Curriculum Vitae of

Michael B. Parks, PE, CEM

***Me in a Nutshell**: Engineer. Ethical Hacker. Writer. Educator. Leader. Entrepreneur.*

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I am an extroverted engineer with an entrepreneurial bent, a leader who knows when to lead and when to get out of the way. I possess both practical hands-on skills and a penchant for pioneering thinking and experimentation. In addition, I have a penchant for technical communications in multiple formats, including written, visual presentation, audio, and video. I am technically trained in embedded electronics, with a focus on Building Automation Systems (BAS), Environmental Monitoring Systems (EMS), Industrial Control Systems (ICS), and the Internet of Things (IoT).

Those early crossroads experiences of electronics design and facilities design led to an interest and training in cyber and physical security. It also led to a stint in the U.S. Navy as a Civil Engineer Corps officer responsible for the design, construction, maintenance, and operations of large defense-related facilities, including highly complex, multi-million dollar Research, Development, Test, and Evaluation (RDT&E) facilities and industrial repair depots.

During my twenty-plus-year career, I have worked in a wide range of roles that exist at the intersection of embedded systems design, facilities engineering/maintenance, project management, technical writing, and security research. I have held numerous positions, including facilities planner, electronics design engineer, cyber-physical security specialist, and project manager. I look forward to applying my unique knowledge and skills to new technical and management challenges!

Education:

- U.S. Merchant Marine Academy. Logistics and Intermodal Transportation Major
- University of Maryland, Baltimore County. Bachelor of Science (Cum Laude) in Computer Engineering
- Johns Hopkins University. Master of Science (With Honors) in Systems Engineering

Professional Career:

- **2012-Present**: Green Shoe Garage. Chief Engineering Officer
  - Bespoke embedded electronics product development studio
  - Security consultancy with a focus on IoT and building automation technologies
  - Producer of technically focused digital content and training (blogs, articles, podcasts, videos)
  - Technical management and engineering executive leadership coaching

- **2009-2021**: Naval Air Systems Command (NAVAIR). Currently an NHIV-0801 Engineer.
  - NAVAIR HQ-7.10 Corporate Operations. Facilities Engineer and Logistics Element Manager
  - NAWCAD, AD-5.3 Weapon Server Common Environment (WSCE), Systems Engineer
  - NAVAIR PEO(A), PMA-205 Top Gun Integrated Training Facility (NAWDC), Systems Engineer
  - NAVAIR HQ, Strategic Planning and Analysis Department, Systems Engineer

- **1999-2009**: Sailor, United States Navy. Culminating as an active-duty Naval Officer.
  - Military Sealift Command (MSC), USNA KISKA (T-AE 35)
  - Naval Facilities Engineering Command (NAVFAC), Production Officer, NAS Key West, FL
  - Naval Air Systems Command (NAVAIR), Environmental Officer (AIR-1.6) and Staff Civil Engineer (AIR-7.10), NAS Patuxent River, MD

Technical Project Experiences:

- Wrote a minimalist netcat and port scanner in the Go programming language.
- Setup numerous WordPress-based websites and hardened them against cyberattacks using Cloudflare solutions.
- Provisioning and managing large-scale IoT networks on various IoT cloud platforms, including Azure, AWS, Google Cloud Platform (GCP), and Medium One.
- Created numerous machine learning (ML) algorithms using the Edge Impulse tool suite. Trained, tested, and deployed multiple convolution neural networks (CNN) to identify keywords in audio samples, object recognition in static photos, and machine operation status based on accelerometer data.
- Knowledgeable of the full OSI stack and associated protocols and standards for embedded development from I2C/SPI/JTAG/UART for onboard interconnect communications to JSON/MQTT/REST/WebSockets for edge-to-cloud communications.
- Experienced in developing custom applications using industrial protocols and standards such as CANbus, Modbus, BACnet, RS485, and RS422.
- Implemented IoT device security leveraging TLS/SSL public-key certificates based on X.509 cryptography for secure communications between IoT edge devices and IoT cloud services.
- Use Docker containers and virtual machines to manage secure computing environments for clients.
- Build out and maintain wired and wireless networks (PAN/LAN/WAN/Mesh) in both IT and OT spaces. Configured routers, switches, wireless APs, and WLAN controllers. Familiar with setting up VPNs, segmented networks, and securing OT/IoT devices including edge devices and Internet gateways, and use of a variety of protocols including WiFi, BLE, GSM, ZigBee, LoRa, LTE Cat-M, NB-IoT, and Sigfox.
- Rewired and updated residential and light commercial electrical wiring and troubleshot electrical distribution failures. Upgraded legacy outlets to GFCI/AFCI outlets in older buildings with wiring lacking proper grounds. Replaced failed and added new circuit breakers to breakers.
- Established, operated, and maintained Command and Control (C2) infrastructure for the Hak5 suite of pentesting products using Amazon Web Services and No-IP services. Provisioned devices onto the network and oversaw their deployment, operation, maintenance, and decommissioning,
- Capable of performing vulnerability assessment, penetration tests, and red team engagements to assess and document an organization’s security posture with respect to cyber, physical, and social engineering attacks. I am trained in various reverse engineering and cybersecurity tactics, techniques, and procedures, specifically concerning Industrial Control Systems (ICS).
- Adept at implementing side-channel attacks (electron starving, clocking hazards) to bypass security mechanisms in embedded systems to exfiltrate encryption keys.
- Seasoned technical writer able to create, edit and present technical findings in a variety of formats, including white papers, executive summaries, in-person presentations, and virtual presentations.
- Designed and implemented effective incident response procedures and various disaster recovery tools related to industrial control and building automation systems.

Management and Leadership Experiences:

- Managed a $20-million/year public works budget and supervised over 100 civilian and military personnel. Responsibilities included utility and energy analysis, resource budgeting, establishing key performance metrics, administering environmental and safety programs, management of base support vehicle and equipment program, space allocation planning, union negotiations, long-term capital maintenance planning, and developing statements of work.
- Responsible for a $300-million integrated project list to repair hurricane-damaged facilities at NAS Key West. Led an interdisciplinary rapid damage assessment team tasked with thoroughly documenting all damage to facilities and infrastructure and then providing cost and schedule estimates for repair projects.
- Chief Architect conceptual design for major information technology systems, including the Department of the Navy Airfield Safety Waiver web-based tool.
- Supported the divestiture of excess government real property through detailed analysis of facility condition assessments and repair project proposals. This work led to the sale of excess government real property (Plant Replacement Value ~$1B) to private industry to help encourage private economic growth.
- Established Innovation Cell to identify and analyze potential disrupting infrastructure and facility planning technologies. Spearheaded 3D modeling and laser scanning initiative of RDT&E aircraft hangars to help improve operations analysis and future planning.
- Hand-selected for long-term rotational engineering and program management assignment in support of the Integrated Battlespace Simulation and Test Department, Manned Flight Simulator. Helped support PMA 205 Common Simulation Products Integrated Product Team and Weapon Server Common Environment teams.
- Delivered over major 300 system improvements to NAVAIR's facilities and safety operations web-based tool based. Oversaw the delivery of over 25 analytics apps (6 of which are recognized as Command Key Performance Indicators) covering safety and facility topics ranging from inspections, waiver approvals, and mishaps to space allocation, project execution, and material conditions. Reduced the time to complete requirements analysis of new tools by nearly 50% by integrating teams and implementing Human-Centered Design (HCD), Agile, Lean, Kanban, and SCRUM methodologies replacing older, waterfall, and functionally "silo-ed" methods.

Software Tools Experience:

- **Security and Reverse Engineering:** Wireshark, Fiddler, Metasploit, Aircrack-NG, Bettercap, OWASP ZAP, BeEF, BurpSuite, Ghidra, KillerBee, Wifite, Trufflehog, Social Engineering Toolkit, Gobuster, SAINT, Firmwalker, Princeton IoT Inspector, Expliot Hardware Auditor, Shodan.io, Maltego, John the Ripper, Social Engineering Toolkit, CyberChef, SQLmap, Hashcat, Kismet, Nessus, SNORT, binwalk, Binary Ninja, IO Ninja, nmap, netcat, scapy, wpscan, responder, impacket, inSSIDer, Hak5 C2, and GNUradio. Use of security-oriented operating systems such as Kali, Parrot, and the Control Things Platform.
- **Media Production:** Adobe Photoshop, Illustrator, Premiere Pro, After Effects, Audacity, InkScape, Autodesk Sketchbook, Procreate, and Affinity Designer.
- **Electronics Design and Test**: Simulators such as TINA, LTspice, Partsim, and MPLAB Mindi. Schematic and PCB Layout using EagleCAD, KiCAD, Fritzing, Flux.ai, and Altium Designer
- **3D Design:** Fusion 360, OnShape, and SketchUp
- **Software Development**: Visual Studio Code, Eclipse, Atom, PyCharm, Atmel Studio, TI Code Composer Studio, Arduino IDE, Thunkable (iOS and Android apps), MIT Android App Inventor, MPLAB X IDE, Mu, Postman, MQTT.fx, and HTTP Toolkit. Used tools such as GitHub, debuggers, and linters to rapidly develop high-quality software.
- **Embedded-oriented Development Frameworks**: Zerynth and Kivy
- **Programming Languages:** C, C++, Python, MicroPython, JavaScript, PHP, Rust, GoLang
- **Office and Project Management Tools**: Microsoft Office, Google Workspace, Microsoft Project, Primavera, Monday, Shortcut, Slack, Teams, Zoho Books, Zoho Bug Tracker, Wave, Notion, Parts Box.

Hardware Tools Experience:

- **Desktop Manufacturing Equipment**: Use various manufacturing tools for prototyping and low-volume production runs. Tools include 3D printers, 3D scanners, CNC milling machines, laser cutters, embroidery machines, vinyl cutters, PCB milling machines, and PCB reflow ovens.
- **Woodworking**: Table saw, compound miter saw, bandsaw, drill press, belt sander, scroll saw, circular saw, drills, impact driver, impact wrench, rotary tools, lathes, milling machines
- **Metalworking**: Stick welder, spot welder, flux core arc welder, plasma cutter, waterjet cutter, grinder, milling machines
- **CAM Software**: X-Carve Easel, Fusion 360, Glowforge App, Fire Control, Prusa Slicer, Pronterface, Cricut Design Space, Silhouette Studio, Bantam Tools (OMC).
- **Electronics Test Equipment**: DMM, oscilloscopes, logic analyzers, signal generator, BusPirate, I2C driver, GreatFET, Black Magic Probe, JTAGulator, Analog Discovery 2, Binho, HackRF One, RF Explorer, LoStik, and Tigard.
- **Pentesting Tools**: Rubber Ducky, Wifi Pineapple, Screen Crab, LAN Turtle, Key Croc, Plunder Bug, O.MG cables, Shark Jack, Packet Squirrel, Bash Bunny, Kali Linux-based Raspberry Pi, Hak5 C2 Suite, Expliot Nano, Bus Auditor, Zigbee Auditor, PROXMARK3 KIT (RDV4.01), and ChipWhisperer.
- **Physical Security Tools**: Under Door Tool, thumb door turner, bump keys, locksmithing tools.
- **Microcontroller and FPGA Platforms**: AVR, PIC, MSP430/432, RISC-V, and ARM-based embedded systems.

Qualifications:

- Licensed Professional Engineer in Maryland (License #33857)
- Certified Energy Manager (CEM, License #22589)
- TRUST-certified Drone Pilot
- DAWIA Level 3 engineering certified and member of the Defense Acquisition Corps
- Graduate of NAVAIR Executive Leadership Development Program
- 2017 Mouser Technical Writer Top 10

Technical Training:

- ICS Active Defense and Incident Response (SANS ICS515)
- Hacker Tools, Techniques, Exploits, and Incident Handling (SANS SEC504)
- ICS/SCADA Security Essentials (SANS ICS410)
- Certified Ethical Hacker
- TryHackMe badges earned: Burp'ed, cat linux.txt, Webbed, World Wide Web, Network Nerd.
- Global Industrial Cyber Security Professional (GICSP), attempting certification in the next 12 months.

Business Management Training:

- Financial and Contract Management (Johns Hopkins)
- Project Planning and Control (Johns Hopkins)
- Software Engineering Management (Johns Hopkins)
- Shaping Smart Business Arrangements (Defense Acquisition University)
- Principles of Contract Pricing (Defense Acquisition University)
- Business Decisions for Contracting (Defense Acquisition University)
- Legal Consideration in Contracting (Defense Acquisition University)
- Improving Project Communications (Defense Acquisition University)
- Earned Value Management (Defense Acquisition University)
- Engineering Change Proposals for Engineers (Defense Acquisition University)
- Six Sigma: Concepts and Processes (Defense Acquisition University)
- System Sustainment Management (Defense Acquisition University)

Random

- Host of the Gears of Resistance blog/podcast/YouTube/Twitch channel
- Co-Founder of Western Maryland Makers
- Writer at large for a variety of trade publications (Mouser, Molex, EECatalog, Make Magazine)
- Licensed amateur radio operator (Extra Class license, N1HNP)
- Member of the National Eagle Scout Association
- Member of the Tau Beta Pi Engineering Honor Society
- Dad to an awesome daughter

Links

- greenshoegarage[.]com
- gearsofresistance[.]com
- linkedin.com/in/mbparks
- Email:
    - mike@greenshoegarge.com
    - PGP Fingerprint: **87C4 CFC9 BF46 9AEA 53C8 2CFF 762F FC60 1DDE 61B6**

"Wherefore the mere practical architect is not able to assign sufficient reasons for the forms he adopts; and the theoretic architect also fails, grasping the shadow instead of the substance. He who is theoretic as well as practical is therefore doubly armed; able not only to prove the propriety of his design but equally so to carry it into execution."

-Vitruvius