

RICH RAREY

rich@rareworks.net
linkedin.com/in/richrarey

Engineering Experience, Technical Leadership & Contributions

PROFESSIONAL HIGHLIGHTS

- 30+ years engineering embedded, broadcast, and communication systems
- Founder and Principal Engineer, Rareworks LLC
- Architect of U.S. DHS Accessible CAP/RDS system
- Two U.S. patents
- Author, *NAB Engineering Handbook*
- FAA Private Pilot and FAA Remote Pilot
- Engineering leadership across national broadcast, public safety, embedded systems, and connected mobility.

PROFESSIONAL EXPERIENCE

Rareworks LLC
Founder and Principal Engineer
Kensington, MD | August 2014-Present



Rareworks LLC is an engineering consultancy specializing in embedded systems, wireless communications, public safety technologies, audio systems, and rapid hardware/software prototyping for commercial, government, and research organizations. As Founder and Principal Engineer, Rich leads system architecture, embedded firmware development, hardware/software integration, technical strategy, and client engagement from concept through deployment.

Representative engineering engagements include:

Tome, Inc. Royal Oak, MI:

- Integrated Tome's proprietary communications technology into a drone command-and-control iOS app with remote navigation display, telemetry, and real-time camera video stream for Search and Rescue.
- Project engineering and implementation of small unmanned aircraft systems (UAS) protocols, policy, licensing, registration, and software for Search and Rescue, including Tome's flight operations at NASA's Langley Research Center.
- Hardware engineering on high-resolution, in-car audio solutions for the Ford Motor Company. Designed and built hardware to power and control the in-car audio module.

Odhner Holographics, Inc. Amherst, NH:

Designed and implemented patented novel hardware and software solution to read and manage holographic data.

SoundHound, Inc. Santa Clara, CA:

Developed a unique embedded interface (C/C++ and hardware) to a consumer appliance that implements HOUND Speech-to-Meaning™ technology.

Jump2Go, Inc. Seattle, WA: Development and implementation of a national alert dissemination system from AMBER and FEMA sources to broadcast and Internet outlets: Wrote the server ingest and database management of the FEMA and AMBER messages (Java, MySQL), and a RESTful presentation of the messages to downstream clients (Java, JSON, Tomcat).

iBiquity Digital Corporation (now Xperi), Columbia, MD; Study to assess public radio HD Radio Technology for brand expansion.

MacBe, bv Eersel, the Netherlands; Software development for the Android platform and technical consultant on wireless projects (Java, Android).

Texas Public Radio San Antonio, TX: Concentrated remote work during time of COVID to identify new engineering staff, review technical operations and goals, and coordinate AudioVAULT factory-led instruction for TPR Staff, and wrote a detailed report illustrating the state of TPR's technical operations, including a coverage map for each station.

Valtech Solutions LLC (formerly Tome, Inc.)
Senior Software Engineer/Bluetooth SME



Royal Oak, MI | November 2017-January 2026

- Developed V2X firmware and embedded hardware (ARM Cortex) integrating Bluetooth, BLE mesh, LTE, and C-V2X to detect and monitor vulnerable road users, including road workers, in live traffic environments.
- Compiled SAE J2735 ASN.1 specifications into C, implemented supporting libraries, and integrated across Swift, Kotlin, macOS, and Linux platforms to enable real-time safety message exchange.
- Implemented embedded C across three hardware platforms to integrate LTE, BLE, UWB, and mesh networking for a road safety detection and monitoring proof-of-concept.
- Developed and debugged embedded C firmware across bare-metal (super-loop), Zephyr RTOS, and Raspberry Pi Linux systems supporting B2V detection, search-and-rescue, and field monitoring applications.

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NPR

Director/Manager, NPR Labs



Washington, DC | December 2009-August 2014

2014 CES Innovations Design and Engineering Awards Honoree for the unique NPR Labs-designed accessible alerting receiver.

- Architect and Project lead - *Accessible CAP RDS Demonstration Project for U.S. Gulf Coast States*, for U.S. Department of Homeland Security, Science and Technology Directorate (DHS S&T).

Designed a national alerting infrastructure and unique, accessible alerting receivers for deaf/hard-of-hearing consumers.

Authored the FEMA-alert ingest software and developed the alerting receiver's display and control software (Java/Android).

- Architect - Real-time captioning and rapid transcription.

Created novel, cost-saving software and methods that produce real-time, high-accuracy captioned streams and transcriptions for audio and video programs.

US Patent No.: 15/0098018 covering these techniques and methods.

- Co-Principal Investigator and Architect - Personalized Audio Information Services (PAIS) project for NIDRR (Department of Education).

Designed and implemented a unique broadcast tagging infrastructure and custom hardware to capture broadcast programming for blind/low-vision radio listeners (embedded C on Atmel AVR, VB.net).

Designed and built the world's first PAIS-enabled HD Radio Receiver (embedded C).

The public PAIS final report, schema, and project details are available upon request.

Master Control Supervisor

December 2000-December 2009

- Designed and administered NPR mission-critical audio ingest, routing, automation, recording, playback and transmission systems running on Windows, Linux, QNX, and macOS. Managed staff and five international stations.

SELECTED PUBLICATIONS

NAB Engineering Handbook, 11th Edition (2017), National Association of Broadcasters, Washington, DC; *In-Studio Audio Recording* (chapter).

Radio World magazine, Alexandria, VA, contributor and author.

- Author, *Radio Station Streaming 2015*

- Author, *Audio over IP*

- Author, *IP4: The Evolution of Audio and Data Transport*

EDUCATION

Bachelor of Science in Communications, *cum laude* - Ohio University, Athens, Ohio

PROFESSIONAL CERTIFICATIONS

Certified Engineer, Audio - Society of Broadcast Engineers

Certified Broadcast Network Technician - Society of Broadcast Engineers

Private Pilot License, Single Engine, Land - Federal Aviation Administration

Remote Pilot Certificate with small UAS rating - Federal Aviation Administration

PATENTS

Patent - TECHNIQUES FOR LIVE-WRITING AND EDITING CLOSED CAPTIONS

United States US 2015/0098018, published April 9, 2015

Patent - OPTICAL IDENTIFIER AND SYSTEM FOR READING SAME

United States, 11,887,639, published November 12, 2024.

TECHNICAL KNOWLEDGE SUMMARY

Programming Languages: C, embedded C, Swift, Kotlin, Java, JavaScript, BASH, Python, AI Fundamentals.

Embedded Platforms: Zephyr RTOS • Embedded Linux • Raspberry Pi

Wireless Technologies: Bluetooth LE • BLE Mesh • LTE • UWB • GPS • SAE J2735

Audio & DSP: Digital Signal Processing • Audio over IP • Broadcast Infrastructure • Recording • Mixing • Post Production

Engineering Profile available at www.rareworks.net