Government of
Northwest Territories

IDENTIFICATION

Department	Position Title	
Finance	Remote Sensing Analyst	
Position Number	**Community**	**Division/Region**
15-14771	Inuvik	NWT Centre for Geomatics

PURPOSE OF THE POSITION

The Remote Sensing Analyst (The Analyst) leads remote sensing analysis and monitoring, develops geospatial data products, and provides services and expertise to all Government of the Northwest Territories (GNWT) departments and agencies. The work of the Remote Sensing Analyst supports the management and monitoring of natural and economic resources in the NWT. The Remote Sensing Analyst is a highly technical resource dealing with complex scientific information spanning environmental issues to engineering and mathematical applications. The Analyst also provides services, advice, recommendations and leadership in satellite and airborne data acquisition, and image analysis.

SCOPE

The position is located in Inuvik and is part of the Western Arctic Centre for Geomatics (WACG), a regional office of the NWT Centre for Geomatics (NWTCG) division, within the Office of the Chief Information Officer branch in the Department of Finance. The Remote Sensing Analyst reports to the Manager, Remote Sensing & Western Arctic Centre for Geomatics. The NWTCG is the GNWT Centre of Excellence for geomatic services, Earth Observation (EO), geographic databases and applications, remote sensing and geographic information systems.

The NWTCG provides services, leadership and expertise to all departments of the GNWT, as well as government associated boards and agencies, on matters related to mapping; spatial data creation, maintenance, storage and standards; remotely piloted aircraft systems; remote sensing and data acquisition; geospatial software and hardware management; and online geospatial tools and services. The Centre promotes the use of geospatial data and tools for decision making through education and outreach and collaborates with a variety of internal

and external partners to maximize the benefits of investments made in the GNWT's geospatial resources.

The Western Arctic Centre for Geomatics coordinates the remote sensing activities of the NWT Centre for Geomatics. It works to maximize the benefit of remote sensing projects and initiatives for the GNWT through increased coordination of remote sensing projects; the development, implementation and maintenance of operational monitoring programs to support decision making; the promotion, education and outreach on remote sensing and its value to the territory; facilitating collaboration between stakeholders with common interests; the development of new projects and proposals; and pursuing third party funding sources to resource projects and initiatives.

The Remote Sensing Analyst is both highly technical and scientific. The Analyst has advanced knowledge of the electromagnetic spectrum in determining appropriate earth observation sensors for various applications and interpreting results of earth observation analysis. The incumbent provides services to all GNWT departments and associated agencies and boards and develops custom remote sensing raster products, analytical models, and scripted procedures to assist in the management and monitoring of natural resources and infrastructure in the NWT.

The Analyst has a strong science background and supports multidisciplinary science programs including forest science, geoscience and geomorphology, climate change, hydrology, and landscape and wildlife dynamics. In supporting these GNWT programs, the Analyst contributes to peer-review journal publications and conferences to share what they have learned. The incumbent seeks funding opportunities from third-party sources or through academic collaborations to achieve research objectives.

The incumbent works directly with clients to define their needs and scope projects, and to implement remote sensing solutions within the available range of geomatics equipment (GPS, drone, LiDAR, RADAR, and other ground observation tools), specialized remote sensing software (Esri, PCI, ENVI, BAE Socet Set, Terrago, Pix4D, Google Earth Engine), and data (Satellite and Airborne, with active and passive sensors) at the Centre. The incumbent prepares analytical results for clients in map form, as geospatial data, or in an alternative product format to enable integration with web and other applications.

The Analyst works independently on most projects but collaborates from time to time with other resources within the NWT Centre for Geomatics, and with scientists across governments, academia and in non-government organizations. Client requests are made through the Coordinator or directly via phone calls, unscheduled office visits and e-mail. The incumbent also performs as a technical consultant/advisor for less experienced staff and clients undertaking their own remote sensing projects.

RESPONSIBILITIES

1. **Lead remote sensing analysis by:**
   - Evaluating and applying the most suitable software to achieve project results (including PCI Geomatics, ENVI, BAE Socet Set, Terrago, Pix4D, Esri, Google Earth Engine and others).
   - Evaluating and applying the most appropriate sensor (active or passive), resolution, and temporal coverage of data available to achieve the analytical outputs requested by the client (including various spectral sensors, RADAR, LiDAR, etc.).
   - Conducting raster and spectral analysis using the above mentioned software and data to derive products such as digital vegetation maps, landscape change data and terrain analysis from satellite imagery and airborne data.
   - Developing and executing analytical processes through manual or automated (scripted models) applications of software and data.
   - Interpreting landscape features from earth observation data.
   - Establishing repeatable monitoring programs using remote sensing tools and data to evaluate long-term trends.
   - Integrating GIS tools, data, software and methodologies to derive remote sensing products or to prepare data for remote sensing analysis.
   - Evaluating statistical and other mathematical models related to analytical outputs to ensure conformance of results to published methodologies.
   - Conducting data improvements including orthorectification, cloud masking, top-of-atmosphere corrections, seam-line corrections, etc.
   - Developing output products including thematic raster data sets, mosaics, maps, posters and web-based publications.
   - Conducting quality control/assessment of data products, including results of analysis.
   - Planning field operations to ground-truth results of analysis.

2. **Conduct all phases of a project by:**
   - Scoping project requests with clients.
   - Assessing client timelines, budgets and other requirements.
   - Assessing data requirements liaising with other NWTCG experts to coordinate space borne and airborne (including manned and unmanned) data acquisitions.
   - Conducting research on new technology and methodologies, software functionality, data products and data sensors to support new and emerging initiatives.
   - Developing contracting terms of reference and managing remote sensing contracts.
   - Liaising with consultants and acting as the remote sensing project manager on behalf of clients.
   - Maintaining communication with clients, researcher and other stakeholders, as well as senior managers.
   - Managing multiple concurrent projects, maintaining a high level of organization including effective time management.
   - Developing and maintaining all project documentation, including technical process manual, project chronology, output reports, etc.
   - Managing project and output data according to the standards of the NWTCG, including the development of metadata.

- Applying for third-party funding opportunities or collaborating with Academic partners to obtain research funds to advance remote sensing research objectives related to northern applications and monitoring.

3. **Establish effective client and stakeholder engagement and outreach by:**
   - Promoting results of analysis through the spatial data warehouse or development of online data services.
   - Anticipating organizational requirements by having a deep understanding of departmental mandates through regular client consultation.
   - Developing written materials distributed by emails, newsletters, face-to-face presentation to promote outputs of analysis or availability of new data products.
   - Developing training or outreach opportunities for clients, colleagues and external stakeholders.
   - Authoring or co-authoring scientific articles for peer-review journals.
   - Collaborating with other scientists and remote sensing practitioners (Government, Academia and Industry) on development of best practices or the development of new analysis methodologies.
   - Representing the NWT on Federal/Provincial/Territorial committees, societies, boards and forums related to remote sensing.
   - Presenting work and results at conferences and other knowledge sharing events;
   - Participating in GNWT interdepartmental working groups as a remote sensing subject matter expert.

4. **Assists the Manager in the planning activities related to remote sensing and data management by:**
   - Maintaining an on-going liaison with other departments, agencies, academic institutions and the private sector to ensure a high degree of awareness of new advances and development in satellite data and image analysis technology.
   - Anticipating organizational needs as it relates to remote sensing and initiating adoption of new tools and services to better serve GNWT clients (e.g., development of procurement tools, data publishing strategies, identification of big-data processing initiatives, etc.).
   - Participating in the development of strategies and operational plans for the delivery of geomatics technologies and services to GNWT departments.
   - Assisting in the strategic and operational planning process by maintaining a continued awareness of the planning/forecasted direction and growth of client departments in remote sensing.

WORKING CONDITIONS

Physical Demands

The incumbent works in a normal office environment but also conducts summer field work. During the summer field season, the incumbent may hike over rough terrain with a backpack and surveying equipment (up to 50 pounds) for 8 hours per day, up to 3 weeks per year.

Environmental Conditions

The incumbent works in a normal office environment but also conducts field work to validate project outputs or to support research objectives. While in the field the incumbent may be exposed to: rapidly-changing weather; conditions such as cold (hypothermia), intense sun (burn), wind, and rain; helicopters, airplanes, ATVs, and road vehicles (physical injury, noise fatigue, fumes from fuel); insects and insect bites; and dangerous, unforeseen, and uncontrolled field situations such as vehicular accidents, attack by wild animals, falls, and other accidents while travelling or on traverse (broken bones, cuts, etc.).The incumbent may be exposed to these environmental conditions while in the field for up to three weeks per year. Field work may involve travel in aircrafts at low-altitude under turbulent conditions for extended periods of time.

Sensory Demands

The incumbent works in a normal office environment but also conducts summer field work. While in the field, the incumbent may be affected by long hours of work (fatigue, stress). The incumbent may be exposed to these sensory conditions while in the field for up to three weeks per year.

During computer work, the incumbent requires prolonged, concentrated visual attention to colours, tones and textures of digital maps on a computer monitor. The incumbent requires unencumbered ability to determine full range of colours.

Mental Demands

No unusual demands.

KNOWLEDGE, SKILLS AND ABILITIES

- Advanced knowledge of remote sensing and geomatics principles.
- Expert knowledge of remote sensing systems, sensors, processes, and analysis.
- Advanced knowledge of digital image analysis using software including but not limited to PCI Geomatics, Esri Suite, ENVI, Pix4D, Terrago, Google Earth Engine.
- Expert ability with automation of remote sensing analysis using modelling techniques and scripting.
- Knowledge of the scientific principles and techniques behind geomatics and remote sensing research and monitoring, including field-based data acquisition and analysis.
- Knowledge of and experience in field work preparation and conducting efficient and safe field programs within prescribed budgets and timelines.
- Ability to organize and undertake fieldwork in order to validate outputs from earth observation imagery.
- Ability to work efficiently and independently to meet deadlines and set priorities for completing remote sensing projects for clients.
- Ability to develop and build relationships and partnerships with clients and stakeholders.

- Strong ability to communicate effectively with clients to recommend appropriate products and services that meet their needs in a timely manner.
- Strong oral communication skills, including good listening skills to communicate technical concepts to train and support staff members and clients using remote sensing technology and outputs.
- Strong ability to solve complex application problems in digital image analysis and to develop new products and techniques to help the Centre meet clients' needs and keep abreast with changing methods in a rapidly developing field.
- Knowledge of the principles and procedures of projections and earth coordinate systems.
- Knowledge geomatics metadata standards.
- Experience with GIS analysis and data manipulation.
- Adapt quickly to changing tools and technologies.
- Good time management and organizational skills.
- Ability to work well under pressure in a stressful environment.
- Ability to work in an inter-cultural environment.
- Ability to work effectively and well in a team environment.

Typically, the above qualifications would be attained by:

A graduate degree in Remote Sensing, or Geomatics and 2 years of recent and related experience in the area of image analysis.

OR

A university degree in related sciences, planning or computer science with a post-graduate diploma in Geomatics, Remote Sensing, or Geographic Information Systems with a minimum of 4 years of recent and related experience in the area of image analysis.

*Recent is described as within the last five years.

ADDITIONAL REQUIREMENTS

Position Security (check one)

- ☒ No criminal records check required
- ☐ Position of Trust – criminal records check required
- ☐ Highly sensitive position – requires verification of identity and a criminal records check

French language (check one if applicable)

- ☐ French required (must identify required level below)
  Level required for this Designated Position is:
  ORAL EXPRESSION AND COMPREHENSION
      Basic (B) ☐   Intermediate (I) ☐   Advanced (A) ☐
  READING COMPREHENSION:
      Basic (B) ☐   Intermediate (I) ☐   Advanced (A) ☐
  WRITING SKILLS:

Basic (B) ☐   Intermediate (I) ☐   Advanced (A) ☐
☐ French preferred

Indigenous language: Select language

☐ Required
☐ Preferred