Associate 1371

SUMMARY

RF radios systems

- Designed built and tested several custom S-band telemetry systems, including ground stations and spacecraft radios flown on the ALEXIS, HETE2, and TERRIERS systems.
- Designed, built and tested custom S-band radio for the Air Force PnP Satellite and for the Swedish Astrid satellite.
- Developed CubeSat format S-band firmware defined radio to be flown on two different NASA mission.
- Designed and built S-band inner-satellite ranging and communications system test bed for the NASA MMS IRAS system. Design was extended to support up to a 100 satellite constellation.
- Wrote signal processing firmware for the custom SpaceX Dragon telemetry system.
- Developed software defined radio for DVB-S2 waveform.
- System Enginner on millimeter wave multi-beam wide band TCDA antenna. Designed and built millimeter wave RF circuit or the antenna.
- System engineering on communications systems for Lunar missions.

Satellite attitude control

- Developed mathematical dynamical models for satellite attitude determination and control systems used for numerical computer simulation of flight software in an on orbit environment.
- Designed, built, and tested the attitude control system for the HETE2 satellite. This system performed the initial acquisition from launch to on station and achieved a 2 arc-second pointing accuracy on orbit.

UAV systems

- Performed systems engineering, design, analysis and testing for UAV command and control and payload data links.
- Designed and wrote high altitude airship dynamical system model for flight simulator to train airship pilots.

Metrology

- Designed test mass position measurement hardware for Stanford's ST-7 gravity wave measurement project.
- Designed, and built Laser Tracking Frequency Distance Gauge capable of 10^{-12} meter measurement accuracy for the Smithsonian Astrophysical Observatory.

WORK EXPERIENCE

Engineering Technical Consultant   **12/31/2001 - Present**

President, GMH Engineering, Inc.

Consulting for aerospace projects. Provide hardware/software and consulting services for several projects, including: ST-7 gravity wave project for Stanford University and NASA JPL, MMS inter satellite ranging system (IRAS) development for NASA GSFC, Air Force PnP Satellite S-band telemetry system for satellite and ground station, Air Force Sand Dragon IPT lead for command and control and payload data communications. Currently working on high precision PNT solutions using software defined radios for both space and terrestrial applications in GPS challenged or denied environments.

Principal RF Communications Engineer   **3/16/2017 - 9/30/2020**

Parry Labs, LLC.

- Worked with a small team to develop a wide band multi-beam electronically steered phased array antenna based on a TCDA that covers the millimeter bands from 10 GHz to35 GHz. Performed system engineering and hardware design for wide-band front end and frequency conversion electronics.

Engineering Consultant   **12/31/1996 - 12/31/2001**

MIT, Boston University & University of New Hampshire

- Consulting to MIT Center for space research on the HETE2 (High Energy Transient Experiment) satellite. Responsible for attitude control system (ACS) and mission simulations. Responsible for building, testing and integration of satellite and ground station telemetry system, including RF hardware.
- Consulting to Boston University Center for Space Physics on the TERRIERS satellite telemetry system.
- System integrator and hardware supplier for University of New Hampshire CatSat satellite spacecraft transceiver system.

Engineering Consultant   **6/24/1996 - 12/31/1996**

MIT

- Center for space research on the HETE (High Energy Transient Experiment) satellite. Responsible for testing attitude control system (ACS) and mission simulations prior to launch (scheduled for October 12th, 1996). Responsible for testing and integration of satellite telemetry system, including RF hardware and ground station telemetry system, including hardware.

Director of Analog Systems Group Lead   **5/1/1993 - 6/21/1996**

AeroAstro Corp.

- Telemetry systems and hardware engineer on HETE (High Energy Transient Experiment) satellite.
- Designed, developed and tested both spacecraft RF and ground station RF hardware.
- Designed, developed and tested the spacecraft power system, including a solar panel peak power tracker and battery charge subsystems.
- Responsible for HETE ACS (Attitude Control System) integration and test.
- Lead engineer on avionics system on PAX (single stage LOX/Kerosene sounding rocket).
- Lead on various satellite systems studies, including Mars Observer follow up mission, L1 early solar storm warning satellite, and TOSS (Tactical Ocean Surveillance Satellite).

- Lead telemetry and power systems engineer on ALEXIS (Array of Low Energy X-ray Instruments Satellite) rescue mission. The satellite was launched in April 1993 and, after a two month rescue mission, has been operating continuously as of August 1995.

Senior Engineer   **2/1990 - 4/1993**
AeroAstro Corp.
- Designed, built and tested ALEXIS telemetry and power system, including ground and space segments.
- Designed, built and tested satellite and ground station radios.
- Designed, built and tested digital power control system for 100 W solar / NiCd power system.
- Member of satellite systems design team - developed integrated satellite electrical design.
- Lead on satellite integration and test.

Technical Staff   **12/1987 - 1/1989**
The Analytic Sciences Corporation (TASC)
- Performed design and analysis of satellite communications systems and signal processing systems for detection and estimation of signals in high interference level environments, software models for signal processing system simulation and analysis. Helped to develop and write a generic communications link simulator.

Graduate Research Associate   **9/1986 - 12/1986**
Department of Electrical Engineering, Ohio State University
- Research in Error Control Coding Techniques for Packet Radio Networks. Research in packet radio systems with adaptive array antennas.

Electronics Engineer   **3/1983 - 7/1986**
Motorola Inc.
- Government Electronics Group. Communications Research Facility: Designed, analyzed, built, and tested broadband communications circuits including adaptive equalizers and fast acquisition carrier synchronizer loops. Helped design, build and test a multi mode, broadband receiver/demodulator/signal identifier.
- Designed and tested high speed bipolar integrated circuits and GaAs MMICs, including a 1 Gs/s sample and hold amplifier and a DC to 8 GHz traveling wave amplifier.

Lab Instructor   **9/1979 - 3/1983**
Michigan Technological University
- Linear control systems and electro-magnetics; calculus tutor.

Engineer   **Summer 1979 & 1980**
Hydreco Inc.
- Responsible for designing, building and testing of electronic control for variable displacement piston pump.