Brasstech, Inc.

Used PTC Creo to design tools and fixtures used in various assembly processes, PVD racking (physical vapor deposition) for coating, and manufacturing procedures. Wrote work instructions to document and standardize procedures, in English as well as Spanish. Improved the layout of the shipping department and a center in the assembly department to facilitate optimal product flow. Lastly, designed and built several workstations that addressed safety and ergonomic concerns for operators.

Enrique Reyes

(949) 417-5207

NASA Marshall Space Flight Center

Supported research of adapting permanent correlated magnet technology (Polymagnet) to dynamic applications, e.g., contact-free bearings, using an array of electromagnets. In support of design and testing of prototypes I refined a VI (virtual instrument) in LabVIEW that allows a user to design a magnetic topology and then upload and replicate that pattern on an electromagnetic array. Testing was facilitated by modifying an automated testing procedure that integrates the VI with a Python GUI (graphical user interface), in conjunction with an Arduino Uno and a 3D printer. Preliminary control of the arrays was studied by developing and simulating a robust PID controller in Simulink for an electromagnetic rotational dynamic system that is capable of tracking reference angles. I also provided wireless uploading capabilities to the electromagnetic arrays using XBee modules; this permits real-time uploading of patterns while the arrays were situated on a test stand. Finally, performed FEA analysis of a test platform using COMSOL Multiphysics.

Sarah Triana

(210) 279-8110

NASA Langley Research Center

Designed a fixture in PTC Creo required for structural testing of novel joints being employed on prototypes of the Tension Actuated Long-reach In-Space Manipulator (TALISMAN). Compared several initial designs through finite-element analyses (FEA) generated in PTC Creo Simulate. Performed testing and documentation of results for a novel cable arrestment system that would be used for TALISMAN—this system would mitigate risks associated with failure of actuation cables during autonomous operation of the system.

Matthew K. Mahlin

(402) 419-1806

NASA Langley Research Center

In support of research of autonomous robots in autonomous in-space assembly procedures I was tasked with studying vision implementations. As such, I performed the 3D reconstruction of a structural object in Python using the OpenCV library and AprilTag fiducial system (University of Michigan). I then implemented a robust bundle-adjustment algorithm to perform the simultaneous refinement of estimated camera parameters and pose estimation of the object reconstruction. Lastly, I produced a real-time pose estimation algorithm in Python of a two-tag object from a live video stream to provide visual servoing capabilities to a long-range robotic manipulator to be used in autonomous in-space assembly demonstrations.

Dr. Erik Komendera

(734)276-6710

MIT Lincoln Laboratory

Developed and rendered a low-fidelity multi-agent environment using OpenAI Gym's framework and Python to facilitate testing of reinforcement algorithms for robotic swarms. Constructed an integrated environment constituted by OpenAI Gym and ROS/Gazebo as a platform for simulating multi-agent reinforcement learning algorithms using quadrotors. Created a ROS package that integrates QR code reading and writing capabilities, along with the OpenCV library to enable visual communication between quadcopters of encoded data.

Dr. Ross Allen