Joel Markham

Chief Engineer, Embedded Computing

Joel Markham is a Chief Engineer in the Edge Computing & Controls Lab for GE at the Research Center in Niskayuna, NY. As part of the center, he focuses on the development of industrial software, edge computing and networking technologies to deliver innovation at GE. He is a highly skilled software architect and technologist with a focus on safety-critical real-time embedded systems. Prior to joining GE, he worked on mission critical systems for Lockheed Martin's autonomous vehicles. Some of those programs include USMC Cargo UAS, Army's Autonomous Technologies for Unmanned Air Systems and ONR's Autonomous Aerial Cargo/Utility System.

EDUCATION

- MS in Computer Science, Johns Hopkins University, Baltimore, MD
- BS in Computer Science & Mathematics, Clarkson University, Potsdam, NY

RESEARCH AND PROFESSIONAL EXPERIENCE

GE Research Center
Chief Engineer
April 2015 - Present

Drive embedded software technology roadmaps across multiple GE businesses. Architect, design, and collaborate with world-renowned experts to co-design the brains of GE's intelligent machines that will be the foundation of the Industrial Internet. Work with multiple GE businesses including Power & Water, Oil & Gas, Aviation, Transportation, Energy Management, and Healthcare to develop solutions ranging from miniature sensors in harsh environments to advanced control of multi-million dollar assets.

- Establish and evolve real-time embedded systems roadmap and drive vision across GE's intelligent machines portfolio
- Specify and execute research projects with GE businesses to realize implementations of vision and real-time embedded systems roadmap
- Interpret larger system requirements, architect overall solutions, and flow down plans to sub-system teams to develop products
- Design real-time software for GE control systems while employing interoperability best practices and industry standards to realize common, modular, scalable solutions
- Develop processes, techniques and tools to accelerate real-time, embedded system design, implementation, and integration
- Advance embedded software technologies through collaboration with universities, customers, and other GE teams to provide novel capabilities

Lockheed Martin MST
Senior Staff Software Engineer
2006 - March 2015

Directed and carried out design and development of technical products for global provider of technology and services for military, government, and civilian agencies. Served as Lead Architect, Senior Engineer, and Principal Investigator on various projects. Supervised up to 20 engineers per project.

- Technical Lead and Software Architect on Combat Rescue Helicopter (Air Force). Established software architecture and lead development activities on tactical mission kit being integrated on modified UH-60M platform

- Technical Lead and Software Architect on unmanned rotorcraft efforts (Marine Cargo UAS, ATUAS, AACUS). Played active role in design of development process and system testing. Researched technologies and made recommendations for architecture. Established baseline to position platform for future business pursuits
- Earned award and praise for successfully demonstrating unmanned resupply capability to USMC and subsequent deployment to Afghanistan
- Led investigatory processes for semantic technology IRAD to create ontologies and rules supporting flexible addition of new vehicle and sensors into mission planning and scheduling algorithms
- Managed software architecture for prototype autonomous mission management module of a Littoral Combat Ship. Designed and developed service-oriented architecture
- Prepared and delivered technical presentations for Office of Naval Research, Naval Surface Warfare Center, and other organizations
- Oversaw integration team in release planning, regression testing, defect resolution, and integration of systems for flight and mission avionics on multi-mission helicopter program (MH-60)
- Designed and developed embedded software components that interfaced with downed aviator locator system hardware for MH-60 helicopter flight avionics subsystem

GE Global Exchange Services
Software Engineer III – GXS
2000 - 2002

Provided technical direction and software management for critical B2B eCommerce product for $350M division of GE. Platform consisted of integrated 3rd-party COTS products, Java Beans, and MVC-based application framework. Coordinated development in US, Philippines, and India.

- Enabled successful delivery of product by managing design of multiple modules, including quotation, procurement, forecasting, order tracking, deal settlement, and order routing services
- Actively involved in benchmarking and performance improvements. Increased efficiency by automating daily builds and creating staging and integration environments/pipelines

Lockheed Martin
Staff Software Engineer - IS&GS
1994 - 2000

Developed complex ground systems for satellites. Formulated complex scheduling algorithms. Designed prototypes and performed testing

- Primary developer and SME for project software frameworks for P470 program
- Contributed to project success by resolving complex technical issues and algorithm development
- Trained and mentored staff on programming language (C++) and object-oriented design

SELECTED PUBLICATIONS/PATENTS

- Enabling Multiple Autonomous Cargo Deliveries in a Single Mission
- A Method for Controlling DDS Quality-of-Service over TSN
- Composible Systems
- Dynamic DDS Integration with TSN via IEEE 802.1Qcc
- A Method for DDS/TSN Scheduling using Network Calculus