Capt Shankar Kulumani

CONTACT INFORMATION

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RESEARCH INTERESTS

Astronautical Engineering with applications in control systems theory: Focus on spacecraft attitude dynamics and control, estimation and orbit determination

EDUCATION

Purdue University, West Lafayette, IN **January 2011 to December 2013**

M.S., Aeronautics and Astronautics Engineering

- Overall GPA: 3.66/4.00
- Area of Study: Spacecraft Dynamics and Control

United States Air Force Academy, Colorado Springs, CO **June 2005 to May 2009**

B.S., Astronautical Engineering

- Overall GPA: 3.35/4.00

PROFESSIONAL EXPERIENCE

United States Air Force, Kirtland AFB, NM

Lead Test Engineer, Air Force Research Laboratory **August 2011 to July 2014**

- Created orbit determination software for geo-stationary GPS receiver validation
- Designed astrodynamics force model for AFRL satellite science experiment
- Developed attitude control simulations for CMG test-bed known as Attitude Control System Proving (ACSPG) ground
- Developed ground transmitter geolocation via satellite time difference of arrival algorithm
- Led incorporation of satellite relative motion dynamics,guidance and control for simulation on embedded robotic system
- Implemented miniature inertial measurement unit (IMU) sensors for attitude control experiments
- Managed space situational awareness software development by leading diverse team of universities, industry, and government in effort to create integrated orbit determination software

Deputy Space Vehicles Lead, Responsive Space Squadron **May 2009 to August 2011**

- Responsible for development, integration, test, & launch of ORS-1 satellite
- Extensive experience with technical management of diverse contractor/government team
- Resolved $600K satellite hardware issues and prevented ORS-1 launch delays
- First hand experience monitoring 100+ days of integration and testing of ORS-1 satellite
- Assessed 200+ satellite test plans leading to successful test campaign and mitigated possible launch delays

PROFESSIONAL MEMBERSHIPS

American Institute of Aeronautics and Astronautics (AIAA), Member, 2012–present

Sigma Gamma Tau, Member, 2008–present

QUALIFICATIONS AND SKILLS

MATLAB/Simulink skill set:

- Dynamical system simulation, astrodynamics applications, Linear algebra, Monte Carlo analysis, Optimization, GUI development, statistics, estimation, data processing, visualization

Design Software:

- Solidworks, AutoCAD

Computer Programming:
- Experience with C, C++, UNIX shell scripting, DVCS (Git)

Desktop Editing and Productivity Software:
- TEX (LATEX, BIBTEX, PSTricks),
- Microsoft Office, OpenOffice.org, LibreOffice, Google Docs
- GIMP, InkScape

Operating Systems:
- Microsoft Windows family, Apple OS X, Linux/UNIX

Hardware Systems:
- PhaseSpace motion capture system
- VectoNav Inertial Measurement Unit
- Embedded robotic systems

EXPERTISE

Control Theory and Engineering:
- Linear and Nonlinear Systems Theory, Feedback, Optimization, Digital Control

Communications and Signal Processing:
- Probability, Random Variables, Stochastic Processes, Estimation, Statistical Inference

Astronautical Engineering:
- Astrodynamics, Orbit Determination, Attitude Dynamics, Analytical dynamics, Rocket Propulsion

AWARDS

United States Air Force Academy
- Awarded Commandant/Dean pin 8 consecutive semesters for high military/academic performance (2005-2009)
- Top Academic Performer - Astrodynamics 321 (2007)

SECURITY CLEARANCE

Department of Defense Top Secret SCI (awarded: 2010)