

## Jacobs' Team Experience – GBL Systems Corporation (GBL)

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### GBL Systems Corporation Overview

Since 1990, GBL Systems Corporation (GBL) has provided extensive systems engineering and software development services primarily to the U.S. Navy at the Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu, CA. GBL provides a full range of technical services, including system/subsystem architecture and design, systems integration, automated testing, program management and software development lifecycle. GBL's long history with the Navy has enabled the company to develop outstanding expertise in developing/debugging multiple operating systems and operational flight software, laying out system design enhancements, and performing system integration testing.

GBL has also successfully researched and developed automated test methodologies and implementations over the past 14 years for the Navy, including verification of complex real-time software. Automated tests and test support software developed by GBL validated interoperability requirements imposed on the F-14B Upgrade Mission Computer (FMC) and the Controls & Displays Navigation Unit (CDNU) for a variety of avionics integration efforts. The benefits resulting from having automated tests greatly enhanced the overall F-14B Upgrade software development process. As an example, automated testing processes developed by GBL enabled the development of more than 20,000 source lines of code within eight months during JDAM efforts. The test environment developed by GBL also enabled broader test coverage by exercising error paths in addition to normal conditions and provided a readily repeatable regression test environment that accelerated software releases when fixes were implemented. GBL has developed proprietary test tools and software utilities that are critical and uniquely suited to perform automated testing of avionics subsystems and mission planning software.

GBL has developed, enhanced, and integrated real-time embedded software for the F-14B Upgrade, F-14D, and EA-6B ICAP II platforms. Previous F-14 projects include the baseline F-14B Upgrade conversion program and integration of an Embedded GPS/INS (EGI) subsystem, a Control Display Navigation Unit (CDNU) subsystem, the Joint Direct Attack Munition (JDAM), a Global Positioning System (GPS) guided weapon onto the F-14, and the Lantirn Control Pod. GBL also supported the EA-6B Integrated Product Team (IPT) to integrate Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) and Embedded Terrain Awareness Warning System (ETAWS) / Ground Proximity Warning System (GPWS) capabilities onto the EA-6B electronic warfare aircraft.

GBL's highly-skilled team of systems and software engineers has the requisite technical experience to support any phase of a program development lifecycle and has developed an exemplary reputation with our customers for GBL's demonstrated ability to complete extremely challenging tasks within budget and schedule. GBL is highly experienced in requirements development and validation and uses the structured Systems Engineering approach established by the Electronics Industry Alliance Standard for Engineering of Systems to identify, coordinate, prioritize, and document operational and functional needs. GBL's experience has shown that it is vital, early in the development effort, to establish a comprehensive and coordinated understanding of the governing needs and operational behaviors of the

system. These needs and behavior models are then used to derive requirements that form the basis for selection of appropriate technology options for system design and subsequent implementation.

GBL was the lead team member that integrated the Joint Direct Attack Munition (JDAM) onto the on the F-14B Upgrade in an extremely aggressive schedule. System concept to first flight test weapon drop was accomplished within an 18 month window. GBL was responsible for the overall system design for integrating JDAM to the aircraft, developing the mission computer software interacting with the weapons, developing an automated test environment to verify Operational Flight Program (OFP) compliance with requirements, perform system and software integration, and support flight test on performing data analysis.

The overall CNS/ATM approach and system design was considered extremely cost effective by NAVAIR program sponsors and the project was completed within existing schedules. GBL published a white paper for Mode Select (Mode S) integration approach, one of the CNS/ATM components, which was presented at the 2005 Joint Navigation Conference. Mode S is a civil aviation initiative to overcome deficiencies associated with Secondary Surveillance Radar (SSR) Mode 3/A and C by providing a more efficient cooperative surveillance and communication system for civil Air Traffic Control (ATC) to manage improved separation between en-route aircraft and handle projected increases in air traffic growth/congestion.

GBL was recently notified of being selected as a Small Business Innovation Research (SBIR) grant recipient in the area of agent-based electronic combat systems development. This research effort includes the definition of system architecture, functional and operational requirements, and detailed system level requirements definition. GBL can leverage this EA-18G SBIR R&D project to help develop AEA automation and decision aids to increase situational awareness while reducing Electronic Warfare (EW) operator workloads. Areas of focus to apply such concepts can include determination of current and predictive jammer effectiveness, provide auto-routing functionality, and EW battle-management.