

José Manuel Requena Plens

Firmware & Software Engineer

Valencia, Spain • jmrplens@gmail.com • jmrp.io • github.com/jmrplens • linkedin.com/in/jmrplens • [Google Scholar](https://scholar.google.com/citations?user=0000-0003-1250-6212) • 0000-0003-1250-6212

On-site, remote or hybrid

Summary

Embedded firmware and software engineer with experience building industrial firmware for solar inverters (C, STM32, FreeRTOS) and a solid R&D background. Focused on low-level optimization, industrial communications (Modbus) and hardware test automation. I maintain *open source* projects used by developers worldwide. Targeting **firmware, software and QA** roles, bringing engineering rigor and a focus on quality.

Experience

R&D Software Developer

Apr 2023 - May 2026

Power Electronics (PE) — Solar + Storage (PE Solar) · Liria, Spain

Firmware development for solar inverters and control systems in photovoltaic plants, working on STM32 microcontrollers with bare-metal and RTOS environments.

- Reduced RTOS task stack usage by 30%–50%, optimizing memory on STM32 microcontrollers.
- Optimized Modbus TCP request handling, cutting CPU usage under load (40,000 req/s) from 80% to 17% with no dropped responses.
- Redesigned embedded file-system access, cutting access times by over 50%.
- Implemented a scheduled purge (daily/monthly) that safely clears thousands of files, preventing storage exhaustion under continuous operation.
- Built and maintained industrial communications in C with hardware abstraction layers (HAL): Modbus RTU/TCP, UART, I2C and SPI.
- Automated the test suite: ~50–80 unit tests per module (Ceedling, thousands in total) reaching 100% line and branch coverage via standard-library mocks/fakes, plus hundreds of on-hardware integration tests (pytest) — TCP/FTP performance and FTP security —; all in CI.
- Reviewed merge requests across a 12-person team, catching bugs and proposing improvements before integration.

Predoctoral researcher

Jan 2023 - Apr 2023

Polytechnic University of Valencia (UPV) · Spanish National Research Council (CSIC) · Hospital La Fe (IIS) — Medical Imaging and Therapy Systems (i3M) · Valencia, Spain

Researcher in the R&D line: **Acoustic Metamaterials for Ultrasound Histotripsy treatments**. **Project:** New generation of smart metasurfaces based on additive manufacturing for strategic applications in telecommunications (Metasmart). Funded by the Valencian Agency for Innovation (Reference: INNEST/2022/345).

- Ultra-close focus acoustic lens design.
- Prototype manufacturing.
- Experimentation with ex-vivo tissues.

Predoctoral researcher

Jul 2021 - Jul 2022

Polytechnic University of Valencia (UPV) · Spanish National Research Council (CSIC) — Medical Imaging and Therapy Systems (i3M) · Valencia, Spain

The main objective is to conduct research and development of acoustic metamaterials for use in architectural applications and medical imaging.

- Developed acoustic metadiffusers reaching a diffusion coefficient of 0.8 with a thickness 10× smaller than traditional diffusers.
- Simulation of the acoustic diffusers and validation of results (MATLAB & COMSOL).
- Designed and 3D-printed (resin) slitted-tube waveguides with numerically-computed slits (2–3 cm tubes, ~0.5 mm slits) that increased ultrasound directivity and range ~15× in air, validated experimentally.
- Validated experimental results against those obtained in simulation.
- Advisor of the Master thesis of a student of the Master's Degree in Acoustic Engineering of the UPV.

Researcher in European project

Feb 2020 - Jul 2021

Higher Polytechnic School of Gandia (UPV) · European Space Agency (ESA) — Complex Media Acoustics Group of IGIC (IGIC) · Gandia, Spain

Implement and experimentally validate a sound mitigation method, applicable to a real space vehicle launch configuration (VEGA), that results in a significant decrease in sound pressure levels generated in the launch area during spacecraft liftoff. Project funded by ESA (European Space Agency) with reference ESA AO/1-9479/18/NL/LvH, in collaboration with: CNRS/Laboratoire d'Acoustique de la Université du Mans; COMET Ingeniería; Spanish National Research Council (CSIC) and Polytechnic University of Madrid.

- Designed the optimum acoustic-metamaterial geometry, achieving near-total absorption ($\alpha \approx 1$) across 200–500 Hz with a subwavelength design (wavelength/thickness ratio ≈ 16.5 vs ~ 2 conventional), validated on real lab prototypes.
- Simulation of a real environment to validate design performance (MATLAB, COMSOL & Python).
- Designed and 3D-printed the first prototype; for the large-scale version designed the injection-molding model and sourced the manufacturing of 600 modules with a supplier.
- Development of software for acoustic measurements according to ISO 10534-2 and ASTM E2611 standards. A|Lab
- Design and development of a 3-axis robotic system to perform experimental measurements. Photos and some information here: NEWS
- Results validated and accepted by ESA.

Research internship

Feb 2018 - Jul 2018

University of Alicante (UA) — Dep. of Physics, Systems Engineering and Signal Theory (DFESTS) · Alicante, Spain

Internship in different research projects in the Applied Acoustics Group, belonging to the University Institute of Physics Applied to Sciences and Technologies of the Higher Polytechnic School of Alicante.

- Simulation of acoustic models.
- Acoustic measurements by means of a LabView-controlled robotic system.
- Investigation of the acoustic radiation efficiency (Vibration-borne noise) of metallic plates for an initial study of ship noise emissions in water. Carried out in collaboration with SAES, here you can read a news item on the subject: NEWS.

Founder and Vocal Member

Sep 2016 - Jul 2018

AmicroTech (AμTech) — University of Alicante (UA) · Alicante, Spain

Association based at the Higher Polytechnic School of the University of Alicante. Promotes project-oriented microcontroller programming knowledge.

- Taught 30+ students in reinforcement and extension classes for the subject "Digital Electronic Systems" of the Degree in Sound and Image Engineering of the University of Alicante.
- Laboratory organization and planning (located at the Colegio Mayor).
- Communication and Public Relations.

Sound technician

Jun 2011 - Feb 2018

Acusticox · Cox, Spain

- Equipment installation and adjustment for events.
- Equipment installation and adjustment for permanent installation.
- FOH Technician.
- Customer acquisition.

Laboratory technician

Sep 2005 - Nov 2009

Profdent · Alicante, Spain

- Reception of work and casting of plaster models from impressions (alginate/silicone), with and without implants.
- Mounting articulators and casting metal crowns in a centrifuge.
- Ceramic application on crowns and bridges.

Technical Skills

Embedded Firmware & Electronics: C, STM32 & ARM, ESP32 / ESP-IDF, PlatformIO, Texas Instruments (MSP430, Tiva C, Code Composer Studio), FreeRTOS / RTOS, Comm. Protocols (I2C, SPI, RS485, Modbus), HW Debugging (JTAG / SWD), Keil uVision, Instrumentation (Oscilloscopes, DAQs, Logic A.), Secure Boot & Embedded Security (secure boot, flash encryption, key derivation), Doxygen (firmware documentation)

Software Engineering & Tools: Python, C++, Go, TypeScript, Bash (shellcheck, bats), Clang Tooling (clangd, clang-format, clang-tidy), Git, GitHub, GitLab, Docker, MATLAB, CMake, JetBrains Toolbox (CLion, PyCharm, WebStorm)

Quality, CI/CD & DevSecOps: GitHub Actions, GitLab CI, Jenkins, SonarQube / SonarCloud, GoReleaser (multi-platform releases), Static Analysis & SAST (CodeQL, gitleaks, golangci-lint), Testing (Ceedling, pytest, Playwright, Vitest, bats), pre-commit hooks

Networking: TCP/IP & Networking, MikroTik RouterOS, WireGuard / VPN, IPv6 & Dual-stack, QUIC / HTTP3, DNS / Dynamic DNS

Security & Cryptography: Applied Cryptography (AEAD, encrypt-then-MAC, KDFs), TLS / mTLS / PKI (client certificates), Nginx Hardening (CSP, security headers), CrowdSec (IDS/IPS), Network Hardening (firewall, tarpit, honeypot)

AI & Agentic Engineering: Model Context Protocol (MCP) (Server development in Go), AI Coding Agents (Claude Code, Copilot, agent skills/workflows), LLM Integration (API, prompt engineering, tool-use)

Simulation & Acoustics: COMSOL Multiphysics, LabView, Acoustic Instrumentation (laser/vibration accelerometers, microphones)

General & Platforms: Linux / Unix, MacOS, Windows, LaTeX, HTML / CSS

Open Source Projects

gitlab-mcp-server — Go · Model Context Protocol server

31 ★ · 38 releases · ~40k downloads · [Listed on Glama](#), [mcp.so](#), [Cursor](#) & [mcpservers.org](#)

Open-source GitLab MCP server that exposes 1,000+ GitLab operations to AI assistants through a dynamic 2-tool find/execute design, with stdio/HTTP/OAuth transports and safe & read-only modes.

phonometry — Python · DSP · Acoustics

108 ★ · 24 releases · [PyPI](#)

Acoustic measurement toolkit: fractional octave-band filter banks, A/C/Z and Fast/Slow/Impulse weighting, and sound level metrology (Leq, percentiles), conformance-tested against IEC 61260-1 and IEC 61672-1 class 1 tolerances. Formerly PyOctaveBand.

cs-routeros-bouncer — Go · Firewall · MikroTik · WAF

12 ★ · 14 releases · 321 downloads · [On the CrowdSec Hub](#)

CrowdSec bouncer for MikroTik RouterOS: feeds the collaborative IPS/WAF CrowdSec decisions into the RouterOS firewall (address lists) through its API, blocking malicious IPs in real time.

Cloudflare-DNS-Updater — Bash · DevOps

27 ★ · 6 releases · 52 downloads

Dynamic DNS client for Cloudflare (IPv4/IPv6) written in Bash, with a bats test suite and coverage reporting.

TFG-TFM_EPS — LaTeX · Academic template

83 ★ · 3 releases · 21 downloads

LaTeX template for Bachelor's and Master's theses at the University of Alicante (EPS), with an automated CI build pipeline.

Education

PhD program in Health and Wellness Technologies (discontinued)

2019–2023

Polytechnic University of Valencia (UPV) — Ultrasound Medical and Industrial Laboratory (UMIL) · Valencia, Spain

Before completing the doctorate, I redirected my career toward industrial software development, applying my foundation in data analysis, programming and analytical problem-solving. The discontinued program focused on industrial and biomedical applications of metamaterials for the control of acoustic beams, combining new air-coupled ultrasound transducers with hyperbolic metamaterials to design vision systems that exceed the imaging capabilities of traditional systems.

- Biomedical signal processing and acoustic analysis algorithms.
- Ultrasound characterization for medical applications.
- Computational modeling and simulation of acoustic phenomena.
- Development of experimental methodologies for biomedical studies.
- Publication of results in specialized conferences and journals.

[Academic record \(ENG\)](#) · [Academic record \(SPA\)](#)

Master's Degree in Acoustical Engineering

2019

Polytechnic University of Valencia (UPV) — Higher Polytechnic School of Gandia (EPSG) · Gandia, Spain

Degree obtained with honors in: Fundamentals of Acoustics, Acoustic Isolation, Musical Acoustics, Signal Processing in Acoustic Engineering, Ultrasonics and Acoustic Simulation Techniques. Final Master's thesis entitled **Difusores acústicos basados en resonadores de membrana y placa** ('Acoustic diffusers based on membrane and plate resonators'), qualified with honors with special mention.

[Diploma](#) · [Academic record](#)

Degree in Telecommunication Engineering in Sound and Image

2018

University of Alicante (UA) — Higher Polytechnic School (EPS) · Alicante, Spain

Degree obtained together with the 2 specializations: Acoustic Engineering and Audiovisual Technology. Final Degree Work entitled **Estudio de la relación campo directo/reverberado; útil/perjudicial** ('Study of the direct/reverberated field relationship; useful/harmful').

Diploma • Academic record

Higher Vocational Degree — Superior Sound Technician

2011

IES Luis García Berlanga • Alicante, Spain

Diploma (Sound)

Intermediate Vocational Degree — Electronics Technician

2009

IES Salesianos (San José Artesano) • Elche, Spain

Diploma (Electronics)

Certificates

Occupational Health and Safety

Generic (INVASSAT, 50 Hours) • **Nanomaterials** (INVASSAT, 50 Hours) • **Chemical sector** (INVASSAT, 50 Hours) • **Emergencies** (INVASSAT, 70 Hours) • **Nutrition** (INVASSAT, 50 Hours) • **Educational** (INVASSAT, 50 Hours) • **Services** (INVASSAT, 50 Hours) • **Researcher** (UPV, 15 Hours)

Transversal competences

Gender perspective (EVES, 20 Hours) • **Teamwork** (Labora, 25 Hours) • **Design Thinking** (Labora, 25 Hours) • **Critical Thinking** (Labora, 25 Hours) • **Adaptability, flexibility and agility** (Labora, 25 Hours) • **Workplace autonomy and innovation, initiative and creativity** (Labora, 25 Hours) • **Improving professional efficiency** (Labora, 25 Hours) • **Entrepreneur gender perspective** (UPV, 20 Hours)

Labor/Industrial

Op. Industrial trucks (Gescoform, 15 Hours) • **Food Hygiene Course** (Asonoman, 30 Hours) • **Self-protection plans** (INVASSAT, 15 Hours) • **Static electricity** (INVASSAT, 15 Hours) • **Data privacy** (CSIRT-CV, 10 Hours)

Information technology

Using Python for Research (HarvardX, 50 Hours) • **Analyzing Data With Python** (IBM, 20 Hours) • **Visualizing Data with Python** (IBM, 20 Hours)

Publications & conferences

Journal

- Francisco Castells, **José M. Requena-Plens** (2019). **Loudspeakers for Vented Enclosures: a Backwards Approach for Speaker Selection (LoVE BASS)**. *Voice Coil*.

Conferences

- **José M. Requena-Plens**, Rubén Picó, Víctor J. Sánchez-Morcillo, Noé Jiménez, Alejandro Cebrecos, Mara Salut Escartí-Guillem (2021). **Perfect broadband sound absorber metamaterial for noise reduction in a rocket launch**. *European Congress and Exposition on Noise Control Engineering (EuroNoise 2021)*.
- **José M. Requena-Plens**, Jean-Philippe Groby, Noé Jiménez, Vicente Romero-García (2021). **Sound diffusing metasurfaces based on elastic plates and membranes**. *European Congress and Exposition on Noise Control Engineering (EuroNoise 2021)*.
- Mara Salut Escartí-Guillem, Pablo Barriuso Feijoo, Alejandro Cebrecos, Marcos Chimeno Manguán, Pedro Cobo Parra, Luis Miguel García Raffi, Jean-Philippe Groby, Sergio Hoyas Calvo, Noé Jiménez, Mario Lázaro Navarro, Julien Leng, José Nieto Mocholí, Rubén Picó, **José M. Requena-Plens**, Elena Roibás Millán (2021). **Application of metamaterials to control noise scattering during space vehicle lift-off**. *European Congress and Exposition on Noise Control Engineering (EuroNoise 2021)*.

- Mara Salut Escartí-Guillem, **José M. Requena-Plens**, Pablo Barriuso Feijoo, Alejandro Cebrecos, Marcos Chimeno Manguán, Pedro Cobo Parra, Luis Miguel García Raffi, Jean-Philippe Groby, Sergio Hoyas Calvo, Noé Jiménez, Mario Lázaro Navarro, Julien Leng, José Nieto Mocholí, Elena Roibás Millán, Vicente Romero-García, Rubén Picó, Víctor J. Sánchez-Morcillo, F. Simón Hidalgo, I. C.S. Ngan (2021). Launch sound level characterisation and mitigation: numerical modelling framework and metamaterial proof of concept. *16th European Conference on Spacecraft structures, Materials & Environmental Testing*.
- **José M. Requena-Plens**, Noé Jiménez, Alejandro Cebrecos, Rubén Picó, Víctor J. Sánchez-Morcillo (2020). **Acoustic field prediction during the launch of rockets**. *Tecniacústica 2020: 50º Congreso Español de Acústica. XI Congreso Ibérico de Acústica. Faro, Portugal*.
- Noé Jiménez, Trevor J. Cox, **José M. Requena-Plens**, Eric Ballesteros, Jean-Philippe Groby, Vicente Romero-García (2020). **Beyond Schroeder diffusers using acoustic metasurfaces**. *Tecniacústica 2020: 50º Congreso Español de Acústica. XI Congreso Ibérico de Acústica. Faro, Portugal*.
- Jaime Ramis, Jesús Carbajo, Juan de Dios González, Pedro Poveda, **José M. Requena-Plens**, Enrique G. Segovia, others (2018). **Aprendizaje basado en proyectos en las materias transductores acústicos y vibroacústica**. *Memorias del Programa de Redes-ICE de calidad, innovación e investigación en docencia universitaria. Convocatoria 2017-18*.
- **José M. Requena-Plens**, Jenaro Vera Guarinos (2018). **Cálculo corregido, basado en la teoría moderna, de los campos acústicos (directo, temprano y tardío)**. *Tecniacústica 2018: 49º Congreso Español de Acústica; XI Congreso Iberoamericano de Acústica; X Congreso Ibérico de Acústica*.
- **José M. Requena-Plens**, Jenaro Vera Guarinos (2018). **Campo directo (útil)/reverberado (perjudicial) resultados experimentales frente a simulación en EASE**. *Tecniacústica 2018: 49º Congreso Español de Acústica; XI Congreso Iberoamericano de Acústica; X Congreso Ibérico de Acústica*.
- Francisco J. Rodrigo, Pedro Poveda, Jesús Carbajo, **José M. Requena-Plens**, Jaime Ramis (2018). **Comportamiento vibroacústico de contenedores cilíndricos en aire**. *Tecniacústica 2018: 49º Congreso Español de Acústica; XI Congreso Iberoamericano de Acústica; X Congreso Ibérico de Acústica*.
- **José M. Requena-Plens**, Jenaro Vera Guarinos, María Soledad Yebra Calleja (2017). **Campo directo (útil)/reverberado (perjudicial) resultados experimentales frente a simulación en catt-acoustic**. *Tecniacústica 2017: 48º Congreso Español de Acústica; Encuentro Ibérico de Acústica; European Symposium on Underwater Acoustics Applications; European Symposium on Sustainable Building Acoustics*.

Theses & projects

- **José M. Requena-Plens** (2019). **Difusores acústicos basados en resonadores de membrana y placa**. *Universitat Politècnica de València. Departamento de Física Aplicada. Escuela Politécnica Superior de Gandía*.
- **José M. Requena-Plens** (2018). **Estudio de la relación campo directo/reverberado; útil/perjudicial**. *Universidad de Alicante. Departamento de Física, Ingeniería de Sistemas y Teoría de la Señal*.