Hashem Firas Qasem AL-Rawashdah

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RESEARCH INTERESTS

RF systems for space and airborne platforms: high-power linear amplifiers and microwave/RF front-ends, antennas & arrays, GNSS/anti-jamming, satellite communications, radar & remote sensing.

EDUCATION

The Hashemite University — **Zarqa, Jordan**

Bachelor of Science — **July 2024**

Major in Electrical Engineering with Concentration in Communications and Electronics

Ranked first in class, cumulative GPA: **3.94/4.00**

Relevant Coursework: Communications Electronics; Electromagnetics (1, 2); Antennas and Wave Propagation; Wireless Communications Systems; Digital Communications; Digital Signal Processing; Satellite Communication; Probability & Random Processes.

WORK EXPERIENCE

Lead RF Systems Engineer — **Jun 2025 – Present**

MARS Robotics — Irbid, Jordan & Abu Dhabi, UAE

- Lead the datalink R&D program: architect a three-board, multiband full-duplex air↔ground stack (interface/control/power board, modem-adapter board, dual-channel GaN bidirectional-amplifier RF board) for mission-critical links.
- Architect and design a dual-channel, automatically switched GaN BDA integrating HPAs, LNAs, circulators, limiters and filters on a shared aluminum baseplate for high-power linear COFDM/QAM air↔ground links; design the RF, bias and protection networks, define interfaces to the modem and control boards, and coordinate thermal-mechanical and EMC constraints.
- Deliver the JEER communications system end-to-end: authored the RF parts of the SRD and project plan; defined ICD, architecture and BOM; led PDR/CDR; planned the communication-system test campaign with ATP tables; oversaw integration, TRR and flight tests; and produced integration reports plus pre-/post-flight checklists and reports.
- Engineer UHF/S/C-band telemetry/control and 1080p video links; build STK link budgets to set margins and flight-profile constraints; assess Ka-band SATCOM-on-the-move antenna placement for BVLOS operation.
- Run monthly internal design reviews and management updates; centralize execution in GitHub.

RF Systems Engineer — **Jun 2024 – May 2025**

MARS Robotics — Irbid, Jordan & Abu Dhabi, UAE

- Initiated and lead the Anti-GNSS jamming R&D program; architect and design a digital CRPA-based GNSS anti-jam front-end for UAVs, combining a conformal multi-antenna array, multi-channel coherent ADC, FPGA/DSP adaptive beamforming, DAC and RF upconversion into external GNSS receivers, guided by STK and MATLAB/Python MVDR/JSR analysis; continue to lead this program in the current role.
- Led REACH-S integration and pre-/post-flight testing; performed in-flight RSSI/antenna-tracker monitoring; produced checklists and reports.
- Configured radios/modems via AT commands; enabled AES-256 and FHSS with custom hop tables; tuned power, data rate, and bandwidth; integrated RS-232/Ethernet interfaces.
- Performed antenna-placement optimization; installed ground planes; terminated coax and mounted airframe antennas; performed crimp and solder work, torque and continuity checks, and DTF and VSWR checks; specified and sourced the RF BOM and installation tooling.
- Conducted monostatic RCS characterization using reference models for B-2, DJI Phantom 3 and TB2–class platforms to inform detectability and signature-management decisions.
- Designed and built SDR PHY prototypes: FM receiver; BPSK/QPSK/OOK/ASK Tx/Rx; GNSS interference emulators for CRPA/DF testing.
- Led adoption and rollout of AGI STK as the company's standard mission/link-simulation platform and Keysight ADS as the primary RF circuit/PA design environment; created Python/Jupyter post-processing workflows and internal templates, and trained engineers.
- Owned the RF hiring pipeline: authored job postings, screened 200+ CVs, conducted all technical interviews, and hired 4 engineers and 3 university trainees; delivered onboarding, technical training, and monthly reviews.

TEACHING

Private Tutor (online, part-time) **Mar 2023 – Jun 2024**

- Tutored undergraduates in calculus, circuits, electromagnetics, electronics, digital logic and related core EE courses.

HIGHLIGHTED PROJECTS

CRPA-Enabled Airborne GNSS Anti-Jamming (GitHub) **Jan 2025**

- Compared COTS u-blox ANN-MB FRPA vs 2-element CRPA (MVDR, 0.5 λ) over Abu Dhabi: 5 W omni → FRPA $\Delta C/N_0$ ≈ 8.21 dB-Hz vs CRPA ≈ 0.38 dB-Hz; 20 W + 10 dBi panel → FRPA ≈ 23.9 dB-Hz vs CRPA ≈ 4.1 dB-Hz, keeping SV medians near/above the ~35 dB-Hz line.
- Built with live GPS ephemerides and ITU-R P.618 / P.840 / P.676 propagation; implemented MVDR beamforming on a 2-element array.
- Estimated JSR suppression from receiver-gain dynamics (~38–44 dB per-SV medians) and benchmarked against TUALCOM ANTY nominal wideband suppression (>40 dB).

Enhancing Wireless Communication Using Intelligent Reflective Surfaces (GitHub) **May 2024**

- Designed an IRS-based passive beamforming surface that steered incident waves to improve received power by ~11 dB in campus-scale simulations, and evaluated active beamforming extensions.
- Built a 3D model of the university campus and conducted MATLAB simulations over multiple deployment scenarios.
- Executed CST unit-cell and array simulations, then designed and built a PCB prototype using EasyEDA.

Additional work on GitHub: SATCOM, Antenna Design, RCS, etc. — github.com/ihalhashem

ACHIEVEMENTS

- **Undergraduates Research & Innovation Support Program:** Won funding support from the King Abdullah II Fund for Development (KAFD) for the project titled "Swarm UAVs with Wireless Charging Stations for Surveillance," awarded up to 5000 JOD.
- **AIDTSEC Conference**: Exhibited a machine learning project at the AIDTSEC conference in 2021, showcasing advancements in anomaly detection for industrial control systems.

ACTIVITIES

- **IDEX 2025 (Abu Dhabi)** — Attended as the sole RF Systems Engineer for the JEER UAV during its public display.
- **Participation in Shamal Start Mobile FabLab:** Engaged in a digital fabrication workshop series, acquiring hands-on skills in electronic design, programming, PCB milling, and general lab techniques such as soldering.

TECHNICAL SKILLS

- **Simulation and Design Tools:** ANSYS HFSS; AGI Systems Tool Kit (STK); Keysight Advanced Design System (ADS); CST Studio Suite; ANSYS SIwave; ANSYS EMIT; MATLAB/Simulink; GNU Radio.
- **Tools and Equipment:** Vector Network Analyzer, Spectrum Analyzer, Power Meter.
- **Programming Languages:** Python, MATLAB, C++, C#, and Assembly.

CERTIFICATIONS

- **Certifications & coursework (AI and RF):** Selected course certificates and notes available at: Certificates Repository.

ADDITIONAL

- **Languages:** Arabic (native), English (fluent).