IDENTIFICATION

Department	Position Title	
Finance	Remote Sensing Lead Scientist	
Position Number	**Community**	**Division/Region**
15-15208	Yellowknife	NWT Centre for Geomatics

PURPOSE OF THE POSITION

The Remote Sensing Lead Scientist (Lead Scientist) leads multi-departmental remote sensing science initiatives, provides authoritative scientific and strategic advice, supervises the Remote Sensing Technician, and is responsible for ensuring information needs of the Government and NWT residents are met while maintaining relationships and partnerships with other government agencies, Indigenous governments, and academics.

SCOPE

The Lead Scientist is located in Yellowknife and reports to the Manager, Remote Sensing & Western Arctic Centre for Geomatics (WACG) of the NWT Centre for Geomatics (NWTCG) Division. The Lead Scientist leads and manages staff and working groups to conceive, plan, and implement research initiatives that support the remote sensing monitoring goals and objectives of the Government of the Northwest Territories (GNWT). The Lead Scientist is responsible for remote sensing research initiated by the Division and for leveraging external research activities for the betterment of the GNWT.

The NWTCG Division, within the Office of the Chief Information Officer (OCIO) branch of the Department of Finance, is the GNWT-wide corporate service and program provider that develops business decision tools using remote sensing data science and geographic information systems. Departments in the GNWT have recognized the need for remote sensing-derived information to better understand and adapt to the effects of climate change on infrastructure, the environment, and significant cultural places. An ability to monitor and predict the environmental impacts of climate change represents a distinct advantage in planning and maintaining infrastructure and preparing for changes to natural and cultural environments such as changes due to forest fires, permafrost thaw, and flooding/erosion.

Remote sensing research supports GNWT departments in their decision making (e.g., geohazard risks along transportation infrastructure or Land Use Permits) by developing, testing, and integrating cutting-edge technologies and analyses into made-in-the-North monitoring services. This research is conducted collaboratively with GNWT and external partners and include partnership building and program support to ensure the services appropriately meet the needs and questions of our NWT partners. As such the Lead Scientist works with legislative, regulatory, and policy frameworks that include the NWT Climate Change Strategic Framework, the NWT Transportation Strategy, the GNWT Knowledge Agenda, the NWT Water Stewardship Strategy, and the *NWT Scientist Act*.

The Lead Scientist leads, conceives, plans, and implements remote sensing research initiatives. Initiatives vary from (inter)national or territory, multi-disciplinary and multi-year collaborative studies to smaller targeted studies with fewer stakeholders and shorter timeframes. A key research focus is the integration of various data sources and calibrating and validating data science methods and models (e.g., artificial intelligence) to NWT conditions. In implementing this work, the Lead Scientist is required to supervise the Remote Sensing Technician, and may recruit and supervise academic graduate students, field staff, and summer students, ensuring that operations follow occupational health and safety procedures.

The Lead Scientist collaborates closely with the Senior Permafrost Scientist (ITI NT Geological Survey), Territorial Archaeologist (ECE Culture and Heritage), and staff at the GNWT departments of Environment and Climate Change (ECC), Infrastructure, as well as remote sensing analysts in the NWTCG Division. The Lead Scientist also regularly works with federal departments (especially Natural Resources Canada), Indigenous governments (especially their land management agencies), and academic partners.

The Lead Scientist is called upon by management functions and GNWT departments to provide analysis and advice based on extensive scientific knowledge and experience. The Lead Scientist must keep up to date on research, science, Indigenous knowledge, new monitoring technologies and new analytical methodologies related to remote sensing and the terrain, vegetation and hydrological changes observed throughout the NWT. The Lead Scientist is also responsible for overseeing the testing and implementation of new techniques and methodologies to meet program and service needs. To do this, the Lead Scientist needs a strong foundation in remote sensing theory, analysis, sensor capabilities, software and advanced computational processes and scripting. The Lead Scientist conducts peer reviews of scientific papers, presents results, and publishes results of high technical quality that can be in the form of briefing memos, technical reports, scientific papers, or plain language reports.

The Lead Scientist uses sound research and scientific methodology in the development of models and approaches to meet the information needs reflected in policy frameworks and departmental mandates. The Lead Scientist has significant latitude in terms of scientific research, study, models, and applied technologies to assess the accuracy, precision, viability

and maturity of remote sensing technologies and derived information streams. The Lead Scientist represents research interest on intra- and inter-governmental working groups, international experiments, and research consortiums tasked to develop and implement monitoring tools and programs in Canada's north. The incumbent provides leadership in overseeing data analysis, reporting and data sharing, and mentors staff within the unit.

The Lead Scientist oversees the cross-departmental GNWT Drone Program endorsed by the Informatics Policy Council. An applied science and technology monitoring program using remote sensing technologies, the Program expands monitoring capacity at GNWT regional offices. Herein the Lead Scientist provides leadership to ensure the GNWT obtains maximum benefit and can leverage these potential technologies more broadly than if this capacity was housed in a single centralized unit. The Lead Scientist is responsible for decision-making concerning the drone operation of staff in various departments by monitoring program compliance with federal regulations and managing risks to the GNWT. The Lead Scientist leads communication on matters of drone risk exposure to senior management (including OCIO, Informatics Policy Council and FIN Risk Management), and leads the implementation of risk controls as it applies to the Company Operations Manual. The incumbent is a subject matter expert who develops and implements cross-departmental drone-related directives and working groups and represents the interests of the GNWT when liaising with Transport Canada, inter-jurisdictional working groups, and user communities.

RESPONSIBILITIES

1. **Provides strategic scientific oversight and supervision to the design and implementation, evaluation and integration of remote sensing monitoring and research programs.**
   - Develops and implements comprehensive remote sensing monitoring and research initiatives tied to legislative, regulatory, and policy frameworks as both the primary investigator and as a scientific collaborator.
   - Collaborates and maintains communications with local, national and international stakeholders to identify new research and funding opportunities and by developing funding proposals, project scopes, and research methodologies.
   - Provides advice and oversight to the Remote Sensing Technician, Remote Sensing Analysts, and summer/graduate students in conducting calibration/validation work, capturing and managing data, and developing scientific findings.
   - Conducts periodic review of GNWT remote sensing monitoring services to ensure appropriateness, operational feasibility, fiscal efficiency, and to reduce duplication.
   - Shares in strategic decision-making on scientific or technological information needs and priorities of GNWT business units, and where possible help assemble existing data to serve as a framework for interpreting new information.

2. **Provides specialized advice, as the GNWT's subject matter expert on remote sensing science and research, and derived information, to internal clients, technical committees, and external stakeholders.**
   - Organizational lead on remote sensing science and research.
   - Makes recommendations, provides expertise and professional advice to business leaders across GNWT departments.
   - Leads planning, coordination and decision-making meetings and activities regarding remote sensing research activities by the GNWT and associated stakeholders.
   - Prepares or provides review of scientific and technical reports outlining the findings of remote sensing monitoring programs in the NWT, which can include data reports, scientific papers, or plain language summaries.
   - Oversees the collection, tracking, and evaluation of data based on best-practice guidelines, standards, process reviews, and policy changes to analyze and identify territorial, regional, and program-specific issues.

3. **Promotes monitoring and research capacity, partnerships, and collaborations.**
   - Supervises the Remote Sensing Technician, including developing employee objectives and performance indicators, and reviewing of individual staff goals and training needs.
   - Develops and refines a long-term vision and mandates and creates shorter-term (e.g., annual) operational goals and objectives to develop research capacity.
   - Manages administrative aspects of research projects, which may include supervision of field staff, acquisition of permits and licenses, and local consultations.
   - Develops and cultivates positive and productive relationships with government agencies, Indigenous governments, academia, and private sector for developing, funding, and implementing NWT research activities.
   - Provides positive leadership, peer review, mentorship, and advice to staff to provide critical feedback of work and to support the completion of high-quality work.
   - Ensures cost-effective, efficient, and safe work practices in the field and office.

4. **Develops communications and publishes and presents scientific findings and data from monitoring and research across the NWT.**
   - Conducts peer review of scientific papers, technical reports, or funding applications.
   - Prepares and presents research results at scientific meetings, conferences, and workshops to various audiences as part of information sharing and outreach activities.
   - Authors and disseminates research and technical information (reports, maps, web pages) to stakeholders, regulators and the science/technology community through briefing notes, technical memos, and scientific publications.
   - Participates in national and international technical workshops, forums, sessions, and training exercises, as required.
   - Prepares non-technical promotional and educational materials about remote sensing solutions in northern Canada.

5. Leads the continuous improvement of the GNWT Drone Program.
- Leads and implements strategies for the provision of drone hardware/software technologies and support systems to advance GNWTs' regional monitoring capacity.
- Provides program monitoring of federal/territorial regulatory compliance and participates in shared senior management decision making to implement risk controls.
- Conducts longer-term planning based on program success criteria, and assesses the impact of, and leads program adaptations to regulatory changes or other developments which risks the long-term viability and sustainment of the program.
- Steers the development and implementation of policies, directives, and the drone community of practice, and leads the communication on matters of drone risk exposure envelopes to senior management.
- Develops procurement tools with northern industry for drone-specific services.

WORKING CONDITIONS

Physical Demands

The incumbent works in a normal office environment from approximately October to March. April to October, the position often works in the field, up to 10 weeks per field season. The incumbent walks over varied terrain with backpack and field equipment (up to 50 pounds) for up to 10 hours per day during the field season.

Environmental Conditions

The incumbent works in a normal office environment from approximately October to March. April to October, the position often works in the field, up to 10 weeks per field season. Travel by fixed-wing or rotary aircraft and boats (up to 10 hours per day) can be noisy. While in the field, the incumbent will occasionally be exposed to a variety of weather and temperature conditions, insects and possibly wildlife.

Sensory Demands

The incumbent works in a normal office environment from approximately October to March. April to October, the position often works in the field, up to 10 weeks per field season. During field season, the incumbent must have continual awareness of surroundings, and hand-eye coordination is required for operation of equipment.

Mental Demands

The incumbent works in a normal office environment from approximately October to March. April to October, the position often works in the field, up to 10 weeks per field season, and is therefore away from home base for this time.

KNOWLEDGE, SKILLS AND ABILITIES

- Knowledge of scientific principles, techniques and recent advances pertaining to remote sensing research and monitoring, including assessing the nature and extent of terrain, vegetation and hydrological changes or impacts on the environment and infrastructure.
- Knowledge of remote sensing theory, analysis, sensor capabilities, software and advanced computational processes and scripting.
- Knowledge of scientific principles and statistical analyses pertaining to discipline-specific field data and remote sensing data, and ability to apply this knowledge to synthesize new data and statistical models.
- Knowledge of drone/GPS/geomatics field data capture and processing techniques, including photogrammetry and surveying.
- Knowledge of spatial modeling, including artificial intelligence/machine learning.
- Knowledge of the methods and practices of spatial information management, including manipulation, interpretation, digitization, retrieval, and storage of data.
- Knowledge of the roles and remote sensing needs of other government departments, Indigenous governments, agencies, and industry.
- Knowledge of basic computer coding to search, evaluate, manipulate, model and analyze geospatial data.
- Knowledge of government strategic priorities and policy frameworks.
- Knowledge of regulatory bodies and processes as it relates to Remotely Piloted Aircraft Systems.
- Supervisory skills to oversee other staff, field assistants, and contractors.
- Project management, organizational, and logistical skills to effectively manage and participate in independent and collaborative research projects.
- Oral communication skills, including listening skills, to convey technical concepts in plain language when training and supporting colleagues and collaborators.
- Data management skills to organize, archive, and manage large volumes of spatial data.
- Field skills that are grounded in best practices in safety management and environmental research and monitoring.
- Ability to manage people and financial resources and budgeting.
- Ability to work effectively and under pressure or stressful situations, both independently and in collaboration with other professionals in a team environment.
- Ability to interact, develop and build relationships and research proposals with multidisciplinary and cross-cultural groups, including clients, government agencies, Indigenous organizations, research institutions and industry.
- Ability to analyze complex issues, and conceptualize, design, and implement remote sensing research initiatives using sound decision making.
- Ability to manage diverse project teams comprised of researchers, government staff, industry, and community members.

- Ability to produce scientific reports of high technical quality suitable for publishing in external journals or through government reports/information pieces.
- Ability to communicate scientific information clearly and effectively in a variety of forms (visual, oral, and written) and at appropriate levels for the respective audience.
- Ability to engage with stakeholders to determine research and monitoring priorities and disseminate research and monitoring results.
- Ability to develop technical and scientific workplans to guide research and monitoring programs for the NWT in a cost-effective way.
- Ability to efficiently use computer hardware and software for data collection, data management, synthesis and modeling, and presentations (e.g. ESRI ArcGIS suite; Pix4D, Python/R; specialized graphic design, statistics, and modelling software).
- Ability to commit to actively upholding and consistently practicing personal diversity, inclusion, and cultural awareness, as well as safety and sensitivity approaches in the workplace.

Typically, the above qualifications would be attained by:

A Master of Science (M.Sc.) degree in Geography, or related field, with at least 3 years of work experience conducting science and research, professional RPAS operations and remote sensing / geomatics in industry, academia, or a government agency in a related capacity.

Equivalent combinations of education and experience will be considered.

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