University of Toronto Institute for Aerospace Studies
4925 Dufferin Street, Toronto, Ontario, Canada, M3H 5T6

Attitude Control Engineer

Level Definition:

This level covers positions involving the application of engineering knowledge and training in the design, development or modification of new or existing spacecraft attitude control systems, including the analysis, design, prototyping, assembly, integration and testing of all the necessary components. Employees may provide guidance to junior engineers and technical staff. They may also interact with graduate students undertaking research relevant to spacecraft attitude control development.

Typical Duties:

Typical duties may include:

- Defining attitude determination and control requirements.
- Defining attitude determination and control architectures.
- Identifying off the shelf components to support attitude determination and control architectures.
- Developing new components or modifying existing component designs, including actuators, sensors and ground support equipment.
- Developing mathematical models of attitude determination and control systems, including modeling in Matlab/Simulink, performing detailed simulations in discrete time, using the simulations to tune controllers and estimators.
- Developing attitude estimators and controllers based on established approaches to control design.
- Assembling, integrating and testing attitude determination and control systems, from the unit to subsystem to system level. Verifying compliance with requirements.
- Supporting on-orbit commissioning and operations of attitude determination and control systems.

- Selecting, defining, acquiring, installing and/or identifying facilities to support attitude control development and testing. This includes developing or acquiring any necessary software.

- Interacting and communicating with consultants that are supporting attitude determination and control system development. This includes coordinating analyses, prototyping and testing activities.

- Performing trade analyses on alternate spacecraft configurations.

- Developing and maintaining pointing and timing budgets for attitude control systems.

- Communicating with other engineers to specify requirements on, and obtain requirements from other spacecraft subsystems that are affected by the attitude control designs.

- Interacting via meetings, e-mail, phone, and facsimile with consultants to the Space Flight Laboratory, so as to obtain comments and review of analysis and design efforts, component selection and acquisition, and assembly and testing procedures.

- Communicating designs to reviewers and systems engineers.

- Supervising other engineering officers and interacting with graduate students who contribute directly to the attitude control subsystems currently being worked on. This includes students whose theses are related to attitude determination and control.

- Preparing or reviewing plans, specifications and designs produced by subordinate engineering officers for attitude determination and control subsystems.

- Reporting to the Space Flight Laboratory Director and/or senior staff with regard to technical progress, costs, and ability to meet schedule.

- Preparing cost estimates for new attitude control systems or modifications to existing systems.

- Advising on design feasibility and cost.

- Facilitating new development contract opportunities for the Space Flight Laboratory through interaction with other engineers in the attitude control field.

Decision Making: Exercises judgment in the application or adaptation of engineering methods and techniques to design or modify equipment and instrumentation to meet performance objectives. Makes recommendations on the purchase of commercial equipment and the placing of contracts with outside contractors. Selects materials and decides on recommended designs and design changes obtained from consultants or other engineers. Assists in the definition of the technical content of student work packages in consultation with the Space Flight Laboratory Director and senior staff. Determines best assembly and testing procedures to follow.

Supervision Received: Works under the technical, budget, and schedule direction of the of the Space Flight Laboratory Director and senior staff, conducts independent studies and analyses and provides interpretations and conclusions. Complex or unusual problems are normally resolved in consultation with supervisor.

Supervision Exercised: May provide guidance to graduate students assisting with development through thesis or course work. May supervise junior engineers, technologists or draftsmen when they are employed on the same projects.

Qualifications: Bachelor's degree in Aerospace or Electrical Engineering with specialization in attitude control. Four years relevant experience following graduation or demonstrated equivalent capability. Space industry experience preferred.

Contact: Dr. Robert E. Zee
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