



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

RF and Microwave Electronics Engineer

Level Definition:

This level covers positions involving the application of engineering knowledge and training in developing RF (radio frequency) and/or microwave electronics, including receivers, transmitters, transponders, transceivers, and antennas for spacecraft applications, including the design, prototyping, assembly, integration and testing of all the necessary hardware and software. Employees may provide guidance to junior engineers and technical staff. They may also interact with graduate students undertaking research relevant to RF or microwave electronics development.

Typical Duties:

Typical duties may include:

- Performing link analysis and budgeting.
- Defining space and ground segment communication architectures.
- Defining the hardware architectures for RF/microwave electronics. Performing trade analyses on various architectures.
- Selecting components for RF/microwave electronic boards including power electronics/supplies, oscillators, synthesizers, mixers, and filtering. This includes searching for and acquiring evaluation components for breadboarding and testing.
- Designing, prototyping, assembling, and/or testing custom RF/microwave electronics boards including power boards/supplies, amplification stages, intermediate frequency, mixing, and filtering. This includes schematic design, layout, parts selection and documentation, derating analysis, following good EMC practice, soldering surface mount components, handling test equipment, following good ESD practice, and using RF test equipment and facilities.
- Communicating with other engineers to specify requirements on, and obtain requirements from other spacecraft subsystems that must interface with the RF/microwave electronics being developed.

- Interacting via meetings, e-mail, phone, and facsimile with consultants to the Space Flight Laboratory, so as to obtain detailed instructions, comments, and review of hardware and/or software designs, component selection and acquisition, and assembly and testing procedures.
- Communicating designs to reviewers and systems engineers.
- Interacting with graduate students who contribute directly to the electronics currently being worked on. This includes students whose theses are focused on communications.
- Reporting to the Space Flight Laboratory Director and/or senior staff with regard to technical progress, costs, and ability to meet schedule.
- Supporting the acquisition and installation of all required facilities for the development and testing of analog electronics.
- Facilitating new development contract opportunities for the Space Flight Laboratory through interaction with other engineers in the computer 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:*

Working 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 communication subsystem 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 Electrical Engineering with some specialization in RF/microwave electronics and antennas. Six years relevant

experience following graduation or demonstrated equivalent capability. Some experience in the space industry is preferred.

Contact:

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Director, Space Flight Laboratory
University of Toronto Institute for Aerospace Studies
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