Annex A

Statement of Work

Satellite Space Segment Capacity Services, Teleport Services, and Associated Services for Remote Sites

Table of Contents

1 PART 1 - INTRODUCTION

1.1 INTRODUCTION

1.1.1 Definition of Service

1.1.1.1 The Network and End Users Branch (NEUB), a branch of Shared Services Canada (SSC), has a requirement to facilitate potential satellite communication services for use by its Clients.

The services required are Satellite Space Segment Capacity Services; Teleport Services, and Associated Services for Remote Sites (remote earth station equipment, installation and maintenance) and are in the Ku and C frequency bands, herein after called the Services.

These services will be provisioned in one of two ways:

1) The Associated Services for Remote Sites (remote earth station, installation and maintenance) will be procured along with Satellite Space Segment Capacity Services and Teleport Services.

2) SSC's Clients may provide, install, operate and maintain Government Furnished Equipment (GFE) at the remote location and will also procure Satellite Space Segment Capacity Services and Teleport Services.

In general, these Services can offer special assembly end-to-end solutions to SSC's Clients.

There are three (3) separate Streams for the Services, Ku-band (Canada and CONUS), Ku-band (Canada only) and C-Band (Canada and CONUS).

Stream 1 - Services in Ku-band (Canada and CONUS) with coverage across Canada and the CONUS with a requirement for available alternate Satellite Space Segment Capacity for service restoration.

Stream 2 - Services in Ku-band (Canada only) with coverage in Canada only to address potential applications that do not require available alternate Satellite Space Segment Capacity for service restoration. This stream is intended to allow proposals that may only be focused on higher power satellite solutions in northern Canada.

Stream 3 - Services in C-band (Canada and CONUS) with coverage across Canada and the CONUS with a requirement for available alternate Satellite Space Segment Capacity for service restoration.

1.1.1.2 Canada requires a service provider, for each Stream, that has expertise in satellite communications, satellite earth station equipment provisioning, satellite earth station equipment repair and maintenance, and satellite earth station equipment training.

1.1.1.3 The Services for each Stream are to be provided in the most cost effective manner in a way to meet the requirements of potential new Clients and their organic growth.

1.1.1.4 The Contractor may bid on any or all Stream(s).

1.1.2 Division of Documents into Parts

1.1.2.1 This Statement of Work is divided into the following 6 parts:

a) Part 1 – Introduction;

b) Part 2 – General Requirements for Stream 1 Ku-band (Canada and CONUS);

c) Part 3 – Technical Requirements for Stream 1 Ku-band (Canada and CONUS);

d) Part 4 - General Requirements for Stream 2 Ku-band (Canada only);

e) Part 5 – Technical Requirements for Stream 2 Ku-band (Canada only);

f) Part 6 – General Requirements for Stream 3 C-band (Canada and CONUS);

g) Part 7 - Technical Requirements for Stream 3 C-band (Canada and CONUS); and

h) Part 8 - Glossary and Definitions.

2 PART 2 – GENERAL REQUIREMENTS FOR STREAM 1 - SERVICES FOR KU-BAND (CANADA AND CONUS)

2.1 GENERAL

The following general requirements apply to Satellite Space Segment Capacity Services, Teleport Services and Associated Service for Remote Sites, for Stream 1 – Services for Ku-band (Canada and CONUS) unless otherwise noted.

2.1.1 The Contractor must provide the following to Canada for the Services:

a) Service Management;
b) Service Order Processing;
c) Client Support;
d) Problem Management;
e) Service Performance Monitoring;
f) Scheduled Service-Affecting and Maintenance Advisory;
g) Reporting;
h) Invoicing;
i) Training;
j) Link Budget Design;
k) Maintenance Services for Remote Hardware (Associated Services for Remote Sites only); and
l) Maintenance Services for Teleport Equipment (Teleport Services only).

2.1.2 The Satellite Space Segment Capacity provided to Canada must NOT be shared with any other user or party without the prior written consent of the Technical Authority and the Contracting Authority.

2.1.3 The Contractor is responsible for all functional aspects as required to satisfy all requirements for the Service(s), including planning, scheduling, directing, supervising, maintaining and operating.

2.1.4 The Contractor is also responsible for the overall services provided by its team members.

2.1.5 The Contractor must fulfill all Service obligations to Canada's user groups and operate and manage the required Service(s) on Canada's behalf to ensure continuous operation of the Service(s) as specified in this Statement of Work (SOW).

2.1.6 This SOW outlines the Service(s) attributes and quality of service that must be provided to Canada as part of the Contractor's obligations in providing the Service(s). In addition, the SOW describes the Contractor's support functions required to manage the relationships among Canada's user groups and the Contractor.

2.1.7 The Contractor must provide, when requested, Hardware Maintenance Services to Canada for all Remote Hardware during the Hardware Maintenance Period. The Hardware Maintenance Period is a minimum one year period plus any time by which the Hardware Maintenance Period is extended during the entire contract period.

2.1.8 The Contractor must ensure that all verbal, written and electronic communications that are required to be provided directly to Clients (e.g. Client support, recorded greetings and prompts, email and voice mail) are available at all times in both official languages of Canada (English and French), offering users a choice of either language depending on their individual preference.

2.1.9 In this Contract, "Regular Business Hours" refers to 8:00AM to 4:00PM Eastern Time, Monday to Friday, excluding statutory holidays observed by the Federal Government in the Province of Ontario.

2.1.10 NEUB wishes to have available a long-term solution for its Clients with a supplier(s) for its Space Segment Services that evolve as technology changes. The Contractor must offer to Canada any new Satellite Space Segment capacity, as well as all administrative or business improvements, within one month of making them generally available to other customers, by advising the Contracting Authority and the Technical Authority. For Space Segment Capacity that has become part of its standard service offering, it must provide these improvements at no additional charge to Canada. The price of any other service enhancements will be negotiated on a case-by-case basis. The Contractor acknowledges that no new services can be provided under this Contract unless the Contracting Authority issues a contract amendment authorizing the provision of those service. Canada reserves the right to add new services as services and technologies evolve and become available.

2.1.11 The Contractor must have a minimum of 5 years of experience provisioning, installing, operating and maintaining Fixed Satellite services to various customers in which the contractor maintained at least 10 Fixed Satellite earth stations for all their customers.

2.1.12 Within the last 10 years, the Contractor must have experience provisioning, installing, operating and maintaining Fixed Satellite services to large organizations with at least 20 users.

2.1.13 The Contractor must have the ability to provide alternate satellite space segment capacity for service restoration in case of a failure of the Contractor's proposed primary satellite. The alternate satellite EIRP and G/T must be of such values that do not lead to changes to the antenna and RF portion of the ground segment infrastructure. This does not mean that the capacity must be guaranteed in advance on this alternate satellite but rather that an alternate satellite with the same characteristics must be available to transfer service without changing the established ground segment network infrastructure (e.g. antenna sizes and RF components).

2.1.14 The Contractor must have, at a minimum, 1 Teleport or telecom serving office located in Canada.

2.1.15 The Contractor must indicate if they are providing site diversity (another teleport located at another location) pointed to the same serving satellite.

2.1.16 The Contractor must have prepared and delivered a minimum of 5 Operator Training and Specialized Training courses in satellite telecommunications technology in the past 5 years. The Contractor must provide the syllabus and delivery date of the delivered courses.

2.2 SERVICE MANAGEMENT

2.2.1. The SSC Satellite Service Manager will:

a) Accept and validate service requests from the Clients and determine whether to forward them to the Contractor as Service Orders;
b) Monitor and manage the Contractor's Service Level performance; and
c) Manage ongoing service issues.

2.2.2 The Contractor must assign a Contract Account Representative (CAR) to Canada to address any technical, administrative and service-related issues.

2.2.3 The CAR must have a minimum of 5 years of satellite telecommunications experience within the last 8 years.

2.2.4 During the Contract Period, the Contractor must provide the résumé for each new CAR to the Technical Authority for approval within 10 working days of the date the Contractor notifies the Technical Authority that a new CAR is required.

2.2.5 When requested, the CAR must meet with the SSC Satellite Service Manager, Technical Authority and/or Contracting Authority, at a location within the National Capital Area, or occasionally when this is not possible, must be available by teleconference phone call. Except in case of emergencies, Canada will provide the CAR with at least 5 days of notice before a meeting.

2.2.6 The CAR must provide the relevant Authority (or Authorities) with a record of decision and meeting minutes within 10 working days following any meeting. If the relevant Authority does not agree with the record of decision or meeting minutes prepared by the CAR, the relevant Authority will advise the CAR within 5 working days after receiving them.

2.2.7 When requested, the Contractor must provide sales and marketing support to Canada when Canada is communicating with existing and prospective Clients. This support will consist of the following:

a) Attending meetings;
b) Participating in telephone teleconferences or videoconferences;
c) Providing literature (either electronic or paper) explaining Fixed Satellite Services (FSS);
d) Assisting Canada in communicating with Clients about the FSS Services available under this Contract;
e) Acknowledging receipt of any of Canada's information requests within 2 working days to the Technical Authority and the SSC Satellite Service Manager; and
f) Providing the information within 5 working days to the Technical Authority and the SSC Satellite Service Manager.

2.2.8 The CAR's attendance at all meetings is at the Contractor's own expense, including any travel and living expenses that may be incurred.

2.3 SERVICE ORDER PROCESSING

2.3.1 General

2.3.1.1 The Contractor must provide two priority levels for Service Orders:

a) **Regular priority**: Normal non-rush delivery of the Services processed during Regular Business Hours.
b) **Express priority**: Expedited delivery of the Services processed during Regular Business Hours. The Contractor should process this Service Order before any other Service Order already in queue under a Regular priority.

2.3.1.2 The Maximum Service Delivery Interval (MSDI) for Service Orders with each level of priority is set out in Section 2.3.3 of this Annex. While the order in which the Contractor processes Service Orders is within the Contractor's discretion, meeting the MSDIs is mandatory. Each Service Order will clearly indicate the priority level.

2.3.1.3 The Contractor must provide a single ordering point for all Regular and Express Priority Service Orders.

2.3.1.4 The Contractor must only accept Regular and Express Priority Service Orders and Service Order revisions sent by the SSC Satellite Service Manager by email.

2.3.2 Regular and Express Priority Service Orders

2.3.2.1 The Contractor must accept Regular and Express Priority Service Orders made by email to the Contractor-provided email address twenty-four (24) hours per day, seven (7) days per week, and every day of the year, and must provide an automated reply to confirm receipt of the emailed Service Order.

2.3.2.2 Regular and Express Priority Service Orders sent to the Contractor by the SSC Satellite Service Manager during Regular Business Hours will be considered received by the Contractor on that day. Service Orders sent to the Contractor by the SSC Satellite Service Manager between 4:01 PM and 7:59 AM (Eastern Time) will be considered received by the Contractor at 8:00 AM the next working day.

2.3.2.3 The Committed Service Delivery Date (CSDD) is the date that the Contractor must complete the delivery of a given Service Order. This date must be within the appropriate Maximum Service Delivery Interval (MSDI).

2.3.2.4 If for any reason the CSDD for a Service Order cannot be met, the Contractor must immediately notify the SSC Satellite Service Manager outlining the reason for the delay and providing a new CSDD. If the revised CSDD places the completion of the order outside the MSDI, the information related to this Service Order must be tracked and reported in the Monthly Service Order Tracking Report, and the Service Order will be subject to service credits.

2.3.3 Service Delivery Intervals (SDI)

2.3.3.1 The SDI is defined as the elapsed time between the issuance of the Service Order or subsequent Service Order Revision by the SSC Satellite Service Manager and the delivery/acceptance of the Service.

2.2.3.2 The Maximum Service Delivery Interval (MSDI) is defined as the maximum allowable amount of time to process a Service Order depending on the type and priority of that Service Order. The Maximum Service Delivery Interval Table is as follows:

2.3.3.3 The Maximum Service Delivery Interval (MSDI) for Satellite Space Segment Capacity Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Regular Priority Service delivery	45 business days after receipt of Service Order (inclusive of Satellite Link Budget Analysis (SLBA) and Frequency Clearance mentioned in Section 3A.4 & 3A.5)
Express Priority Service delivery	10 calendar days after receipt of Service Order (inclusive of SLBA and Frequency Clearance mentioned in Section 3A.4 & 3A.5)

Within 5 calendar days of receipt of the Regular Priority Service Order, the Contractor must obtain, if required by the Client, from the relevant spectrum authorities worldwide all Radio Frequency Interface (RFI) clearances for all Transmit and Receive frequency pairs assigned between the satellite and Deployed Demarcation Point (DDP).

2.3.3.4 The Maximum Service Delivery Interval (MSDI) for Teleport Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Service Turn-up assuming the modems in use are as defined in Section: 3B.2	30 calendar days after receipt of Service Order
Service Turn-up assuming the modems are other than those defined in Section 3B.2	30 calendar days after receipt of Service Order

2.3.3.5 The Maximum Service Delivery Interval (MSDI) for Associated Services for Remote Sites is specified in the table below.

Service Order Type	MSDI for Service Orders
Identification of site survey and install dates for remote sites	5 working days
Site survey, Hardware purchase, Installation of Remote Hardware and service turn-up regardless of site location(s) assuming that all landlord access and transportation to the site(s) is available	60 calendar days

2.4 CLIENT SUPPORT

2.4.1 Hotline Service

2.4.1.1 The Contractor must provide the Client with technical support for all aspects of the Service including a hotline accessible using a toll-free number (the "Hotline"). The Contractor must satisfy the requirements of Supplemental General Conditions 4001, Section 25(4) relating to Remote Hardware and Supplemental General Conditions 4004, Section 5 relating to software using this Hotline, except as specifically noted below.

2.4.1.2 The Contractor must pick up all Hotline calls within 5 rings 95 percent of the time. The Contractor must answer all calls, with a live service agent, within 2 minutes 95 percent of the time.

2.4.1.3 The Contractor must log and track all reported calls to the Hotline from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

2.4.1.4 The Contractor must track and resolve a Client reported problem call only during the selected maintenance coverage time specific to a particular Client. (i.e. A Client reported problem call occurring at 6 p.m. on Friday for a Client whom has selected an maintenance coverage time of 9 hr/5 day, 8 a.m. to 5 p.m., Monday to Friday must be tracked and resolved by the Contractor beginning the following Monday at 8 a.m. only until resolution but only during the selected O&M coverage time specific to a particular Client.)

2.4.1.5 The Contractor's Hotline must be staffed and available to the Client twenty-four (24) hours per day, seven (7) days per week, and every day of the year.

2.4.2 Engineering Assistance

2.4.2.1 In addition to the Hotline, the Contractor must provide engineering assistance to the SSC Satellite Service Manager and Technical Authority accessible using a North American phone number separate from the Hotline toll-free number.

2.4.2.2 The Contractor must assist with issues requiring technical expertise at a level greater than the Hotline. This could include, but not be limited to, assistance with:

a) Link budget issues;
b) Compatibility issues; and
c) Intermittent or chronic performance issues.

2.4.2.3 The Contractor's Engineering Assistance must be available Monday to Friday from 8:00 AM to 4:00 PM Eastern Time to receive and respond to calls.

2.4.3 Web Site Support Service

2.4.3.1 The Contractor must provide Canada with technical support for all aspects of the Services, through a web site support service, which must include at a minimum, Frequently Asked Questions (FAQs) and, if applicable, on-line software diagnostic routines, support tools and services.

2.4.3.2 The Contractor's web site must provide support in English and in French, and must be available twenty-four (24) hours per day, seven (7) days per week, and every day of the year. The Contractor's web site must be available 99% of the time.

2.4.3.2 The Contractor must provide WEB portal access (read only) to the SSC Satellite Service Manager and Technical Authority in order to view all trouble tickets related to all Services being provided to Canada under this contract.

2.5 PROBLEM MANAGEMENT

2.5.1 General

2.5.1.1 The Contractor must manage all problems affecting the delivery of the Service(s). These problems must be managed twenty-four (24) hours per day, seven (7) days per week, and every day of the year, by the Contractor by diagnosing, tracking, recording and reporting on all problems that affect any Client user's ability to use the Service(s). The Contractor must document all problems, including a description of the problem and all details on how the problem was resolved.

2.5.1.2 The Contractor must be the single point of contact and have full responsibility for leading and coordinating all activities with any Satellite Space Segment provider, Teleport Service provider or Remote Hardware provider for the resolution of any problem that affects the performance of the Service(s).

2.5.1.3 The Contractor must log and track all reported calls to its help desk from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

2.5.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of a High Severity event (as per Section 2.5.2.2) service outage or performance problem as soon as it appears that it may exceed thirty (30) minutes in duration.

2.5.1.5 The Contractor must perform the following activities on an on-going basis when handling service-related problems:

a) Identify each reported problem by a unique problem record number (ticket number);
b) Perform an analysis of the problem reported;
c) Maintain an audit trail that includes all actions taken until the problem is resolved; and
d) Provide reports as listed in the Section named “Reporting”.

2.5.2 Escalation Procedures

2.5.2.1 The Contractor’s Hotline representatives must escalate to the appropriate level of the Contractor’s management and generate a Critical Incident Report for any unresolved problems according to the time lines and severity indicated below.

2.5.2.2 Escalation time lines (which are in effect twenty-four (24) hours per day, seven (7) days per week, and every day of the year) are:

ESCALATION	Low Severity	Medium Severity	High Severity
Manager Operations	2 hours	30 minutes	15 mins
Director Operations	3 hours	1 hour	30 mins
VP Operations	8 hours	2 hours	1 hour

Note: All escalation times listed in the table above start running when the initial request is made, regardless of the time of day.

a) **Low Severity**: Diminished capacity (including repeated intermittent non-availability) of the network affecting any single, or group of, remote earth station(s) (excluding scheduled maintenance as defined in Section 2.7).

b) **Medium Severity:** Diminished capacity (including repeated intermittent non-availability) of the network affecting all remote earth station(s) (excluding scheduled maintenance as defined in Section 2.7).

c) **High Severity:** Complete unavailability of the network, including the failure of a Hub and all remotes or the complete failure of a satellite (excluding scheduled maintenance as defined in Section 2.7).

2.5.2.3 Within 10 working days of this Contract being issued, the Contractor must provide the SSC Satellite Service Manager and Technical Authority a list of the names and contact information (phone number, email address, etc.) of the Manager of Operations, Director of Operations, and Vice President of Operations (or the equivalent positions with the Contractor’s organization). The Contractor must continue to provide an updated list to the SSC Satellite Service Manager and Technical Authority as changes in personnel occur in the management positions listed above.

2.6 SERVICE PERFORMANCE MONITORING

2.6.1 Availability of Services

2.6.1.1 The Contractor must perform remote network monitoring, preventative diagnostics, and coordinate problem isolation and resolution.

2.6.1.2 Satellite Space Segment Capacity Services

The Contractor must provision the Satellite Space Segment Capacity Service to ensure a Service Availability Percentage of at least 99.99% for each calendar month.

2.6.1.3 Satellite Space Segment Capacity Service and Teleport Services

The Contractor must provision the combined Satellite Space Segment Capacity Service and Teleport Service to ensure a Service Availability Percentage of at least 99.95% for each calendar month.

2.6.1.4 Satellite Space Segment Capacity Service, Teleport Service and Remote Site

The Contractor must provision the combined Satellite Space Segment Capacity Service, Teleport Services and Remote Site Service to ensure a Service Availability Percentage of at least 99.30% for each calendar month.

2.7 SCHEDULED SERVICE-AFFECTING AND MAINTENANCE ADVISORY

2.7.1 The Contractor must provide the SSC Satellite Service Manager with written notice of any scheduled maintenance that may affect the Service(s) at least ten (10) working days before performing any scheduled maintenance. The SSC Satellite Service Manager will provide written notice to the Contractor agreeing to the scheduled maintenance within two (2) business days from receipt of the scheduled maintenance notice.

2.7.2 Except in cases of emergency, the Contractor must notify the SSC Satellite Service Manager before proceeding with any unscheduled maintenance activities that may affect the Service. When possible, the Contractor agrees to coordinate unscheduled maintenance activities that may affect the Service with the SSC Satellite Service Manager.

2.7.3 In cases of emergency, the Contractor must notify the SSC Satellite Service Manager as soon as possible after beginning the emergency unscheduled maintenance activity. The Contractor must provide the reason for the unscheduled activity and must provide information about how long the Service will be affected.

2.7.4 The Contractor must have available on the Internet all information indicating when the sun transits will occur and when they will affect each geostationary satellite being used by the Contractor to deliver the Services under this Contract. The Contractor must provide the URL of the Web Site where the Sun Transit information can be obtained. The Contractor must provide a notice to the SSC Satellite Service Manager by email, at least 2 weeks before the beginning of the sun transits.

2.8 REPORTING

2.8.1 General

2.8.1.1 The Contractor must provide the following reports in an electronic format (in comma or tab-delimited file format, MS Excel) by way of email:

a) Recurring Problem Report;
b) Problem Summary Report;
c) Service Performance Levels Report; and
d) Traffic Throughput Report

2.8.1.2 Amendments, changes or deletion of reports, as requested by the Technical Authority, will be handled through a Contract Amendment issued by the Contracting Authority.

2.8.2 Recurring Problem Report

2.8.2.1 When requested by the SSC Satellite Service Manager, where the SSC Satellite Service Manager has identified a recurring problem, the Contractor must provide a consolidated report by email detailing all the instances in previous reporting periods of similar problems, together with the Contractor's detailed proposed plan for addressing the recurring problem, including a timeline for resolution. The Contractor must provide the SSC Satellite Service Manager with an incident report by email within 24 hours and the report must contain, at a minimum:

a) Problem Ticket number(s);
b) Date(s) of the ticket(s);
c) Outage start date(s) and time(s);
d) Name of the person and department reporting the incident;
e) Severity level (as described in Section 2.5.2.2);
f) Description of the problem;
g) Description of the proposed resolution; and
h) Estimated time to implement remedial action to remedy underlying problem causing recurring problem.

2.8.3 Problem Summary Report

2.8.3.1 The Contractor must provide the SSC Satellite Service Manager with a monthly Problem Summary Report containing the following information, within 10 calendar days from the end of the billing period:

a) All problem tickets logged by the Contractor;
b) The nature of each problem;
c) The date and time at which each problem was first reported to the Contractor;
d) The date and time at which the Contractor determined each problem began (where the Contractor is able to determine this);
e) The disposition of each problem;
f) Whether the underlying cause of the problem was related to the Service or to equipment provided by Canada;
g) The duration of each problem; and
h) Whether, in the previous three monthly reporting periods, any similar problem tickets were opened.

2.8.4 Service Performance Levels Report

2.8.4.1 Within 10 calendar days of the end of each billing period, the Contractor must provide a monthly report to the SSC Satellite Service Manager showing the calculations of Service Availability Level for the month on a per-Client basis. Although Service Availability Credits are only payable based on the calculation of Service Availability during a calendar year (or partial calendar year, when applicable), reports on Service Availability must be submitted monthly, to allow Canada to monitor Service Availability performance throughout the year and address recurring issues by requesting corrective action. The values of these monthly calculations will be compared to the threshold values listed in Section 2.6. The method of calculation is indicated in Section 2.8.4.2.

2.8.4.2 The Service Availability Level for the Service that is reported by the Contractor in the monthly Service Performance Level report must be calculated using the following formula:

[(TNT – TOT) / TNT] X 100

where "**TNT**" is defined as the total network time, which is the total available number of minutes in the reported month and is calculated by multiplying by the number of calendar days in the month, times 24 hours, times 60 minutes (i.e., in April the TNT would be 30 X 24 X 60 = 43200); and

where "**TOT**" is defined as the total outage time, which is the total number of outage minutes as tracked by the Contractor's problem record system affecting that service. The service outage problem records logged by the Contractor will be used to calculate outage minutes. The outage minutes will be calculated from the time the problem is first recorded until the problem is resolved (ticket close) for each problem record. The sum of all these outage minutes will be the TOT. This number does not include scheduled maintenance or sun transit downtime where the Contractor properly advised the SSC Satellite Service Manager in accordance with Section 2.7.

2.8.5 Traffic Throughput Report

2.8.5.1 For all the networks provided by this Contract, the Contractor must have equipment capable of providing traffic throughput statistics. The Contractor must provide the SSC Satellite Service Manager with a monthly traffic throughput report. The report will outline the outbound and inbound traffic expressed in throughput versus time. The data points will be tabulated in 1 hour intervals (data point averaged over 1 hour) over the monthly period. Upon request of the Technical Authority or the SSC Satellite Service Manager, more specific ad hoc reports may be requested with shorter time intervals for the data points.

2.9 INVOICING

2.9.1 General

2.9.1.1 The Contractor must establish a federal government master account with at least one sub-level to identify the Client. The account number must be 15 characters or less and must not include any special characters.

2.9.1.2 The Contractor must cooperate with the SSC Satellite Service Manager or Technical Authority for the resolution of any billing issues to the satisfaction of the SSC Satellite Service Manager or Technical Authority.

2.9.1.3 The billing period is defined as each calendar month, starting from the 1st of the month to the last day of that month.

2.9.2 Invoices

2.9.2.1 The Contractor must provide a printable and non-modifiable monthly invoice to the SSC Satellite Service Manager in Portable Document Format (PDF) and it must be submitted on the Contractor's official letterhead or include its logo.

2.9.2.2 The Contractor must ensure that the invoice is sent by email to the SSC Satellite Service Manager within 10 working days after the end of each billing period.

2.9.2.3 The Contractor must invoice Canada on a monthly basis for all one-time and recurring charges accounted for in that month based on a billing period of the first of the month until the last day of that month. All invoices for one-time costs (installation, de-installation, site surveys, civil works) must come from the Contractor and not from any of the Contractor's third party companies. Services that start part way during a calendar month will be prorated using the formula of: Total cost / number of days in billing month * number of days the item is being charged for. All Services and Remote Hardware must be delivered before the Services and Remote Hardware can be invoiced.

2.9.2.4 The Contractor must summarize charges associated with Services separately from those associated with equipment purchases on the invoice.

2.9.2.5 The summary invoice must include the previous balance, current total charges, total payments, total adjustments, and any outstanding balance.

2.9.2.6 In addition to the information required by General Conditions 2035, the Contractor must ensure that the individual Service Order reference number, deliverable and/or description of work is included in the invoice.

2.10 TRAINING

2.10.1 General

2.10.1.1 Upon request of the Technical Authority, the Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned Satellite Earth Station Remote Hardware and satellite telecommunications theory and technology.

2.10.1.2 The training session must either be conducted at a Government of Canada facility located within Canada as identified by the SSC Satellite Service Manager or at a location in Canada provided by the Contractor as determined by the SSC Satellite Service Manager. Canada will not be charged for the use of the Contractor's premises if Operator and Specialized Training courses are conducted on the Contractor's premises. Canada will provide the Contractor at least 1 month notice of any training session requirement.

2.10.1.3 It is anticipated that most training sessions will be conducted in English, however there may be a requirement for the session to be conducted in French and the training must then be conducted in French. Regardless of the language used to conduct the training session, the Contractor must supply all necessary material and documentation to the trainees at the start of the course with a complete copy for each trainee in their official language of choice.

2.10.1.4 For Instructor Travel and Living (T&L) expenses associated with training services, the Contractor must submit T&L expenses separate from the labour hours.

2.10.1.5 The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the National Joint Council Travel Directive and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".

All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

2.10.2 Operator Training

2.10.2.1 When requested by the Technical Authority, from time to time, the Contractor must provide Operator Training based on a Statement of Work.

2.10.2.2 The Statement of Work to the Contractor may request hands-on, instructor-led Client Operator Training for all provisioned Satellite Earth Station Remote Hardware. The total number of Operator Training sessions requested will not exceed 20, each of which must accommodate up to 5 trainees. Each course should include the following topics, unless other topics are agreed to between the Technical Authority and the Contractor:

a) Basic Satellite Knowledge as it pertains to Fixed Satellite Services;
b) Satellite Earth Station Remote Hardware installation and configuration, earth station commissioning including antenna pointing;
c) Satellite Earth Station Remote Hardware analysis of visible LED and controls; and
d) Learning how to perform user preventative and basic corrective maintenance.

2.10.2.3 In addition to covering the specific subjects described above the instructor(s) must be knowledgeable about all the Satellite Earth Station Remote Hardware available under the Contract and must be able to answer questions from trainees about the features of the Satellite Earth Station Remote Hardware supplied under this Contract.

2.10.3 Specialized Training

2.10.3.1 When requested by the Technical Authority, from time to time, the Contractor must provide hands-on, instructor-led training for Clients who require more Specialized Training on Satellite Earth Station Remote Hardware. This request will be based on a Statement of Work.

2.10.3.2 In addition to covering the subjects described above, the instructor(s) must be knowledgeable about all the Satellite Remote Hardware available under the Contract and be able to answer questions from trainees about the features of the Remote Hardware supplied under this Contract.

2.11 LINK BUDGET DESIGN

2.11.1.1 Upon request, the Contractor must provide to the SSC Satellite Service Manager a link budget describing the power and satellite space segment parameters. Specifications are detailed in Part 3 - Technical Requirements, Section 3A.4.

2.12 MAINTENANCE SERVICES FOR REMOTE HARDWARE

2.12.1 General

2.12.1.1 The Contractor must provide Remote Hardware Maintenance Services for remote sites that includes the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 2.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Remote Hardware; and
f) Software/Firmware revisions.

2.12.1.2 As per Section 2.12.1.1(c) & (d), the Contractor must provide Warranty and Maintenance Services for all new Remote Hardware delivered under this Contract in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

2.12.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

2.12.2 Equipment Retrofit, Software Updates and Configuration Changes

2.12.2.1 The Contractor must satisfy the requirements of Supplemental General Conditions 4001 and Supplemental General Conditions 4004, except as specifically noted below. As part of the Hardware Maintenance Service, the Contractor must provide hardware retrofits/modifications, software upgrades and configuration changes at the Contractor's cost, where required, for the correction of identified operational problems as a result of design deficiencies, and where such modifications are supported by the Remote Hardware manufacturer or software publisher.

2.12.2.2 Where Remote Hardware retrofits and/or upgrades are required, the Contractor must coordinate these activities with user groups and perform these activities where required to ensure that system/hardware modifications are performed with minimal inconvenience and no additional cost to the Clients, and with minimal disruption to service.

2.12.2.3 The Contractor must provide software updates as supported by the hardware manufacturer or his agent and configuration changes at no additional cost to the Clients for Remote Hardware supported directly by the Contractor, during the Contract Period. These software updates and/or configuration changes are to be downloaded to the Remote Hardware through the transmission capability of the Hub or through the actions of an agent of the Contractor who is providing On-Site Maintenance Services on the Remote Hardware. If the Remote Hardware is not on-line during the software update process or the configuration change process and that Canada has been advised of the scheduled activity, the Contractor will, upon request from Canada, perform a site visit to implement the update at Canada's cost.

2.12.3 Maintenance Capability & Response Times

2.12.3.1 Maintenance Zones are defined in Section 3C.4.2.

2.12.3.2 The Contractor must ensure that all locations designated as equipment Maintenance Centres are equipped with adequate tools and test equipment to effectively perform the equipment maintenance function and that technicians are skilled in the performance of such activity and are familiar with the equipment to be maintained.

2.12.3.3 The Contractor must ensure that maintenance technicians are equipped with adequate tools, test equipment and equipment spares to effectively perform the equipment maintenance function at the remote site(s). The maintenance technicians must be skilled in the performance of such activity and must be familiar with the equipment to be maintained.

2.12.3.4 The Contractor must ensure that in the process of On-Site Maintenance Service, any impaired or failed Remote Hardware must be rendered serviceable within a period designated in Section 2.12.3.9 (subject to timely availability of commercial transportation). In the event of non-timely availability of commercial transportation, the Contractor must make a best effort approach to respect the period designated in Section 2.12.3.9.

2.12.3.5 Despite Supplemental General Conditions 4001, Section 12(3), the Contractor is responsible for the Service including any failure caused by a defect in any Government Furnished Equipment (GFE) being maintained as part of the Hardware Maintenance Service.

2.12.3.6 "Maximum Time to Repair" or "MTTR" is the elapsed time from when Canada first reports the trouble or the time when Contractor first recognizes the performance of the Service or the Hardware is being affected by any condition (whichever is earlier) until the trouble or other performance problem has been resolved (i.e., the trouble has been resolved and the Service has been restored to full performance in accordance with the terms of this Contract). The MTTR, in the case of On-Site Maintenance will be calculated as the time elapsed during Regular Business Hours. The MTTR includes all time taken by the Contractor to detect the fault, isolate the problem, remove and replace any faulty equipment, verify the repair, and restore the Service and/or Hardware to fully functional operation.

2.12.3.7 The MTTR is calculated based on response from Contractor to mobilize to site. The hotline service is a twenty-four (24) hour service offered by the Contractor. In other words, the hotline service must be available twenty-four (24) hours per day, seven (7) days per week and every day of the year to answer the Client reported problem call as referenced in Section 2.4.1.

2.12.3.8 Despite Supplemental General Conditions 4001, Section 26(3)(d), where the Contractor is able to resolve the trouble or performance problem remotely, the MTTR is 4 hours.

2.12.3.9 Despite Supplemental General Conditions 4001, Section 26(3)(a) & (d), where On-Site Maintenance is required, the Contractor must resolve the trouble or performance problem, within the following MTTR:

a) Maintenance Zone A : 4 hours
b) Maintenance Zone B : 12 hours
c) Maintenance Zone C : 24 hours

(i.e. in Maintenance Zone A, a problem reported at 8:00 AM Tuesday must be resolved by 12:00 Noon Tuesday; another example, in Maintenance Zone B a problem reported at 11:00 AM Friday must be resolved by 3:00 PM Monday (11:00 – 16:00 Friday is 5 hours and 08:00 – 15:00 is 7 hours for a total of 12 hours).)

2.12.3.10 The Contractor must act on problems reported to the Hotline without delay and use all means at its disposal to restore the Service or service quality or the Hardware to fully functional operation without undue delay.

2.12.3.11 The Contractor must ensure that the Remote Hardware being provisioned at a remote site has a Mean Time Between Failure (MTBF) equal to or exceeding 55,000 hours. The calculation of the MTBF must be in accordance with the U.S. Department of Defence MIL-HDBK-217F Reliability Model.

2.12.4 Services Outside Maintenance Coverage

2.12.4.1 The Contractor must provide labour services for additional technical resource work done by the Contractor that is not included as part of the Hardware Maintenance Service described in the Contract. Pre-approval from the SSC Satellite Service Manager or Technical Authority is required before work commences. This additional service includes work done by the Contractor's technician being sent to a remote site for maintenance purposes where the Contractor can demonstrate that the problem was caused by Client-owned non-satellite related equipment.

2.12.4.2 For Travel and Living (T&L) expenses associated with the services outside maintenance coverage, the Contractor must submit T&L expenses separate from the labour hours associated with the activity.
The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the *National Joint Council Travel Directive* and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".
All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

2.13 MAINTENANCE SERVICES FOR TELEPORT EQUIPMENT

2.13.1 The Contractor is responsible to install, operate, monitor and maintain all equipment associated with the Teleport Service and the Modem Service at the Contractor's cost as shown in Annex B1 – Appendix C and D.

3 PART 3 – TECHNICAL REQUIREMENTS FOR STREAM 1 – KU-BAND SERVICE (CANADA AND CONUS)

3A - SATELLITE SPACE SEGMENT CAPACITY SERVICES

3A.1 General Requirements

3A.1.1 The Contractor must provide 1 and 2 way single hop satellite communication services; between Canada, the Continental US (CONUS), and the Caribbean Islands; as well as any 1 or 2 way satellite communication within Canada, CONUS & the Caribbean Islands.

3A.1.2 The Contractor must provide the Satellite Space Segment Capacity in a Partial RF Channel. The Partial RF Channel satellite capacity must be provided in 0.1 MHz increments.

3A.1.3 The Contractor must provide same pricing to all satellite categories independent of which satellite will be utilized in the delivery of the Ku-band service.

3A.1.4 The Contractor must provide the Satellite Space Segment Capacity Service on a twenty-four (24) hours per day, seven (7) days per week, and every day of the year basis.

3A.1.5 The Contractor must have the ability to provide alternate satellite space segment capacity for service restoration in case of a failure of the Contractor's proposed primary satellite. The alternate satellite EIRP and G/T must be of such values that do not lead to changes to the antenna and RF portion of the ground segment infrastructure. This does not mean that the capacity must be guaranteed in advance on this alternate satellite but rather that an alternate satellite with the same characteristics must be available to transfer service without changing the established ground segment network infrastructure (e.g. antenna sizes and RF components).

3A.1.6 The Contractor must provide Satellite Space Segment Capacity in the most efficient and cost effective manner to facilitate satellite connectivity services, integrating Canada-owned and operated earth stations.

3A.2 Classification of Services

The Contractor must provide the Satellite Space Segment Capacity Service in the following categories:

3A.2.1 Ku-Band

a) Type 3 Service

Defined as non-protected in the event of an interruption. No restoration is designated for this Type 3 Service, but the Type 3 Service may be restored at the discretion of the Contractor, subject to the availability of Satellite Space Segment Capacity at the time of interruption and prudent facility management.

3A.2.2 Additional types of Satellite Space Segment Capacity may be required.

3A.3 Ku-Band Type 3 Service

3A.3.1 The Contractor must provide, to Clients who subscribe to Ku-band Type 3 Satellite Space Segment Capacity Service, Ku-band Satellite Space Segment Capacity to support operations twenty-four (24) hours per day, seven (7) days per week, and every day of the year. If Full Period Whole RF Channel is provided to Clients who subscribe to this Type 3 Service, then any other Partial RF Channel must, subject to availability, be on the same primary satellite as the Whole RF Channel capacity.

3A.3.2 Coverage

The RF channel must have continuous coverage of Canada, CONUS and the Caribbean to be able to establish inter Canada/CONUS/Caribbean traffic with single hop satellite connectivity. Canada coverage includes East Coast coverage of Nova Scotia, Newfoundland and Labrador. It also includes the North, including Nunavut, North West Territories the Yukon and Northern Quebec up to at least 70 degrees North latitude.

3A.3.3 Service Performance Parameters

Throughout the Contract period the Contractor's Whole RF Channel over the coverage area from 55 degrees North Latitude and down to 15 degrees North Latitude must at minimum meet the following metric requirements:

a) Effective Isotropic Radiated Power (EIRP): 39 dBW
b) Gain to Temperature Ratio (G/T): -5.5 dB/K
c) Transponder Bandwidth (BW): 36 or 54 MHz

The performance above 55 degrees North Latitude and below 15 degrees North Latitude will be of a lower EIRP and G/T.

As it relates to Partial RF Channel capacity, EIRP and BW parameters will be determined through the Contractor's link budget design.

3A.3.4 Availability for Ku-Band Satellite Space Segment Capacity

The Contractor must provide Ku-band Satellite Space Segment Capacity requested by Canada, subject to the Contractor's concurrence that such capacity is available at the time the services are required. Costing for this bandwidth must be at the price specified in Annex B1, Appendix B.

3A.4 Satellite Link Budget Analysis

3A.4.1 The Contractor must provide a Satellite Link Budget Analysis (SLBA), which will indicate the space link availability and the system margins for both one-way and two-way satellite connections. The SLBA must take into account at a minimum the following parameters:

a) EIRP;
b) Thermal noise;
c) Earth Station G/T;
d) Rain fade;
e) System margin;
f) Eb/No of modem;
g) Adjacent channel interference;
h) Adjacent satellite interference;
i) Intermodulation noise and;
j) MODCOD Selection (including TPC/LDPC coding, and ACM/Carrier in Carrier technology)

3A.4.2 The Contractor must provide the Service so that each remote site will have an end-to-end one-way space link availability (Propagation Availability) of 99.8% with a Bit Error Rate (BER) of 1×10^{-7}. The Contractor must clearly explain how they can meet the 99.8% one-way end-to-end space link availability in relations to the rain fade margin for the uplink and downlink. The Contractor must clearly explain the relationship between the modem's Eb/No and BER specifically for a BER of 1×10^{-7}.

3A.4.3 On the occasion that any of Canada's Clients provide a SLBA to the Contractor, the Contractor must review it for consideration. Canada recognizes that the implementation of this SLBA is subject to Contractor's approval.

3A.4.4 The contractor must provide a SLBA for the following locations and earth station characteristics taking into account the parameters listed in Section 3A.4.1. As well, the SLBA must take into consideration the Contractor's proposed Teleport location and Teleport Earth Station characteristics. For all SLBA's, the contractor will use a Comtech CDM-625A satellite modem at the proposed Teleport location and at the remote earth station location. Furthermore, for each link design listed below, the contractor will select the most space segment efficient MODCOD setting and calculate the BW utilization based on a carrier spacing factor of 1.35.

The resulting Satellite Space Segment consumption rates and appropriate prices are to be input in Annex B1, Appendix L.

LINK DESIGN ID#	**REMOTE EARTH STATION G/T (db/K)**	**REMOTE EARTH STATION ANTENNA DIAMETER & Tx ANT. GAIN (m/dBi)**	**REMOTE EARTH STATION LOCATION**	**DATA RATE (expressed in MBPS for a full duplex symmetrical link design)**	**SPACE SEGMENT CAPACITY UTILIZATION (PEB or bandwidth utilization whichever is greater) FOR FULL DUPLEX SYMMETRICAL LINK (expressed in 0.1 MHz segments)**
A	25.7	1.8/44.6	Tofino, BC	3.0	
B	25.7	1.8/44.6	Sable Island, NS	2.0	
C	23	2.4/47.4	Whitehorse, YT	2.0	
D	23	2.4/47.4	Iqaluit, NU	2.0	
E	23	2.4/47.4	Los Angeles, CA, USA	1.5	
F	23	2.4/47.4	Oklahoma City, OK, USA	1.0	
G	23	2.4/47.4	Jacksonville, FL, USA	1.0	
H	23	2.4/47.4	Port-au-Prince, Haiti	1.0	

3A.5 Frequency Clearance

3A.5.1 The Contractor must ensure that the frequencies assigned to Canada are cleared with Industry Canada with regards to any Canadian radio frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from Industry Canada. If Canada decides to process the radio frequency interference study with Industry Canada, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

3A.5.2 In the case that the Deployed Demarcation Point (DDP) is outside Canada, the Contractor will endeavor to obtain frequencies clearances assigned to Canada with the respective country's frequency spectrum administration agency and on a case-by-case basis will endeavor to meet the service interval for the clearance of frequencies with regards to satellite frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from the respective country's frequency spectrum administration agency. If Canada decides to process the radio frequency interference study with the respective country's frequency spectrum administration agency, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

3A.5.3 All costs involving frequency clearance and earth station licensing must be consolidated with the Contractor who will provide one invoice that includes everything, including licensing costs. License requests can be submitted by the Contractor to Industry Canada or the respective country's frequency spectrum administration agency who will invoice the Contractor directly.

3B - TELEPORT SERVICES

3B.1 General Requirements

3B.1.1 Teleport Services are managed services that allows transmission and reception of traffic of a certain bandwidth (bit rate) to and from a Canada owned remote earth station. Teleport Services

- must include leased Teleport and Teleport based modem services including operation and maintenance (O&M);
- incorporates the remote earth station, which Canada may procure under this contract; or may already own;
- will be procured with the Satellite Space Segment Capacity Service (Section 3A); and
- may include Contractor provisioned terrestrial backhaul(s), when requested.

3B.1.2 The Contractor must provide the Teleport Services so that it can be used in conjunction with Government furnished or Contractor provisioned Remote Hardware and Space Segment Capacity Services provided under this Contract. The Contractor must provide the Teleport Services with the capability of pointing to the Contractor proposed satellite(s) as per Section 3A of this SOW.

3B.1.3 At a minimum one (1) Teleport must be situated within the boundaries of Canada. Additional Teleport(s) in CONUS are acceptable. The Teleport in Canada must support the RF channels that accommodate inter Canada/CONUS/Caribbean traffic with single hop satellite connectivity. The Teleport must have high data rate connections to terrestrial backhauls including high-speed internet connectivity.

3B.1.4 The Contractor must provide the Teleport Service in the Ku-band frequency ranges.

3B.1.5 The Contractor must provide air-conditioned building space and commercial, conditioned, protected, redundant, AC or DC power including an uninterruptible power supply (UPS) with battery backup capacity for 30 mins and must also provide a diesel generator for backup at the Teleport(s).

3B.1.6 The Contractor must provide redundant equipment (RF/IF Chain, LNB, BUC) for the Teleport Service.

3B.1.7 The Contractor must provide secure rack space and power at the Teleport(s) for GFE, as required.

3B.1.8 The Teleport Services must allow unimpeded transmission of user-initiated encrypted data and user/machine authentication. The Service must support typical user-provided security applications, which include communications link security as well as remote desktop physical security, all of which may require encryption and authentication techniques initiated at the Remote Site. The Contractor acknowledges that Canada's LAN environment will implement a Virtual Private Network (VPN) solution using IP Security (IPSEC), which will include the Entrust™ PKI products with Open Systems Integration (OSI) layer 3 (Network)/layer 4 (Transport) encryption. The Contractor further acknowledges that Canada may in the future deploy an applications-based encryption/authentication solution such as Secure Socket Layer (SSL) encryption. The Teleport Services must support the Client's deployment of both IPSEC VPN and SSL solutions.

3B.1.9 The Contractor must not protocol filter any IP traffic originating from equipment at remote sites unless requested by the SSC Satellite Service Manager.

3B.1.10 The Contractor must notify the Contracting Authority of any plans to sunset this Service at least 18 months in advance and must provide, at the Contractor's cost, migration to an equivalent or better Service.

3B.2 Modem Services

3B.2.1 The Contractor must provide Modem Services which is a monthly fee service for the operation of modems, either owned by the Contractor or furnished by Canada, and used in the Contractor's Teleport(s) to complete the communication link with Canada's modems at the Remote Site(s).

3B.2.2 The Contractor must install, operate, monitor and maintain all equipment associated with the Modem Services at the Contractor's cost.

3B.2.3 The modems used can be categorized under the following types of interfaces and operating modes:

a) L-Band Interface type satellite modem – modems which have an interface that operates anywhere within the range of 950 to 2000 MHz

   a. SCPC mode – Single Channel per Carrier
   b. DVB-S mode – Digital Video Broadcasting – Satellite
   c. DVB-S2 mode – Digital Video Broadcasting – Satellite 2nd generation

3B.2.4 In the case where Canada provides the modem(s) to be installed at the Teleport(s), the Contractor must provide a firm unique monthly rate as per Annex B1, Appendix D. It is the responsibility of the Contractor to install and monitor these modems to an operational level such that the complete end-to-end service is maintained. The Contractor must include into the monthly price any specific customer requirements in the case that Canada's modem(s) are installed in an area away from where the Contractor's modems are installed (i.e. specific customer racks or equipment cages or in specific customer equipment rooms). The Contractor must be prepared to swap out Canada's modem with a Canada supplied spare modem in the event the modem malfunctions.

3B.2.5 The Contractor must provide other satellite modems, as required, to be used in the Teleport Service.

3B.2.6 The Contractor must provide automatic switchable redundancy for the L-Band Equipment and RF Equipment to achieve the Service Availability requirements described in in Section 2.6.1.3.

3B.2.7 The Contractor must provide sufficient capacity on the IF and RF links, from the satellite modem(s) to the RF transmitter, to accommodate a minimum uplink EIRP in multi-carrier mode of 69 dBW.

3B.3 Backhaul Requirements

3B.3.1 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide Internet access up to 100 Mbps at the Teleport(s). The Contractor must absorb all one-time construction costs to provide Internet Access at the Teleport(s).

3B.3.2 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide up to 100 Mbps of dedicated terrestrial backhaul capacity for connectivity to Canada's Data Centre(s). The Contractor must absorb all one-time construction costs to provide dedicated backhaul connectivity to the Teleport(s).

3B.3.3 Upon request by the SSC Satellite Service Manager, the Contractor must provide the Internet access or the dedicated backhaul. Costing for backhaul(s) must be at the price specified in Annex B1 - Appendix H.

3B.4 Service and Demarcation Points

3B.4.1 Service points are the physical locations where the Teleport satellite modems are located.

3B.4.2 The Demarcation point for the Teleport Service terminates at the Client end of the interconnecting cable connecting the satellite modem. The Client end of the interconnecting cable connects to either a Client backhaul or Client's end user equipment that is located in the customer room at a Teleport.

3B.4.3 The Contractor will be responsible to provide the interconnecting cable between the Contractor's Demarcation point and either a Client backhaul or Client's end user equipment.

3B.4.4 The Contractor must provide a secure environment against unauthorized access at the Service Points.

3B.4.5 The Contractor must provide recommendations in the interconnection design of the Client's terminal or communication equipment, cabling and facilities at the remote Service Point.

3B.4.6 Inside space for Remote Hardware that is provided by Canada to the Contractor will normally be in a common space without security. For cases where the Contractor requires controlled access to the Remote Hardware, the Contractor must negotiate with the SSC Satellite Service Manager and/or individual Clients for security accommodations and there may be costs to the Contractor associated with any such arrangement.

3C - ASSOCIATED SERVICES FOR REMOTE SITES

3C.1 General Requirements

3C.1.1 Upon request, the Contractor must be able to provide the following Associated Services to Canada:

- Provisioning of Remote Hardware;
- Installation of Remote Hardware in Canada;
- Maintenance of Remote Hardware in Canada;
- Operator and Specialized Training; and
- May incorporate Canada owned Ku-band Remote Hardware.

3C.1.2 Upon receipt of a Service Order, the contractor must acknowledge receipt of the Service Order to the SSC Satellite Service Manager within two (2) business days.

3C.1.3 Further to 3C.1.2, the Contractor must provide the delivery date for the equipment to the SSC Satellite Service Manager within five (5) to ten (10) business days.

3C.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of any delay to the agreed upon date for delivery and installation of the Remote Hardware.

3C.1.5 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Remote Equipment.

3C.2 Provisioning of Remote Hardware

3C.2.1 The Remote Hardware mainly consists of Ku-band Earth Station components and Associated Parts as listed in the pricing sheet (Annex B1 – Appendix E).

3C.2.2 The provisioning of the Remote Hardware includes shipping to major cities in Canada.

3C.2.3 The provisioning of the Remote Hardware includes a one (1) year Warranty Maintenance Service unless otherwise indicated.

3C.2.4 All Remote Hardware supplied by the Contractor, including parts used to provide Maintenance Services, must be new and unused. The Remote Hardware must also:

a) be off-the-shelf, meaning it must be composed of standard equipment requiring no further research or development;
b) be a model that is still in production by the time of delivery; and
c) conform to the version of the applicable specification or part number of the manufacturer in effect at the time of delivery.

3C.2.5 The Contractor must deliver the Equipment to the location(s) designated by Canada by the delivery date. The Contractor must pay all costs associated with replacing any item damaged in transit to the final destination. The Contractor acknowledges that no item will be considered delivered on the delivery date if it is damaged or otherwise not ready for Canada to begin its acceptance procedures. The Contractor must, at a minimum, package the Remote Equipment according to industry standards and include a packing slip with each shipment. Packaging, shipping, transportation and delivery must be included in the price of the Remote Hardware.

3C.2.6 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Equipment.

3C.3 Installation of Remote Hardware

3C.3.1 The Contractor must perform all site surveys, civil works for antenna foundation, shipping of Remote Hardware, installation of Remote Hardware, de-installation of Remote Hardware (when required) and must make all arrangements with landlords and landowners necessary to deliver the Installation Service.

3C.3.2 Canada will provide air-conditioned building space and commercial, conditioned, protected, AC power to the Contractor at the remote location. Upon request, the Contractor must provide, install, operate and maintain an Uninterruptible Power Supply (UPS) at a remote site intended only to power the satellite equipment. The amount of space available to house the satellite equipment will depend on the location.

3C.3.3 Despite Supplemental General Conditions 4001, Section 5(4) Installation, Integration and Configuration, all installation prices are indicated separately in the Basis of Payment and are not included in the price of the Hardware.

3C.3.4 The Installation Zones for the remote sites are defined as follows:

a) Installation Zone 1: Any site within 100 km from the city halls for Vancouver, Edmonton, Calgary, Regina, Winnipeg, Thunder Bay, Toronto, Ottawa, Montreal, Saint John, Halifax and St John's.
b) Installation Zone 2: Anywhere south of or on the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere south of the 50th parallel in all other provinces.
c) Installation Zone 3: Anywhere north of the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere north of the 50th parallel in all other provinces.
d) Installation Zone 4: Anywhere in the Yukon, North West Territories and Nunavut.

3C.3.5 For each new site installed under this Contract and for cases where the Client is providing the Remote Hardware, the Contractor must provide to the SSC Satellite Service Manager, within 30 days of initial site visit, complete site-specific, as-built, documentation packages. The Contractor must ensure that the site specific documentation packages are detailed and complete and include the physical layout of Remote Hardware and civil works. Power distribution documentation is to be provided, if supplied by the Contractor.

3C.3.6 For each new site installed under this Contract, the Contractor must maintain a duplicate copy of site-specific documentation during the term of the contract.

3C.4 Maintenance of Remote Hardware

3C.4.1 General

3C.4.1.1 The Contractor must provide Remote Hardware Maintenance Services for fixed remote sites including the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 2.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Hardware; and
f) Software/Firmware revisions.

3C.4.1.2 As per Section 2.12.1.2 (c) & (d) the Contractor must provide Warranty and Maintenance Services for all new Hardware delivered under this Contract in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 25(1), the "Hardware Maintenance Period" is the entire Contract Period.
b) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

3C.4.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

3C.4.2 Maintenance Zones

3C.4.2.1 Despite the Supplemental General Conditions 4001, Section 26 (3) (a), the Maintenance Zones are defined as follows:

Zone A:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador and is accessible using all-season paved public highways. Any location within Zone A boundaries that cannot be accessed using all-season paved public highways will be considered to fall within Zone B.

Zone B:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador that cannot be reached using all-season paved public highways, or where a ferry or air transport must be used. Examples include bush camps, mining sites, oil explorations sites and isolated communities. Repair time includes time spent on scheduled transportation only.

Zone C:

Includes any sites north of the Zone B boundaries. Repair time includes time spent on scheduled transportation only.

3C.5 Operator and Specialized Training Services

3C.5.1 General Requirements

3C.5.1.1 Training requirements are specified in Section 2.10

The Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned equipment and satellite telecommunications theory and technology.

4 PART 4 – GENERAL REQUIREMENTS FOR STREAM 2 – SERVICES FOR KU-BAND (CANADA ONLY)

4.1 GENERAL

The following general requirements apply to Satellite Space Segment Capacity Services, Teleport Services and Associated Service for Remote Sites, for Stream 2 – Services for Ku-band (Canada) unless otherwise noted.

4.1.1 The Contractor must provide the following to Canada for the Services:

a) Service Management;
b) Service Order Processing;
c) Client Support;
d) Problem Management;
e) Service Performance Monitoring;
f) Scheduled Service-Affecting and Maintenance Advisory;
g) Reporting;
h) Invoicing;
i) Training;
j) Link Budget Design;
k) Maintenance Services for Remote Hardware (Associated Services for Remote Sites only); and
l) Maintenance Services for Teleport Equipment (Teleport Services only).

4.1.2 The Satellite Space Segment Capacity provided to Canada must NOT be shared with any other user or party without the prior written consent of the Technical Authority and the Contracting Authority.

4.1.3 The Contractor is responsible for all functional aspects as required to satisfy all requirements for the Service(s), including planning, scheduling, directing, supervising, maintaining and operating.

4.1.4 The Contractor is also responsible for the overall services provided by its team members.

4.1.5 The Contractor must fulfill all Service obligations to Canada's user groups and operate and manage the required Service(s) on Canada's behalf to ensure continuous operation of the Service(s) as specified in this Statement of Work (SOW).

4.1.6 This SOW outlines the Service(s) attributes and quality of service that must be provided to Canada as part of the Contractor's obligations in providing the Service(s). In addition, the SOW describes the Contractor's support functions required to manage the relationships among Canada's user groups and the Contractor.

4.1.7 The Contractor must provide, when requested, Hardware Maintenance Services to Canada for all Remote Hardware during the Hardware Maintenance Period. The Hardware Maintenance Period is a minimum one year period plus any time by which the Hardware Maintenance Period is extended during the entire contract period.

4.1.8 The Contractor must ensure that all verbal, written and electronic communications that are required to be provided directly to Clients (e.g. Client support, recorded greetings and prompts, email and voice mail) are available at all times in both official languages of Canada (English and French), offering users a choice of either language depending on their individual preference.

4.1.9 In this Contract, "Regular Business Hours" refers to 8:00AM to 4:00PM Eastern Time, Monday to Friday, excluding statutory holidays observed by the Federal Government in the Province of Ontario.

4.1.10 NEUB wishes to have available a long-term solution for its Clients with a supplier(s) for its Space Segment Services that evolve as technology changes. The Contractor must offer to Canada any new Satellite Space Segment capacity, as well as all administrative or business improvements, within one month of making them generally available to other customers, by advising the Contracting Authority and the Technical Authority. For Space Segment Capacity that has become part of its standard service offering, it must provide these improvements at no additional charge to Canada. The price of any other service enhancements will be negotiated on a case-by-case basis. The Contractor acknowledges that no new services can be provided under this Contract unless the Contracting Authority issues a contract amendment authorizing the provision of those service. Canada reserves the right to add new services as services and technologies evolve and become available.

4.1.11 The Contractor must have a minimum of 5 years of experience provisioning, installing, operating and maintaining Fixed Satellite services to various customers in which the contractor maintained at least 10 Fixed Satellite earth stations for all their customers.

4.1.12 Within the last 10 years, the Contractor must have experience provisioning, installing, operating and maintaining Fixed Satellite services to large organizations with at least 20 users.

4.1.13 The Contractor must have, at a minimum, 1 Teleport or telecom serving office located in Canada.

4.1.14 The Contractor must indicate if they are providing site diversity (another teleport located at another location) pointed to the same serving satellite.

4.1.15 The Contractor must have prepared and delivered a minimum of 5 Operator Training and Specialized Training courses in satellite telecommunications technology in the past 5 years. The Contractor must provide the syllabus and delivery date of the delivered courses.

4.2 SERVICE MANAGEMENT

4.2.1. The SSC Satellite Service Manager will:

a) Accept and validate service requests from the Clients and determine whether to forward them to the Contractor as Service Orders;
b) Monitor and manage the Contractor's Service Level performance; and
c) Manage ongoing service issues.

4.2.2 The Contractor must assign a Contract Account Representative (CAR) to Canada to address any technical, administrative and service-related issues.

4.2.3 The CAR must have a minimum of 5 years of satellite telecommunications experience within the last 8 years.

4.2.4 During the Contract Period, the Contractor must provide the résumé for each new CAR to the Technical Authority for approval within 10 working days of the date the Contractor notifies the Technical Authority that a new CAR is required.

4.2.5 When requested, the CAR must meet with the SSC Satellite Service Manager, Technical Authority and/or Contracting Authority, at a location within the National Capital Area, or occasionally when this is not possible, must be available by teleconference phone call. Except in case of emergencies, Canada will provide the CAR with at least 5 days of notice before a meeting.

4.2.6 The CAR must provide the relevant Authority (or Authorities) with a record of decision and meeting minutes within 10 working days following any meeting. If the relevant Authority does not agree with the record of decision or meeting minutes prepared by the CAR, the relevant Authority will advise the CAR within 5 working days after receiving them.

4.2.7 When requested, the Contractor must provide sales and marketing support to Canada when Canada is communicating with existing and prospective Clients. This support will consist of the following:

a) Attending meetings;
b) Participating in telephone teleconferences or videoconferences;
c) Providing literature (either electronic or paper) explaining Fixed Satellite Services (FSS);
d) Assisting Canada in communicating with Clients about the FSS Services available under this Contract;
e) Acknowledging receipt of any of Canada's information requests within 2 working days to the Technical Authority and the SSC Satellite Service Manager; and
f) Providing the information within 5 working days to the Technical Authority and the SSC Satellite Service Manager.

4.2.8 The CAR's attendance at all meetings is at the Contractor's own expense, including any travel and living expenses that may be incurred.

4.3 SERVICE ORDER PROCESSING

4.3.1 General

4.3.1.1 The Contractor must provide two priority levels for Service Orders:

a) **Regular priority**: Normal non-rush delivery of the Services processed during Regular Business Hours.
b) **Express priority**: Expedited delivery of the Services processed during Regular Business Hours. The Contractor should process this Service Order before any other Service Order already in queue under a Regular priority.

4.3.1.2 The Maximum Service Delivery Interval (MSDI) for Service Orders with each level of priority is set out in Section 4.3.3 of this Annex. While the order in which the Contractor processes Service Orders is within the Contractor's discretion, meeting the MSDIs is mandatory. Each Service Order will clearly indicate the priority level.

4.3.1.3 The Contractor must provide a single ordering point for all Regular and Express Priority Service Orders.

4.3.1.4 The Contractor must only accept Regular and Express Priority Service Orders and Service Order revisions sent by the SSC Satellite Service Manager by email.

4.3.2 Regular and Express Priority Service Orders

4.3.2.1 The Contractor must accept Regular and Express Priority Service Orders made by email to the Contractor-provided email address twenty-four (24) hours per day, seven (7) days per week, and every day of the year, and must provide an automated reply to confirm receipt of the emailed Service Order.

4.3.2.2 Regular and Express Priority Service Orders sent to the Contractor by the SSC Satellite Service Manager during Regular Business Hours will be considered received by the Contractor on that day. Service Orders sent to the Contractor by the SSC Satellite Service Manager between 4:01 PM and 7:59 AM (Eastern Time) will be considered received by the Contractor at 8:00 AM the next working day.

4.3.2.3 The Committed Service Delivery Date (CSDD) is the date that the Contractor must complete the delivery of a given Service Order. This date must be within the appropriate Maximum Service Delivery Interval (MSDI).

4.3.2.4 If for any reason the CSDD for a Service Order cannot be met, the Contractor must immediately notify the SSC Satellite Service Manager outlining the reason for the delay and providing a new CSDD. If the revised CSDD places the completion of the order outside the MSDI, the information related to this Service Order must be tracked and reported in the Monthly Service Order Tracking Report, and the Service Order will be subject to service credits.

4.3.3 Service Delivery Intervals (SDI)

4.3.3.1 The SDI is defined as the elapsed time between the issuance of the Service Order or subsequent Service Order Revision by the SSC Satellite Service Manager and the delivery/acceptance of the Service.

4.2.3.2 The Maximum Service Delivery Interval (MSDI) is defined as the maximum allowable amount of time to process a Service Order depending on the type and priority of that Service Order. The Maximum Service Delivery Interval Table is as follows:

4.3.3.3 The Maximum Service Delivery Interval (MSDI) for Satellite Space Segment Capacity Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Regular Priority Service delivery	45 business days after receipt of Service Order (inclusive of Satellite Link Budget Analysis (SLBA) and Frequency Clearance mentioned in Section 5A.4 & 5A.5)
Express Priority Service delivery	10 calendar days after receipt of Service Order (inclusive of SLBA and Frequency Clearance mentioned in Section 5A.4 & 5A.5)

Within 5 calendar days of receipt of the Regular Priority Service Order, the Contractor must obtain, if required by the Client, from the relevant spectrum authorities worldwide all Radio Frequency Interface (RFI) clearances for all Transmit and Receive frequency pairs assigned between the satellite and Deployed Demarcation Point (DDP).

4.3.3.4 The Maximum Service Delivery Interval (MSDI) for Teleport Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Service Turn-up assuming the modems in use are as defined in Section: 5B.2	30 calendar days after receipt of Service Order
Service Turn-up assuming the modems are other than those defined in Section 5B.2	30 calendar days after receipt of Service Order

4.3.3.5 The Maximum Service Delivery Interval (MSDI) for Associated Services for Remote Sites is specified in the table below.

Service Order Type	MSDI for Service Orders
Identification of site survey and install dates for remote sites	5 working days
Site survey, Hardware purchase, Installation of Remote Hardware and service turn-up regardless of site location(s) assuming that all landlord access and transportation to the site(s) is available	60 calendar days

4.4 CLIENT SUPPORT

4.4.1 Hotline Service

4.4.1.1 The Contractor must provide the Client with technical support for all aspects of the Service including a hotline accessible using a toll-free number (the “Hotline”). The Contractor must satisfy the requirements of Supplemental General Conditions 4001, Section 25(4) relating to Remote Hardware and Supplemental General Conditions 4004, Section 5 relating to software using this Hotline, except as specifically noted below.

4.4.1.2 The Contractor must pick up all Hotline calls within 5 rings 95 percent of the time. The Contractor must answer all calls, with a live service agent, within 2 minutes 95 percent of the time.

4.4.1.3 The Contractor must log and track all reported calls to the Hotline from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

4.4.1.4 The Contractor must track and resolve a Client reported problem call only during the selected maintenance coverage time specific to a particular Client. (i.e. A Client reported problem call occurring at 6 p.m. on Friday for a Client whom has selected an maintenance coverage time of 9 hr/5 day, 8 a.m. to 5 p.m., Monday to Friday must be tracked and resolved by the Contractor beginning the following Monday at 8 a.m. only until resolution but only during the selected O&M coverage time specific to a particular Client.)

4.4.1.5 The Contractor's Hotline must be staffed and available to the Client twenty-four (24) hours per day, seven (7) days per week, and every day of the year.

4.4.2 Engineering Assistance

4.4.2.1 In addition to the Hotline, the Contractor must provide engineering assistance to the SSC Satellite Service Manager and Technical Authority accessible using a North American phone number separate from the Hotline toll-free number.

4.4.2.2 The Contractor must assist with issues requiring technical expertise at a level greater than the Hotline. This could include, but not be limited to, assistance with:

a) Link budget issues;
b) Compatibility issues; and
c) Intermittent or chronic performance issues.

4.4.2.3 The Contractor's Engineering Assistance must be available Monday to Friday from 8:00 AM to 4:00 PM Eastern Time to receive and respond to calls.

4.4.3 Web Site Support Service

4.4.3.1 The Contractor must provide Canada with technical support for all aspects of the Services, through a web site support service, which must include at a minimum, Frequently Asked Questions (FAQs) and, if applicable, on-line software diagnostic routines, support tools and services.

4.4.3.2 The Contractor's web site must provide support in English and in French, and must be available twenty-four (24) hours per day, seven (7) days per week, and every day of the year. The Contractor's web site must be available 99% of the time.

4.4.3.2 The Contractor must provide WEB portal access (read only) to the SSC Satellite Service Manager and Technical Authority in order to view all trouble tickets related to all Services being provided to Canada under this contract.

4.5 PROBLEM MANAGEMENT

4.5.1 General

4.5.1.1 The Contractor must manage all problems affecting the delivery of the Service(s). These problems must be managed twenty-four (24) hours per day, seven (7) days per week, and every day of the year, by the Contractor by diagnosing, tracking, recording and reporting on all problems that affect any Client user's ability to use the Service(s). The Contractor must document all problems, including a description of the problem and all details on how the problem was resolved.

4.5.1.2 The Contractor must be the single point of contact and have full responsibility for leading and coordinating all activities with any Satellite Space Segment provider, Teleport Service provider or Remote Hardware provider for the resolution of any problem that affects the performance of the Service(s).

4.5.1.3 The Contractor must log and track all reported calls to its help desk from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

4.5.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of a High Severity event (as per Section 4.5.2.2) service outage or performance problem as soon as it appears that it may exceed thirty (30) minutes in duration.

4.5.1.5 The Contractor must perform the following activities on an on-going basis when handling service-related problems:

a) Identify each reported problem by a unique problem record number (ticket number);
b) Perform an analysis of the problem reported;
c) Maintain an audit trail that includes all actions taken until the problem is resolved; and
d) Provide reports as listed in the Section named "Reporting".

4.5.2 Escalation Procedures

4.5.2.1 The Contractor's Hotline representatives must escalate to the appropriate level of the Contractor's management and generate a Critical Incident Report for any unresolved problems according to the time lines and severity indicated below.

4.5.2.2 Escalation time lines (which are in effect twenty-four (24) hours per day, seven (7) days per week, and every day of the year) are:

ESCALATION	Low Severity	Medium Severity	High Severity
Manager Operations	2 hours	30 minutes	15 mins
Director Operations	3 hours	1 hour	30 mins
VP Operations	8 hours	2 hours	1 hour

Note: All escalation times listed in the table above start running when the initial request is made, regardless of the time of day.

a) **Low Severity**: Diminished capacity (including repeated intermittent non-availability) of the network affecting any single, or group of, remote earth station(s) (excluding scheduled maintenance as defined in Section 4.7).

b) **Medium Severity:** Diminished capacity (including repeated intermittent non-availability) of the network affecting all remote earth station(s) (excluding scheduled maintenance as defined in Section 4.7).

c) **High Severity:** Complete unavailability of the network, including the failure of a Hub and all remotes or the complete failure of a satellite (excluding scheduled maintenance as defined in Section 4.7).

4.5.2.3 Within 10 working days of this Contract being issued, the Contractor must provide the SSC Satellite Service Manager and Technical Authority a list of the names and contact information (phone number, email address, etc.) of the Manager of Operations, Director of Operations, and Vice President of Operations (or the equivalent positions with the Contractor's organization). The Contractor must continue to provide an updated list to the SSC Satellite Service Manager and Technical Authority as changes in personnel occur in the management positions listed above.

4.6 SERVICE PERFORMANCE MONITORING

4.6.1 Availability of Services

4.6.1.1 The Contractor must perform remote network monitoring, preventative diagnostics, and coordinate problem isolation and resolution.

4.6.1.2 Satellite Space Segment Capacity Service

The Contractor must provision the Satellite Space Segment Capacity Service to ensure a Service Availability Percentage of at least 99.99% for each calendar month.

4.6.1.3 Satellite Space Segment Capacity Service and Teleport Services

The Contractor must provision the combined Satellite Space Segment Capacity Service and Teleport Service to ensure a Service Availability Percentage of at least 99.95% for each calendar month.

4.6.1.4 Satellite Space Segment Capacity Service, Teleport Service and Remote Site

The Contractor must provision the combined Satellite Space Segment Capacity Service, Teleport Services and Remote Site Service to ensure a Service Availability Percentage of at least 99.30% for each calendar month.

4.7 SCHEDULED SERVICE-AFFECTING AND MAINTENANCE ADVISORY

4.7.1 The Contractor must provide the SSC Satellite Service Manager with written notice of any scheduled maintenance that may affect the Service(s) at least ten (10) working days before performing any scheduled maintenance. The SSC Satellite Service Manager will provide written notice to the Contractor agreeing to the scheduled maintenance within two (2) business days from receipt of the scheduled maintenance notice.

4.7.2 Except in cases of emergency, the Contractor must notify the SSC Satellite Service Manager before proceeding with any unscheduled maintenance activities that may affect the Service. When possible, the Contractor agrees to coordinate unscheduled maintenance activities that may affect the Service with the SSC Satellite Service Manager.

4.7.3 In cases of emergency, the Contractor must notify the SSC Satellite Service Manager as soon as possible after beginning the emergency unscheduled maintenance activity. The Contractor must provide the reason for the unscheduled activity and must provide information about how long the Service will be affected.

4.7.4 The Contractor must have available on the Internet all information indicating when the sun transits will occur and when they will affect each geostationary satellite being used by the Contractor to deliver the Services under this Contract. The Contractor must provide the URL of the Web Site where the Sun Transit information can be obtained. The Contractor must provide a notice to the SSC Satellite Service Manager by email, at least 2 weeks before the beginning of the sun transits.

4.8 REPORTING

4.8.1 General

4.8.1.1 The Contractor must provide the following reports in an electronic format (in comma or tab-delimited file format, MS Excel) by way of email:

a) Recurring Problem Report;
b) Problem Summary Report;
c) Service Performance Levels Report; and
d) Traffic Throughput Report

4.8.1.2 Amendments, changes or deletion of reports, as requested by the Technical Authority, will be handled through a Contract Amendment issued by the Contracting Authority.

4.8.2 Recurring Problem Report

4.8.2.1 When requested by the SSC Satellite Service Manager, where the SSC Satellite Service Manager has identified a recurring problem, the Contractor must provide a consolidated report by email detailing all the instances in previous reporting periods of similar problems, together with the Contractor's detailed proposed plan for addressing the recurring problem, including a timeline for resolution. The Contractor must provide the SSC Satellite Service Manager with an incident report by email within 24 hours and the report must contain, at a minimum:

a) Problem Ticket number(s);
b) Date(s) of the ticket(s);
c) Outage start date(s) and time(s);
d) Name of the person and department reporting the incident;
e) Severity level (as described in Section 4.5.2.2);
f) Description of the problem;
g) Description of the proposed resolution; and
h) Estimated time to implement remedial action to remedy underlying problem causing recurring problem.

4.8.3 Problem Summary Report

4.8.3.1 The Contractor must provide the SSC Satellite Service Manager with a monthly Problem Summary Report containing the following information, within 10 calendar days from the end of the billing period:

a) All problem tickets logged by the Contractor;
b) The nature of each problem;
c) The date and time at which each problem was first reported to the Contractor;
d) The date and time at which the Contractor determined each problem began (where the Contractor is able to determine this);
e) The disposition of each problem;
f) Whether the underlying cause of the problem was related to the Service or to equipment provided by Canada;
g) The duration of each problem; and
h) Whether, in the previous three monthly reporting periods, any similar problem tickets were opened.

4.8.4 Service Performance Levels Report

4.8.4.1 Within 10 calendar days of the end of each billing period, the Contractor must provide a monthly report to the SSC Satellite Service Manager showing the calculations of Service Availability Level for the month on a per-Client basis. Although Service Availability Credits are only payable based on the calculation of Service Availability during a calendar year (or partial calendar year, when applicable), reports on Service Availability must be submitted monthly, to allow Canada to monitor Service Availability performance throughout the year and address recurring issues by requesting corrective action. The values of these monthly calculations will be compared to the threshold values listed in Section 4.6. The method of calculation is indicated in Section 4.8.4.2.

4.8.4.2 The Service Availability Level for the Service that is reported by the Contractor in the monthly Service Performance Level report must be calculated using the following formula:

[(TNT – TOT) / TNT] X 100

where "**TNT**" is defined as the total network time, which is the total available number of minutes in the reported month and is calculated by multiplying by the number of calendar days in the month, times 24 hours, times 60 minutes (i.e., in April the TNT would be 30 X 24 X 60 = 43200); and

where "**TOT**" is defined as the total outage time, which is the total number of outage minutes as tracked by the Contractor's problem record system affecting that service. The service outage problem records logged by the Contractor will be used to calculate outage minutes. The outage minutes will be calculated from the time the problem is first recorded until the problem is resolved (ticket close) for each problem record. The sum of all these outage minutes will be the TOT. This number does not include scheduled maintenance or sun transit downtime where the Contractor properly advised the SSC Satellite Service Manager in accordance with Section 4.7.

4.8.5 Traffic Throughput Report

4.8.5.1 For all the networks provided by this Contract, the Contractor must have equipment capable of providing traffic throughput statistics. The Contractor must provide the SSC Satellite Service Manager with a monthly traffic throughput report. The report will outline the outbound and inbound traffic expressed in throughput versus time. The data points will be tabulated in 1 hour intervals (data point averaged over 1 hour) over the monthly period. Upon request of the Technical Authority or the SSC Satellite Service Manager, more specific ad hoc reports may be requested with shorter time intervals for the data points.

4.9 INVOICING

4.9.1 General

4.9.1.1 The Contractor must establish a federal government master account with at least one sub-level to identify the Client. The account number must be 15 characters or less and must not include any special characters.

4.9.1.2 The Contractor must cooperate with the SSC Satellite Service Manager or Technical Authority for the resolution of any billing issues to the satisfaction of the SSC Satellite Service Manager or Technical Authority.

4.9.1.3 The billing period is defined as each calendar month, starting from the 1st of the month to the last day of that month.

4.9.2 Invoices

4.9.2.1 The Contractor must provide a printable and non-modifiable monthly invoice to the SSC Satellite Service Manager in Portable Document Format (PDF) and it must be submitted on the Contractor's official letterhead or include its logo.

4.9.2.2 The Contractor must ensure that the invoice is sent by email to the SSC Satellite Service Manager within 10 working days after the end of each billing period.

4.9.2.3 The Contractor must invoice Canada on a monthly basis for all one-time and recurring charges accounted for in that month based on a billing period of the first of the month until the last day of that month. All invoices for one-time costs (installation, de-installation, site surveys, civil works) must come from the Contractor and not from any of the Contractor's third party companies. Services that start part way during a calendar month will be prorated using the formula of: Total cost / number of days in billing month * number of days the item is being charged for. All Services and Remote Hardware must be delivered before the Services and Remote Hardware can be invoiced.

4.9.2.4 The Contractor must summarize charges associated with Services separately from those associated with equipment purchases on the invoice.

4.9.2.5 The summary invoice must include the previous balance, current total charges, total payments, total adjustments, and any outstanding balance.

4.9.2.6 In addition to the information required by General Conditions 2035, the Contractor must ensure that the individual Service Order reference number, deliverable and/or description of work is included in the invoice.

4.10 TRAINING

4.10.1 General

4.10.1.1 Upon request of the Technical Authority, the Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned Satellite Earth Station Remote Hardware and satellite telecommunications theory and technology.

4.10.1.2 The training session must either be conducted at a Government of Canada facility located within Canada as identified by the SSC Satellite Service Manager or at a location in Canada provided by the Contractor as determined by the SSC Satellite Service Manager. Canada will not be charged for the use of the Contractor's premises if Operator and Specialized Training courses are conducted on the Contractor's premises. Canada will provide the Contractor at least 1 month notice of any training session requirement.

4.10.1.3 It is anticipated that most training sessions will be conducted in English, however there may be a requirement for the session to be conducted in French and the training must then be conducted in French. Regardless of the language used to conduct the training session, the Contractor must supply all necessary material and documentation to the trainees at the start of the course with a complete copy for each trainee in their official language of choice.

4.10.1.4 For Instructor Travel and Living (T&L) expenses associated with training services, the Contractor must submit T&L expenses separate from the labour hours.

4.10.1.5 The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the National Joint Council Travel Directive and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".

All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

4.10.2 Operator Training

4.10.2.1 When requested by the Technical Authority, from time to time, the Contractor must provide Operator Training based on a Statement of Work.

4.10.2.2 The Statement of Work to the Contractor may request hands-on, instructor-led Client Operator Training for all provisioned Satellite Earth Station Remote Hardware. The total number of Operator Training sessions requested will not exceed 20, each of which must accommodate up to 5 trainees. Each course should include the following topics, unless other topics are agreed to between the Technical Authority and the Contractor:

a) Basic Satellite Knowledge as it pertains to Fixed Satellite Services;
b) Satellite Earth Station Remote Hardware installation and configuration, earth station commissioning including antenna pointing;
c) Satellite Earth Station Remote Hardware analysis of visible LED and controls; and
d) Learning how to perform user preventative and basic corrective maintenance.

4.10.2.3 In addition to covering the specific subjects described above the instructor(s) must be knowledgeable about all the Satellite Earth Station Remote Hardware available under the Contract and must be able to answer questions from trainees about the features of the Satellite Earth Station Remote Hardware supplied under this Contract.

4.10.3 Specialized Training

4.10.3.1 When requested by the Technical Authority, from time to time, the Contractor must provide hands-on, instructor-led training for Clients who require more Specialized Training on Satellite Earth Station Remote Hardware. This request will be based on a Statement of Work.

4.10.3.2 In addition to covering the subjects described above, the instructor(s) must be knowledgeable about all the Satellite Remote Hardware available under the Contract and be able to answer questions from trainees about the features of the Remote Hardware supplied under this Contract.

4.11 LINK BUDGET DESIGN

4.11.1.1 Upon request, the Contractor must provide to the SSC Satellite Service Manager a link budget describing the power and satellite space segment parameters. Specifications are detailed in Part 5 - Technical Requirements, Section 5A.4.

4.12 MAINTENANCE SERVICES FOR REMOTE HARDWARE

4.12.1 General

4.12.1.1 The Contractor must provide Remote Hardware Maintenance Services for remote sites that includes the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 4.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Remote Hardware; and
f) Software/Firmware revisions.

4.12.1.2 As per Section 4.12.1.1(c) & (d), the Contractor must provide Warranty and Maintenance Services for all new Remote Hardware delivered under this Contract in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

4.12.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

4.12.2 Equipment Retrofit, Software Updates and Configuration Changes

4.12.2.1 The Contractor must satisfy the requirements of Supplemental General Conditions 4001 and Supplemental General Conditions 4004, except as specifically noted below. As part of the Hardware Maintenance Service, the Contractor must provide hardware retrofits/modifications, software upgrades and configuration changes at the Contractor's cost, where required, for the correction of identified operational problems as a result of design deficiencies, and where such modifications are supported by the Remote Hardware manufacturer or software publisher.

4.12.2.2 Where Remote Hardware retrofits and/or upgrades are required, the Contractor must coordinate these activities with user groups and perform these activities where required to ensure that system/hardware modifications are performed with minimal inconvenience and no additional cost to the Clients, and with minimal disruption to service.

4.12.2.3 The Contractor must provide software updates as supported by the hardware manufacturer or his agent and configuration changes at no additional cost to the Clients for Remote Hardware supported directly by the Contractor, during the Contract Period. These software updates and/or configuration changes are to be downloaded to the Remote Hardware through the transmission capability of the Hub or through the actions of an agent of the Contractor who is providing On-Site Maintenance Services on the Remote Hardware. If the Remote Hardware is not on-line during the software update process or the configuration change process and that Canada has been advised of the scheduled activity, the Contractor will, upon request from Canada, perform a site visit to implement the update at Canada's cost.

4.12.3 Maintenance Capability & Response Times

4.12.3.1 Maintenance Zones are defined in Section 5C.4.2.

4.12.3.2 The Contractor must ensure that all locations designated as equipment Maintenance Centres are equipped with adequate tools and test equipment to effectively perform the equipment maintenance function and that technicians are skilled in the performance of such activity and are familiar with the equipment to be maintained.

4.12.3.3 The Contractor must ensure that maintenance technicians are equipped with adequate tools, test equipment and equipment spares to effectively perform the equipment maintenance function at the remote site(s). The maintenance technicians must be skilled in the performance of such activity and must be familiar with the equipment to be maintained.

4.12.3.4 The Contractor must ensure that in the process of On-Site Maintenance Service, any impaired or failed Remote Hardware must be rendered serviceable within a period designated in Section 4.12.3.9 (subject to timely availability of commercial transportation). In the event of non-timely availability of commercial transportation, the Contractor must make a best effort approach to respect the period designated in Section 4.12.3.9.

4.12.3.5 Despite Supplemental General Conditions 4001, Section 12(3), the Contractor is responsible for the Service including any failure caused by a defect in any Government Furnished Equipment (GFE) being maintained as part of the Hardware Maintenance Service.

4.12.3.6 "Maximum Time to Repair" or "MTTR" is the elapsed time from when Canada first reports the trouble or the time when Contractor first recognizes the performance of the Service or the Hardware is being affected by any condition (whichever is earlier) until the trouble or other performance problem has been resolved (i.e., the trouble has been resolved and the Service has been restored to full performance in accordance with the terms of this Contract). The MTTR, in the case of On-Site Maintenance will be calculated as the time elapsed during Regular Business Hours. The MTTR includes all time taken by the Contractor to detect the fault, isolate the problem, remove and replace any faulty equipment, verify the repair, and restore the Service and/or Hardware to fully functional operation.

4.12.3.7 The MTTR is calculated based on response from Contractor to mobilize to site. The hotline service is a twenty-four (24) hour service offered by the Contractor. In other words, the hotline service must be available twenty-four (24) hours per day, seven (7) days per week and every day of the year to answer the Client reported problem call as referenced in Section 4.4.1.

4.12.3.8 Despite Supplemental General Conditions 4001, Section 26(3)(d), where the Contractor is able to resolve the trouble or performance problem remotely, the MTTR is 4 hours.

4.12.3.9 Despite Supplemental General Conditions 4001, Section 26(3)(a) & (d), where On-Site Maintenance is required, the Contractor must resolve the trouble or performance problem, within the following MTTR:

a) Maintenance Zone A : 4 hours
b) Maintenance Zone B : 12 hours
c) Maintenance Zone C : 24 hours

(i.e. in Maintenance Zone A, a problem reported at 8:00 AM Tuesday must be resolved by 12:00 Noon Tuesday; another example, in Maintenance Zone B a problem reported at 11:00 AM Friday must be resolved by 3:00 PM Monday (11:00 – 16:00 Friday is 5 hours and 08:00 – 15:00 is 7 hours for a total of 12 hours).)

4.12.3.10 The Contractor must act on problems reported to the Hotline without delay and use all means at its disposal to restore the Service or service quality or the Hardware to fully functional operation without undue delay.

4.12.3.11 The Contractor must ensure that the Remote Hardware being provisioned at a remote site has a Mean Time Between Failure (MTBF) equal to or exceeding 55,000 hours. The calculation of the MTBF must be in accordance with the U.S. Department of Defence MIL-HDBK-217F Reliability Model.

4.12.4 Services Outside Maintenance Coverage

4.12.4.1 The Contractor must provide labour services for additional technical resource work done by the Contractor that is not included as part of the Hardware Maintenance Service described in the Contract. Pre-approval from the SSC Satellite Service Manager or Technical Authority is required before work commences. This additional service includes work done by the Contractor's technician being sent to a remote site for maintenance purposes where the Contractor can demonstrate that the problem was caused by Client-owned non-satellite related equipment.

4.12.4.2 For Travel and Living (T&L) expenses associated with the services outside maintenance coverage, the Contractor must submit T&L expenses separate from the labour hours associated with the activity.
The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the *National Joint Council Travel Directive* and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".
All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

4.13 MAINTENANCE SERVICES FOR TELEPORT EQUIPMENT

4.13.1 The Contractor is responsible to install, operate, monitor and maintain all equipment associated with the Teleport Service and the Modem Service at the Contractor's cost as shown in Annex B2 – Appendix C and D.

5 PART 5 – TECHNICAL REQUIREMENTS FOR STREAM 2 – KU-BAND SERVICE (CANADA ONLY)

5A - SATELLITE SPACE SEGMENT CAPACITY SERVICES

5A.1 General Requirements

5A.1.1 The Contractor must provide 1 and 2 way single hop satellite communication services within Canada.

5A.1.2 The Contractor must provide the Satellite Space Segment Capacity in a Partial RF Channel. The Partial RF Channel satellite capacity must be provided in 0.1 MHz increments.

5A.1.3 The Contractor must provide same pricing to all satellite categories independent of which satellite will be utilized in the delivery of the Ku-band service.

5A.1.4 The Contractor must provide the Satellite Space Segment Capacity Service on a twenty-four (24) hours per day, seven (7) days per week, and every day of the year basis.

5A.1.5 The Contractor must provide Satellite Space Segment Capacity in the most efficient and cost effective manner to facilitate satellite connectivity services, integrating Canada-owned and operated earth stations.

5A.2 Classification of Services

The Contractor must provide the Satellite Space Segment Capacity Service in the following categories:

5A.2.1 Ku-Band

a) Type 3 Service

Defined as non-protected in the event of an interruption. No restoration is designated for this Type 3 Service, but the Type 3 Service may be restored at the discretion of the Contractor, subject to the availability of Satellite Space Segment Capacity at the time of interruption and prudent facility management.

5A.2.2 Additional types of Satellite Space Segment Capacity may be required.

5A.3 Ku-Band Type 3 Service

5A.3.1 The Contractor must provide, to Clients who subscribe to Ku-band Type 3 Satellite Space Segment Capacity Service, Ku-band Satellite Space Segment Capacity to support operations twenty-four (24) hours per day, seven (7) days per week, and every day of the year. If Full Period Whole RF Channel is provided to Clients who subscribe to this Type 3 Service, then any other Partial RF Channel must, subject to availability, be on the same primary satellite as the Whole RF Channel capacity.

5A.3.2 Coverage

The RF channel must have continuous coverage over all of Canada. This includes East Coast coverage of Nova Scotia, Newfoundland and Labrador. It also includes the North, including Nunavut, North West Territories the Yukon and Northern Quebec up to at least 70 degrees North latitude.

5A.3.3 Service Performance Parameters

Throughout the Contract period the Contractor's Whole RF Channel over the coverage area up to 55 degrees North Latitude and down to 42 degrees North Latitude must at minimum meet the following metric requirements:

a) Effective Isotropic Radiated Power (EIRP): 49 dBW
b) Gain to Temperature Ratio (G/T): 2 dB/K
c) Transponder Bandwidth (BW): 36 or 54 MHz

The performance above 55 degrees North Latitude and below 42 degrees North Latitude will be of a lower EIRP and G/T.

As it relates to Partial RF Channel capacity, EIRP and BW parameters will be determined through the Contractor's link budget design.

5A.3.4 Availability for Ku-Band Satellite Space Segment Capacity

The Contractor must provide Ku-band Satellite Space Segment Capacity requested by Canada, subject to the Contractor's concurrence that such capacity is available at the time the services are required. Costing for this bandwidth must be at the price specified in Annex B2, Appendix B.

5A.4 Satellite Link Budget Analysis

5A.4.1 The Contractor must provide a Satellite Link Budget Analysis (SLBA), which will indicate the space link availability and the system margins for both one-way and two-way satellite connections. The SLBA must take into account at a minimum the following parameters:

a) EIRP;
b) Thermal noise;
c) Earth Station G/T;
d) Rain fade;
e) System margin;
f) Eb/No of modem;
g) Adjacent channel interference;
h) Adjacent satellite interference;
i) Intermodulation noise and;
j) MODCOD Selection (including TPC/LDPC coding, and ACM/Carrier in Carrier technology)

5A.4.2 The Contractor must provide the Service so that each remote site will have an end-to-end one-way space link availability (Propagation Availability) of 99.8% with a Bit Error Rate (BER) of 1×10^{-7}. The Contractor must clearly explain how they can meet the 99.8% one-way end-to-end space link availability in relations to the rain fade margin for the uplink and downlink. The Contractor must clearly explain the relationship between the modem's Eb/No and BER specifically for a BER of 1×10^{-7}.

5A.4.3 On the occasion that any of Canada's Clients provide a SLBA to the Contractor, the Contractor must review it for consideration. Canada recognizes that the implementation of this SLBA is subject to Contractor's approval.

5A.4.4 The Contractor must provide a SLBA for the following locations and earth station characteristics taking into account the parameters listed in Section 5A.4.1. As well, the SLBA must take into consideration the Contractor's proposed Teleport location and Teleport Earth Station characteristics. For all SLBA's, the contractor will use a Comtech CDM-625A satellite modem at the proposed Teleport location and at the remote earth station location. Furthermore, for each link design listed below, the contractor will select the most space segment efficient MODCOD setting and calculate the BW utilization based on a carrier spacing factor of 1.35.

The resulting Satellite Space Segment consumption rates and appropriate prices are to be input in Annex B2, Appendix L.

LINK DESIGN ID#	**REMOTE EARTH STATION G/T (db/K)**	**REMOTE EARTH STATION ANTENNA DIAMETER & Tx ANT. GAIN (m/dBi)**	**REMOTE EARTH STATION LOCATION**	**DATA RATE (expressed in MBPS for a full duplex symmetrical link design)**	**SPACE SEGMENT CAPACITY UTILIZATION (PEB or bandwidth utilization whichever is greater) FOR FULL DUPLEX SYMMETRICAL LINK (expressed in 0.1 MHz segments)**
A	23	2.4/47.4	Whitehorse, YT	2.0	
C	23	2.4/47.4	Resolute, NU	2.0	
D	23	2.4/47.4	Repulse Bay, NU	2.0	
E	23	2.4/47.4	Iqaluit, NU	2.0	
F	25.7	1.8/44.6	Tofino, BC	3.5	
G	25.7	1.8/44.6	Stony Rapids, SK	3.5	
H	25.7	1.8/44.6	Kuujjuarapik, QC	4.0	
I	25.7	1.8/44.6	Sable Island, NS	5.0	

5A.5 Frequency Clearance

5A.5.1 The Contractor must ensure that the frequencies assigned to Canada are cleared with Industry Canada with regards to any Canadian radio frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from Industry Canada. If Canada decides to process the radio frequency interference study with Industry Canada, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

5A.5.2 In the case that the Deployed Demarcation Point (DDP) is outside Canada, the Contractor will endeavor to obtain frequencies clearances assigned to Canada with the respective country's frequency spectrum administration agency and on a case-by-case basis will endeavor to meet the service interval for the clearance of frequencies with regards to satellite frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from the respective country's frequency spectrum administration agency. If Canada decides to process the radio frequency interference study with the respective country's frequency spectrum administration agency, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

5A.5.3 All costs involving frequency clearance and earth station licensing must be consolidated with the Contractor who will provide one invoice that includes everything, including licensing costs. License requests can be submitted by the Contractor to Industry Canada or the respective country's frequency spectrum administration agency who will invoice the Contractor directly.

5B - TELEPORT SERVICES

5B.1 General Requirements

5B.1.1 Teleport Services are managed services that allows transmission and reception of traffic of a certain bandwidth (bit rate) to and from a Canada owned remote earth station. Teleport Services

- must include leased Teleport and Teleport based modem services including operation and maintenance (O&M);
- incorporates the remote earth station, which Canada may procure under this contract; or may already own;
- will be procured with the Satellite Space Segment Capacity Service (Section 5A); and
- may include Contractor provisioned terrestrial backhaul(s), when requested.

5B.1.2 The Contractor must provide the Teleport Services so that it can be used in conjunction with Government furnished or Contractor provisioned Remote Hardware and Space Segment Capacity Services provided under this Contract. The Contractor must provide the Teleport Services with the capability of pointing to the Contractor proposed satellite(s) as per Section 5A of this SOW.

5B.1.3 The Teleport(s) must be situated within the boundaries of Canada. The Teleport in Canada must accommodate the RF channels with single hop satellite coverage of Canada. The Teleport must have high data rate connections to terrestrial backhauls including high-speed internet connectivity.

5B.1.4 The Contractor must provide the Teleport Service in the Ku-band frequency ranges.

5B.1.5 The Contractor must provide air-conditioned building space and commercial, conditioned, protected, redundant, AC or DC power including an uninterruptible power supply (UPS) with battery backup capacity for 30 mins and must also provide a diesel generator for backup at the Teleport(s).

5B.1.6 The Contractor must provide redundant equipment (RF/IF Chain, LNB, BUC).

5B.1.7 The Contractor must provide secure rack space and power at the Teleport(s) for GFE, as required.

5B.1.8 The Teleport Services must allow unimpeded transmission of user-initiated encrypted data and user/machine authentication. The Service must support typical user-provided security applications, which include communications link security as well as remote desktop physical security, all of which may require encryption and authentication techniques initiated at the Remote Site. The Contractor acknowledges that Canada's LAN environment will implement a Virtual Private Network (VPN) solution using IP Security (IPSEC), which will include the Entrust™ PKI products with Open Systems Integration (OSI) layer 3 (Network)/layer 4 (Transport) encryption. The Contractor further acknowledges that Canada may in the future deploy an applications-based encryption/authentication solution such as Secure Socket Layer (SSL) encryption. The Teleport Services must support the Client's deployment of both IPSEC VPN and SSL solutions.

5B.1.9 The Contractor must not protocol filter any IP traffic originating from equipment at remote sites unless requested by the SSC Satellite Service Manager.

5B.1.10 The Contractor must notify the Contracting Authority of any plans to sunset this Service at least 18 months in advance and must provide, at the Contractor's cost, migration to an equivalent or better Service.

5B.2 Modem Services

5B.2.1 The Contractor must provide Modem Services which is a monthly fee service for the operation of modems, either owned by the Contractor or furnished by Canada, and used in the Contractor's Teleport(s) to complete the communication link with Canada's modems at the Remote Site(s).

5B.2.2 The Contractor must install, operate, monitor and maintain all equipment associated with the Modem Services at the Contractor's cost.

5B.2.3 The modems used can be categorized under the following types of interfaces and operating modes:

a) L-Band Interface type satellite modem – modems which have an interface that operates anywhere within the range of 950 to 2000 MHz

   a. SCPC mode – Single Channel per Carrier
   b. DVB-S mode – Digital Video Broadcasting – Satellite
   c. DVB-S2 mode – Digital Video Broadcasting – Satellite 2nd generation

5B.2.4 In the case where Canada provides the modem(s) to be installed at the Teleport(s), the Contractor must provide a firm unique monthly rate as per Annex B2, Appendix D. It is the responsibility of the Contractor to install and monitor these modems to an operational level such that the complete end-to-end service is maintained. The Contractor must include into the monthly price any specific customer requirements in the case that Canada's modem(s) are installed in an area away from where the Contractor's modems are installed (i.e. specific customer racks or equipment cages or in specific customer equipment rooms). The Contractor must be prepared to swap out Canada's modem with a Canada supplied spare modem in the event the modem malfunctions.

5B.2.5 The Contractor must provide other satellite modems, as required, to be used in the Teleport Service.

5B.2.6 The Contractor must provide automatic switchable redundancy for the L-Band Equipment and RF Equipment to achieve the Service Availability requirements described in in Section 4.6.1.3.

5B.2.7 The Contractor must provide sufficient capacity on the IF and RF links, from the satellite modem(s) to the RF transmitter, to accommodate a minimum uplink EIRP in multi-carrier mode of 69 dBW.

5B.3 Backhaul Requirements

5B.3.1 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide Internet access up to 100 Mbps at the Teleport(s). The Contractor must absorb all one-time construction costs to provide Internet Access at the Teleport(s).

5B.3.2 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide up to 100 Mbps of dedicated terrestrial backhaul capacity for connectivity to Canada's Data Centre(s). The Contractor must absorb all one-time construction costs to provide dedicated backhaul connectivity to the Teleport(s).

5B.3.3 Upon request by the SSC Satellite Service Manager, the Contractor must provide the Internet access or the dedicated backhaul. Costing for backhaul(s) must be at the price specified in Annex B2 - Appendix H.

5B.4 Service and Demarcation Points

5B.4.1 Service points are the physical locations where the Teleport satellite modems are located.

5B.4.2 The Demarcation point for the Teleport Service terminates at the Client end of the interconnecting cable connecting the satellite modem. The Client end of the interconnecting cable connects to either a Client backhaul or Client's end user equipment that is located in the customer room at a Teleport.

5B.4.3 The Contractor will be responsible to provide the interconnecting cable between the Contractor's Demarcation point and either a Client backhaul or Client's end user equipment.

5B.4.4 The Contractor must provide a secure environment against unauthorized access at the Service Points.

5B.4.5 The Contractor must provide recommendations in the interconnection design of the Client's terminal or communication equipment, cabling and facilities at the remote Service Point.

5B.4.6 Inside space for Remote Hardware that is provided by Canada to the Contractor will normally be in a common space without security. For cases where the Contractor requires controlled access to the Remote Hardware, the Contractor must negotiate with the SSC Satellite Service Manager and/or individual Clients for security accommodations and there may be costs to the Contractor associated with any such arrangement.

5C - ASSOCIATED SERVICES FOR REMOTE SITES

5C.1 General Requirements

5C.1.1 Upon request, the Contractor must be able to provide the following Associated Services to Canada:

- Provisioning of Remote Hardware;
- Installation of Remote Hardware in Canada;
- Maintenance of Remote Hardware in Canada;
- Operator and Specialized Training; and
- May incorporate Canada owned Ku-band Remote Hardware.

5C.1.2 Upon receipt of a Service Order, the contractor must acknowledge receipt of the Service Order to the SSC Satellite Service Manager within two (2) business days.

5C.1.3 Further to 5C.1.2, the Contractor must provide the delivery date for the equipment to the SSC Satellite Service Manager within five (5) to ten (10) business days.

5C.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of any delay to the agreed upon date for delivery and installation of the Remote Hardware.

5C.1.5 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Remote Equipment.

5C.2 Provisioning of Remote Hardware

5C.2.1 The Remote Hardware mainly consists of Ku-band Earth Station components and Associated Parts as listed in the pricing sheet (Annex B2 – Appendix E).

5C.2.2 The provisioning of the Remote Hardware includes shipping to major cities in Canada.

5C.2.3 The provisioning of the Remote Hardware includes a one (1) year Warranty Maintenance Service unless otherwise indicated.

5C.2.4 All Remote Hardware supplied by the Contractor, including parts used to provide Maintenance Services, must be new and unused. The Remote Hardware must also:

a) be off-the-shelf, meaning it must be composed of standard equipment requiring no further research or development;
b) be a model that is still in production by the time of delivery; and
c) conform to the version of the applicable specification or part number of the manufacturer in effect at the time of delivery.

5C.2.5 The Contractor must deliver the Equipment to the location(s) designated by Canada by the delivery date. The Contractor must pay all costs associated with replacing any item damaged in transit to the final destination. The Contractor acknowledges that no item will be considered delivered on the delivery date if it is damaged or otherwise not ready for Canada to begin its acceptance procedures. The Contractor must, at a minimum, package the Remote Equipment according to industry standards and include a packing slip with each shipment. Packaging, shipping, transportation and delivery must be included in the price of the Remote Hardware.

5C.2.6 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Equipment.

5C.3 Installation of Remote Hardware

5C.3.1 The Contractor must perform all site surveys, civil works for antenna foundation, shipping of Remote Hardware, installation of Remote Hardware, de-installation of Remote Hardware (when required) and must make all arrangements with landlords and landowners necessary to deliver the Installation Service.

5C.3.2 Canada will provide air-conditioned building space and commercial, conditioned, protected, AC power to the Contractor at the remote location. Upon request, the Contractor must provide, install, operate and maintain an Uninterruptible Power Supply (UPS) at a remote site intended only to power the satellite equipment. The amount of space available to house the satellite equipment will depend on the location.

5C.3.3 Despite Supplemental General Conditions 4001, Section 5(4) Installation, Integration and Configuration, all installation prices are indicated separately in the Basis of Payment and are not included in the price of the Hardware.

5C.3.4 The Installation Zones for the remote sites are defined as follows:

a) Installation Zone 1: Any site within 100 km from the city halls for Vancouver, Edmonton, Calgary, Regina, Winnipeg, Thunder Bay, Toronto, Ottawa, Montreal, Saint John, Halifax and St John's.
b) Installation Zone 2: Anywhere south of or on the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere south of the 50th parallel in all other provinces.
c) Installation Zone 3: Anywhere north of the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere north of the 50th parallel in all other provinces.
d) Installation Zone 4: Anywhere in the Yukon, North West Territories and Nunavut.

5C.3.5 For each new site installed under this Contract and for cases where the Client is providing the Remote Hardware, the Contractor must provide to the SSC Satellite Service Manager, within 30 days of initial site visit, complete site-specific, as-built, documentation packages. The Contractor must ensure that the site specific documentation packages are detailed and complete and include the physical layout of Remote Hardware and civil works. Power distribution documentation is to be provided, if supplied by the Contractor.

5C.3.6 For each new site installed under this Contract, the Contractor must maintain a duplicate copy of site-specific documentation during the term of the contract.

5C.4 Maintenance of Remote Hardware

5C.4.1 General

5C.4.1.1 The Contractor must provide Remote Hardware Maintenance Services for fixed remote sites including the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 4.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Hardware; and
f) Software/Firmware revisions.

5C.4.1.2 As per Section 4.12.1.2 (c) & (d) the Contractor must provide Warranty and Maintenance Services for all new Hardware delivered under this Contract in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 25(1), the "Hardware Maintenance Period" is the entire Contract Period.
b) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

5C.4.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

5C.4.2 Maintenance Zones

5C.4.2.1 Despite the Supplemental General Conditions 4001, Section 26 (3) (a), the Maintenance Zones are defined as follows:

Zone A:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador and is accessible using all-season paved public highways. Any location within Zone A boundaries that cannot be accessed using all-season paved public highways will be considered to fall within Zone B.

Zone B:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador that cannot be reached using all-season paved public highways, or where a ferry or air transport must be used. Examples include bush camps, mining sites, oil explorations sites and isolated communities. Repair time includes time spent on scheduled transportation only.

Zone C:

Includes any sites north of the Zone B boundaries. Repair time includes time spent on scheduled transportation only.

5C.5 Operator and Specialized Training Services

5C.5.1 General Requirements

5C.5.1.1 Training requirements are specified in Section 4.10

The Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned equipment and satellite telecommunications theory and technology.

6 PART 6 – GENERAL REQUIREMENTS FOR STREAM 3 - SERVICES FOR C-BAND (CANADA AND CONUS)

6.1 GENERAL

The following general requirements apply to Satellite Space Segment Capacity Services, Teleport Services and Associated Service for Remote Sites, for C-band unless otherwise noted.

6.1.1 The Contractor must provide the following to Canada for the Services:

a) Service Management;
b) Service Order Processing;
c) Client Support;
d) Problem Management;
e) Service Performance Monitoring;
f) Scheduled Service-Affecting and Maintenance Advisory;
g) Reporting;
h) Invoicing;
i) Training;
j) Link Budget Design;
k) Maintenance Services for Remote Hardware (Associated Services for Remote Sites only); and
l) Maintenance Services for Teleport Equipment (Teleport Services only).

6.1.2 The Satellite Space Segment Capacity provided to Canada must NOT be shared with any other user or party without the prior written consent of the Technical Authority and the Contracting Authority.

6.1.3 The Contractor is responsible for all functional aspects as required to satisfy all requirements for the Service(s), including planning, scheduling, directing, supervising, maintaining and operating.

6.1.4 The Contractor is also responsible for the overall services provided by its team members.

6.1.5 The Contractor must fulfill all Service obligations to Canada's user groups and operate and manage the required Service(s) on Canada's behalf to ensure continuous operation of the Service(s) as specified in this Statement of Work (SOW).

6.1.6 This SOW outlines the Service(s) attributes and quality of service that must be provided to Canada as part of the Contractor's obligations in providing the Service(s). In addition, the SOW describes the Contractor's support functions required to manage the relationships among Canada's user groups and the Contractor.

6.1.7 The Contractor must provide, when requested, Hardware Maintenance Services to Canada for all Remote Hardware during the Hardware Maintenance Period. The Hardware Maintenance Period is a minimum one year period plus any time by which the Hardware Maintenance Period is extended during the entire contract period.

6.1.8 The Contractor must ensure that all verbal, written and electronic communications that are required to be provided directly to Clients (e.g. Client support, recorded greetings and prompts, email and voice mail) are available at all times in both official languages of Canada (English and French), offering users a choice of either language depending on their individual preference.

6.1.9 In this Contract, "Regular Business Hours" refers to 8:00AM to 4:00PM Eastern Time, Monday to Friday, excluding statutory holidays observed by the Federal Government in the Province of Ontario.

6.1.10 NEUB wishes to have available a long-term solution for its Clients with a single supplier for its Space Segment Services that evolve as technology changes. The Contractor must offer to Canada any new Satellite Space Segment capacity, as well as all administrative or business improvements, within one month of making them generally available to other customers, by advising the Contracting Authority and the Technical Authority. For Space Segment Capacity that has become part of its standard service offering, it must provide these improvements at no additional charge to Canada. The price of any other service enhancements will be negotiated on a case-by-case basis. The Contractor acknowledges that no new services can be provided under this Contract unless the Contracting Authority issues a contract amendment authorizing the provision of those service. Canada reserves the right to add new services as services and technologies evolve and become available.

6.1.11 The Contractor must have a minimum of 5 years of experience provisioning, installing, operating and maintaining Fixed Satellite services to various customers in which the contractor maintained at least 10 Fixed Satellite earth stations for all their customers.

6.1.12 Within the last 10 years, the Contractor must have experience provisioning, installing, operating and maintaining Fixed Satellite services to large organizations with at least 20 users.

6.1.13 The Contractor must have the ability to provide alternate satellite space segment capacity for service restoration in case of a failure of the Contractor's proposed primary satellite. The alternate satellite EIRP and G/T must be of such values that do not lead to changes to the antenna and RF portion of the ground segment infrastructure. This does not mean that the capacity must be guaranteed in advance on this alternate satellite but rather that an alternate satellite with the same characteristics must be available to transfer service without changing the established ground segment network infrastructure (e.g. antenna sizes and RF components).

6.1.14 The Contractor must have, at a minimum, 1 Teleport or telecom serving office located in Canada.

6.1.15 The Contractor must indicate if they are providing site diversity (another teleport located at another location) pointed to the same serving satellite.

6.1.16 The Contractor must have prepared and delivered a minimum of 5 Operator Training and Specialized Training courses in satellite telecommunications technology in the past 5 years. The Contractor must provide the syllabus and delivery date of the delivered courses.

6.2 SERVICE MANAGEMENT

6.2.1. The SSC Satellite Service Manager will:

a) Accept and validate service requests from the Clients and determine whether to forward them to the Contractor as Service Orders;
b) Monitor and manage the Contractor's Service Level performance; and
c) Manage ongoing service issues.

6.2.2 The Contractor must assign a Contract Account Representative (CAR) to Canada to address any technical, administrative and service-related issues.

6.2.3 The CAR must have a minimum of 5 years of satellite telecommunications experience within the last 8 years.

6.2.4 During the Contract Period, the Contractor must provide the résumé for each new CAR to the Technical Authority for approval within 10 working days of the date the Contractor notifies the Technical Authority that a new CAR is required.

6.2.5 When requested, the CAR must meet with the SSC Satellite Service Manager, Technical Authority and/or Contracting Authority, at a location within the National Capital Area, or occasionally when this is not possible, must be available by teleconference phone call. Except in case of emergencies, Canada will provide the CAR with at least 5 days of notice before a meeting.

6.2.6 The CAR must provide the relevant Authority (or Authorities) with a record of decision and meeting minutes within 10 working days following any meeting. If the relevant Authority does not agree with the record of decision or meeting minutes prepared by the CAR, the relevant Authority will advise the CAR within 5 working days after receiving them.

6.2.7 When requested, the Contractor must provide sales and marketing support to Canada when Canada is communicating with existing and prospective Clients. This support will consist of the following:

a) Attending meetings;
b) Participating in telephone teleconferences or videoconferences;
c) Providing literature (either electronic or paper) explaining Fixed Satellite Services (FSS);
d) Assisting Canada in communicating with Clients about the FSS Services available under this Contract;
e) Acknowledging receipt of any of Canada's information requests within 2 working days to the Technical Authority and the SSC Satellite Service Manager; and
f) Providing the information within 5 working days to the Technical Authority and the SSC Satellite Service Manager.

6.2.8 The CAR's attendance at all meetings is at the Contractor's own expense, including any travel and living expenses that may be incurred.

6.3 SERVICE ORDER PROCESSING

6.3.1 General

6.3.1.1 The Contractor must provide two priority levels for Service Orders:

a) **Regular priority**: Normal non-rush delivery of the Services processed during Regular Business Hours.
b) **Express priority**: Expedited delivery of the Services processed during Regular Business Hours. The Contractor should process this Service Order before any other Service Order already in queue under a Regular priority.

6.3.1.2 The Maximum Service Delivery Interval (MSDI) for Service Orders with each level of priority is set out in Section 6.3.3 of this Annex. While the order in which the Contractor processes Service Orders is within the Contractor's discretion, meeting the MSDIs is mandatory. Each Service Order will clearly indicate the priority level.

6.3.1.3 The Contractor must provide a single ordering point for all Regular and Express Priority Service Orders.

6.3.1.4 The Contractor must only accept Regular and Express Priority Service Orders and Service Order revisions sent by the SSC Satellite Service Manager by email.

6.3.2 Regular and Express Priority Service Orders

6.3.2.1 The Contractor must accept Regular and Express Priority Service Orders made by email to the Contractor-provided email address twenty-four (24) hours per day, seven (7) days per week, every day of the year, and must provide an automated reply to confirm receipt of the emailed Service Order.

6.3.2.2 Regular and Express Priority Service Orders sent to the Contractor by the SSC Satellite Service Manager during Regular Business Hours will be considered received by the Contractor on that day. Service Orders sent to the Contractor by the SSC Satellite Service Manager between 4:01 PM and 7:59 AM (Eastern Time) will be considered received by the Contractor at 8:00 AM the next working day.

6.3.2.3 The Committed Service Delivery Date (CSDD) is the date that the Contractor must complete the delivery of a given Service Order. This date must be within the appropriate Maximum Service Delivery Interval (MSDI).

6.3.2.4 If for any reason the CSDD for a Service Order cannot be met, the Contractor must immediately notify the SSC Satellite Service Manager outlining the reason for the delay and providing a new CSDD. If the revised CSDD places the completion of the order outside the MSDI, the information related to this Service Order must be tracked and reported in the Monthly Service Order Tracking Report, and the Service Order will be subject to service credits.

6.3.3 Service Delivery Intervals (SDI)

6.3.3.1 The SDI is defined as the elapsed time between the issuance of the Service Order or subsequent Service Order Revision by the SSC Satellite Service Manager and the delivery/acceptance of the Service.

6.2.3.2 The Maximum Service Delivery Interval (MSDI) is defined as the maximum allowable amount of time to process a Service Order depending on the type and priority of that Service Order. The Maximum Service Delivery Interval Table is as follows:

6.3.3.3 The Maximum Service Delivery Interval (MSDI) for Satellite Space Segment Capacity Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Regular Priority Service delivery	45 business days after receipt of Service Order (inclusive of Satellite Link Budget Analysis (SLBA) and frequency clearance mentioned in Section 7A.5 & 7A.6)
Express Priority Service delivery	10 calendar days after receipt of Service Order (inclusive of SLBA and frequency clearance mentioned in Section 7A.5 & 7A.6)

Within 5 calendar days of receipt of the Regular Priority Service Order, the Contractor must obtain, if required by the Client, from the relevant spectrum authorities worldwide all Radio Frequency Interface (RFI) clearances for all Transmit and Receive frequency pairs assigned between the satellite and Deployed Demarcation Point (DDP).

6.3.3.4 The Maximum Service Delivery Interval (MSDI) for Teleport Services is specified in the table below.

Service Order Type	MSDI for Service Orders
Service Turn-up assuming the modems in use are as defined in Section: 7B.2	30 calendar days after receipt of Service Order
Service Turn-up assuming the modems are other than those defined in Section 7B.2	30 calendar days after receipt of Service Order

6.3.3.5 The Maximum Service Delivery Interval (MSDI) for Associated Services for Remote Sites is specified in the table below.

Service Order Type	MSDI for Service Orders
Identification of site survey and install dates for remote sites	5 working days after receipt of Service Order
Site survey, Installation of remote(s) and service turn-up regardless of site location(s) assuming that all landlord access and transportation to the site(s) is available	60 calendar days after receipt of Service Order

6.4 CLIENT SUPPORT

6.4.1 Hotline Service

6.4.1.1 The Contractor must provide the Client with technical support for all aspects of the Service including a hotline accessible using a toll-free number (the “Hotline”). The Contractor must satisfy the requirements of Supplemental General Conditions 4001, Section 25(4) relating to Remote Hardware and Supplemental General Conditions 4004, Section 5 relating to software using this Hotline, except as specifically noted below.

6.4.1.2 The Contractor must pick up all Hotline calls within 5 rings 95 percent of the time. The Contractor must answer all calls, with a live service agent, within 2 minutes 95 percent of the time.

6.4.1.3 The Contractor must log and track all reported calls to the Hotline from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

6.4.1.4 The Contractor must track and resolve a Client reported problem call only during the selected maintenance coverage time specific to a particular Client. (i.e. A Client reported problem call occurring at 6 p.m. on Friday for a Client whom has selected an maintenance coverage time of 9 hr/5 day, 8 a.m. to 5 p.m., Monday to Friday must be tracked and resolved by the Contractor beginning the following Monday at 8 a.m. only until resolution but only during the selected O&M coverage time specific to a particular Client.)

6.4.1.5 The Contractor's Hotline must be staffed and available to the Client twenty-four (24) hours per day, seven (7) days per week, and every day of the year.

6.4.2 Engineering Assistance

6.4.2.1 In addition to the Hotline, the Contractor must provide engineering assistance to the SSC Satellite Service Manager and Technical Authority accessible using a North American phone number separate from the Hotline toll-free number.

6.4.2.2 The Contractor must assist with issues requiring technical expertise at a level greater than the Hotline. This could include, but not be limited to, assistance with:

a) Link budget issues;
b) Compatibility issues; and
c) Intermittent or chronic performance issues.

6.4.2.3 The Contractor's Engineering Assistance must be available Monday to Friday from 8:00 AM to 4:00 PM Eastern Time to receive and respond to calls.

6.4.3 Web Site Support Service

6.4.3.1 The Contractor must provide Canada with technical support for all aspects of the Services, through a web site support service, which must include at a minimum, Frequently Asked Questions (FAQs) and, if applicable, on-line software diagnostic routines, support tools and services.

6.4.3.2 The Contractor's web site must provide support in English and in French, and must be available twenty-four (24) hours per day, seven (7) days per week, and every day of the year. The Contractor's web site must be available 99% of the time.

6.4.3.2 The Contractor must provide WEB portal access (read only) to the SSC Satellite Service Manager and Technical Authority in order to view all trouble tickets related to all Services being provided to Canada under this contract.

6.5 PROBLEM MANAGEMENT

6.5.1 General

6.5.1.1 The Contractor must manage all problems affecting the delivery of the Service(s). These problems must be managed twenty-four (24) hours per day, seven (7) days per week and every day of the year, by the Contractor by diagnosing, tracking, recording and reporting on all problems that affect any Client user's ability to use the Service(s). The Contractor must document all problems, including a description of the problem and all details on how the problem was resolved.

6.5.1.2 The Contractor must be the single point of contact and have full responsibility for leading and coordinating all activities with any Satellite Space Segment provider, Teleport Service provider or Remote Hardware provider for the resolution of any problem that affects the performance of the Service(s).

6.5.1.3 The Contractor must log and track all reported calls to its help desk from the time of initial report until the resolution of the problem. This must be done through a computerized logging system.

6.5.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of a High Severity event (as per Section 6.5.2.2) service outage or performance problem as soon as it appears that it may exceed thirty (30) minutes in duration.

6.5.1.5 The Contractor must perform the following activities on an on-going basis when handling service-related problems:

a) Identify each reported problem by a unique problem record number (ticket number);
b) Perform an analysis of the problem reported;
c) Maintain an audit trail that includes all actions taken until the problem is resolved; and
d) Provide reports as listed in the Section named “Reporting”.

6.5.2 Escalation Procedures

6.5.2.1 The Contractor’s Hotline representatives must escalate to the appropriate level of the Contractor’s management and generate a Critical Incident Report for any unresolved problems according to the time lines and severity indicated below.

6.5.2.2 Escalation time lines (which are in effect twenty-four (24) hours per day, seven (7) days per week, and every day of the year) are:

ESCALATION	Low Severity	Medium Severity	High Severity
Manager Operations	2 hours	30 minutes	15 mins
Director Operations	3 hours	1 hour	30 mins
VP Operations	8 hours	2 hours	1 hour

Note: All escalation times listed in the table above start running when the initial request is made, regardless of the time of day.

a) **Low Severity**: Diminished capacity (including repeated intermittent non-availability) of the network affecting any single, or group of, remote earth station(s) (excluding scheduled maintenance as defined in Section 6.7).

b) **Medium Severity:** Diminished capacity (including repeated intermittent non-availability) of the network affecting all remote earth station(s) (excluding scheduled maintenance as defined in Section 6.7).

c) **High Severity:** Complete unavailability of the network, including the failure of a Hub and all remotes or the complete failure of a satellite (excluding scheduled maintenance as defined in Section 6.7).

6.5.2.3 Within 10 working days of this Contract being issued, the Contractor must provide the SSC Satellite Service Manager and Technical Authority a list of the names and contact information (phone number, email address, etc.) of the Manager of Operations, Director of Operations, and Vice President of Operations (or the equivalent positions with the Contractor’s organization). The Contractor must continue to provide an updated list to the SSC Satellite Service Manager and Technical Authority as changes in personnel occur in the management positions listed above.

6.6 SERVICE PERFORMANCE MONITORING

6.6.1 Availability of Services

6.6.1.1 The Contractor must perform remote network monitoring, preventative diagnostics, and coordinate problem isolation and resolution.

6.6.1.2 Satellite Space Segment Capacity Service

The Contractor must provision the Satellite Space Segment Capacity Service to ensure a Service Availability Percentage of at least 99.99% for each calendar month.

6.6.1.3 Satellite Space Segment Capacity Service and Teleport Services

The Contractor must provision the combined Satellite Space Segment Capacity Service and Teleport Service to ensure a Service Availability Percentage of at least 99.95% for each calendar month.

6.6.1.4 Satellite Space Segment Capacity Service, Teleport Service and Remote Site

The Contractor must provision the combined Satellite Space Segment Capacity Service, Teleport Services and Remote Site Service to ensure a Service Availability Percentage of at least 99.30% for each calendar month.

6.7 SCHEDULED SERVICE-AFFECTING AND MAINTENANCE ADVISORY

6.7.1 The Contractor must provide the SSC Satellite Service Manager with written notice of any scheduled maintenance that may affect the Service(s) at least ten (10) working days before performing any scheduled maintenance. The SSC Satellite Service Manager will provide written notice to the Contractor agreeing to the scheduled maintenance within two (2) business days from receipt of the scheduled maintenance notice.

6.7.2 Except in cases of emergency, the Contractor must notify the SSC Satellite Service Manager before proceeding with any unscheduled maintenance activities that may affect the Service. When possible, the Contractor agrees to coordinate unscheduled maintenance activities that may affect the Service with the SSC Satellite Service Manager.

6.7.3 In cases of emergency, the Contractor must notify the SSC Satellite Service Manager as soon as possible after beginning the emergency unscheduled maintenance activity. The Contractor must provide the reason for the unscheduled activity and must provide information about how long the Service will be affected.

6.7.4 The Contractor must have available on the Internet all information indicating when the sun transits will occur and when they will affect each geostationary satellite being used by the Contractor to deliver the Services under this Contract. The Contractor must provide the URL of the Web Site where the Sun Transit information can be obtained. The Contractor must provide a notice to the SSC Satellite Service Manager by email, at least 2 weeks before the beginning of the sun transits.

6.8 REPORTING

6.8.1 General

6.8.1.1 The Contractor must provide the following reports in an electronic format (in comma or tab-delimited file format, MS Excel) by way of email:

a) Recurring Problem Report;
b) Problem Summary Report;
c) Service Performance Levels Report; and
d) Traffic Throughput Report

6.8.1.2 Amendments, changes or deletion of reports, as requested by the Technical Authority, will be handled through a Contract Amendment issued by the Contracting Authority.

6.8.2 Recurring Problem Report

6.8.2.1 When requested by the SSC Satellite Service Manager, where the SSC Satellite Service Manager has identified a recurring problem, the Contractor must provide a consolidated report by email detailing all the instances in previous reporting periods of similar problems, together with the Contractor's detailed proposed plan for addressing the recurring problem, including a timeline for resolution. The Contractor must provide the SSC Satellite Service Manager with an incident report by email within 24 hours and the report must contain, at a minimum:

a) Problem Ticket number(s);
b) Date(s) of the ticket(s);
c) Outage start date(s) and time(s);
d) Name of the person and department reporting the incident;
e) Severity level (as described in Section 6.5.2.2);
f) Description of the problem;
g) Description of the proposed resolution; and
h) Estimated time to implement remedial action to remedy underlying problem causing recurring problem.

6.8.3 Problem Summary Report

6.8.3.1 The Contractor must provide the SSC Satellite Service Manager with a monthly Problem Summary Report containing the following information, within 10 calendar days from the end of the billing period:

a) All problem tickets logged by the Contractor;
b) The nature of each problem;
c) The date and time at which each problem was first reported to the Contractor;
d) The date and time at which the Contractor determined each problem began (where the Contractor is able to determine this);
e) The disposition of each problem;
f) Whether the underlying cause of the problem was related to the Service or to equipment provided by Canada;
g) The duration of each problem; and
h) Whether, in the previous three monthly reporting periods, any similar problem tickets were opened.

6.8.4 Service Performance Levels Report

6.8.4.1 Within 10 calendar days of the end of each billing period, the Contractor must provide a monthly report to the SSC Satellite Service Manager showing the calculations of Service Availability Level for the month on a per-Client basis. Although Service Availability Credits are only payable based on the calculation of Service Availability during a calendar year (or partial calendar year, when applicable), reports on Service Availability must be submitted monthly, to allow Canada to monitor Service Availability performance throughout the year and address recurring issues by requesting corrective action. The values of these monthly calculations will be compared to the threshold values listed in Section 3.6. The method of calculation is indicated in Section 3.8.4.2.

6.8.4.2 The Service Availability Level for the Service that is reported by the Contractor in the monthly Service Performance Level report must be calculated using the following formula:

[(TNT – TOT) / TNT] X 100

where "**TNT**" is defined as the total network time, which is the total available number of minutes in the reported month and is calculated by multiplying by the number of calendar days in the month, times 24 hours, times 60 minutes (i.e., in April the TNT would be 30 X 24 X 60 = 43200); and

where "**TOT**" is defined as the total outage time, which is the total number of outage minutes as tracked by the Contractor's problem record system affecting that service. The service outage problem records logged by the Contractor will be used to calculate outage minutes. The outage minutes will be calculated from the time the problem is first recorded until the problem is resolved (ticket close) for each problem record. The sum of all these outage minutes will be the TOT. This number does not include scheduled maintenance or sun transit downtime where the Contractor properly advised the SSC Satellite Service Manager in accordance with Section 5.7.

6.8.5 Traffic Throughput Report

6.8.5.1 For all the networks provided by this Contract, the Contractor must have equipment capable of providing traffic throughput statistics. The Contractor must provide the SSC Satellite Service Manager with a monthly traffic throughput report. The report will outline the outbound and inbound traffic expressed in throughput versus time. The data points will be tabulated in 1 hour intervals (data point averaged over 1 hour) over the monthly period. Upon request of the Technical Authority or the SSC Satellite Service Manager, more specific ad hoc reports may be requested with shorter time intervals for the data points.

6.9 INVOICING

6.9.1 General

6.9.1.1 The Contractor must establish a federal government master account with at least one sub-level to identify the Client. The account number must be 15 characters or less and must not include any special characters.

6.9.1.2 The Contractor must cooperate with the SSC Satellite Service Manager or Technical Authority for the resolution of any billing issues to the satisfaction of the SSC Satellite Service Manager or Technical Authority.

6.9.1.3 The billing period is defined as each calendar month, starting from the 1st of the month to the last day of that month.

6.9.2 Invoices

6.9.2.1 The Contractor must provide a printable and non-modifiable monthly invoice to the SSC Satellite Service Manager in Portable Document Format (PDF) and it must be submitted on the Contractor's official letterhead or include its logo.

6.9.2.2 The Contractor must ensure that the invoice is sent by email to the SSC Satellite Service Manager within 10 working days after the end of each billing period.

6.9.2.3 The Contractor must invoice Canada on a monthly basis for all one-time and recurring charges accounted for in that month based on a billing period of the first of the month until the last day of that month. All invoices for one-time costs (installation, de-installation, site surveys, civil works) must come from the Contractor and not from any of the Contractor's third party companies. Services that start part way during a calendar month will be prorated using the formula of: Total cost / number of days in billing month * number of days the item is being charged for. All Services and Remote Hardware must be delivered before the Services and Remote Hardware can be invoiced.

6.9.2.4 The Contractor must summarize charges associated with Services separately from those associated with equipment purchases on the invoice.

6.9.2.5 The summary invoice must include the previous balance, current total charges, total payments, total adjustments, and any outstanding balance.

6.9.2.6 In addition to the information required by General Conditions 2035, the Contractor must ensure that the individual Service Order reference number, deliverable and/or description of work is included in the invoice.

6.10 TRAINING

6.10.1 General

6.10.1.1 Upon request of the Technical Authority, the Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned Satellite Earth Station Remote Hardware and satellite telecommunications theory and technology.

6.10.1.2 The training session must either be conducted at a Government of Canada facility located within Canada as identified by the SSC Satellite Service Manager or at a location in Canada provided by the Contractor as determined by the SSC Satellite Service Manager. Canada will not be charged for the use of the Contractor's premises if Operator and Specialized Training courses are conducted on the Contractor's premises. Canada will provide the Contractor at least 1 month notice of any training session requirement.

6.10.1.3 It is anticipated that most training sessions will be conducted in English, however there may be a requirement for the session to be conducted in French and the training must then be conducted in French. Regardless of the language used to conduct the training session, the Contractor must supply all necessary material and documentation to the trainees at the start of the course with a complete copy for each trainee in their official language of choice.

6.10.1.4 For Instructor Travel and Living (T&L) expenses associated with training services, the Contractor must submit T&L expenses separate from the labour hours.

6.10.1.5 The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the National Joint Council Travel Directive and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".

All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

6.10.2 Operator Training

6.10.2.1 When requested by the Technical Authority, from time to time, the Contractor must provide Operator Training based on a Statement of Work.

6.10.2.2 The Statement of Work to the Contractor may request hands-on, instructor-led Client Operator Training for all provisioned Satellite Earth Station Remote Hardware. The total number of Operator Training sessions requested will not exceed 20, each of which must accommodate up to 5 trainees. Each course should include the following topics, unless other topics are agreed to between the Technical Authority and the Contractor:

a) Basic Satellite Knowledge as it pertains to Fixed Satellite Services;
b) Satellite Earth Station Remote Hardware installation and configuration, earth station commissioning including antenna pointing;
c) Satellite Earth Station Remote Hardware analysis of visible LED and controls; and
d) Learning how to perform user preventative and basic corrective maintenance.

6.10.2.3 In addition to covering the specific subjects described above the instructor(s) must be knowledgeable about all the Satellite Earth Station Remote Hardware available under the Contract and must be able to answer questions from trainees about the features of the Satellite Earth Station Remote Hardware supplied under this Contract.

6.10.3 Specialized Training

6.10.3.1 When requested by the Technical Authority, from time to time, the Contractor must provide hands-on, instructor-led training for Clients who require more Specialized Training on Satellite Earth Station Remote Hardware. This request will be based on a Statement of Work.

6.10.3.2 In addition to covering the subjects described above, the instructor(s) must be knowledgeable about all the Satellite Remote Hardware available under the Contract and be able to answer questions from trainees about the features of the Remote Hardware supplied under this Contract.

6.11 LINK BUDGET DESIGN

6.11.1.1 Upon request, the Contractor must provide to the SSC Satellite Service Manager a link budget describing the power and satellite space segment parameters. Specifications are detailed in Part 7 - Technical Requirements, Section 7A.5.

6.12 MAINTENANCE SERVICES FOR REMOTE HARDWARE

6.12.1 General

6.12.1.1 The Contractor must provide Remote Hardware Maintenance Services for remote sites that includes the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 6.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Remote Hardware; and
f) Software/Firmware revisions.

6.12.1.2 As per Section 6.12.1.1(c) & (d), the Contractor must provide Warranty and Maintenance Services for all new Remote Hardware delivered under this Contract in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

6.12.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

6.12.2 Equipment Retrofit, Software Updates and Configuration Changes

6.12.2.1 The Contractor must satisfy the requirements of Supplemental General Conditions 4001 and Supplemental General Conditions 4004, except as specifically noted below. As part of the Hardware Maintenance Service, the Contractor must provide hardware retrofits/modifications, software upgrades and configuration changes at the Contractor's cost, where required, for the correction of identified operational problems as a result of design deficiencies, and where such modifications are supported by the Remote Hardware manufacturer or software publisher.

6.12.2.2 Where Remote Hardware retrofits and/or upgrades are required, the Contractor must coordinate these activities with user groups and perform these activities where required to ensure that system/hardware modifications are performed with minimal inconvenience and no additional cost to the Clients, and with minimal disruption to service.

6.12.2.3 The Contractor must provide software updates as supported by the hardware manufacturer or his agent and configuration changes at no additional cost to the Clients for Remote Hardware supported directly by the Contractor, during the Contract Period. These software updates and/or configuration changes are to be downloaded to the Remote Hardware through the transmission capability of the Hub or through the actions of an agent of the Contractor who is providing On-Site Maintenance Services on the Remote Hardware. If the Remote Hardware is not on-line during the software update process or the configuration change process and that Canada has been advised of the scheduled activity, the Contractor will, upon request from Canada, perform a site visit to implement the update at Canada's cost.

6.12.3 Maintenance Capability & Response Times

6.12.3.1 Maintenance Zones are defined in Section 7C.4.2.

6.12.3.2 The Contractor must ensure that all locations designated as equipment Maintenance Centres are equipped with adequate tools and test equipment to effectively perform the equipment maintenance function and that technicians are skilled in the performance of such activity and are familiar with the equipment to be maintained.

6.12.3.3 The Contractor must ensure that maintenance technicians are equipped with adequate tools, test equipment and equipment spares to effectively perform the equipment maintenance function at the remote site(s). The maintenance technicians must be skilled in the performance of such activity and must be familiar with the equipment to be maintained.

6.12.3.4 The Contractor must ensure that in the process of On-Site Maintenance Service, any impaired or failed Remote Hardware must be rendered serviceable within a period designated in Section 7.12.3.9 (subject to timely availability of commercial transportation). In the event of non-timely availability of commercial transportation, the Contractor must make a best effort approach to respect the period designated in Section 7.12.3.9.

6.12.3.5 Despite Supplemental General Conditions 4001, Section 12(3), the Contractor is responsible for the Service including any failure caused by a defect in any Government Furnished Equipment (GFE) being maintained as part of the Hardware Maintenance Service.

6.12.3.6 "Maximum Time to Repair" or "MTTR" is the elapsed time from when Canada first reports the trouble or the time when Contractor first recognizes the performance of the Service or the Hardware is being affected by any condition (whichever is earlier) until the trouble or other performance problem has been resolved (i.e., the trouble has been resolved and the Service has been restored to full performance in accordance with the terms of this Contract). The MTTR, in the case of On-Site Maintenance will be calculated as the time elapsed during Regular Business Hours. The MTTR includes all time taken by the Contractor to detect the fault, isolate the problem, remove and replace any faulty equipment, verify the repair, and restore the Service and/or Hardware to fully functional operation.

6.12.3.7 The MTTR is calculated based on response from Contractor to mobilize to site. The hotline service is a twenty-four (24) hour service offered by the Contractor. In other words, the hotline service must be available twenty-four (24) hours per day, seven (7) days per week and every day of the year to answer the Client reported problem call as referenced in Section 6.4.1.

6.12.3.8 Despite Supplemental General Conditions 4001, Section 26(3)(d), where the Contractor is able to resolve the trouble or performance problem remotely, the MTTR is 4 hours.

6.12.3.9 Despite Supplemental General Conditions 4001, Section 26(3)(a) & (d), where On-Site Maintenance is required, the Contractor must resolve the trouble or performance problem, within the following MTTR:

a) Maintenance Zone A : 4 hours
b) Maintenance Zone B : 12 hours
c) Maintenance Zone C : 24 hours

(i.e. in Maintenance Zone A, a problem reported at 8:00 AM Tuesday must be resolved by 12:00 Noon Tuesday; another example, in Maintenance Zone B a problem reported at 11:00 AM Friday must be resolved by 3:00 PM Monday (11:00 – 16:00 Friday is 5 hours and 08:00 – 15:00 is 7 hours for a total of 12 hours).)

6.12.3.10 The Contractor must act on problems reported to the Hotline without delay and use all means at its disposal to restore the Service or service quality or the Hardware to fully functional operation without undue delay.

6.12.3.11 The Contractor must ensure that the Remote Hardware being provisioned at a remote site has a Mean Time Between Failure (MTBF) equal to or exceeding 55,000 hours. The calculation of the MTBF must be in accordance with the U.S. Department of Defence MIL-HDBK-217F Reliability Model.

6.12.4 Services Outside Maintenance Coverage

6.12.4.1 The Contractor must provide labour services for additional technical resource work done by the Contractor that is not included as part of the Hardware Maintenance Service described in the Contract. Pre-approval from the SSC Satellite Service Manager or Technical Authority is required before work commences. This additional service includes work done by the Contractor's technician being sent to a remote site for maintenance purposes where the Contractor can demonstrate that the problem was caused by Client-owned non-satellite related equipment.

6.12.4.2 For Travel and Living (T&L) expenses associated with the services outside maintenance coverage, the Contractor must submit T&L expenses separate from the labour hours associated with the activity.
The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the *National Joint Council Travel Directive* and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".
All travel must have the prior authorization of the SSC Satellite Service Manager or Technical Authority.

All payments are subject to Government audit.

6.13 MAINTENANCE SERVICES FOR TELEPORT EQUIPMENT

6.13.1 The Contractor is responsible to install, operate, monitor and maintain all equipment associated with the Teleport Service and the Modem Service at the Contractor's cost as shown in Annex B3 – Appendix C and D.

7 PART 7 – TECHNICAL REQUIREMENTS FOR STREAM 3 – C-BAND SERVICE (CANADA AND CONUS)

7A - SATELLITE SPACE SEGMENT CAPACITY SERVICES

7A.1 General Requirements

7A.1.1 The Contractor must provide 1 and 2 way single hop satellite communication services; between Canada, the Continental US (CONUS) and the Caribbean Islands; as well as any 1 or 2 way satellite communication within Canada, CONUS & the Caribbean Islands.

7A.1.2 The Contractor must provide the Satellite Space Segment Capacity in a Partial RF Channel. The Partial RF Channel satellite capacity must be provided in 0.1 MHz increments.

7A.1.3 The Contractor must provide same pricing to all satellite categories independent of which satellite will be utilized in the delivery of the C-band service.

7A.1.4 The Contractor must provide the Satellite Space Segment Capacity Service on a twenty-four (24) hours per day, seven (7) days per week, and every day of the year basis.

7A.1.5 The Contractor must have the ability to provide alternate satellite space segment capacity for service restoration in case of a failure of the Contractor's proposed primary satellite. The alternate satellite EIRP and G/T must be of such values that do not lead to changes to the antenna and RF portion of the ground segment infrastructure. This does not mean that the capacity must be guaranteed in advance on this alternate satellite but rather that an alternate satellite with the same characteristics must already be in operation in order to be able to transfer service without changing the established ground segment network infrastructure (e.g. antenna sizes and RF components).

7A.1.6 The Contractor must provide Satellite Space Segment Capacity in the most efficient and cost effective manner to facilitate satellite connectivity services, integrating Canada-owned and operated earth stations.

7A.2 Classification of Services

The Contractor must provide the Satellite Space Segment Capacity Service in the following categories:

7A.2.1 C-Band

a) Type 3 Service

Defined as non-protected in the event of an interruption. No restoration is designated for this Type 3 Service, but the Type 3 Service may be restored at the discretion of the Contractor, subject to the availability of Satellite Space Segment Capacity at the time of interruption and prudent facility management.

b) Type D Diversity Service

Defined as a diversity type of non-protected service. The Type D Diversity Service is defined as a service used in situations where standard Type 3 Services is not available for specific locations due to geographical obstructions, such as mountain ranges. In these situations, the Contractor may utilize Satellite Space Segment Capacity from an alternate fleet of satellites.

7A.2.2 Additional types of Satellite Space Segment Capacity may be required.

7A.3 C-Band Type 3 Service

7A.3.1 The Contractor must provide, to Clients who subscribe to C-band Type 3 Service, C-band Satellite Space Segment Capacity to support operations twenty-four (24) hours per day, seven (7) days per week, and every day of the year. If Full Period Whole RF Channel is provided to Clients who subscribe to Type 3 Service, then any other Partial RF Channel must, subject to availability, be on the same primary Satellite as the Whole RF Channel capacity.

7A.3.2 Coverage

The RF channel must have continuous coverage of Canada, CONUS and the Caribbean to be able to establish inter Canada/CONUS/Caribbean traffic with single hop satellite connectivity. Canada coverage includes East Coast coverage of Nova Scotia, Newfoundland and Labrador. It also includes the North, including Nunavut, North West Territories the Yukon and Northern Quebec up to at least 70 degrees North latitude.

One set of requirements must be met by satellite(s) that are located between 68 and 112 degrees West Longitude, to ensure Line of Sight (LOS), for sites located in areas with lower than 80 degrees North Latitude.

Another set of requirements must be met by satellite(s) that are located between 97 and 112 degrees West Longitude, to ensure Line of Sight (LOS), for sites located specifically at 80 degrees North Latitude in Canada.

7A.3.3 Service Performance Parameters

Throughout the Contract period the Contractor's Whole RF Channel over the coverage area between 15 degrees North Latitude and 70 degrees North Latitude must at minimum meet the following metric requirements:

a) Effective Isotropic Radiated Power (EIRP): 38 dBW
b) Gain to Temperature Ratio (G/T): -5 dB/K
c) Transponder Bandwidth (BW): 36 MHz

The performance between 70 and 80 degree North Latitude will be of a lower EIRP and G/T.

As it relates to Partial Channel capacity, EIRP and BW parameters will be determined through the Contractor's satellite link budget design.

7A.3.4 Availability for C-Band Capacity

The Contractor must provide C-band capacity requested by Canada, subject to the Contractor's concurrence that such capacity is available at the time the services are required. Costing for this bandwidth must be at the price specified in Annex B3, Appendix B.

7A.4 C-Band Type D Service

The Contractor must provide, to Clients who subscribe to this C-band D Type Satellite Space Segment Capacity, C-band Satellite Space Segment Capacity to support operations twenty-four (24) hours per day, seven (7) days per week, and every day of the year. If Full Period Whole RF Channel is provided to Clients who subscribe to this Type D Service, then any other Partial RF Channel must, subject to availability, be on the same primary Satellite as the Whole RF Channel capacity.

7A.4.1 Coverage

To ensure Line of Sight (LOS) the satellite must be located between 82 and 97 degrees West Longitude.

7A.4.2 Service Performance Parameters

Throughout the Contract period the Contractor's Whole RF Channel at sites located at 80 degrees North Latitude in Canada must at a minimum meet the following metric requirements:

a) Effective Isotropic Radiated Power (EIRP): 34 dBW
b) SFD -81 dbW/m2
c) Transponder bandwidth (BW): 36 MHz

The performance between 70 and 80 degrees North Latitude will be of a higher EIRP and SFD.

As it relates to Partial Channel capacity, EIRP and BW parameters will be determined through the Contractor's link budget design.

7A.4.3 Availability for C-Band Capacity

The Contractor must provide C-band capacity requested by Canada, subject to the Contractor's concurrence that such capacity is available at the time the services are required. Costing for this bandwidth must be at the price specified in Annex B3, Appendix B.

7A.5 Satellite Link Budget Analysis

7A.5.1 The Contractor must provide a Satellite Link Budget Analysis (SLBA), which will indicate the space link availability and the system margins for both one-way and two-way satellite connections. The SLBA must take into account at a minimum the following parameters:

a) EIRP;
b) Thermal noise;
c) Earth Station G/T;
d) Rain fade;
e) System margin;
f) Eb/No of modem;
g) Adjacent channel interference;
h) Adjacent satellite interference;
i) Intermodulation noise and;
j) MODCOD Selection (including TPC/LDPC coding, and ACM/Carrier in Carrier technology)

7A.5.2 The Contractor must provide the Service so that each remote site will have an end-to-end one-way space link availability (Propagation Availability) of 99.95% with a BER of 1×10^{-7}. The Contractor must clearly explain how they can meet the 99.95% one-way end-to-end space link availability in relations to the rain fade margin for the uplink and downlink. The Contractor must clearly explain the relationship between the modem's Eb/No and BER specifically for a BER of 1×10^{-7}.

7A.5.3 On the occasion that any of Canada's Clients provide a SLBA to the Contractor, the Contractor must review it for consideration. Canada recognizes that the implementation of this SLBA is subject to Contractor's approval.

7A.5.4 The Contractor must provide a SLBA for the following locations and earth station characteristics taking into account the parameters listed in Section 7A.5.1. As well, the SLBA must take into consideration the Contractor's proposed Teleport location and Teleport Earth Station characteristics. For all SLBA's, the contractor will use a Comtech CDM-625A satellite modem at the propose Teleport location and at the remote earth station location. Furthermore, for each link design listed below, the contractor will select the most space segment efficient MODCOD setting and calculate the BW utilization based on a carrier spacing factor of 1.35.

The resulting Satellite Space Segment consumption rates and appropriate prices are to be input in Annex B3, Appendix L.

LINK DESIGN ID#	**REMOTE EARTH STATION G/T (dB/K**	**REMOTE EARTH STATION ANTENNA DIAMETER & Tx ANT. GAIN (m/dBi)**	**REMOTE EARTH STATION LOCATION**	**DATA RATE (expressed in MBPS for a full duplex symmetrical link design)**	**SPACE SEGMENT CAPACITY UTILIZATION (PEB or bandwidth utilization whichever is greater) FOR FULL DUPLEX SYMMETRICAL LINK (expressed in 0.1 MHz segments)**
A	18.4	2.4/42.7	Tofino, BC	3.0	
B	18.4	2.4/42.7	Sable Island, NS	3.0	
C	22.5	3.8/46.3	Anchorage, AK, USA	2.0	
D	22.5	3.8/46.3	Resolute Bay, NU	2.0	
E	22.5	3.8/46.3	Iqaluit, NU	2.0	
F	22.5	3.8/46.3	Los Angeles, CA, USA	2.0	
G	22.5	3.8/46.3	Jacksonville, FL, USA	2.0	
H	22.5	3.8/46.3	Port-au-Prince, Haiti	2.0	

7A.6 Frequency Clearance

7A.6.1 The Contractor must ensure that the frequencies assigned to Canada are cleared with Industry Canada with regards to any Canadian radio frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from Industry Canada. If Canada decides to process the radio frequency interference study with Industry Canada, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

7A.6.2 In the case that the Deployed Demarcation Point (DDP) is outside Canada, the Contractor will endeavor to obtain frequencies clearances assigned to Canada with the respective country's frequency spectrum administration agency and on a case-by-case basis will endeavor to meet the service interval for the clearance of frequencies with regards to satellite frequency interference. The Contractor must deliver frequencies to Canada within 1 business day after receiving clearance from the respective country's frequency spectrum administration agency. If Canada decides to process the radio frequency interference study with the respective country's frequency spectrum administration agency, the Contractor must provide the frequency plan to Canada at a minimum of 30 days before the service date requested by Canada.

7A.6.3 All costs involving frequency clearance and earth station licensing must be consolidated with the Contractor who will provide one invoice that includes everything, including licensing costs. License requests can be submitted by the Contractor to Industry Canada or the respective country's frequency spectrum administration agency who will invoice the Contractor directly.

7A.7 Service Migration

7A.7.1 Satellite Earth Station Characteristics at existing sites

The information below outlines satellite connections of critical importance using existing permanently installed earth stations that are part of the existing satellite networks:

Table 1

Remote earth Station location	Remote Earth Station Characteristics	Symmetrical date rate on point-to-point satellite link	Location of Teleport Facility
Cambridge Bay, Nunavut	3.8 meter offset fed antenna equipped with redundant 100 watt RF Transceivers	10 Mbps	Montreal, Quebec (Contractor owned)

Table 2

Remote earth Station location	Remote Earth Station Characteristics	Symmetrical date rate on point-to-point satellite link	Location of Teleport Facility
Eureka, Nunavut	11.3 meter earth station antenna equipped with redundant 200 watt SSPA RF Amplifiers and 8.0 meter earth station antenna equipped with redundant 200 watt SSPA RF Amplifiers.	12 Mbps	Ottawa, Ontario (Government Furnished Equipment consisting of a 3.8 meter offset fed antenna equipped with redundant 100 watt RF Transceivers)

The satellite system design for connectivity to the Eureka site is based on providing site diversity between the (2) earth stations installed at this location (11.3 meter and 8.0 meter earth stations as per table 1 above). Due to low elevation angle RF signal fading effects, the data is dynamically switched from one earth station to the another based on real-time BER measurements relating to varying RF signal fading. The contractor must ensure that both of these earth stations continue to operate with this implemented system design.

In the case of the need for a migration to a new network, and specifically for the satellite system connecting to Eureka, Nunavut, the Contractor must submit the names of the engineering personnel and provide specific details relating to their level of experience to transfer this specific satellite system to the Contractors proposed satellite.

Table 3

Remote earth Station location	Remote Earth Station Characteristics	Asymmetrical date rate on point-to-multipoint satellite link	Location of Teleport Facility
Cape Dorset Nunavut,	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Igloolik, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Kimmirut, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Broughton Island, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Baker Lake, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Rankin Inlet, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)
Cambridge Bay, Nunavut	1.8 meter offset fed antenna equipped with 40 watt RF Transceiver	3 Mbps outbound (Hub to Remote/400 kbps Inbound (Remote to Hub)	Montreal, Quebec (Contractor owned) and Iqaluit, Nunavut (Contractor owned)

In the case of the need for a migration to a new network, the satellite system design for connectivity to the sites listed in table 3 above is based on a DVB-S/MF TDMA system design. For the teleport located in Southern Canada and the teleport located in Iqaluit, Nunavut, the Contractor must provide the service using readily available teleport facilities. Any one-time costs (RF/IF or Romantis modem infrastructure) to transfer the service to the bidder's new proposed satellite for these (2) teleports must be at no cost to Canada. However, the recurring costs associated with the operation of these two (2) teleports must follow the pricing submitted in the bid response.

7A.7.2 Migration Plan

The satellite networks that presently operational in this Stream use a combination of Government Furnished Equipment (GFE) as well as SSC owned earth stations as defined in section 7A7.1 above.

In the case of the need for a migration of services to a new satellite network given the high degree of their customization, the Contractor must transfer service to their new proposed satellite, at no cost to Canada for all sites as per tables 1, 2 and 3 of Section 7A7.1. The Contractor must repoint the permanently installed GFE earth stations to their new proposed satellite as well as use their proposed Teleport facilities (including the mandatory Iqaluit location). All labour and all travel and living costs for Contractor personnel and Government of Canada personnel to supervise service transfer are to be provided at no cost to Canada.

Furthermore in the case of the need for a migration of services to a new satellite network, a migration plan must be submitted as part of the response to the RFP. This migration plan:

a) must clearly show how the transfer of all sites are completed within a 60 day period after contract award;

b) must clearly address how each satellite system as listed in tables 1 and 3 of section 7A.7.1 will be transferred over to the Contractor's proposed satellite within a two (2) hour transfer window to be decided by Canada in coordination with its end user partner departments. If the transfer is unsuccessful, the service must be transferred back to the original network. Should the initial transfer prove unsuccessful, two (2) additional transfer attempts per service will be permitted within the 60 day period.

c) must clearly address how each satellite system as listed in table 2 of section 7A.7.1 will be transferred over to the Contractor's proposed satellite within a twelve (12) hour transfer window to be decided by Canada in coordination with its end user partner departments. If the transfer is unsuccessful, the service must be transferred back to the original network. Should the initial transfer prove unsuccessful, two (2) additional transfer attempts per service will be permitted within the 60 day period.

d) must clearly address the technical design proposed by the Contractor to transfer the sites as identified in section 7A7.1 to the new satellite system. This must include the technical details (selection of antenna size, RF components, satellite modems) of the proposed Contractor provided earth stations and their commissioning for service transfer;

e) must also include the link design analysis that supports the service transfer using the permanent installed Government Furnished Equipment (GFE) earth stations. The link design analysis must abide to the specifications as outlined in sections 7A.5.1 and 7A.5.2.

f) must clearly address the transfer of the terrestrial backhaul services.

The Teleport facility proposed by the Contractor must have broadband capability such as MPLS or Fiber with added capability to supply Committed Information Rate (CIR) connections on the terrestrial backhauls.

All costs to transfer all sites as per section 7A7.1 within the 60 day migration period would be covered by the Contractor at no cost to Canada.

Furthermore, during the 60 day migration period in the event that the incumbent does not win the RFP, Canada will pay to the incumbent for invoices for recurring services (includes satellite connectivity and remote site operations and maintenance costs) on a pro-rated basis as the sites are transferred to the new satellite network.

7B - Teleport Services

7B.1 General Requirements

7B.1.1 Teleport Services are managed services that allows transmission and reception of traffic of a certain bandwidth (bit rate) to and from a Canada owned remote earth station. Teleport Services

- must include leased Teleport and Teleport based modem services including operation and maintenance (O&M);
- incorporates the remote earth station, which Canada may procure under this contract; or may already own;
- will be procured with the Satellite Space Segment Capacity Service (Section 7A); and
- may include Contractor provisioned terrestrial backhaul(s), when requested.

7B.1.2 The Contractor must provide the Teleport Services so that it can be used in conjunction with Government furnished or Contractor provisioned Remote Hardware and Space Segment Capacity Services provided under this Contract. The Contractor must provide the Teleport Services with the capability of pointing to the Contractor proposed satellite(s) as per Section 7A of this SOW.

7B.1.3 At a minimum one (1) Teleport must be situated within the boundaries of Canada. Additional Teleport(s) in CONUS are acceptable. The Teleport in Canada must support the RF channels that accommodate inter Canada/CONUS/Caribbean traffic with single hop satellite connectivity. The Teleport must have high data rate connections to terrestrial backhauls including high-speed internet connectivity.

7B.1.4 The Contractor must provide the Teleport Service in the C-band frequency ranges.

7B.1.5 The Contractor must provide air-conditioned building space and commercial, conditioned, protected, redundant, AC or DC power including an uninterruptible power supply (UPS) with battery backup capacity for 30 mins and must also provide a diesel generator for backup at the Teleport(s).

7B.1.6 The Contractor must provide redundant equipment (RF/IF Chain, LNB, BUC).

7B.1.7 The Contractor must provide secure rack space and power at the Teleport(s) for GFE, as required.

7B.1.8 The Teleport Services must allow unimpeded transmission of user-initiated encrypted data and user/machine authentication. The Service must support typical user-provided security applications, which include communications link security as well as remote desktop physical security, all of which may require encryption and authentication techniques initiated at the Remote Site. The Contractor acknowledges that Canada's LAN environment will implement a Virtual Private Network (VPN) solution using IP Security (IPSEC), which will include the Entrust™ PKI products with Open Systems Integration (OSI) layer 3 (Network)/layer 4 (Transport) encryption. The Contractor further acknowledges that Canada may in the future deploy an applications-based encryption/authentication solution such as Secure Socket Layer (SSL) encryption. The Teleport Services must support the Client's deployment of both IPSEC VPN and SSL solutions.

7B.1.9 The Contractor must not protocol filter any IP traffic originating from equipment at remote sites unless requested by the SSC Satellite Service Manager.

7B.1.10 The Contractor must notify the Contracting Authority of any plans to sunset this Service at least 18 months in advance and must provide, at the Contractor's cost, migration to an equivalent or better Service.

7B.2 Modem Services

7B.2.1 The Contractor must provide Modem Services which is a monthly fee service for the operation of modems, either owned by the Contractor or furnished by Canada, and used in the Contractor's Teleport(s) to complete the communication link with Canada's modems at the Remote Site(s).

7B.2.2 The Contractor must install, operate, monitor and maintain all equipment associated with the Modem Services at the Contractor's cost.

7B.2.3 The modems used can be categorized under the following types of interfaces and operating modes:

a) L-Band Interface type satellite modem – modems which have an interface that operates anywhere within the range of 950 to 2000 MHz

   a. SCPC mode – Single Channel per Carrier
   b. DVB-S mode – Digital Video Broadcasting – Satellite
   c. DVB-S2 mode – Digital Video Broadcasting – Satellite 2nd generation

7B.2.4 In the case where Canada provides the modem(s) to be installed at the Teleport(s), the Contractor must provide a firm unique monthly price as per Annex B3, Appendix D. It is the responsibility of the Contractor to install and monitor these modems to an operational level such that the complete end-to-end service is maintained. The Contractor must include into the monthly price any specific customer requirements in the case that Canada's modem(s) are installed in an area away from where the Contractor's modems are installed (i.e. specific customer racks or equipment cages or in specific customer equipment rooms). The Contractor must be prepared to swap out Canada's modem with a Canada supplied spare modem in the event the modem malfunctions.

7B.2.5 The Contractor must provide other satellite modems, as required, to be used in the Teleport Service.

7B.2.6 The Contractor must provide automatic switchable redundancy for the L-Band Equipment and RF Equipment to achieve the Service Availability requirements described in in Section 6.6.1.3.

7B.2.7 The Contractor must provide sufficient capacity on the IF and RF links, from the satellite modem(s) to the RF transmitter, to accommodate a minimum uplink EIRP in multi-carrier mode of 67 dBW.

7B.3 Backhaul Requirements

7B.3.1 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide Internet access up to 100 Mbps at the Teleport(s). The Contractor must absorb all one-time construction costs to provide Internet Access at the Teleport(s).

7B.3.2 Upon request by the SSC Satellite Service Manager, the Contractor must be ready and capable to provide up to 100 Mbps of dedicated terrestrial backhaul capacity for connectivity to Canada's Data Centre(s). The Contractor must absorb all one-time construction costs to provide dedicated backhaul connectivity to the Teleport(s).

7B.3.3 Upon request by the SSC Satellite Service Manager, the Contractor must provide the Internet access or the dedicated backhaul. Costing for backhaul(s) must be at the price specified in Annex B3 - Appendix H.

7B.4 Service and Demarcation Points

7B.4.1 Service points are the physical locations where the Teleport satellite modems are located.

7B.4.2 The Demarcation point for the Teleport Service terminates at the Client end of the interconnecting cable connecting the satellite modem. The Client end of the interconnecting cable connects to either a Client backhaul or Client's end user equipment that is located in the customer room at a Teleport.

7B.4.3 The Contractor will be responsible to provide the interconnecting cable between the Contractor's Demarcation point and either a Client backhaul or Client's end user equipment.

7B.4.4 The Contractor must provide a secure environment against unauthorized access at the Service Points.

7B.4.5 The Contractor must provide recommendations in the interconnection design of the Client's terminal or communication equipment, cabling and facilities at the remote Service Point.

7B.4.6 Inside space for Remote Hardware that is provided by Canada to the Contractor will normally be in a common space without security. For cases where the Contractor requires controlled access to the Remote Hardware, the Contractor must negotiate with the SSC Satellite Service Manager and/or individual Clients for security accommodations and there may be costs to the Contractor associated with any such arrangement.

7C - Associated Services for Remote Sites

7C.1 General Requirements

7C.1.1 Upon request, the Contractor must be able to provide the following Associated Services to Canada:

- Provisioning of Remote Hardware;
- Installation of Remote Hardware in Canada;
- Maintenance of Remote Hardware in Canada; and
- Operator and Specialized Training; and
- May incorporate Canada owned Ku-band Remote Hardware.

7C.1.2 Upon receipt of a Service Order, the contractor must acknowledge receipt of the Service Order to the SSC Satellite Service Manager within two (2) business days.

7C.1.3 Further to 7C.1.2, the Contractor must provide the delivery date for the equipment to the SSC Satellite Service Manager within five (5) to ten (10) business days.

7C.1.4 The Contractor must notify the SSC Satellite Service Manager by e-mail of any delay to the agreed upon date for delivery and installation of the Remote Hardware.

7C.1.5 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Remote Equipment.

7C.2 Provisioning of Remote Hardware

7C.2.1 The Remote Hardware mainly consists of C-band Earth Station components and Associated Parts as listed in the pricing sheet (Annex B3 – Appendix E).

7C.2.2 The provisioning of the Remote Hardware includes shipping to major cities in Canada.

7C.2.3 The provisioning of the Remote Hardware includes a one (1) year Warranty Maintenance Service unless otherwise indicated.

7C.2.4 All Remote Hardware supplied by the Contractor, including parts used to provide Maintenance Services, must be new and unused. The Remote Hardware must also:

a) be off-the-shelf, meaning it must be composed of standard equipment requiring no further research or development;
b) be a model that is still in production by the time of delivery; and
c) conform to the version of the applicable specification or part number of the manufacturer in effect at the time of delivery.

7C.2.5 The Contractor must deliver the Equipment to the location(s) designated by Canada by the delivery date. The Contractor must pay all costs associated with replacing any item damaged in transit to the final destination. The Contractor acknowledges that no item will be considered delivered on the delivery date if it is damaged or otherwise not ready for Canada to begin its acceptance procedures. The Contractor must, at a minimum, package the Remote Equipment according to industry standards and include a packing slip with each shipment. Packaging, shipping, transportation and delivery must be included in the price of the Remote Hardware.

7C.2.6 The Contractor must notify the Contracting Authority of any plans to sunset any Remote Hardware at least 18 months in advance and must provide, at the Contractor's cost, equivalent or better Equipment.

7C.3 Installation of Remote Hardware

7C.3.1 The Contractor must perform all site surveys, civil works for antenna foundation, shipping of Remote Hardware, installation of Remote Hardware, de-installation of Remote Hardware (when required) and must make all arrangements with landlords and landowners necessary to deliver the Installation Service.

7C.3.2 Canada will provide air-conditioned building space and commercial, conditioned, protected, AC power to the Contractor at the remote location. Upon request, the Contractor must provide, install, operate and maintain an Uninterruptible Power Supply (UPS) at a remote site intended only to power the satellite equipment. The amount of space available to house the satellite equipment will depend on the location.

7C.3.3 Despite Supplemental General Conditions 4001, Section 5(4) Installation, Integration and Configuration, all installation prices are indicated separately in the Basis of Payment and are not included in the price of the Hardware.

7C.3.4 The Installation Zones for the remote sites are defined as follows:

a) Installation Zone 1: Any site within 100 km from the city halls for Vancouver, Edmonton, Calgary, Regina, Winnipeg, Thunder Bay, Toronto, Ottawa, Montreal, Saint John, Halifax and St John's.
b) Installation Zone 2: Anywhere south of or on the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere south of the 50th parallel in all other provinces.
c) Installation Zone 3: Anywhere north of the 55th parallel in B.C., Alberta, Saskatchewan or Manitoba and anywhere north of the 50th parallel in all other provinces.
d) Installation Zone 4: Anywhere in the Yukon, North West Territories and Nunavut.

7C.3.5 For each new site installed under this Contract and for cases where the Client is providing the Remote Hardware, the Contractor must provide to the SSC Satellite Service Manager, within 30 days of initial site visit, complete site-specific, as-built, documentation packages. The Contractor must ensure that the site specific documentation packages are detailed and complete and include the physical layout of Remote Hardware and civil works. Power distribution documentation is to be provided, if supplied by the Contractor.

7C.3.6 For each new site installed under this Contract, the Contractor must maintain a duplicate copy of site-specific documentation during the term of the contract.

7C.4 Maintenance of Remote Hardware

7C.4.1 General

7C.4.1.1 The Contractor must provide Remote Hardware Maintenance Services for fixed remote sites including the following:

a) Problem identification and resolution;
b) Hotline services (refer to Section 6.4.1);
c) On-site Maintenance for Remote Hardware including IFL cabling;
d) Warranty tracking and administration with the original Remote Hardware manufacturer;
e) Sparing of Hardware; and
f) Software/Firmware revisions.

7C.4.1.2 As per Section 6.12.1.1 (c) & (d) the Contractor must provide Warranty and Maintenance Services for all new Hardware delivered under this Contra ct in accordance with Supplemental General Conditions 4001, with the exceptions of:

a) Despite 4001, Section 25(1), the “Hardware Maintenance Period” is the entire Contract Period.
b) Despite 4001, Section 14(1) & (3), the amount payable for the Maintenance Services is set out in the Basis of Payment and applies throughout the balance of the Contract Period.

7C.4.1.3 Within 10 days of this Contract being issued, the Contractor must provide the Technical Authority with its warranty and maintenance procedures, which must meet all the requirements of this Contract.

7C.4.2 Maintenance Zones

7C.4.2.1 Despite the Supplemental General Conditions 4001, Section 26 (3) (a), the Maintenance Zones are defined as follows:

Zone A:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador and is accessible using all-season paved public highways. Any location within Zone A boundaries that cannot be accessed using all-season paved public highways will be considered to fall within Zone B.

Zone B:

Includes any site south of the 55th parallel in British Columbia, Saskatchewan or Manitoba, south of the 57th parallel in Alberta, or south of the 50th parallel in Ontario, Quebec, the Maritimes, Newfoundland and Labrador that cannot be reached using all-season paved public highways, or where a ferry or air transport must be used. Examples include bush camps, mining sites, oil explorations sites and isolated communities. Repair time includes time spent on scheduled transportation only.

Zone C:

Includes any sites north of the Zone B boundaries. Repair time includes time spent on scheduled transportation only.

7C.5 Operator and Specialized Training Services

7C.5.1 General Requirements

7C.5.1.1 Training requirements are specified in Section 6.10

The Contractor must be able to prepare and deliver Operator Training and upon agreement must be able to prepare and deliver Specialized Training courses related to the provisioned equipment and satellite telecommunications theory and technology.

8 PART 6 - GLOSSARY AND DEFINITIONS

- **BPS:** Bits per second
- **BUC:** A block upconverter is used in the transmission (uplink) of satellite signals. It converts a band (or "block") of frequencies from a lower frequency to a higher frequency.
- **C-band:** A portion of the electromagnetic spectrum in the microwave range of frequencies ranging from 4 and 6 GHz.
- **CONUS:** Contiguous United States of America; comprised of the 48 mainland states, which excludes Hawaii and Alaska and all off-shore US territories and possessions, such as Puerto Rico.
- **DDP (Deployed Demarcation Point):** is defined as a Client owned remote satellite earth station.
- **De-icing:** The process of removing or preventing buildup of ice or snow on a satellite antenna. This can be accomplished by either heating the surface or installing a specially designed non-sticky nylon cover over the face of the satellite dish.
- **Documentation:** means all of the manuals, handbooks, user guides and other human-readable material to be provided by the Contractor to Canada for use with the Specialized Satellite Earth Station Equipment, whether it is to be supplied in printed form or on an electronic storage medium, such as a CD-ROM.
- **EB/NO:** the energy per bit to noise power spectral density ratio
- **EIRP:** Effective Isotropic Radiated Power
- **Footprint Coverage (of a satellite)**: The area on the Earth's surface (sea or land) covered by the satellite and where an antenna can obtain line-of-sight communications. In the Inmarsat systems, this area is also known as the ocean region or coverage area.
- **G/T (Antenna-Gain-to Noise-Temperature):** is a figure of merit in the characterization of antenna performance, where *G* is the antenna gain in decibels at the receive frequency, and *T* is the equivalent noise temperature of the receiving system in kelvins. The receiving system noise temperature is the summation of the antenna noise temperature and the RF chain noise temperature from the antenna terminals to the receiver output.
- **GHZ:** Short for gigahertz, GHz is a unit of measurement for alternating current (AC) or electromagnetic (EM) wave frequencies equal to 1,000,000,000 Hz (Hertz)
- **Government Furnished Equipment (GFE):** the satellite-related Remote Hardware, which is currently owned by the Client from previous procurement.
- **IF (Intermediate Frequency):** a frequency to which a carrier frequency is shifted as an intermediate step in transmission or reception. Satellite uplink downlink equipment 950-1450 MHz
- **Ku-band:** A portion of the electromagnetic spectrum in the microwave range of frequencies ranging from 12 to 20 GHz.
- **Kbps:** Kilobits per second
- **LOS (Line of Sight):** The line between two points; specifically the straight path between a transmitting antenna and a receiving antenna when unobstructed by the horizon.
- **LNB (Low Noise Block Converter):** A device in the downlink chain which converts Radio Frequency (RF) frequencies to Intermediate Frequency (IF) frequencies..
- **Mbps:** Megabits per second
- **MHz:** is a unit of alternating current (AC) or electromagnetic (EM) wave frequency equal to one million hertz (1,000,000 Hz)
- **Modem**: MODulator/DEModulator, a device used to transmit digital data, by converting (modulating) a digital signal into an analogue form and re-converting (demodulating) the analogue signal into digital form at the receiving end.
- **MTBF:** Mean Time Between Failure is the mean (average) time between failures of a device, and is often attributed to the "useful life" of the device.

- **NEUB:** Network and End User Branch, a branch of Shared Services Canada (SSC), which provides communication services to the Federal Government.
- **Partial RF Channel:** Partial RF Channel refers to the provision of only a portion of a RF channel's bandwidth.
- **Remote Hardware:** the term used for the satellite-related equipment located at the Client's remote location. It consists of the satellite antenna, BUC, LNB, indoor unit/modem and associated IFL. Remote Hardware can also be represented by the terms: remote earth station, earth station, remote equipment
- **RF:** Radio Frequency is any of the electromagnetic wave frequencies that lie in the range extending from around3 kHz to300 GHz
- **RF Channel:** RF Channel Service is the retransmission, through a satellite, of a microwave signal carrying voice, data or video traffic, together with associated tracking, telemetry, command facilities and the Satellite Operations Centre. RF Channel is furnished as Whole RF Channel available on a full period basis and on an occasional use basis; also as Partial RF Channel, available on a full period basis only.
- **SFD (Saturation Flux Density):** is a reference point of p0wer required to saturate a transponder from a given point on earth**.**
- **SGS (Satellite Ground Station):** Refers to a Teleport based facility in which the data information through satellite space segment is received within the footprint of specific satellites. From a SGS or Teleport, data is usually forwarded onwards through the use of terrestrial backhaul facilities to Client's Data Center(s).
- **Space Segment:** The portion of a communication link which involves only the satellite and bandwidth to and from an earth station. Space segment can also be represented by the term "bandwidth".
- **Sun Transit:** Sun Transits occur when the sun crosses the earth's equatorial plane during the spring and fall equinoxes (late February or early March; September or October). Each spring and fall RF Channel users will experience varying degrees of signal interference caused by Sun Transit.
- **Type 3 Service:** Defined as not protected in the event of an interruption. No restoration is designated for Type 3 Service, but the service may be restored at the discretion of the Contractor, subject to the availability of capacity at the time of interruption and prudent facility management. This type of service may be pre-empted to restore a Type 1 Service.
- **Type D Service:** Defined as a diversity type of non-protected service. The Type D Diversity Service is defined as a service used in situations where standard Type 3 Services is not available for specific locations due to geographical obstructions, such as mountain ranges. In these situations, the Contractor may utilize Satellite Space Segment Capacity from an alternate fleet of satellites.
- **Whole RF Channel:** Whole RF Channel refers to the provision of the full bandwidth (36MHz for a C-band channel) or (27 MHz for a Ku-band RF Channel.