Resume

Robert E. Palma

Resume - Robert E. Palma P.O. Box 2256 Fairfield, IA 52556
Business Phone: 641-472-1515 Ext. 700, Business Fax: 208-474-5445
Internet: http://mrtel.com/ http://mxdna.com http://ketufile.com http://ketuchat.com http://rfreduce.com
Email: info@rfreduce.com

EXPERIENCE AREAS

Engineering My experience includes detailed research, design and development; subsystem engineering; and system engineering. I have nearly 5 decades conducting detailed hardware design at the piece-part / material level. I have designed numerous flight avionics subsystems (electronics, electro-mechanical and electro-explosive devices and subsystems) for (17 total) spacecraft and launch vehicles, as well as "racks" of ground test and simulation hardware for each of those flight systems. These subsystems/disciplines included: instrumentation, control, communications, power conversion/conditioning, radio frequency, electromagnetic compatibility (EMC), reliability, and safety.

I have written hundreds of thousands of lines of code (software) for diverse applications. These applications include: circuit modeling, design analysis and synthesis, Fourier analysis, EMC, machine/process control, automatic test equipment, voicemail, auto-attendant, audio text, fax-on-demand, fax-retrieval, fax mailbox, Internet search robot, custom TCP/IP peer-to-peer and client-server applications, PC desktop file encryption using Advanced Encryption Standard (AES), email client with advanced encryption of enclosures, and point-and-execute operating system shell. I have written for numerous computers/chips including: Burroughs, Univac and CDC mainframes; DEC and HP minis; many x86 PCs; many 8080 clone chips. Operating systems for the mainframe/minis were proprietary to the host. PC operating systems were DOS, Win98, Win-NT, Win2K, Win-XP, Win7, Win10, and Linux. Languages included: C/C++, Fortran, Basic, Algol, PHP, Vulcan, VAL, Assembler and machine language.

I have served as Design Engineer, Software Engineer, Project Engineer, System Engineer and Chief Engineer in several organizations on numerous projects. A majority of experience was in an industry where it was there was no "second chance". Systems had to be highly reliable at their initial deployment.

Management My experience includes: 1] functional management of highly specialized technology R&D teams, 2] project and program management of diverse technologies with a central focus, and 3] administrative management of business, financial, security and other logistical areas.

All of my nearly 50 years of experience has been in the vein of having to deliver cost-effective, reliable, technology innovation within the constraints of a given budget and schedule. I have done this in private industry and in the federal government. My management positions have included: supervising and guiding small R&D teams (20 – 40), managing several projects simultaneously with 500+ aggregate staff, and serving as office head with general organizational administrative duties. The environments of these assignments, particularly the government, were quite challenging. There were numerous conflicting bureaucratic and political requirements that had to be satisfied, and there was a constant pressure of competition from various sectors. In the vast majority of my experience, I was the lead 'sales' person for my efforts. I had to find sponsors/investors (in the Pentagon), make credible and compelling arguments for funding, and most importantly, keep them satisfied during the course of the project. Studying, understanding and abiding-by near countless, and often conflicting laws, regulations and instructions was a common background in my years of service.

SPECIFIC EXPERIENCE

May 1991 to Present: President and Chief Engineer of Midwest Research Corp. Midwest Research develops and markets sophisticated telecommunications systems and data-communications, devices and software; develops technology products for reduction of RF for personnel; consults on electromagnetic field environments; installs telephone systems for office, industry, military and other applications.

Midwest Research Corp also installs and maintains business telephone systems (PBXs) for offices from 20 employees to 600 employees. These efforts include all PBX hardware, wiring, phone sets, Telco and private interfaces, peripheral hardware and un-interruptable power supply systems.

Development of Power Line Filters 22 diverse models of power line filters to reduce high frequency noise (Dirty Electricity - DE) These products span the range of residential, commercial and industrial applications. Some products are of a "plug-in" configuration and some are in-line filters.

Development of Wideband Isolation Transformer This design, with a response from 20 Hz to 20 Mhz is an ultra-wideband instrumentation interface. It solves the age-old problem of connecting an oscilliscope to the AC power lines to allow the measurement of Dirty Electricity, i.e. Power Quality.

Development of KetuFile, software. This product is an application that allows Window's desktop users to encrypt any PC file, up to 2 gigabytes in size, with strong encryption. This software uses the next-generation Advanced Encryption Standard (AES).

Deployment of KetuChat (http://ketuchat.com) AES encrypted chatting service. Encryption strength 512 bits.

Development of GoRobot, Internet search robot/crawler. GoRobot is a programmable web retrieval application. It 'sweeps' ('crawls', 'scans', etc.) the web looking for files that match a specific criteria.

Development of Magic Voice, a flexible, PC-based Telephony Voice/Fax Response System with voicemail, automated receptionist (auto attendant) capability.

Activities of Engineering Design, Consulting and Management 1] Electromagnetic field analysis for specific environments. 2] aerospace systems engineering, 3] electronics design and space qualification, 4] aerospace safety analysis, 5] electromagnetic compatibility, 6] design and analysis of power, ordnance, instrumentation, control, telemetry and command systems, 7] reliability systems design, 8] design and development of computer based instruments and controllers including voice processing/storage/retrieval/mail and voice conferencing systems, and 9] program management principles, approaches/systems, analysis and review. 10] Systems Engineering, Power and Ordnance Subsystem Engineering, and Program Management consulting for Naval Research Lab DSPSE Program; 11] Systems Engineering, Avionics and Ordnance System design consulting and Deputy Program Manager for ORBEX space launch vehicle for CTA Launch Services; 12] Safety and Reliability analysis of industrial ordnance firing circuitry for the Ensign Bickford Co.

Nov. 1997 to 2001:
Chief Engineer of vidya.net corporation. Vidya.net designs and develops high technology systems for the transport and serving of integrated voice, data and video, content and information.

My major effort in vidya.net was lead developmental engineer and Project Manager of the ADAM Exchange. ADAM (All Digital And MultiMedia) is an integrated Metropolitan Area Network (MAN) architecture that entirely replaces the combined infrastructures of telephone, cable TV and Internet provisioning. It brings fiber-to-the-home (FTTH) and to the business. In addition to traditional phone, cable TV (MPEG-2) and wideband Internet, our design included, true video on demand, security/surveillance systems, and utility power monitoring and control. We concluded our efforts with a prototype system demonstration. Our documentation was quite thorough, including: 1] Strategic Plan, 2] System Performance and Design Requirements, 3] Task Descriptions and Qualifications, 4] Advanced Features, 5] Work Breakdown Structure, 6] Program Management Plan, 7] Business Plan.

Note: The above position was concurrent with Midwest Research Corp. activities.

1985 to May 1991: GM-15 Program Manager and Chief Engineer at the Naval Research Laboratory (NRL) for the SDI Programs. In this position I had total program responsibility from conceptualization, design and qualification, to delivery, launch, deployment and operation and scientific data processing of sophisticated spacecraft systems and the related ground assets. All projects required significant strides in technological innovation and a broad attack on a complex set of interdisciplinary problems to achieve the needed results. The disciplines/subsystems involved in these projects included: 1] Optical and Focal Plane, 2] Radio Frequency, 3] Electrical Power, 4] Telemetry, Tracking and Command, 5] Attitude Control, 6] Reaction Control, 7] Structures and Mechanisms, 8] Thermal Control Subsystems, 9] Ordnance Control, 10] System Safety including ground processing and flight, 11] Reliability and Quality Assurance, and a variety of experimental subsystems and devices.

The largest single project was the Low Power Atmospheric Compensation Experiment (LACE). It comprised 4 experiment subsystems including a wide dynamic range electro-optic laser sensor array with 210 individual sensors, and a high precision gimbaled ultraviolet telescope with automatic acquisition and tracking of rocket plumes. The ground assets included fixed and transportable satellite tracking stations, ground processing facilities and operational control centers. These ground assets included computer and communication technologies such as: mini-computers (VAX); work stations; numerous PC's (Mac and IBM clone); image display and processing platforms; and PBX, data and voice mail communications electronics.

The multi-year cost of LACE was $154M (including $46M for the Delta launch vehicle). I was responsible for staffing and directing the efforts of approximately 500 scientists, engineers, technicians and support personnel.

I served as Program Manager and Systems Engineer for the Navy Sealar Program. Sealar is a multi-stage, liquid propellant, sea launched and recovered booster (rocket) system for placing satellites into Earth orbit. This concept offers to reduce the cost of space access by an order of magnitude.

1972 to 1985: Designer and Head of Spacecraft Power Systems and Instrumentation Section (staff of 40 professionals from Ph.D. to electronic Tech.). My responsibilities included: 1] research, design development and qualification of space-borne electrical power and precision instrumentation/control systems, 2] design, development and qualification of space-borne ordnance control systems, 3] explosive control systems safety analysis, 4] electromagnetic compatibility analysis and design, 5] design and safety qualification of numerous ground test sets including bridgewire resistance testers, firing circuit stray voltage test sets, and explosion-proof hydrazine fueling control sets, 6] spacecraft integration and test management, 7] launch vehicle integration, 8] special study project manager and 9] payload manager. I performed these efforts for 13 Earth orbiting satellites, 1 Shuttle attached payload compliment and 3 booster upper stage vehicles including a Shuttle/Titan4 bi-propellant transfer stage capable of 15,000 lb. throw weight.

Examples of **Space Avionics** and **Aerospace Ground Equipment** Designs follow.

Circa 1973
Lead Designer for the electro-explosives subsystem. i.e. **Timation 3A Ordnance Control System** (OCS), on the Timation 3A satellite. The Global Positioning System as it is known in the world today was invented, developed and refined by 4 experimental Navy salettiles, Timation 1 through Timation 4. This OCS had 3 separate flight avionics electronics subsystems. In addition to firing numerous explosive devices associated with deployments, articulations and releases, this OCS fired a large solid rocket motor for final orbit insertion.

Lead Designer for **Ordnance Test Set** (OTS). This Aerospace Ground Equipment (AGE) electronically simulated the electro-pyro-mechanical action of an electro explosive device (EED). The OTS simulated 40 EEDs simultaneoulsy and had both visual indicators as well as interfaces to test center mini-computers.

Lead Designer for **Ordnance Pulsed Current-Controlled Test Set** (OPCTS). This Aerospace Ground Equipment provided a recisely settable output current, using a negative feedback control system. It's unique feature was that it was a pulsed system, where the current was precisely controlled during the on-time of the output pulse. This test set was used for characterization of the thesholds of initiation of EEDs and their associated eletronic simulators.

Lead Designer for **Spacecraft Ordnance Test Set** (SCOTS). This AGE test set is used in the launch gantry in the final testing and arming activities at T-2 hours in the launch countdown. It measured stray voltages on the firing circuits, prior to arming the circuits. SCOTS was also was used to verify EED integrity i.e. EED bridgewire resistance.

Lead Designer for **Spacecraft Ordnance Power Circuits Test Set** (SCOPCTS). This AGE test set allowed testing of 28 volt bus power that was supplied to the OCS. This AGE also allowed commanding and configuring the power circuitry of the OCS.

Circa 1975
Lead Designer for the electro-explosives subsystem. i.e. **Timation 4 Ordnance Control System** (OCS), on the Timation 4 satellite. The Global Positioning System as it is known in the world today was invented, developed and refined by 4 experimental Navy salettiles, Timation 1 through Timation 4.

Lead Designer for the electro-explosives subsystem. i.e. **SOLRAD 11A Ordnance Control System** (OCS). This was one of 2 spacecraft placed into extremely high orbits (70,000 miles) orbiting the Earth and reported X-ray emissions of the Sun in real time. In addition to firing numerous explosive devices associated with deployments, articulations and releases, this OCS fired a large solid rocket motor for final orbit insertion. This OCS had 3 separate flight avionics electronics subsystems.

Lead Designer for the electro-explosives subsystem. i.e. **SOLRAD 11B Ordnance Control System** (OCS). This was one of 2 spacecraft placed into extremely high orbits (70,000 miles) orbiting the Earth and reported X-ray emissions of the Sun in real time. See SOLRAD 11A description above.

Lead Designer for **Flight Ranging System Electronics, SOLRAD 11A** satellite. This design was the critical flight subsystem for determining the range of the satellite, from Earth, at any moment. It was a custom design with automatic gain control circuits, active filters, threshold detector and amplifiers.

Lead Designer for **Flight Ranging System Electronics, SOLRAD 11B** satellite. See description for SOLRAD 11A above.

Lead Designer for **Ground Station Component For The Ranging System, SOLRAD 11A.** This system operated in the Ground Station that contorlled the satellites over the course of their lifetime. It interfaced with the Ground Station Mini computer. This system had active switches, programmable amplifiers, super High-Q (Q = 1000) bandpass filters and precison temperature controlled oven for the electronics that maintained +- 0.02 degrees C temperature control.

Lead Designer for **Ground Station Component For The Ranging System, SOLRAD 11B.** See description above for SOLRAD 11A satellite.

Lead Designer for **Flight Telemetry System Interface, SOLRAD 11A.** This system interfaced the flight telemetry system data train with the launch vehicle umbillical to allow monitoring the satellite health right up to lift off.

Lead Designer for **Flight Telemetry System Interface, SOLRAD 11B.** See description above for SOLRAD 11A satellite.

Lead Designer for **Ground Segment of Flight Telemetry System Interface, SOLRAD 11A.** This ground system received the telemetry data train from the satellite and processed it for interfacing tothe Ground Mini computer.

Lead Designer for **Ground Segment of Flight Telemetry System Interface, SOLRAD 11B.** See description above for SOLRAD 11A satellite.

Lead Analyst for spacecraft negative feedback control systems. I provided critical computer modelling and analysis for designs of other spacecraft designers.

Lead Designer for **Valve Life Test Test** (VALTS) (AGE equipment). This test set interfaced with a programmable desktop computer and exercised spacecraft propulsion valves for an accelerated lifetine test. It concluded controls for setting test chamber temperature, and bus voltages and provided state and temperature recording of all valves.

Circa 1976
Lead Designer for the electro-explosives subsystem. i.e. **180 Series Satellite Ordnance Control System** (OCS). This OCS was responsible for firing numerous explosive devices associated with deployments, articulations and releases.

Lead Designer for the electro-explosives subsystem. i.e. **181 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **182 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **183 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **MSD180 Series Upperstage Booster Ordnance Control System** (OCS). This OCS was responsible for firing numerous explosive devices associated with deployments, articulations and releases. In addition this system fired "spin" and "despin" solid rocket motors (SRM) and a large orbit insertion booster SRM.

Circa 1979
Lead Designer for the electro-explosives subsystem. i.e. **190 Series Satellite Ordnance Control System** (OCS). This OCS was responsible for firing numerous explosive devices associated with deployments, articulations and releases.

Lead Designer for the electro-explosives subsystem. i.e. **191 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **192 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **193 Series Satellite Ordnance Control System** (OCS). See descriotion above for satellite in this series.

Lead Designer for the electro-explosives subsystem. i.e. **MSD190 Series Upperstage Booster Ordnance Control System** (OCS). This OCS was responsible for firing numerous explosive devices associated with deployments, articulations and releases. In addition this system fired "spin" and "despin" solid rocket motors (SRM) and a large orbit insertion booster SRM.

Circa 1981
Lead Designer for the electro-explosives subsystem, **Living Plume Shield Satellite Ordnance Control System** (OCS). This OCS was responsible for firing numerous explosive devices associated with deployments, articulations and releases.

Designer and Lead Analyst for **Living Plume Shield Satellite Electrical Power System**. This EPS was responsible for regulating, controlling, conditioning, and monitoring all satellite power circuits, solar arrays, and batteries.

Circa 1985
Designer for **Non-contact DC Current Measurement Device**. This device allows measurement of DC currents without interrupting the actual circuit being measured. It is a magnetic amplifier design that clamps a magnetic core around the conductor that is carrying the current to be measured. The exceptional feature of this design is that it has a minimum detectable/readable current sensitivity of 1 milliamp. The U.S. Navy granted an Invention Award for this design.

Designer, Switch Mode Power Supply (**SMPS**). High power converter for Space Shuttle to Transfer Stage regulation and conditioning. **600 Watt Four Stage Phase-Shifted-Parallel DC-to-DC Converter**. This design featured a unique phase shifted approach to allow using 5 each 20 kHz switchers in phase-shifted parallel operation to allow achieving and effective 100 kHz switching operation. Paper was published in peer-reviewed journal for this design.

Designer, Switch Mode Power Supply (**SMPS**). This design concept was a forced current sharing for drive of the Base of a Bi-polar junction transistor. **Analysis of Magnetic Proportional Drive Circuits for Bipolar Junction**

Transistors. This design featured a technique to always have correct Beta in the drive of the BiPolar junction transistor. Paper was published in peer-reviewed journal for this design.

Designer, Switch Mode Power Supply (**SMPS**). Simialr in end-goal, this design focused on discontonuous-mode switcher operation. **A Proportional Drive for Discontinuous Mode DC-to-DC Converters**. Paper was published in peer-reviewed journal for this design.

Designer, Switch Mode Power Supply (**SMPS**). This design suppled regulated +- 12 VDC power to instrument subsystem. **Spacecraft Forward Regulator For Regulated Low Voltages**. This design featured a 30 kHz single stage switcher and provided transformer isolation of the reulated output voltages.

Designer, Switch Mode Power Supply (**SMPS**). This design suppled regulated +- 12 VDC power to instrument subsystem. **Spacecraft Flynack Regulator For Regulated Low Voltages**. This design featured a very small magnetcs profile, using a flybacl transformer both as an energy storage element as well as a transformer-isolation element.

Other Capabilities/Duties: 1] I provided expert consultation in the area of R.F. hazards and design engineering practices for ordnance and ordnance subsystem designs, to the DOD on the rewrite of MIL-STD-1512 (tailoring for the US Space Shuttle) for electro-explosive subsystems. For this effort I was the single ordnance electronics design engineer on the committee, 2] I served as Navy Payload Manager and Systems Engineer for first DOD Space Shuttle flight, STS-4, and signed payload safety submittals as the Certifying Safety Officer, 3] I served as Electrical Launch Vehicle Integration Engineer on the SOLRAD-HI spacecraft, 4] I performed numerous other circuit/subsystem detailed designs and space qualifications including a spacecraft ranging system for a 70,000 nmi. orbit, digital/analog telemetry systems, precision analog instrumentation and control circuits and systems, linear and switch-mode power regulators, PC-based automated flight box environmental test controllers, precision timing and sequencing electronics, 5] I performed design and development, including all software, of a precision instrument utilizing high integration microprocessor with digital readout, engineering unit conversion & numerous serial/parallel interfaces, 6] I performed design and development of PC computer based phone mail system, including software, 7] I performed several major designs of PC based process controllers including spacecraft Power System Test Set and Valve Life Test Set for rocket propulsion subsystems.

1971 to 1972: At the Naval Weapons Laboratory I served as analyst and designer on various projects related to electromagnetic compatibility (EMC) and Hazards of Electromagnetic Radiation to Ordnance (HERO). I worked in the frequency regime of 220 MHz to 18 Ghz. I designed the first Aircraft-To-Deck HERO High Impedance RF Meter to be used on the deck of US aircraft carriers to protect Naval personnel.

1967-1971: While obtaining my undergraduate engineering degree I served as Chief Engineer of WCHV (AM 5KW) and WCCV (FM 50KW) in Charlottesville, VA.

EDUCATION: BSEE Univ. of VA, 1971. Also, 16 other Graduate and continuing education courses in technology and management.

MEMBERSHIP: Register EIT VA, former Chairman, Systems Working Group, Interagency Advanced Power Group.

PUBLICATIONS:

* R.E. Palma et.al. "Results from Preliminary Processing of Data from a Rocket Plume Encounter", NRL Publication 185-8102, 1990.
* R.E. Palma et.al. "UV Airglow and Auroral Imaging from the LACE Satellite", presented at the American Geophysical Union, 1990.
* R.E. Palma et.al. "Execution of a Successful Rocket Plume Observation from the LACE Satellite", presented at the 14th Annual Guidance and Control Conference of the American Astronautical Society, 1991.
* R.E. Palma et.al. "(U) Active Survivability Final 88 Report" 1988, NRL
* R.E. Palma et.al. "A 600 Watt Four Stage Phase-Shifted-Parallel DC-to-DC Converter", Proceedings of the 1985 IEEE, PESC.

* R.E. Palma et.al. "Analysis of Magnetic Proportional Drive Circuits for Bipolar Junction Transistors", Proceedings of the IEEE PESC, 1984.
* R.E. Palma et. al. "A Proportional Drive for Discontinuous Mode DC-to-DC Converters", IEEE, Intelec 1984 Conference Record.
* R.E. Palma et.al. "Power MOS Transistor Usage In Space", 1984, Report and Program Control Document to PDE-106.5
* R.E. Palma et. al. "(U) Sortie-Lab Final Report", 1982 NRL Report
* R.E. Palma "HERO High Impedance Voltmeter", 1971
* Introduction To Cryptography For Non Technical Personnel Part 1
* Introduction To Cryptography For Non Technical Personnel Part 2
* What Is SSL?
* The Problem With Public Key Encryption and PKI
* Symmetric vs Asymmetric Encryption
* Unspoken Risk Of E Commerce
* What E Commerce Really Needs

INVENTIONS/PATENTS: "High Accuracy Current Sensor" invention and patent application.

AWARDS: 26 Outstanding Performance Evaluations and publication awards.
Also awarded Individual and Group Achievement Award for the LACE Satellite.

LICENSES: FCC General Radio Telephone (formerly termed 1st Class Radio Telephone) and General Amateur.

CERTIFICATIONS: Factory certified for installation and maintenance of PBX and related hardware/software systems for Mitel, Panasonic and Vodavi business telephone systems.