

Intelligent Next Generation Controller/Sensor Operations Planning Systems

Value Proposition

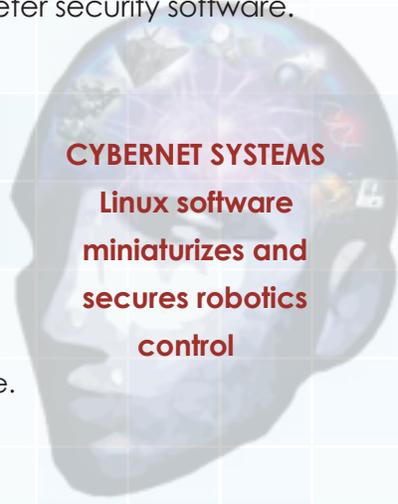
While integrating the first portable operator control unit for autonomous Demo II robotics control, Cybernet exploited emerging Linux open source codes that have subsequently evolved into low-cost security systems gateways and perimeter security software.

About the Company

Year founded: 1988

Heidi N. Jacobus, Chairman & CEO

Cybernet Systems is an 8(a) certified, woman-owned small business that applies human performance analysis in robotics, computer vision, ammunition automation, artificial intelligence, telemedicine, and information assurance.



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Technical Description

Cybernet developed and integrated the operator control unit into a single, dual-processor-based, portable command and control system for Demo II robot control, providing capability that previously required a mobile command center. The key enabling technologies were the fusion of open source code bases and modular PC components. The new manufacturing technologies and processes tightly integrated robotics control, wireless networking, and network security into the Linux environment, allowing increasingly miniaturized components to be incorporated, as available.

As part of this effort, Cybernet also developed an efficient and reproducible methodology for meeting computer system certification and regulatory requirements (e.g., Department of Defense [DoD] Information Assurance Certification and Accreditation Process [DIACAP], Federal Section 508 accessibility, and Food and Drug Administration [FDA] 510(k) certification). This methodology is practiced by Cybernet's Information Assurance Division. A recent derivative DIACAP certification effort was for rugged, secure tablets (branded *Shipboard Wireless Maintenance Assistant*, or SWMA). International Traffic in Arms Regulations (ITAR) are applicable to that effort.

Cybernet's Demo II operator control unit product also led to the development of NetMAX security appliances, marketed from 2000 to 2004 as the precursor to appliances like Barracuda's Spam and Virus Firewall; and firewall routers sold by Linksys, DLINK, and Netgear. Cybernet remains active in this technological area, providing DoD information assurance services to their DoD customers.



DARPA-Funded Linux-based Robotic Control Unit

Technical Challenge Addressed

The primary challenge was to build a portable Unix-compatible network tablet computer to interface with an autonomous robot's control logic via an ad hoc mesh network. These technical elements, put into place in 1995-6, foreshadowed current Linux/Android tablet capabilities. Cybernet also incorporated force feedback driver controls, which provided the technology now used to support current generation game controllers made by Microsoft and Sony. The key challenge was getting this technology into the small module computer hardware available in 1995, and the Linux code base was the key technical enabler of this.



Commercial Result of Linux Security Appliance

Lessons Learned and Best Practices

- ▶ The best approach for Cybernet as a small firm is to license consumer-use technologies to established mass market companies.
- ▶ Cybernet is best served to retain expertise—in the form of expert software development capability and information assurance services—for their primary customer, the DoD.
- ▶ The experience and processes developed by Cybernet combine to help the company support its cyber defense industrial base.
- ▶ Leveraging what was originally a DARPA-funded effort through outside commercial dollars provides better program end results.

Applications

Cybernet's ruggedized computers are used to support remote maintenance, for training and simulation data collection, and for specialized robotic control applications. Cybernet also supplies reliable and cost-effective information assurance services for security certification of vehicles, training systems, and command and control systems.

The graphical user interface (GUI) technology developed in this program combined new technologies that are in mass production today, including touch panel GUI (Apple and Android tablets/phones), force feedback (Microsoft and Sony game controllers), and open-source security products (Internet security appliances).

Partnering and Collaboration

The DARPA Phase II SBIR that initiated this technological advancement was integrated with the larger DARPA Demo II collaboration led by Martin-Marietta (Lockheed Martin), with SRI International, Carnegie Mellon University, Stanford University, Massachusetts Institute of Technology and others. Subsequent funding to continue the work started with this DARPA SBIR, and included Sparton Corporation, Ampex Corporation, Dawson Foundation, and Immersion Corporation. Subsequent third-party commercial technology users include Microsoft, Sony, Logitech, CH Products, Cobalt Networks, Netscape, Veraxx, NG/Remotec, FreeBSD, Red Hat, Samba, and Barracuda Networks.

Economic Impact

- ▶ Since this DARPA award, Cybernet has grown from a 10-person company to over 60 full-time personnel (with offices in Ann Arbor, MI and Orlando, FL; as well as satellites in San Diego, CA; Washington, DC; and Johnstown, PA).
- ▶ Over \$10 million in funded research and development derived from this project, and over \$9 million in commercial non-DoD income spawned a look-alike Linux-based security product industry of over \$0.4 billion per year.
- ▶ More than 60,000 patent-protected NetMAX appliances and related Linux/Security products are deployed to secure networks nationwide.