science, University of Toronto, Canada, 1992

Licenses and Certifications

Professional Engineer Mechanical, California, #31675

Professional Affiliations

American Institute of Aeronautics and Astronautics (member)

American Society of Mechanical Engineers (member)

Patents

US Patent 2010/0178104 A1: Tire Rapid Entanglement and Arresting Device, July 2010 (Bare CI, Smyth BJ, Pye JD).

US Patent 8, 147, 163 B2: Tire Rapid Entanglement and Arresting Device, April 2012 (Bare CI, Smyth BJ, Pye JD).

US Patent 2012/0263525 A1: Tire Rapid Entanglement and Arresting Device, October 2012 (Bare CI, Smyth BJ, Pye JD).

US Patent 2017/0189756 A1: Creating Personalized Athletic-Performance Models, July 2017 (Brothers RJ, Gdoutos EE, Mulliken A, Pye JD).

US Patent 2017/0189757 A1: Monitoring Performance and Generating Feedback with Athletic-Performance Models, July 2017 (Brothers RJ, Gdoutos EE, Mulliken A, Pye JD).

US Patent 2017/0193140 A1: Monitoring Performance and Generating Feedback with Sensor Environment, July 2017 (Brothers RJ, Gdoutos EE, Mulliken A, Pye JD).

US Patent 10, 004, 949 B2: Monitoring Performance and Generating Feedback with Athletic-Performance Models, June 2018 (Brothers RJ, Gdoutos EE, Mulliken A, Pye JD).

US Patent 10, 010, 753 B2: Creating Personalized Athletic-Performance Models, July 2018 (Brothers RJ, Gdoutos EE, Mulliken A, Pye JD).

US Patent 2020/0309809 A1: Support Garment Testing System, October 2020 (Campbell L, Dufour GP, Munro B, Wright I, Blair KB, Kingsley DA, Middleton LR, Pye JD, Rapp van Roden EA).

US Patent 11, 604, 206 B2: Support Garment Testing System, March 2023 (Campbell L, Dufour GP, Munro B, Wright I, Blair KB, Kingsley DA, Middleton LR, Pye JD, Rapp van Roden EA).

US Patent 12, 000, 856 B2: Support Garment Testing System, June 2024 (Campbell L, Dufour GP, Munro B, Wright I, Blair KB, Kingsley DA, Middleton LR, Pye JD, Rapp van Roden EA).

Publications

Caligiuri R, Steffey D, Pye J, Ganot G. The effect of various environmental and physical factors on the measured internal pressure of NFL Footballs, 2015.

Pye J. Optimizing GPR usage with integrated route proofing and clearance solutions. Counter IEDs 2013.

Pye J. Monetizing clean energy. Panel Speaker, Poland-Silicon Valley Technology Symposium, Stanford University, 2010.

Pye J. Outpacing acquisition — Using innovation to manage risk. Army Strategic Leadership Development Course, 2007.

Pye J. Developments and field trials of the advanced robotic controller — Lessons learned. Interfaces for

Ground and Air Military Robots (Workshop Summary), National Academies Press, 2005.

Pye J. Analysis of a 747-100 passenger to cargo conversion. AA252 Techniques of Failure Analysis, Stanford University, 2001.

Medhekar S, Pettinger A, Pye J. SSD design risk assessment. Prepared for Space Systems LORAL, Exponent Failure Analysis Associates, Inc., June 2000.

Caligiuri R, Pye J. MSA passport testing. Prepared for Pennzoil, Exponent Failure Analysis Associates, Inc., February 2000.

Coakley S, Duffner D, Pye J. Pump station analysis study. Prepared for the Union Sanitary District, Exponent Failure Analysis Associates, Inc., October 1999.

Pye J. An Investigation of the flap edge flowfield. Ph.D. Dissertation, Stanford University, 1999.

Pye J. The flap-edge noise source. AA290 Fluid Mechanics Seminar Series, Stanford University, 1998.

Mathias DL, Pye JD, Cantwell BJ. Correlation of wingtip noise with mean flow parameters. American Institute of Aeronautics and Astronautics 16th Applied Aerodynamics Conference, 1998.

Pye J. Flap edge flow field measurements. American Physical Society — Division of Fluid Dynamics Conference, 1997.

Georgakis K, Smith J, Goodfellow H, Pye J. Review and evaluation of models estimating the minimum atmospheric dilution of gases exhausted near buildings. Air & Waste Management Assoc. 1995; 45:722-729.

Project Experience

Technology Innovation & Integration

Dr. Pye has led rapid technology development and insertion programs for U.S. and international defense customers, serving as principal investigator and chief engineer on multiple high-consequence programs where the integration of emerging commercial technologies into military operational environments was the central engineering challenge.

- Led multiple rapid development programs as principal investigator focused on adapting and integrating advanced commercial technologies and components into the unique operational environment of military customers, as well as hardening consumer technologies for use by industrial customers with extreme environment or high-reliability application needs.
- Served as program manager for the development and initial fielding of the RDISS (Rapidly Deployed Integrated Surveillance System) — a networked collection of surveillance assets designed for rapid installation in small fixed sites; approximately 300 systems were delivered and deployed by soldiers in Iraq and Afghanistan.
- Served as program manager for the development of the Auto-Mortar — a robotic conversion kit for a captured-piston, multiple-launch, 51-mm mortar system; managed development from concept through working prototype.
- Served as lead engineer for the development of a prototype supplementary closure device — a downhole oilfield tool designed to close off product flow in emergency situations; managed rapid prototyping and development of the tool from concept through working prototype.

Complex Systems Engineering

Dr. Pye has provided systems engineering leadership across a broad range of complex product and program development efforts, consistently analyzing and delivering integrated systems that meet demanding safety and reliability requirements in military, aerospace, and industrial applications.

- Served as chief engineer for the U.S. Army's Human Machine Integrated Formation (HMIF) program; led the integration of resilient networks, autonomy software, ground robots, air robots, and an extensible suite of modular mission payloads into a coherent operational system for the Army's future soldier formation concept.
- Served as lead engineer for the Duracrete program; adapted a commercial ground penetrating radar (GPR) system and developed custom detection software for a deployed Route Proving and Clearance system for the U.S. Army, enabling detection of buried explosive devices in operational environments.
- Served as lead engineer for the Duraplex program; led a research and development effort for an advanced multi-channel counter-IED radar detection system.
- Served as lead engineer for the PANAMA detection capability for the UK Ministry of Defence's robotic Route Proving and Clearance system (Talisman); developed and integrated the PANAMA detection capability into the UK's deployed route clearance robotic platform.
- Participated in the structural analysis, failure mode analysis, load envelope determination, and performance evaluation of the articulating display system for the original Apple iMac; applied systems engineering methods to evaluate structural performance and failure modes for a high-volume consumer electronics product.
- Performed a detailed structural analysis of a retrofit cargo door surround structure in a 747-100 aircraft; applied non-linear finite element techniques to quantify structural failure loads for the cargo conversion modification.

Model-Based Systems Architecture

Dr. Pye has led architecture definition efforts for major U.S. Army soldier system programs, applying structured systems engineering methodologies to manage the complexity of integrating commercial and military technologies into coherent, extensible system designs.

- Led the 2020 Architecture definition for the Nett Warrior program — the U.S. Army's current wearable soldier system for dismounted infantry; Nett Warrior is the evolution of the Land Warrior, Objective Force Warrior, and Ground Soldier programs and leverages an ensemble of commercially derived wearable electronics to deliver situational awareness and command and control capabilities to the dismounted soldier.
- Served as lead engineer for the Phase One Objective Force Warrior program; defined the system architecture for a follow-on exploration of Land Warrior capabilities treating the soldier and all equipment as a single integrated system, examining enhancement opportunities that the soldier-as-a-system concept enables.

Robotics Design & Development

Dr. Pye has designed, developed, and fielded ground and air robotic systems for military applications, serving as program manager and lead engineer across multiple robotics programs from initial concept through production and operational deployment.

- Served as program manager of development and production program for the MARCbot an IED inspection robot; several thousand units were delivered and deployed by soldiers in Iraq and Afghanistan.
- Served as program manager for the development of the MAVARC micro air vehicle — a man-portable, impact-resistant unmanned air vehicle developed with a PDA controller to explore the limits of portability and simple interfaces for the dismounted soldier; a prototype system was flown in Afghanistan in 2004.

Wearables & Commercial Adaptation

Dr. Pye has more than two decades of direct engineering experience on the U.S. Army's flagship wearable soldier system programs, spanning the full arc from early test and evaluation through architecture definition and operational fielding.

- Served as contractor test lead for the Land Warrior 1.0 program — a U.S. government program with the objectives of bringing advances in situational awareness, lethality, and survivability to the soldier through a networked collection of wearable digital devices; led test and evaluation activities during the program's initial development phase.
- Served as lead engineer for the Phase One Objective Force Warrior program; led engineering development of a soldier-as-a-system wearable ensemble treating the soldier and all gear as a single integrated system for situational awareness and operational effectiveness.
- Led the 2020 Architecture definition for the Nett Warrior program — the current wearable electronics ensemble in use by U.S. Army Infantry; coordinated architecture development across multiple commercial and military technology domains to deliver a coherent, extensible wearable system for the dismounted soldier.