

# David A. Burgess

david.allen.burgess@gmail.com

+1-337-366-1197

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## Short Summary

Developer of many software-defined radio systems, especially in cellular communications, cellular exploitation, and geolocation.

Experienced developer in C/C++ and many other languages on platforms of all sizes, from 8-bit embedded systems to large multi-core servers and clusters.

Start-up founder and business operator.

Buzzword compliance: GSM, GPS, UMTS, LTE, 5G NR, C/C++, Python, Java, bash, Linux, MATLAB, Octave, embedded, planning, management, C4ISR, multi-threaded, DSP, SDR

## Experience

Founder, CEO, Director

[Legba, Inc. \(US\) and SC Legba LTE SRL \(RO\)](#)

New York, New York, USA, and Bucharest, Romania

Sep 2013 - Current

Legba produces cellular radio network equipment and test equipment for GSM (2G) and LTE (4G). It has 10 - 15 staff members typically, with main operations in Romania. As a director and founder, my duties include company operations, strategy, product management, hiring/training, radio network planning, and system design.

My technical duties in this role include designing and managing the development of a complete software LTE eNodeB (written in C++ and Javascript) and overseeing the development of hardware for radio products.

Our customers include small public mobile network operators, private network operators, IoT systems integrators, mobile network operator laboratories, and US defense contractors.

Co-Founder, CEO, CTO

[Range Networks, Inc.](#)

San Francisco, California, USA

Jun 2010 - Sep 2013

Range Networks produced cellular radio network equipment for GSM (2G) and UMTS (3G).

Early products were based on the [OpenBTS](#) GSM implementation, which was developed by the company founders, including me, under my direction. I started the OpenBTS project, recruited the initial management team, and led the company through "angel" and "series-A" financing

rounds. Range Networks continued to operate after my departure and was purchased by Africa Mobile Networks (UK) in August 2020.

Partner

Kestrel Signal Processing, Inc.

Fairfield, California, USA

Sep 2005 - Jun 2010

Kestrel was an engineering and software consulting shop. We provided specialized engineering and software development for signal processing and software-defined radio projects to clients in the San Francisco Bay area. Clients included commercial companies in Silicon Valley, defense contractors, and law enforcement equipment suppliers.

Most projects were in the areas of communications intelligence, radio navigation, and emitter location. Technologies we worked with included GPS, GSM (2G), UMTS (3G), CDMA2000 (3G), iDEN (2G), IS-95 (2G), GMR-1 (2G sat phone), ATSC-53B (TV), DVB-H/T/S (TV), BPL/OPERA (power line modems). Implementation languages included C, C++, and Java for production and Python and MATLAB for prototyping and data analysis. Algorithms I designed and implemented included radio equalizers, multipath mitigation, trellis-search joint demodulation (JMLSE and others), parameter estimation of low-SNR signals, geolocation and navigation based on TOA/FOA/AOA, and MUSIC-based AOA estimation.

Projects done through Kestrel included algorithms and software used by US special forces to intercept, control, and track cellular handsets in tactical missions, and radio-navigation systems based on signals of opportunity. We also provided training on cellular technology and exploitation techniques to US defense contractors and government personnel.

Member of Technical Staff

[Mission Research Corp.](#)

Monterey, California, USA

Feb 2001 - Jul 2005

Worked on signals intelligence applications. Most work was classified TS/SCI.

Signal Processing Engineer

Statistical Signal Processing, Inc.

Napa, California, USA

Nov 1998 - Jan 2001

Worked on signals intelligence applications. Most work was classified TS/SCI. Some of my work here was published in peer-reviewed academic proceedings..

Member of Research Staff

[Interval Research Corp.](#)

Palo Alto, California, USA

Jul 1994 - Oct 1998

Product-oriented research in a wide variety of areas, including digital video, home networks, object tracking and media searching and indexing.

Intern, Research Engineer

[Georgia Tech Research Institute \(GTRI\)](#)

Atlanta, Georgia, USA

Jan 1988 - Jul 1994

Started as an intern assistant to a project manager, promoted to Research Engineer when I received my first degree. Most work was in the fields of electronic warfare and radar for anti-aircraft systems, classified S.

## Education

MS Computer Science, Georgia Institute of Technology, Atlanta, Georgia, USA, 1993

Research was on spatial (3D) audio for use in virtual reality and user interfaces for the blind.

Some of this work was published in peer-reviewed academic proceedings.

BE Electrical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA, 1991

Specialty was computer engineering.

## United States Patents

These are US patents where I am named as an inventor.

Some of these patents are also filed internationally.

10,362,493	High-bandwidth beamforming LTE Base Station
8,253,627	Position determination with NRSC-5 digital radio signals
8,233,091	Positioning and time transfer using television synchronization signals
7,519,271	Low attention recording with particular application to social recording
7,498,873	Wide-lane pseudorange measurements using FM signals
7,194,186	Flexible marking of recording data by a recording unit
6,934,461	Low attention recording, with particular application to social recording
6,825,875	Hybrid recording unit including portable video recorder and auxiliary device
6,720,876	Untethered position tracking system
6,563,532	Low attention recording unit for use by vigorously active recorder
6,011,754	Personal object detector with enhanced stereo imaging capability
5,724,313	Personal object detector

## Peer-Reviewed Publications

These are relevant publications where I am named as an author.

I am not an academic, and do not make such publications a priority, but I have a few.

D. A. Burgess, TECHNIQUES FOR LOW-COST SPATIAL AUDIO, Proceedings of the 5th ACM Conference on User Interface Software and Technology (UIST), December 1992, Monterey, CA.

W. A. Gardner, D. A. Burgess, and C. W. Reed, COMPUTATIONALLY EFFICIENT MIMO DEMODULATION, Proceedings of the 11th Virginia Tech Symposium on Wireless Personal Communications, June 2001, Blacksburg, VA.

W. A. Gardner, D. A. Burgess, and C. W. Reed, FOUR ORDERS OF MAGNITUDE COST REDUCTION IN THE VITERBI ALGORITHM, Proceedings of the 34th IEEE Asilomar Conference on Signals, Systems, and Computers, November 2001, Monterey, CA.

## Public Workshops Presented

These are publicly-advertised workshops with paid attendance.

DeepSec, Vienna, Austria, Nov 2021. "Mobile Network Operations and Security", a 2-day workshop giving an overview of security risks in the mobile network.

OpenBTS, Pfarrkirchen, Germany, Jun 2013, "OpenBTS Workshop", a 4-day training session for engineers wanting to use the OpenBTS open source GSM implementation.

OpenBTS, Pfarrkirchen, Germany, Jun 2010, "OpenBTS Workshop", a 4-day training session for engineers wanting to use the OpenBTS open source GSM implementation.

DeepSec, Vienna, Austria, Nov 2009. "Security on the GSM Air Interface", a 2-day workshop presented together with Harald Welte.

## Other Information

I hold an FAA private pilot's license.