La presente deliberazione viene affissa il 13 FEB. 2006 *all'Albo Pretorio per rimanervi 15 giorni*

IMMEDIATA ESECUTIVITÀ

PROVINCIA di BENEVENTO

Deliberazione della Giunta Provinciale di Benevento n. 59 *del* 10 FEB. 2006

Oggetto: **POTENZIAMENTO DEL SISTEMA DI RICEZIONE DEI DATI DA SATELLITE DEL MARS*ec*. PROVVEDIMENTI.**

L'anno duemilasei il giorno Dieci del mese di Febbraio presso la Rocca dei Rettori si è riunita la Giunta Provinciale con l'intervento dei Signori:

1) On.le Carmine	**NARDONE**	- Presidente	
~~2) Rag. Giovanni~~	~~**MASTROCINQUE**~~	~~- Vice Presidente~~	
3) Rag. Alfonso	**CIERVO**	- Assessore	
4) Ing. Pompilio	**FORGIONE**	- Assessore	ASSENTE
5) Dott. Pasquale	**GRIMALDI**	- Assessore	
6) Dott. Giorgio Carlo	**NISTA**	- Assessore	
7) Dr. Carlo	**PETRIELLA**	- Assessore	
8) Dr. Rosario	**SPATAFORA**	- Assessore	ASSENTE
9) Geom. Carmine	**VALENTINO**	- Assessore	

Con la partecipazione del Segretario Generale Dott. Gianclaudio IANNELLA

L'ASSESSORE PROPONENTE Carmine Nardone

LA GIUNTA

Preso visione della proposta dell'Ufficio Speciale MARS*ec* istruita dal dott. Ludovico Barone, qui di seguito trascritta:

Premesso che:

- la Provincia di Benevento, attraverso il MARS*ec* (Mediterranean Agency for Remote Sensing and Environmental Control) si è dotata di strutture adatte all'acquisizione ed all'elaborazione dei dati da satellite, finalizzati al controllo ed al monitoraggio del territorio e dell'ambiente;
- la fase di realizzazione ed avviamento del MARS*ec* è stata finanziata con i fondi del POR Campania 2000-2006 ASSE VI – Reti e Nodi di Servizio – Misura 6.2 – Sviluppo della Società dell'Informazione, Azione C – Sistema Informativo Territoriale Interprovinciale della Campania;
- con delibera di G.P. n. 541 del 15.10.2004 è stato approvato il progetto per l'acquisto di apparecchiature occorrenti per il Centro di monitoraggio MARS*ec*, da imputarsi sul Cap. n. 13922,
  - per € 86.610,00 sull'impegno n. 2795/2/02;
  - per € 467.790,00 sull'impegno n. 2795/02, comprendente, in particolare, complessivi € 122.000,00 per "Acquisto beni immateriali – software e licenze", di cui:
    - € 37.000,00 per "Certificazione stazione di ricezione dati da parte di Radarsat International comprensiva di accessi da parte di personale Radarsat e software di gestione di dati";
    - € 85.000,00 per "Acquisto licenza ricezione dati Radarsat-1 per 1 anno";
- la Provincia di Benevento, in virtù di accordi di programma, si propone di offrire i servizi del MARS*ec* ad Enti pubblici centrali e locali, ad Amministrazioni Pubbliche e ad altre Istituzioni nazionali ed internazionali, e di collaborare con esse all'implementazione di nuove procedure e metodologie volte ad accrescere la capacità di intervento nelle materie ad esse delegate mediante lo sviluppo e l'applicazione delle innovazioni tecnologiche di cui esso dispone;

- il MARS*ec*, in particolare, si prefigge di fornire servizi ad alto contenuto tecnologico basati su un insieme esaustivo di dati satellitari direttamente acquisiti e/o acquisibili presso la stazione;
- attualmente il sistema è configurato per la ricezione dei dati dal sensore satellitare EROS A e da sensori che non richiedono specifiche autorizzazioni o licenze per il loro utilizzo (ad esempio MODIS e AVHRR);
- da recenti contatti e/o accordi con il Ministero dell'Ambiente e della Tutela del Territorio, la Regione Campania ed altri Enti territoriali è emersa la necessità di estendere la capacità di acquisizione dei dati e del loro successivo utilizzo verso ulteriori sensori con elevatissima risoluzione spaziale;
- il potenziamento delle attuali capacità del MARS*ec* in termini di licenze di acquisizione ed uso, anche commerciale, dei dati trasmessi da sensori satellitari ad alta risoluzione, è indispensabile per produrre i servizi richiesti dagli Enti locali territoriali e, in particolare, per svolgere attività innovative per la misura delle deformazioni sub-centimetriche della crosta terrestre o di manufatti;

Visto che:
- l'Università degli Studi del Sannio già in altre occasioni, in virtù di convenzioni stipulate con la Provincia di Benevento per la gestione del MARS*ec*, ha svolto supporto tecnico per la stipula di contratti per la ricezione diretta di dati da satellite e/o l'acquisto di tali dati dagli enti gestori;

Ritenuto opportuno richiedere un parere scientifico in merito all'acquisizione diretta di dati ad alta risoluzione da parte del MARS*ec*, con specifico riferimento a:

a) le potenzialità del sensore satellitare Radarsat-1;
b) la compatibilità del sistema di ricezione proposto con la tecnologia attualmente installata presso il Centro di monitoraggio;

Considerato che:
- il prof. Maurizio Di Bisceglie, del Dipartimento di Ingegneria dell'Università degli Studi del Sannio, in data 16 gennaio u.s., ha espresso il parere scientifico richiesto;
- dopo aver attentamente esaminato gli aspetti di cui ai sopra citati punti a) e b), il prof. Di Bisceglie conclude affermando che "il sensore RADARSAT-1 rappresenta la soluzione tecnologica al momento più adeguata e rapidamente attuabile per le finalità del MARS*ec*";
- sulla base di tale parere scientifico, si è proceduto ad avviare una trattativa con la "RADARSAT INTERNATIONAL INC.", compagnia costituita nel rispetto delle leggi del Canada, avente ufficio direttivo a Richmond, per l'acquisizione diretta dei dati dal sensore Radarsat-1;
- la "RADARSAT INTERNATIONAL INC." ha formulato una proposta di contratto comprendente la licenza di ricezione dei dati, la fornitura del software di gestione nonché la certificazione del MARS*ec* quale stazione operativa nell'ambito del programma RADARSAT, abilitata alla ricezione e distribuzione dei dati;
- i servizi proposti dalla "RADARSAT INTERNATIONAL INC.", inclusa la licenza di ricezione dei dati Radarsat-1 per la prima annualità, presentano un costo complessivo di USD 143.000,00 pari, al cambio odierno di circa 0,84 EURO per USD, ad € 120.120,00;
- per la stipula del contratto in lingua inglese, il costo di traduzione ed interpretariato ed altre eventuali spese relative alla fase di contrattazione, occorre considerare un importo di circa € 2.000,00;

Tenuto conto che:
- l'accordo raggiunto con il Ministero dell'Ambiente e della Tutela del territorio per la fornitura dei servizi del MARSec al Sistema di Monitoraggio e Difesa del Suolo previsto dal progetto TELLUS rende necessario, per garantire il pieno adempimento agli impegni assunti nel rispetto del cronoprogramma delle attività, l'utilizzo di dati ad alta risoluzione che, allo stato attuale, possono essere acquisiti esclusivamente dal sensore Radarsat-1;
- la conclusione della trattativa con la "RADARSAT INTERNATIONAL INC." risulta strategica per le attività del MARSec, in quanto il Centro, per effetto della licenza e della certificazione da parte della compagnia canadese, rappresenterà l'unica stazione in Italia a ricevere i dati dal sensore Radarsat-1 (allo stato attuale, infatti, la maggior parte dei dati riguardanti il Paese è acquisita presso la stazione esistente in Turchia);
- dai contatti avuti con vari Enti territoriali è scaturita l'opportunità di perfezionare, in tempi brevi, contratti per servizi che il MARS*ec* può offrire proprio utilizzando dati acquisibili dal predetto sensore;

Tanto premesso e considerando l'urgenza di dotarsi del servizio di acquisizione di immagini satellitari ad alta risoluzione, si propone di:
- approvare il testo del contratto con la "RADARSAT INTERNATIONAL INC." per la fornitura della licenza di ricezione dei dati Radarsat-1 e per l'acquisizione della certificazione della stazione di ricezione dati da parte di Radarsat International, comprensiva di accessi da parte di personale Radarsat e software di gestione dati, per

l'importo di complessivi USD 143.000,00 pari, al cambio odierno di circa 0,84 EURO per USD, ad € 120.120,00;

- autorizzare il Dirigente dell'Ufficio Speciale MARS*ec* ai successivi adempimenti, ivi compresa l'autorizzazione a recarsi a Montreal – Canada, per la stipula del contratto presso la sede consolare italiana, avvalendosi dell'assistenza della Camera di Commercio Internazionale;
- imputare la spesa di complessivi € 122.000,00 da sostenere per la prima annualità, compresa quella di circa € 2.000,00 stimata per servizi di traduzione ed interpretariato e per altri eventuali costi relativi alla fase di contrattazione, sull'impegno n. 2795/02 di cui al cap. 13922 stabilito con delibera di G.P. n. 541 del 15.10.2004.

Esprime parere favorevole circa la regolarità tecnica della proposta.

Lì _____

Il Dirigente del MARSec
(Dott. Ludovico Barone)

Esprime parere favorevole circa l'impegno di spesa di € 122.000,00 sul cap. 13922 - impegno n. 2795/02.

Lì _____

Il Dirigente del Settore Edilizia e Patrimonio
(Ing. Valentino Melillo)

Esprime parere favorevole circa la regolarità contabile della proposta.

Lì _____

Il Dirigente del Settore FINANZE
E CONTROLLO ECONOMICO
(Dr. Sergio MUOLLO)

LA GIUNTA

Su parere favorevole dell'~~Assessore relatore~~

D E L I B E R A

Per le motivazioni espresse in narrativa e che formano parte integrante del presente dispositivo:

1) approvare il testo del contratto con la "RADARSAT INTERNATIONAL INC." per la fornitura della licenza di ricezione dei dati Radarsat-1 e per l'acquisizione della certificazione della stazione di ricezione dati da parte di Radarsat International, comprensiva di accessi da parte di personale Radarsat e software di gestione dati, per l'importo di complessivi USD 143.000,00 pari, al cambio odierno di circa 0,84 EURO per USD, ad € 120.120,00;

2) autorizzare il Dirigente dell'Ufficio Speciale MARS*ec* ai successivi adempimenti, ivi compresa l'autorizzazione a recarsi a Montreal – Canada, per la stipula del contratto presso la sede consolare italiana, avvalendosi dell'assistenza della Camera di Commercio Internazionale;

3) imputare la spesa di complessivi € 122.000,00 da sostenere per la prima annualità, compresa quella di circa € 2.000,00 stimata per servizi di traduzione ed interpretariato e per altri eventuali costi relativi alla fase di contrattazione, sull'impegno n. 2795/02 di cui al cap. 13922 stabilito con delibera di G.P. n. 541 del 15.10.2004.

4) dare alla presente delibera l'immediata esecutività.

Verbale letto, confermato e sottoscritto

IL SEGRETARIO GENERALE
(Dr. Gianclaudio IANNELLA)

IL PRESIDENTE
(On. Carmine NARDONE)

N. 119 **Registro Pubblicazione**

Si certifica che la presente deliberazione è stata affissa all'Albo in data odierna, per rimanervi per 15 giorni consecutivi a norma dell'art. 124 del T.U. – D. Lgs.vo 18.8.2000, n.267.

BENEVENTO 13 FEB. 2006

IL MESSO

IL SEGRETARIO GENERALE
(Dott Gianclaudio IANNELLA)

La suestesa deliberazione è stata affissa all'Albo Pretorio in data 13 FEB. 2006 **e contestualmente comunicata ai Capigruppo ai sensi dell'art. 125 del T.U. – D. Lgs.vo 18.8.2000, n. 267.**

SI ATTESTA, che la presente deliberazione è divenuta esecutiva a norma dell'art. 124 del T.U. – D.Lgs.vo 18.8.2000, n. 267 e avverso la stessa non sono stati sollevati rilievi nei termini di legge.

lì 1 MAR. 2006

IL RESPONSABILE DELL'UFFICIO

IL SEGRETARIO GENERALE
(F.to Dott. Gianclaudio IANNELLA)

Si certifica che la presente deliberazione è divenuta esecutiva ai sensi del T.U. – D. Lgs.vo 18.8.2000, n. 267 il giorno 1 MAR. 2006

☒ Dichiarata immediatamente eseguibile (art. 134, comma 4, D Lgs.vo 18.8.2000, n. 267).

☐ Decorsi 10 giorni dalla sua pubblicazione (art. 134, comma 3, D Lgs.vo 18.8.2000, n. 267).

☐ E' stata revocata con atto n. _____ del _____

Benevento lì, 1 MAR. 2006

Il SEGRETARIO GENERALE
IL SEGRETARIO GENERALE
(Dott Gianclaudio IANNELLA)

Copia per

SETTORE Lavori Pubblici il _____ prot. n. Es. 1741

SETTORE Finanze e CC il 12/1/06 prot. n. 3.3.06

SETTORE Risorse Umane il _____ prot. n. _____

Revisori dei Conti il 15/1/06 prot. n. _____

Nucleo di Valutazione il _____ prot. n. _____

Conferenza dei Capigruppo il _____ prot. n. _____

PROVINCIA di BENEVENTO

Settore Servizi ai Cittadini

Servizio Affari Generali

235
13-2-06

Prot. n. 1241 *Benevento, lì* 15 FEB. 2006

U.O.: GIUNTA/CONSIGLIO

Rinvia

AL DIRIGENTE DEL SETTORE
UFFICIO SPECIALE MARSec

AL DIRIGENTE DEL SETTORE
FINANZA E CONTROLLO
ECONOMICO

AL DIRIGENTE DEL SETTORE
RISORSE UMANE

AI PRESIDENTI
REVISORI DEI CONTI
NUCLEO DI VALUTAZIONE

S E D E

OGGETTO: DELIBERA G.P. N. 59 DEL 10.02.2006 AD OGGETTO: POTENZIAMENTO DEL SISTEMA DI RICEZIONE DEI DATI DA SATELLITE DEL MARSec. PROVVEDIMENTI -

Per quanto di competenza, si trasmette copia della delibera indicata in oggetto, immediatamente esecutiva.

IL DIRIGENTE
Dr. ssa Patrizia TARANTO

RICEVUTO IN DATA 30/01/06
CON PROT. N. 39

Università degli Studi del Sannio

Dipartimento di Ingegneria, Piazza Roma 21, 82100 Benevento

Prof. Maurizio di Bisceglie

Docente di Telecomunicazioni

Acquisizione diretta di dati dal sensore Radarsat-1 da parte del MARSec di Benevento: parere scientifico.

PREMESSE

1. La Provincia di Benevento, attraverso il MARSec (Mediterranean Agency for Remote Sensing and Environmental Control) si è dotata di strutture per l'acquisizione e l'elaborazione dei dati da satellite finalizzate al controllo ed al monitoraggio del territorio e dell'ambiente.
2. E' richiesto il potenziamento delle attuali capacità del MARSec in termini di licenze di acquisizione ed uso, anche commerciale, dei dati trasmessi da sensori satellitari, finalizzati ad attività innovative per la misura delle deformazioni sub-centimetriche della crosta terrestre o di manufatti.
3. E' pervenuta una proposta di contratto per l'acquisizione diretta dei dati dal sensore Radarsat-1.
4. E' stato richiesto, un parere scientifico da parte della Provincia di Benevento, relativamente ai seguenti aspetti:

a) compatibilità del sistema di ricezione proposto con la tecnologia installata presso il MARSec;
b) potenzialità del sensore satellitare Radarsat-1.

VALUTAZIONI

Attualmente Radarsat-1, insieme al sensore ASAR a bordo del satellite ENVISAT è l'unico sensore SAR civile in orbita con piene funzionalità.

1. Compatibilità

<u>rispetto alla ricezione dei dati trasmessi dal sensore Radarsat-1.</u>

a) Hardware: Il sistema di ricezione, è attualmente in grado di ricevere dati dal sensore Radarsat-1 senza alcuna modifica.
b) Software: Il sistema necessita di software per la deformattazione dei dati da Telemetria a Level-0. Tale software è in fase di acquisto da parte del MARSec. Il software per l'elaborazine dei dati stripmap fino all'interferometria è acquisito e testato.

<u>rispetto alla ricezione dei dati trasmessi dal sensore ASAR-Envisat.</u>

a) Hardware: Il sistema di ricezione, non è attualmente in grado di ricevere dati dal sensore ASAR-Envisat ma può essere esteso alla ricezione di tale sensore senza rilevanti modifiche.
b) Software: Il sistema necessita di software per la deformattazione dei dati da Telemetria a Level-0. Il software per l'elaborazine dei dati stripmap fino all'interferometria è acquisito ma non testato.

2. Potenzialità dei sensori Radarsat-1 e ASAR-Envisat.

I satelliti sono equipaggiati con un sensore radar ad apertura sintetica (SAR) per l'osservazione della Terra. Radarsat-1 presenta fasci con risoluzione fino a 8 m. e piene funzionalità commerciali. ASAR presenta fasci fino a risoluzione di 30 m.
Entrambe le piattaforme, con diversi gradi di flessibilità, sono in grado di collezionare dati utilizzando diverse modalità di acquisizione dei dati, sia rispetto alle risoluzioni, sia rispetto agli angoli di incidenza e alle aree di copertura. I sistemi operano in banda C e permettono di osservare la Terra in qualunque condizione climatica ed in presenza di nubi. L'angolo e il profilo di elevazione del fascio possono essere variati su richiesta affinchè il fascio intercetti la superficie terrestre secondo un predefinito intervallo di angoli di incidenza. Questa potenzialità è rilevante in quanto, al variare dell'angolo di incidenza, variano le caratteristiche dell'immagine ottenuta. Diverse coperture e risoluzioni possono essere inoltre ottenute variando le caratteristiche dell'impulso trasmesso e la temporizzazione del ricevitore. Il data stream viene trasmesso a terra attraverso un collegamento a 105 Mbit/s.

Caratteristiche fondamentali del sensore
Risoluzione : dipendente dal fascio utilizzato: da 8x8 m a 100x100 m per Radarsat-1, da 30x30 m a 150x150 m per ASAR.
Tempo di rivisitazione: circa 30 gg per passaggi sovrapponibili
Disponibilità del dato: tempo reale per Radasat-1. Per ASAR non è chiarita la possibilità di ricevere i dati in downlink diretto.
Applicazioni del prodotto: Monitoraggio di deformazioni lente, bradisismo, controllo dei vulcani, macchie d'olio, rilievi topografici.

Fasi di processing per l'estrazione dell'informazione interferometrica differenziale.
Preformattazione dei dati dal livello downlink al livello raw (level 0)
Focalizzazione bidimensionale
Coregistrazione delle immagini
Generazione degli interferogrammi
Georeferenziazione
Compensazione del contributo topografico
Compensazione dell'atmosfera
Generazione degli interferogrammi differenziali
Generazione delle mappe di deformazione

CONCLUSIONI

Sulla base di quanto esposto si evince quanto segue

a) Entrambe i sensori presentano caratteristiche interessanti per le finalità del MARS*ec*. Il sensore Radarsat-1 presenta una modalità di acquisizione a risoluzione fine non esistente in ASAR.
b) La serie storica dei dati è comparabile per i due sensori.
c) Al momento non risultano chiare le modalità e le possibilità di ricezione diretta dei dati dal sensore ENVISAT.
d) La stazione del MARS*ec* sarebbe attualmente l'unica stazione in Italia a ricevere i dati dal sensore Radarsat-1. Al momento, infatti, la maggior parte dei dati riguardanti l'Italia vengono acquisiti presso la stazione in Turchia.

Tenendo conto di quanto precedentemente esposto e di altre caratteristiche che non vengono citate per brevità in questo documento, il sensore RADARSAT-1 rappresenta, a giudizio dello scrivente, la soluzione tecnologica al momento più adeguata e rapidamente attuabile per le finalità del MARS*ec*.

Tuttavia, è da tener presente che l'acquisizione di dati da altri sensori non si presenta come un'alternativa ma come un utile complemento che consente di ottenere una più completa serie storica di dati e un miglior tempo di rivisitazione. Si consiglia, a tal fine, di verificare la possibilità di acquisire, in un futuro vicino, anche i dati dal sensore ASAR-Envisat o da altri sensori in fase di programmazione per il lancio nei prossimi due anni (Radarsat-2, Terrasar X/L, Cosmo/Skymed, Palsar).

in fede

Prof. Maurizio di Bisceglie
Università degli Studi del Sannio

Benevento, 16 gennaio 2006.

PROVINCIA DI BENEVENTO

UFFICIO SPECIALE MARS*ec*

Prot. n. 47 **del** 09/02/06

AL SIG. PRESIDENTE

-sede-

OGGETTO: Potenziamento del sistema di ricezione dei dati da satellite del MARS*ec*. Provvedimenti

Premesso che:

- la Provincia di Benevento, attraverso il MARS*ec* (Mediterranean Agency for Remote Sensing and Environmental Control) si è dotata di strutture adatte all'acquisizione ed all'elaborazione dei dati da satellite, finalizzati al controllo ed al monitoraggio del territorio e dell'ambiente;
- la fase di realizzazione ed avviamento del MARS*ec* è stata finanziata con i fondi del POR Campania 2000-2006 ASSE VI – Reti e Nodi di Servizio – Misura 6.2 – Sviluppo della Società dell'Informazione, Azione C – Sistema Informativo Territoriale Interprovinciale della Campania;
- con delibera di G.P. n. 541 del 15.10.2004 è stato approvato il progetto per l'acquisto di apparecchiature occorrenti per il Centro di monitoraggio MARS*ec*, da imputarsi sul Cap. n. 13922,
  - per € 86.610,00 sull'impegno n. 2795/2/02;
  - per € 467.790,00 sull'impegno n. 2795/02, comprendente, in particolare, complessivi € 122.000,00 per "Acquisto beni immateriali – software e licenze", di cui:
    - € 37.000,00 per "Certificazione stazione di ricezione dati da parte di Radarsat International comprensiva di accessi da parte di personale Radarsat e software di gestione di dati";
    - € 85.000,00 per "Acquisto licenza ricezione dati Radarsat-1 per 1 anno";
- la Provincia di Benevento, in virtù di accordi di programma, si propone di offrire i servizi del MARS*ec* ad Enti pubblici centrali e locali, ad Amministrazioni Pubbliche e ad altre Istituzioni

nazionali ed internazionali, e di collaborare con esse all'implementazione di nuove procedure e metodologie volte ad accrescere la capacità di intervento nelle materie ad esse delegate mediante lo sviluppo e l'applicazione delle innovazioni tecnologiche di cui esso dispone;

- il MARS*ec*, in particolare, si prefigge di fornire servizi ad alto contenuto tecnologico basati su un insieme esaustivo di dati satellitari direttamente acquisiti e/o acquisibili presso la stazione;
- attualmente il sistema è configurato per la ricezione dei dati dal sensore satellitare EROS A e da sensori che non richiedono specifiche autorizzazioni o licenze per il loro utilizzo (ad esempio MODIS e AVHRR);
- da recenti contatti e/o accordi con il Ministero dell'Ambiente e della Tutela del Territorio, la Regione Campania ed altri Enti territoriali è emersa la necessità di estendere la capacità di acquisizione dei dati e del loro successivo utilizzo verso ulteriori sensori con elevatissima risoluzione spaziale;
- il potenziamento delle attuali capacità del MARS*ec* in termini di licenze di acquisizione ed uso, anche commerciale, dei dati trasmessi da sensori satellitari ad alta risoluzione, è indispensabile per produrre i servizi richiesti dagli Enti locali territoriali e, in particolare, per svolgere attività innovative per la misura delle deformazioni sub-centimetriche della crosta terrestre o di manufatti;

Visto che:

- l'Università degli Studi del Sannio già in altre occasioni, in virtù di convenzioni stipulate con la Provincia di Benevento per la gestione del MARS*ec*, ha svolto supporto tecnico per la stipula di contratti per la ricezione diretta di dati da satellite e/o l'acquisto di tali dati dagli enti gestori;

Ritenuto opportuno richiedere un parere scientifico in merito all'acquisizione diretta di dati ad alta risoluzione da parte del MARS*ec*, con specifico riferimento a:

a) le potenzialità del sensore satellitare Radarsat-1;
b) la compatibilità del sistema di ricezione proposto con la tecnologia attualmente installata presso il Centro di monitoraggio;

Considerato che:

- il prof. Maurizio Di Bisceglie, del Dipartimento di Ingegneria dell'Università degli Studi del Sannio, in data 16 gennaio u.s., ha espresso il parere scientifico richiesto;

- dopo aver attentamente esaminato gli aspetti di cui ai sopra citati punti a) e b), il prof. Di Bisceglie conclude affermando che "il sensore RADARSAT-1 rappresenta la soluzione tecnologica al momento più adeguata e rapidamente attuabile per le finalità del MARS*ec*";
- sulla base di tale parere scientifico, si è proceduto ad avviare una trattativa con la "RADARSAT INTERNATIONAL INC.", compagnia costituita nel rispetto delle leggi del Canada, avente ufficio direttivo a Richmond, per l'acquisizione diretta dei dati dal sensore Radarsat-1;
- la "RADARSAT INTERNATIONAL INC." ha formulato una proposta di contratto comprendente la licenza di ricezione dei dati, la fornitura del software di gestione nonché la certificazione del MARS*ec* quale stazione operativa nell'ambito del programma RADARSAT, abilitata alla ricezione e distribuzione dei dati;
- i servizi proposti dalla "RADARSAT INTERNATIONAL INC.", inclusa la licenza di ricezione dei dati Radarsat-1 per la prima annualità, presentano un costo complessivo di USD 143.000,00 pari, al cambio odierno di circa 0,84 EURO per USD, ad € 120.120,00;
- per la stipula del contratto in lingua inglese, il costo di traduzione ed interpretariato ed altre eventuali spese relative alla fase di contrattazione, occorre considerare un importo di circa € 2.000,00;

Tenuto conto che:

- l'accordo raggiunto con il Ministero dell'Ambiente e della Tutela del territorio per la fornitura dei servizi del MARSec al Sistema di Monitoraggio e Difesa del Suolo previsto dal progetto TELLUS rende necessario, per garantire il pieno adempimento agli impegni assunti nel rispetto del cronoprogramma delle attività, l'utilizzo di dati ad alta risoluzione che, allo stato attuale, possono essere acquisiti esclusivamente dal sensore Radarsat-1;
- la conclusione della trattativa con la "RADARSAT INTERNATIONAL INC." risulta strategica per le attività del MARSec, in quanto il Centro, per effetto della licenza e della certificazione da parte della compagnia canadese, rappresenterà l'unica stazione in Italia a ricevere i dati dal sensore Radarsat-1 (allo stato attuale, infatti, la maggior parte dei dati riguardanti il Paese è acquisita presso la stazione esistente in Turchia);
- dai contatti avuti con vari Enti territoriali è scaturita l'opportunità di perfezionare, in tempi brevi, contratti per servizi che il MARS*ec* può offrire proprio utilizzando dati acquisibili dal predetto sensore;

Tanto premesso e considerando l'urgenza di dotarsi del servizio di acquisizione di immagini satellitari ad alta risoluzione, si propone di:

- approvare il testo del contratto con la "RADARSAT INTERNATIONAL INC." per la fornitura della licenza di ricezione dei dati Radarsat-1 e per l'acquisizione della certificazione della stazione di ricezione dati da parte di Radarsat International, comprensiva di accessi da parte di personale Radarsat e software di gestione dati, per l'importo di complessivi USD 143.000,00 pari, al cambio odierno di circa 0,84 EURO per USD, ad € 120.120,00;
- autorizzare il Dirigente dell'Ufficio Speciale MARS*ec* ai successivi adempimenti, ivi compresa l'autorizzazione a recarsi a Montreal – Canada, per la stipula del contratto presso la sede consolare italiana, avvalendosi dell'assistenza della Camera di Commercio Internazionale;
- imputare la spesa di complessivi € 122.000,00 da sostenere per la prima annualità, compresa quella di circa € 2.000,00 stimata per servizi di traduzione ed interpretariato e per altri eventuali costi relativi alla fase di contrattazione, sull'impegno n. 2795/02 di cui al cap. 13922 stabilito con delibera di G.P. n. 541 del 15.10.2004.

Il Dirigente
(Dott. Ludovico Barone)

FXConverter - 164 Currency Converter Results

Giovedì 9 Febbraio 2006

1 USA - Dollaro = 0.83567 Euro
1 Euro (EUR) = 1.19664 USA - Dollaro (USD)

Il cambio medio é stato 0.83557 / 0.83567 (vendita/acquisto)
Il cambio minimo é stato 0.83372 / 0.83382
Il cambio massimo é stato 0.83861 / 0.83872

Cambio del giorno precedente

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Università degli Studi del Sannio

Dipartimento di Ingegneria, Piazza Roma 21, 82100 Benevento

Prof. Maurizio di Bisceglie

Docente di Telecomunicazioni

Acquisizione diretta di dati dal sensore Radarsat-1 da parte del MARS*ec* di Benevento: parere scientifico.

PREMESSE

1. La Provincia di Benevento, attraverso il MARS*ec* (Mediterranean Agency for Remote Sensing and Environmental Control) si è dotata di strutture per l'acquisizione e l'elaborazione dei dati da satellite finalizzate al controllo ed al monitoraggio del territorio e dell'ambiente.
2. E' richiesto il potenziamento delle attuali capacità del MARS*ec* in termini di licenze di acquisizione ed uso, anche commerciale, dei dati trasmessi da sensori satellitari, finalizzati ad attività innovative per la misura delle deformazioni sub-centimetriche della crosta terrestre o di manufatti.
3. E' pervenuta una proposta di contratto per l'acquisizione diretta dei dati dal sensore Radarsat-1.
4. E' stato richiesto, un parere scientifico da parte della Provincia di Benevento, relativamente ai seguenti aspetti:

a) compatibilità del sistema di ricezione proposto con la tecnologia installata presso il MARS*ec*;
b) potenzialità del sensore satellitare Radarsat-1.

VALUTAZIONI

Attualmente Radarsat-1, insieme al sensore ASAR a bordo del satellite ENVISAT è l'unico sensore SAR civile in orbita con piene funzionalità.

1. Compatibilità

<u>rispetto alla ricezione dei dati trasmessi dal sensore Radarsat-1.</u>

a) Hardware: Il sistema di ricezione, è attualmente in grado di ricevere dati dal sensore Radarsat-1 senza alcuna modifica.
b) Software: Il sistema necessita di software per la deformattazione dei dati da Telemetria a Level-0. Tale software è in fase di acquisto da parte del MARSec. Il software per l'elaborazine dei dati stripmap fino all'interferometria è acquisito e testato.

<u>rispetto alla ricezione dei dati trasmessi dal sensore ASAR-Envisat.</u>

a) Hardware: Il sistema di ricezione, non è attualmente in grado di ricevere dati dal sensore ASAR-Envisat ma può essere esteso alla ricezione di tale sensore senza rilevanti modifiche.
b) Software: Il sistema necessita di software per la deformattazione dei dati da Telemetria a Level-0. Il software per l'elaborazine dei dati stripmap fino all'interferometria è acquisito ma non testato.

2. Potenzialità dei sensori Radarsat-1 e ASAR-Envisat.

I satelliti sono equipaggiati con un sensore radar ad apertura sintetica (SAR) per l'osservazione della Terra. Radarsat-1 presenta fasci con risoluzione fino a 8 m. e piene funzionalità commerciali. ASAR presenta fasci fino a risoluzione di 30 m.
Entrambe le piattaforme, con diversi gradi di flessibilità, sono in grado di collezionare dati utilizzando diverse modalità di acquisizione dei dati, sia rispetto alle risoluzioni, sia rispetto agli angoli di incidenza e alle aree di copertura. I sistemi operano in banda C e permettono di osservare la Terra in qualunque condizione climatica ed in presenza di nubi. L'angolo e il profilo di elevazione del fascio possono essere variati su richiesta affinchè il fascio intercetti la superficie terrestre secondo un predefinito intervallo di angoli di incidenza. Questa potenzialità è rilevante in quanto, al variare dell'angolo di incidenza, variano le caratteristiche dell'immagine ottenuta. Diverse coperture e risoluzioni possono essere inoltre ottenute variando le caratteristiche dell'impulso trasmesso e la temporizzazione del ricevitore. Il data stream viene trasmesso a terra attraverso un collegamento a 105 Mbit/s.

Caratteristiche fondamentali del sensore
Risoluzione : dipendente dal fascio utilizzato: da 8x8 m a 100x100 m per Radarsat-1, da 30x30 m a 150x150 m per ASAR.
Tempo di rivisitazione: circa 30 gg per passaggi sovrapponibili
Disponibilità del dato: tempo reale per Radasat-1. Per ASAR non è chiarita la possibilità di ricevere i dati in downlink diretto.
Applicazioni del prodotto: Monitoraggio di deformazioni lente, bradisismo, controllo dei vulcani, macchie d'olio, rilievi topografici.

Fasi di processing per l'estrazione dell'informazione interferometrica differenziale.
Preformattazione dei dati dal livello downlink al livello raw (level 0)
Focalizzazione bidimensionale
Coregistrazione delle immagini
Generazione degli interferogrammi
Georeferenziazione
Compensazione del contributo topografico
Compensazione dell'atmosfera
Generazione degli interferogrammi differenziali
Generazione delle mappe di deformazione

CONCLUSIONI

Sulla base di quanto esposto si evince quanto segue

a) Entrambe i sensori presentano caratteristiche interessanti per le finalità del MARS*ec*. Il sensore Radarsat-1 presenta una modalità di acquisizione a risoluzione fine non esistente in ASAR.
b) La serie storica dei dati è comparabile per i due sensori.
c) Al momento non risultano chiare le modalità e le possibilità di ricezione diretta dei dati dal sensore ENVISAT.
d) La stazione del MARS*ec* sarebbe attualmente l'unica stazione in Italia a ricevere i dati dal sensore Radarsat-1. Al momento, infatti, la maggior parte dei dati riguardanti l'Italia vengono acquisiti presso la stazione in Turchia.

Tenendo conto di quanto precedentemente esposto e di altre caratteristiche che non vengono citate per brevità in questo documento, il sensore RADARSAT-1 rappresenta, a giudizio dello scrivente, la soluzione tecnologica al momento più adeguata e rapidamente attuabile per le finalità del MARS*ec*.

Tuttavia, è da tener presente che l'acquisizione di dati da altri sensori non si presenta come un'alternativa ma come un utile complemento che consente di ottenere una più completa serie storica di dati e un miglior tempo di rivisitazione. Si consiglia, a tal fine, di verificare la possibilità di acquisire, in un futuro vicino, anche i dati dal sensore ASAR-Envisat o da altri sensori in fase di programmazione per il lancio nei prossimi due anni (Radarsat-2, Terrasar X/L, Cosmo/Skymed, Palsar).

in fede

Prof. Maurizio di Bisceglie
Università degli Studi del Sannio

Benevento, 16 gennaio 2006.

J. E. G

IMMEDIATA ESECUTIVITA'

La presente deliberazione viene affissa il 22 OTT. 2004 all'Albo Pretorio per rimanervi 15 giorni

PROVINCIA di BENEVENTO

Deliberazione della Giunta Provinciale di Benevento n. 541 *del* 15 OTT. 2004

OGGETTO : Centro per il monitoraggio ambientale mediante telerilevamento da satellite per la realizzazione di *"Un sistema integrato per il monitoraggio ambientale"*. **POR** CAMPANIA 2000-2006 ASSE VI RETI E NODI DI SERVIZIO - MISURA 6.2 SVILUPPO DELLA SOCIETÀ DELL'INFORMAZIONE AZIONE C. Sistema Informativo Territoriale Interprovinciale della Campania.
Approvazione progetto per acquisto apparecchiature occorrenti per il Centro di monitoraggio.

L'anno duemilaquattro il giorno quindici del mese di ottobre presso la Rocca dei Rettori si è riunita la Giunta Provinciale con l'intervento dei Signori:

1) On.le Carmine	NARDONE	- Presidente	
2) Rag. Giovanni	MASTROCINQUE	- Vice Presidente	
3) Rag. Alfonso	CIERVO	- Assessore	
4) Ing. Pompilio	FORGIONE	- Assessore	*ASSENTE*
5) Dott. Pasquale	GRIMALDI	- Assessore	
6) Dott. Giorgio Carlo	NISTA	- Assessore	
7) Dott. Carlo	PETRIELLA	- Assessore	
8) Dott. Rosario	SPATAFORA	- Assessore	
9) Geom. Carmine	VALENTINO	- Assessore	*ASSENTE*

Con la partecipazione del Segretario Generale Dott. Gianclaudio IANNELLA

L'ASSESSORE PROPONENTE

LA GIUNTA

Preso visione della proposta del Settore Infrastrutture, istruita dal Rag. Feleppa Antonio, qui di seguito trascritta :

Premesso che:

- *Con delibera di Giunta Provinciale n°446 del 27.11.2001 venne approvato il progetto generale e del progetto primo stralcio delle apparecchiature relative al Centro di monitoraggio satellitare, in cui il quadro economico di spesa prevedeva l'importo complessivo di €.1.169.051,83 (£.2.263.600.000);*
- *Con delibera della G.P. n° 9 del 20.01.2003 venne approvato il progetto di variante per la realizzazione del Centro per il monitoraggio ambientale mediante telerilevamento da satellite, relativamente al finanziamento provinciale di €.1.169.051,83 (£.2.263.600.000);*

- *Con delibera della G.P. n° 543 del 12.11.2002 venne approvato il progetto relativo ad "Un sistema integrato per il monitoraggio ambientale", nell'ambito del POR CAMPANIA 2000-2006 -ASSE VI RETI E NODI DI SERVIZIO - MISURA 6.2 SVILUPPO DELLA SOCIETÀ DELL'INFORMAZIONE AZIONE C, per l'importo complessivo di €.2.600.000,00 con il quale la Regione Campania riconosceva, quota anticipazione di spesa, l'importo già finanziato dalla Provincia di Benevento con la predetta delibera n°446/2001 per l'importo di €.1.169.051,83. Successivamente venne sottoscritta il Protocollo d'Intesa tra la Regione Campania e questa Provincia per la concessione del finanziamento del predetto progetto per l'importo complessivo di €. 2.599.891,83 così composto:*
  - *€. 1.169.051,83 per il finanziamento del progetto avviato dalla Provincia di Benevento;*
  - *€. 1.430.840,00 per il finanziamento del completamento del Centro di Monitoraggio nell'ottica del progetto-idea SITIPC;*
- *Con delibera di G.P. n°463 del 09.08.2004 venne approvato il progetto di variante nel quale venivano indicati gli importi dei vari capitoli di spesa nei quali venivano indicati, qualitativamente, le attrezzature ed apparecchiature per il completamento del Centro di monitoraggio finanziato dalla Regione Campania;*

Considerato che:

- *Il Prof. Di Bisceglie, del Dipartimento di Ingegneria dell'Università del Sannio, nella qualità di corresponsabile del progetto in questione, ha fatto pervenire l'elenco della attrezzature, opportunamente dettagliato, occorrenti per il Centro di monitoraggio che trovano corrispondenza nel predetto quadro economico innanzi citato, riportate nell'unito elenco (**Allegato n°1**) così di seguito dettagliato:*

  Attrezzature per €. 315.600,00, compreso IVA;

  Acquisto beni Immateriali - Software e licenze: €. 238.800,00 incluso I.V.A.

  A valere, rispettivamente, sugli importi previsti nel quadro economico approvato con la delibera di G.P. n°463/2004, sulle seguenti voci:
  - *Attrezzature per l'importo complessivo di K€.343,60;*
  - *Acquisto beni immateriali per l'importo complessivo di K€.260,95;*

***Ritenuto** doversi procedere all'approvazione del progetto relativo all'acquisto delle attrezzature come individuate dall'Università del Sannio;*

Per tutto quanto sopra detto si propone:

1. *di approvare l'unito progetto relativo all'acquisto delle attrezzature occorrenti per il Centro di monitoraggio rimessoci dal Prof. Di Bisceglie, del Dipartimento di Ingegneria dell'Università del Sannio, così di seguito dettagliato:*

   Attrezzature per €. 315.600,00, compreso IVA;

   Acquisto beni Immateriali - Software e licenze: €. 238.800,00 incluso I.V.A.

2. *di onerare il dirigente del Settore Edilizia e Patrimonio dei successivi adempimenti ed in particolare della attivazione delle gare d'appalto per l'acquisto delle apparecchiature;*

3. *di imputare i suddetti importi sul Capitolo n°13922 e sui seguenti impegni:*
   a. *per €. 86.610,00 sull'impegno n°2795 / 2 / 02;*
   b. *per €. 467.790,00 sull'impegno n°2795 / 02.*

IL RESPONSABILE
(Rag.Antonio Feleppa)

Esprime parere favorevole circa la regolarità tecnica della proposta.
lì _____

Il Dirigente S.E.P.
(ing. Valentino MELILLO)

Esprime parere favorevole circa la regolarità contabile della proposta,
Lì _____

Il Dirigente del Settore FINANZE
E CONTROLLO ECONOMICO
(dott. Sergio MUOLLO)

LA GIUNTA

Su relazione dell'Assessore al ramo
A voti unanimi

D E L I B E R A

Per tutto quanto sopra detto si propone:

1. di approvare l'unito progetto relativo all'acquisto delle attrezzature occorrenti per il Centro di monitoraggio rimessoci dal Prof. Di Bisceglie, del Dipartimento di Ingegneria dell'Università del Sannio, così di seguito dettagliato:
   Attrezzature per €. 315.600,00, compreso IVA;
   Acquisto beni Immateriali - Software e licenze: €. 238.800,00 incluso I.V.A.

2. di onerare il dirigente del Settore Edilizia e Patrimonio dei successivi adempimenti ed in particolare della attivazione delle gare d'appalto per l'acquisto delle apparecchiature;

3. di imputare i suddetti importi sul Capitolo n°13922 e sui seguenti impegni:
   - per €. 86.610,00 sull'impegno n°2795 / 2 / 02;
   - per €. 467.790,00 sull'impegno n°2795 / 02.

PROVINCIA DI BENEVENTO
Settore Edilizia e Patrimonio

S.E.P. / Segreteria

Prot. 6133 / S.E.P. del 05 OTT. 2004

Al Servizio Amministrativo – Sede

OGGETTO: Centro per il monitoraggio ambientale mediante telerilevamento da satellite per la realizzazione di *"Un sistema integrato per il monitoraggio ambientale"*. **POR** CAMPANIA 2000-2006 ASSE VI RETI E NODI DI SERVIZIO - MISURA 6.2 SVILUPPO DELLA SOCIETÀ DELL'INFORMAZIONE AZIONE C. Sistema Informativo Territoriale Interprovinciale della Campania. **Approvazione progetto per acquisto apparecchiature occorrenti per il Centro di monitoraggio.**

Premesso che:

- Con delibera di Giunta Provinciale n°446 del 27.11.2001 venne approvato il progetto generale e del progetto primo stralcio delle apparecchiature relative al Centro di monitoraggio satellitare, in cui il quadro economico di spesa prevedeva l'importo complessivo di €.1.169.051,83 (£.2.263.600.000);
- Con delibera della G.P. n° 9 del 20.01.2003 venne approvato il progetto di variante per la realizzazione del Centro per il monitoraggio ambientale mediante telerilevamento da satellite, relativamente al finanziamento provinciale di €.1.169.051,83 (£.2.263.600.000);
- Con delibera della G.P. n° 543 del 12.11.2002 venne approvato il progetto relativo ad *"Un sistema integrato per il monitoraggio ambientale"*, nell'ambito del POR CAMPANIA 2000-2006 -ASSE VI RETI E NODI DI SERVIZIO - MISURA 6.2 SVILUPPO DELLA SOCIETÀ DELL'INFORMAZIONE AZIONE C, per l'importo complessivo di €.2.600.000,00 con il quale la Regione Campania riconosceva, quota anticipazione di spesa, l'importo già finanziato dalla Provincia di Benevento con la predetta delibera n°446/2001 per l'importo di €.1.169.051,83. Successivamente venne sottoscritta il Protocollo d'Intesa tra la Regione Campania e questa Provincia per la concessione del finanziamento del predetto progetto per l'importo complessivo di €. 2.599.891,83 così composto:
  - €. 1.169.051,83 per il finanziamento del progetto avviato dalla Provincia di Benevento;
  - €. 1.430.840,00 per il finanziamento del completamento del Centro di Monitoraggio nell'ottica del progetto-idea SITIPC;
- Con delibera di G.P. n°463 del 09.08.2004 venne approvato il progetto di variante nel quale venivano indicati gli importi dei vari capitoli di spesa nei quali venivano indicati, qualitativamente, le attrezzature ed apparecchiature per il completamento del Centro di monitoraggio finanziato dalla Regione Campania;

Considerato che:

- Il Prof. Di Bisceglie, del Dipartimento di Ingegneria dell'Università del Sannio, nella qualità di corresponsabile del progetto in questione, ha fatto pervenire l'elenco della attrezzature, opportunamente dettagliato, occorrenti per il Centro di monitoraggio che trovano corrispondenza nel predetto quadro economico innanzi citato, riportate nell'unito elenco (**Allegato n°1**) così di seguito dettagliato:
  Attrezzature per €. 315.600,00, compreso IVA;
  Acquisto beni Immateriali - Software e licenze: €. 238.800,00 incluso I.V.A.

  A valere, rispettivamente, sugli importi previsti nel quadro economico approvato con la delibera di G.P. n°463/2004, sulle seguenti voci:
  - Attrezzature per l'importo complessivo di K€.343,60;
  - Acquisto beni immateriali per l'importo complessivo di K€.260,95;

Ritenuto doversi procedere all'approvazione del progetto relativo all'acquisto delle attrezzature come individuate dall'Università del Sannio;

Per tutto quanto sopra detto si propone:

PROVINCIA di BENEVENTO

Progetto per l'acquisizione di apparecchiature presso il MARS.

Oggetto del documento.
Il presente documento disciplina il dettaglio delle spese per Attrezzature e per Beni immateriali previste per lo svolgimento delle attività del Progetto Regionale SITIPC (in seguito denominato Progetto). Il Progetto prevede complessivamente un impegno di complessivi EURO 1.444.890,00 per attrezzature ed EURO 300.000,00 per beni immateriali. Di questi, restano ancora da impegnare EURO 435.210,00 per attrezzature ed EURO 260.950,00 per beni immateriali.
Il presente documento prevede un impegno a gara di EURO per attrezzature ed EURO per beni immateriali.

Finalizzazione delle spese
Gli acquisti sono finalizzati al completamento strutturale del MARS e alla realizzazione di applicazioni sperimentali sul territorio. In accordo con quanto definito nel Progetto, le applicazioni sono inserite nei seguenti settori di intervento

- Settore Ambientale-Ecologico
- Settore Ambientale-Geofisico
- Settore Infrastrutturale-Tecnologico

Procedure di gara
Da un'analisi preliminare con gli uffici della Provincia, viste le caratteristiche degli acquisti, si prevedono delle trattative private multiple.

Definizione delle apparecchiature
La definizione delle specifiche per le apparecchiature da acquisire è stata definita da una commissione di esperti dell'Università del Sannio.

RIEPILOGO DELLE APPARECCHIATURE

Attrezzature:
Apparecchiature per l'elaborazione e l'archiviazione su nastri e disco dei dati
Sistemi e reti per la trasmissione e ricezione dei dati
Altre apparecchiature ausiliarie e/o di completamento
Budget complessivo da progetto euro 240.210,00 incluso I.V.A.

Cluster per l'elaborazione veloce dei dati	45.000,00	
Storage dati su dischi	20.000,00	
Storage dati su nastro	20.000,00	
Monitor LCD	11.000,00	
Altre apparecchiature accessorie	17.500,00	
Matrice switch per collegamento monitor plasma + cavi VGA	3.000,00	
Computer S.O. Mac OS	8.500,00	
Workstation Utenti (varie tipologie d'uso)	30.000,00	
Router per sicurezza dei dati e connessioni a stazioni esterne	10.000,00	
Stazione ricezione ed elaborazione dati da satelliti geostazionari (MSG)	15.000,00	
Workstation per modello di previsione meteorologica alla mesoscala	8.000,00	
Totale	**188.000,00**	
Totale incluso I.V.A.		**225.600,00**

Attrezzature:
Stazioni GPS per la misurazione di spostamenti a terra e centraline per la trasmissione dei dati - Budget da progetto euro 90.000,00 incluso I.V.A.

Stazione GPS differenziale per il monitoraggio di frane comprensiva di distanziometri laser, corner reflectors e stazione meteoclimatica.	75.000,00	
Totale	**75.000,00**	
Totale incluso I.V.A.		**90.000,00**

Acquisto beni immateriali:
Software e licenze - Budget da progetto euro 260.950,00 incluso I.V.A.

Software Gamma per elaborazione di dati Radarsat-1 finalizzati al controllo di frane, deformazioni, bradisismo.	25.000,00	
Software SKY Processor Vexcel per elaborazione di dati Radarsat-1 fino al livello 0 (CEOS format)	35.000,00	
Software GPS differenziale per il monitoraggio di frane	14.000,00	
Certificazione stazione di ricezione dati da parte di Radarsat International comprensiva di accessi da parte di personale Radarsat e software di gestione di dati.	37.000,00	
Software per sviluppo algoritmi e analisi dati	3.000,00	
Acquisto licenza ricezione dati Radarsat-1 per 1 anno	85.000,00	
Totale	**199.000,00**	
Totale incluso I.V.A.		**238.800,00**

DETTAGLIO DELLE APPARECCHIATURE E DEL SOFTWARE

Cluster per l'elaborazione veloce dei dati
6 nodi + master node
N. 2 Rack 42 U
N. 2 Gigabit Switch
Monitor LCD 1U + Tastiera per Rack + Mouse trackball
Switch KVM 16 porte
Base di Gara EURO 45.000,00 + I.V.A.

Specifiche tecniche	Quantità
Nodi	
Supporto per i doppi processori Intel Xeon con cache 1MB L2 e tecnologia hyper threading Chipset Intel E7520 - 800MHz FSB o equivalenti. Fino a 8GB ECC DDR2 (400MHz) SDRAM (6 DIMM Sockets) 3 slot di espansione PCI-X (64-bit/133Mhz) Intel Gigabit NIC integrato a doppio canale, Controller integrato doppio canale U320 LVD SCSI Possibilità di inserire dischi fissi hot plug, ventole hot plug ridondanti e alimentatori hot plug ridondanti. Supporto per almeno 5 Hard Disk Garanzia 3 anni on-site Next Business Day Formato Rack 1U o 2U Accessori per montaggio rack. Alimentatore singolo. Doppio processore Intel Xeon 2.8GHz con 1MB L2 cache Memoria 3GB DDR SDRAM 2x512MB + 2x1GB 400 MHz DIMMs. 24x IDE CD-ROM Hard Disk 73GB 10,000rpm Ultra 320 SCSI Sistema operativo non installato	6
Master Node. Supporto per i doppi processori Intel Xeon con cache 1MB L2 e tecnologia hyper threading Chipset Intel E7520 - 800MHz FSB o equivalenti. Fino a 8GB ECC DDR2 (400MHz) SDRAM (6 DIMM Sockets) 3 slot di espansione PCI-X (64-bit/133Mhz) Intel Gigabit NIC integrato a doppio canale, Controller integrato doppio canale U320 LVD SCSI Possibilità di inserire dischi fissi hot plug, ventole hot plug ridondanti e alimentatori hot plug ridondanti. Supporto per almeno 5 Hard Disk Garanzia 3 anni on-site Next Business Day Formato Rack 1U o 2U Accessori per montaggio rack. Alimentatore singolo. Doppio processore Intel Xeon 2.8GHz con 1MB L2 cache Memoria 6GB DDR SDRAM 6x1GB 400 MHz DIMMs. 24x IDE CD-ROM Hard Disk 146GB 10,000rpm Ultra 320 SCSI Sistema operativo non installato	1

Nodi per Elaborazione dati SAR
Supporto per i doppi processori Intel Xeon con cache 1MB L2 e tecnologia hyper threading
Chipset Intel E7520 - 800MHz FSB o equivalenti.
Fino a 8GB ECC DDR2 (400MHz) SDRAM (6 DIMM Sockets)
3 slot di espansione PCI-X (64-bit/133Mhz)
Intel Gigabit NIC integrato a doppio canale,
Controller integrato doppio canale U320 LVD SCSI
Possibilità di inserire dischi fissi hot plug, ventole hot plug ridondanti e alimentatori hot plug ridondanti.
Supporto per almeno 5 Hard Disk
Garanzia 3 anni on-site Next Business Day
Formato Rack 2U
Accessori per montaggio rack.
Alimentatore singolo.
Doppio processore Intel Xeon 2.8GHz con 1MB L2 cache
Memoria 3 GB DDR SDRAM 3x1GB 400 MHz DIMMs.
24x IDE CD-ROM
N. 2 Hard Disk 146GB 10,000rpm Ultra 320 SCSI
Sistema operativo non installato 3

Rack
42U completo di porte, pannelli, N. 1 ventola,
piedestallo o barra di stabilizzazione,
prese a pannello 230v 16A (PDU) per almeno 24 unità 2

Monitor LCD 1U + Tastiera per Rack + Mouse trackball 1

Switch KVM 16 porte 1

Gigabit Switch
24 porte Gigabit 48 GB/s complessivi
24 porte RJ-45 10/100/1000BaseT
Almeno 2 alloggiamenti per connettività in fibra opzionale.
Tutte le porte RJ-45 devono negoziare automaticamente velocità, modalità duplex ed controllo di flusso
Altezza 1U o 2U e kit di montaggio rack
Gestione delle priorità sulle porte IEEE 802.1p
MDI/MDIX automatico su tutte le porte
Garanzia 3 anni on-site NBD 2

Storage dati su dischi
Storage Server
Base di gara EURO 20.000,00 + I.V.A.

Specifiche tecniche	Quantità
Caratteristiche Storage Server	
Chassis rack completo di accessori per montaggio	
Raid N+1-SATA,	
MotherBoard 533 MHz FSB, FDD+CD	
CPU INTEL XEON 2.8 GHz.	
Memoria 1 GB. 2100, ECC	
Capacità compresa tra 3 e 4 TB. Dischi 7200RPM SATA	
Compatibilità Linux Red Hat	2

Storage di dati su nastro
Tape Autoloader
Base di gara EURO 20.000,00 + I.V.A.

Specifiche tecniche	Quantità
N. 2 Drive LTO -2	
Almeno 3.4TB Native/Uncompressed (6.8TB Compressed)	
Interfaccia Ultra 2 SCSI LVD	
Montaggio Rack	
17-slot LTO-2	
Garanzia 1 anno NBD	1
Tape LTO-2	50

Workstation Utenti (varie tipologie d'uso)
Base di gara EURO 30.000,00 + I.V.A.

Specifiche tecniche	Quantità
Server – Mission Critical	
Caratteristiche Motherboard	
3.5" Floppy Bay, 2 External 5.25" Bays, 2 Internal Bays	
Fino a 4GB dual channel DDR2 400MHz non-ECC	
Gigabit Ethernet integrata	
Sistema Operativo Microsoft Windows XP Professional Versione italiana	
Chassis Rack	
Processore Intel Pentium4 530 con tecnologia HT (3.00 GHz, 800FSB, 1MB Cache)	
Floppy Drive 3.5 inch 1.44MB	
Memorie 2.0GB (4X512) - 400MHz DDR2 Non-ECC dual hannel	
N. 2 Dischi Fissi 250GB (7,200 rpm) Serial ATA in configurazione RAID 1	
Scheda Grafica 128MB PCIe x16 (DVI/VGA) ATI FireGL V3100, Dual Mon VGA or DVI/VGA	
DVD-ROM/CD-RW Combo Drive 48X	
Monitor Non incluso	
Garanzia 3 anni On Site Next Business day	2

Workstation – Uso standard	
Chipset Intel 925X	
Chassis Desktop	
Sistema Operativo Microsoft Windows XP Professional Versione italiana	
Processore Intel Pentium 4 530 con tecnologia HT (3.00 GHz, 800FSB)	
Floppy Drive 3.5 inch 1.44MB	
1.0GB (2x512MB DIMM) 533MHz DDR2 ECC	
Disco fisso 160GB (7,200 rpm) Serial ATA	
Scheda Grafica 128MB ATI FireGL V3100, Dual Mon VGA o DVI/VGA	
Monitor Non incluso	
48x DVD-ROM/CD-RW Combo Drive	
Speakers interni	
IEEE1394 (Firewire) Controller	
Tastiera enhanced versione italiana	
Mouse ottico Dell 2 tasti Scroll USB	
Garanzia 3 anni On Site Next Business day	9
Workstation – Calcolo Intensivo	
Chassis Desktop	
Chipset Intel 925X	
Sistema Operativo Microsoft Windows XP Professional Versione italiana	
Processore Intel Pentium 4 (3.20GHz, Intel EM64T, 1MB,800 FSB)	
Floppy Drive 3.5 inch 1.44MB	
Memorie 2.0GB (4x512MB DIMM) 533MHz DDR2 ECC	
Disco fisso 250GB (7,200 rpm) Serial ATA	
Scheda Graficha 128MB ATI FireGL V3100, Dual Mon VGA o DVI/VGA	
Monitor Non incluso	
12x DVD+RW Drive	
Speakers interni	
IEEE1394 (Firewire) Controller	
Tastiera versione italiana	
Mouse ottico 2 tasti Scroll USB	
Garanzia 3 anni On Site NBD	4
Workstation Grafica	
Desktop con Floppy Bay 3.5", 2 Bay esterne 5.25", 2 Bay Interne	
Chipset Intel E7525 o equivalenti fino a 8GB di memoria DDR2	
Sistema Operativo Microsoft Windows XP Professional Versione italiana	
Processore Intel Xeon 2.8GHz (800MHz FSB / 1MB cache)	
Floppy Drive 3.5 inch 1.44MB	
Memorie 2.0GB (4x512MB DIMM) 400MHz DDR2 ECC	
Disco Fisso fisso 250GB (7,200 rpm) Serial ATA	
Scheda Grafica 128MB PCIe nVidia Quadro FX 1300, Dual Mon DVI o VGA	
CD & DVD R/W	
Casse Acustiche	
Scheda audio SoundBlaster Audigy II o equivalente	
Porta IEEE 1394 (Firewire)	
Monitor Non incluso	
Tastiera Enhanced versione italiana	
Mouse ottico 2 tasti Scroll USB	
Garanzia 3 anni On Site NBD	1

Computer S.O. Mac OS X
Base di gara EURO 8.500,00 + I.V.A.

Specifiche tecniche	**Quantità**

PowerBook G4 1GB di SDRAM DDR333 - 2 SO-DIMMs	
ATI Mobility Radeon 9700 64MB	
Disco rigido Ultra ATA da 60GB (5400 giri/min)	
DVD/CD-RW	
AirPort Extreme Card	
Tastiera retroilluminata & Mac OS (int'l English)	
1,33GHz PowerPC G4	
Monitor TFT da 15,2"	
Modem interno a 56K	
Alimentatore CA	2
Doppio PowerPC G5 a 1,8GHz	
1GB di SDRAM DDR400 (PC3200) 2x512MB	
Unità Serial ATA da 160GB	
DVD-R/CDRW	
NVIDIA GeForce FX 5200 Ultra da 64MB con ADC/DVI	
Scheda PCI-X Gigabit Ethernet	
Modem interno a 56K V.92	
Modulo Bluetooth	
Tastiera e mouse Apple	
Mac OS X	
Apple Cinema Display (flat-panel da 20")	
Una porta FireWire 800	
Due porte FireWire 400	
Tre porte USB 2.0	1

Monitor LCD
Base di gara EURO 11.000,00 + I.V.A.

Specifiche tecniche	**Quantità**
Monitor 19" LCD	
Risoluzione 1280x1024	
Dimensione pixel < 0.3 mm	
Luminanza > 250	
Contrasto > 700:1	
Diffusori stereo incorporati	
Frequenza orizzontale 28-80 KHz	
Frequenza verticale 48-75 KHz	
Angolo visivo 170O/170V	
Garanzia 3 anni	15

Matrice switch per collegamento monitor plasma + cavi VGA
EURO 3.000,00 + I.V.A.

Specifiche tecniche	**Quantità**
Matrice Matrice 8 ingressi / 4 uscite	1
Cavo professionale VGA da 10 mt. connettore DIN 15 poli	5
Cavo professionale VGA da 20 mt. connettore DIN 15 poli	4

Router per sicurezza dei dati e connessioni a stazioni esterne
EURO 10.000,00 + I.V.A.

Modulo di rete: Digital Modem 6 porte	
modulo di rete non bilanciato 75 Ohm	
modulo di rete bilanciato 120 Ohm	1

Altre apparecchature e accessori
Base di gara EURO 17.500,00 + I.V.A.

Specifiche tecniche	Quantità
Duplicatore CD-R o DVD-R con stampante ink-jet integrata 4800 dpi in stampa diretta su disco	1
Hard Disk – Ata 200 GB + Fan cooler	16
Plastificatrice formato tessera	1
Taglierina Larghezza taglio 145 cm Spessore massimo di taglio 1,5 mm	1
Stampante barcode	1
Sistema di ricezione canali CNN satellitari	1
Proiettore 3 pannelli LCD TFT (1024x768x3) Obiettivo zoom. Correzione distorsione trapezoidale Dimensioni dello schermo da 40 a 300" di area visibile (diagonale). Luminosità: 2000 ANSI lumen. Sistema NTSC, PAL, SECAM, NTSC Risoluzione video 750 linee TV. Segnali compatibili RGB, Y/C. Ingresso Mouse 6-pin (femmina) Ingresso audio Mini jack stereo 3,5mm Input B 10BASE-T/100BASE-TX.	
Collegamento in rete wireless	1
Fax	1
Banco di sviluppo e manutenzione hardware per ICT	1
Rotoli Carta Plotter, Carta, Materiale di cancelleria	

Stazione ricezione ed elaborazione dati da satelliti geostazionari (MSG)
Base di gara EURO 15.000,00 + I.V.A.

Specifiche tecniche	Quantità
Stazione di ricezione dati Meteosat Second Generation completa di software e hardware.	1

Workstation per modello di previsione meteorologica alla mesoscala
Base di gara EURO 8.000,00 + I.V.A.

Specifiche tecniche	Quantità
Workstation per l'elaborazione del modello di previsione Supporto per i doppi processori AMD Opteron Intel Gigabit NIC integrato a doppio canale, Controller SATA Supporto per almeno 4 Hard Disk Formato Rack 2U Accessori per montaggio rack. Alimentatore singolo. Doppio processore AMD Opteron 2.2 GHz Memoria 6GB DDR SDRAM 6x1GB 400 MHz DIMMs. 24x IDE CD-ROM	1

N. 2 x 250 GB Serial ATA hard disks
Sistema operativo non installato

Stazione GPS differenziale per il monitoraggio di frane comprensiva di distanziometri laser, corner reflectors e stazione meteoclimatica.
Base di gara EURO 75.000,00 + I.V.A.

Specifiche tecniche	Quantità
Stazione GPS composta da 1 GPS di riferiento e 4 GPS periferici Stazione di misura monofrequenza (reference/rover) completa Alimentazione tramite panelli solari Comunicazione tramite gsm/gprs Opzioni di montaggio (Box sensori + box Reference) Supporto all'istallazione e alla messa in servizio del sistema + istruzione	1
Stazione di misura laser Alimentazione tramite pannelli solari Comunicazione tramite gsm/gprs N. 3 Sensori Laser Connessione con stazione di misura	1
Corner reflectors	4
Stazione meteoclimatica	1

Software Gamma Remote Sensing per elaborazione di dati Radarsat-1 finalizzati al controllo di frane, deformazioni, bradisismo.
EURO 25.000,00 + I.V.A.

Specifiche tecniche	Quantità
Software per l'elaborazione di dati da sensore RADARSAT-1. Moduli richiesti: Modular SAR Processor (MSP) Interferometric SAR Processor (ISP) Differential Interferometry and Geocoding (DIFF&GEO) Il software verrà fornito compresi di sorgenti in ANSI-C ed eseguibili per S.O. Linux Red Hat 9.	

Software SKY Processor Vexcel per elaborazione di dati Radarsat-1 fino al livello 0 (CEOS format)
EURO 35.000,00 + I.V.A.

Specifiche tecniche	Quantità
Software per la deformattazione della Telemetria SAR da sensore Radarsat-1. Formati di Uscita: RAW Level 0 CEOS e SKY S.O. Linux red hat 9.	

Software GPS differenziale per il monitoraggio di frane.
EURO 14.000,00 + I.V.A.

Software (elaborazioni GPS+LASER) Software Geo-Tec Plus Softer Nonio

Software per sviluppo algoritmi e analisi dati
EURO 3.000,00 + I.V.A.

Fortran compiler Portland Group (PGF)

Certificazione stazione di ricezione dati da parte di Radarsat International comprensiva di accessi da parte di personale Radarsat e software di gestione di dati
EURO 40.000,00 + I.V.A.

Certificazione e software di interscambio. Comprensiva di visita in sede da parte dei tecnici Radarsat International.

Licenza ricezione dati Radarsat-1
EURO 85.000,00 + I.V.A.

Acquisto licenza ricezione dati Radarsat-1 per 1 anno 85000

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RADARSAT-1 DATA RECEPTION LICENSE AGREEMENT

Between:

Radarsat International Inc.,
a subsidiary of MacDONALD, DETTLIWER AND ASSOCIATES LTD.,
incorporated under the laws of Canada
having its head office in Richmond,
British Columbia, Canada
and doing business as MDA Geospatial Services
(hereinafter called "MDA")

OF THE FIRST PART

And:

Provincia di Benevento
an agency of the government of Italy
having its head office in Benevento, Italy

(hereinafter called "Station Operator")

OF THE SECOND PART

And:

Canadian Space Agency
an agency of the Government of Canada, acting through and
represented by the Ministry of Industry

(hereinafter called "CSA")

OF THE THIRD PART

(hereinafter referred to as the "Parties" or individually 'Party")

WHEREAS CSA has put into polar orbit a remote sensing satellite, referred to as "RADARSAT", using Synthetic Aperture Radar (SAR) technology;

AND WHEREAS pursuant to and subject to the terms of a Master License Agreement between MDA, the Canadian Space Agency ("CSA") and Her Majesty the Queen in Right of Canada, as represented by the Minister of Energy, Mines and Resources ("EMR"), MDA has, subject to the reservations set out therein, received an exclusive, unrestricted, world-wide license, including the right to sublicense, distribute and market RADARSAT Data and Data Products to be Commercially Distributed in any form, on any media and for any computer environment for commercial use;

AND WHEREAS MDA has agreed to distribute and market RADARSAT Data and Data Products in a manner consistent with United Nations Resolution A/41/65 of December 3, 1986 on "The Principles Relating to Remote Sensing of the Earth from Space";

AND WHEREAS the Station Operator wishes to obtain a non-exclusive, non-exclusive sublicense for the reception of RADARSAT Data and the distribution of RADARSAT Data and Data Products received at the station within the Territory;

AND WHEREAS the Parties express the intent to amend this Agreement at a later date to incorporate Telespazio S.p.A for the extension of the distribution rights to Italy subject to an agreement between Station Operator and Telespazio;

AND WHEREAS CSA is a Party to this Agreement for the limited purpose of setting out its specific rights and obligations thereunder and consenting to the within sublicense and has no liability vis-à-vis the Station Operator in regards to other provisions of this Agreement.

NOW THEREFORE the Parties agree as follows:

Article 1 - Interpretation

1.1 In this Agreement, the following terms shall have the meanings set forth below:

1.1.1 "Agreement" means this Agreement as well as all Appendices annexed hereto which shall form part of this Agreement.

1.1.2 "Archive" means all the Data acquired by the Network Station and subsequently recorded on any medium.

1.1.3 "Archive Retrieval" means the process of machine reading from the Archive and subsequent recording, copying and transcription of a Scene or any part of a Scene contained on any medium for processing or distribution.

1.1.4 "Circle of Visibility" means the geographic area for which Data can be acquired by the RADARSAT SAR and transmitted on a direct downlink basis to the Network Station.

1.1.5 "Commercially Distributed" means the sale or distribution of Data or Data Products received and processed by the Station Operator, or ordered from MDA, delivered to any Person, under any conditions except Data and Data Products distributed to NASA, NOAA pursuant to the IMOU, Her Majesty the Queen in Right of Canada pursuant to the Master License Agreement (including the Government of the Provinces) and MDA pursuant to the terms of this Network Station Agreement and the Master License Agreement.

1.1.6 "Cost" means cost of processing and/or reproduction and distribution of Data and Data Products and shall consist of:

a) direct labour costs;
b) consumables (on a replacement cost basis);
c) pro rata share of overhead costs determined in accordance with Canadian generally accepted accounting procedures attributable to direct labour and processing calculated on the basis of the particular Data acquisition by the Station Operator as a proportion of the total data acquisition by the Station Operator in the twelve (12)-month period in which the Data is acquired to be estimated initially and adjusted annually on actual results;
d) indirect overhead allowance equal to the Public Works and Government Services Canada's rate of items (a), (b) and (c), as described in article 1031-2 of PWGSC Guidelines, ("PWGSC"), dated (01/04/92) entitled: "Contract Cost Principles"
e) shipment and delivery costs and charges payable, including duties and taxes.

1.1.7 "Data" means all SAR data received from the RADARSAT Satellite including SAR signal data, auxiliary data and preprocessed data on all media including photographic and digital media.

1.1.8 "Data Products" means Data processed to include information such as geo-referencing, radiometric corrections and multi-looking. These products include but are not limited to:

- Geo-referenced fine resolution products, generated in swath section units.
- Geo-referenced coarse resolution products, generated in swath section units.
- Systematically geocoded products, generated for user specific scenes.
- Precision geocoded products, generated for user specific scenes.

1.1.9 "Date of Operation" means the earliest of either the date the Network Station becomes Operations Certified by MDA and CSA or eight (8) months from the date of signature of this Agreement.

1.1.10 "Distributed" means any distribution of Data and Data Products to any Person and under any conditions, excluding Data and Data Products provided to MDA under the terms of this Agreement.

1.1.11 "ExWorks" means the sender of Data and Data Products fulfills its obligation to deliver when it has made them available at its premises (ICC Incoterms 2000). Any freight, taxes, duties and levies of any kind that may be applicable are not included in the ExWorks price.

1.1.12 "IMOU" means the International Memorandum of Understanding between CSA, National Ocean and Atmospheric Administration and the National Aeronautics and Space Administration dated February 27th, 1991 concerning the RADARSAT Project. Reference to the IMOU has no other effect than those explicitly stated in this Agreement.

1.1.13 "Level 0 Format" means the RADARSAT SAR signal used as an exchange format between MDA and network stations, and as described in the Technical Appendix.

1.1.14 "Local Catalogue" means all reference information of RADARSAT Scenes archived at the Network Station and managed by the Station Operator.

1.1.15 "Master License Agreement" means the Agreement dated September 23rd, 1994 between CSA, EMR and MDA pursuant to which MDA received the world-wide license including the right to sublicense, to distribute and to market RADARSAT Data and Data products. Reference to the Master License Agreement has no other effect than those explicitly stated in this Agreement.

1.1.16 "Network Station" means the receiving station operated by the Station Operator and capable of receiving the signals transmitted by the RADARSAT SAR.

1.1.17 "Original Scene" means Archive Retrieval of a Scene when conducted for the first time by the Station Operator.

1.1.18 "Pass" means the full portion of a RADARSAT orbit for which the Station Operator receives Data.

1.1.19 "Person" means an individual, company, partnership, trust or any other entity or association, including any national, regional or local government authority or agency thereof.

1.1.20 "Production" means all processing operations on the Data transmitted by the RADARSAT SAR, constituting a Scene or part thereof required to obtain Data Products, complying with the defined standards and presented in specific formats as determined by MDA.

1.1.21 "Programming Request" means any request concerning the programming of the RADARSAT SAR to collect Scenes.

1.1.22 "Prototype Data Product" means Data Products processed on a case by case basis, which are not offered for sale, and which are still in the development stage before being sent to MDA for approval.

1.1.23 "RADARSAT Mission Control System" (MCS) means CSA operated facility located at Saint-Hubert, Québec, for control and operation of the RADARSAT SAR.

1.1.24 "RADARSAT SAR" means the synthetic aperture radar instrument placed on the RADARSAT Satellite for the transmission of Data.

1.1.25 "RADARSAT Satellite" means the RADARSAT 1 satellite using remote sensing synthetic aperture radar technology placed into earth polar orbit and operated by the CSA on behalf of the Government of Canada.

1.1.26 "Royalty" and "Royalties" means the fee(s) prescribed in Article 8.3.

1.1.27 "Scene" means a set of Data which covers a region ranging from 37 km by 49 km in Fine mode to 500 km by 500 km in ScanSAR mode.

1.1.28 "Tapes" means magnetic tapes used as a media to record and store or ship RADARSAT Data or Data Products in a digital form.

1.1.29 "Territory" means the province of Benevento, including University of Sannio, in Italy.

1.1.30 "Value-Added Products" means products derived at least partially from Data and Data Products that include a significant addition of other information. Included are manually and digitally interpreted Data or Data Products. MDA agrees that any Value Added Product created by the Station Operator during the term of this Agreement shall not be included as a Data Product.

1.1.31 "Worldwide Catalogue" means all reference information of RADARSAT Scenes received by ground stations worldwide and includes the reference information received by the Network Station and communicated to MDA.

Article 2 - Grant of Sublicense

2.1 Non-Exclusive Rights for Territory

Subject to the terms hereof, the rights reserved by the IMOU (annexed as Appendix C) and the rights reserved by the Master License Agreement (detailed in Appendix D), MDA hereby grants to the Station Operator for the term of this Agreement:

i) a non-exclusive sublicense for the direct reception of RADARSAT Data in Italy.

ii) a non-exclusive sublicense for the reproduction and Commercial Distribution of Data and Data Products received at the Network Station in the Territory, in any form, on any media and for any computer environment, excluding those rights reserved by the IMOU and the Master License Agreement.

2.2 Restrictions

The sublicense granted herein is restricted to use effected within the Territory. Outside the Territory, MDA shall be the sole distributor of Data and Data Products received at the Network Station, unless otherwise agreed on a case by case basis.

2.3 Referrals

The Station Operator shall refer any request for Data and Data Products received by it from Persons located outside the Territory to MDA, save and except for requests originating from CSA. MDA may refer any requests received from Persons located within the Territory to the Station Operator.

2.4 End User License

The End User License (annexed as Appendix B) must be used by the Station Operator for the sale of the licensed Data and Data Products in the Territory. The Station Operator shall not amend the terms of the End-User License without the prior agreement of MDA in writing. Except to the extent permitted by the End-User License, end user is acquiring Data and Data Products for its own use and not for resale or redistribution.

2.5 Distribution Sublicense

Station Operator may appoint, with MDA's approval in writing, distributor(s) for marketing in its Territory. However, any permitted subcontracting or sublicensing by Station Operator shall not relieve Station Operator from any of its obligations thereunder including the reporting of sales and the payment of Royalties and other amounts due to MDA.

2.5.1 Distribution Sublicense: legal requirement

Station Operator shall at its own cost provide MDA with a certificate signed by a duly authorized representative of Station Operator, stating that the distribution Sublicense includes the provisions set out in the MDA Distribution Agreement (annexed as Appendix C), such terms to apply mutatis mutandis for the benefit of CSA or MDA in such agreements. Station Operator undertakes to ensure that its distribution sublicensee(s) integrates the terms of the distribution sublicense in the End-User License.

Article 3 - Reception of Data

3.1 Network Station Requirements

Station Operator, at its own cost, shall:

(i) based upon technical information provided in the Technical Appendix and advice provided by CSA or MDA, commission the Network Station facilities and operate such facilities under its authority and direction for the acquisition of Data. Cost of commissioning and operation shall include, without limitation, the cost of establishing and maintaining such necessary communication links between Network Station and MDA, and Network Station and RADARSAT Mission Control System (MCS) located at Saint-Hubert, Québec, Canada;

(ii) in the manner and form required by MCS, inform MCS and MDA after each scheduled transmission, of the results of such transmission including quality and volume of Data received;

(iii) at all times during the term of this Agreement, ensure compatibility of recording media and system for the acquisition of Data as may be directed by MDA or CSA in compliance with Article 21.2;

(iv) use its best commercial efforts to resolve any radio frequency problems occurring in relation to Data reception by the Network Station, and interference with licensed facilities within the country in which the Network Station facilities are located. In this regard, throughout the term of this Agreement, the Station Operator shall promptly provide to MDA all information and inquiries with respect to radio frequency interference from RADARSAT Satellite.

(v) provide to MDA requests for Data acquisitions to the Network Station of areas within the Circle of Visibility.

3.2 Reception of Data requested by CSA

The Station Operator agrees to receive and deliver Data requested by CSA at Cost. These requests are to be given equal priority with commercial requests.

3.3 Restriction on downlink

The Station Operator is strictly prohibited from passive collection, shadowing, pirating or listening of the RADARSAT-1 Signal Data without the prior written consent of CSA and MDA. In the event of the breach of this provision by the Station Operator, CSA or MDA will seek injunctive relief or will file an action against the Station Operator in any court of competent jurisdiction in Ontario, Canada.

Article 4 - Production of Data

4.1 Quality

All Data and Data Products distributed by the Station Operator shall conform to the requirements and in particular to the overall image quality specification as referred to in the Technical Appendix under the reference "Image Quality Requirements of the System" provided that the input Data meets the CSA specifications. It is understood, however, that the quality of a Data Product will depend on the quality of the Data obtained from the RADARSAT Satellite and from which such Data Product is produced. The processing of Data and Data Products shall be the responsibility of the Station Operator at its own cost.

4.2 Processing

The Station Operator will receive, process and distribute Data received by the Network Station in such a manner as to satisfy reasonable requests for such Data in the Territory. In any event, the Station Operator will, on request and as priced in the Commercial Appendix, make available to MDA on magnetic media, as stipulated in the Technical Appendix, any signal Data received by the Network Station and processed to Level 0 Format.

4.3 Samples

The Station Operator shall submit samples of all new types of Data Products to MDA for approval prior to distribution the same in the Territory, which approval shall not be unreasonably withheld. Notice of disapproval must be sent to the Station Operator within 30 days of receipt of the sample, otherwise, approval shall be deemed to have been granted. Any Prototype Data Products shall be subject to the restrictions set out herein with respect to copyright and related intellectual property rights.

4.4 Value-Added Products

To the extent of the Station Operator's right to do so, the Station Operator shall provide MDA during the term of this Agreement with the non-exclusive right to distribute Value Added Products of the Station Operator and to receive such products for distribution on terms no less favourable than comparable distributors (to the extent permitted by law, regulation, the terms of a prime contract or confidentiality agreement).

Article 5 - Archive of Data

5.1 Archiving

The Station Operator will, at its cost, provide for the archiving in digital form and for retrieval services for all Data received by the Network Station. The media and formats for the Archive shall be as set forth in the

Technical Appendix or as otherwise mutually agreed in writing. The Station Operator may retrieve and use Data from the Archive upon payment of the Royalty as stipulated in the Commercial Appendix.

5.2 Archive Change

The Station Operator shall, prior to any action with regard to the Archive that may affect the quantity and quality of the Data, obtain the consent of MDA and CSA to such action. In case the Station Operator requests the authorization to delete Scenes from the Archive, the Station Operator will notify MDA and CSA at least three (3) months before the date of deletion, with the list of the selected Scenes and their Catalogue parameters. If after ninety (90) days notice MDA and CSA fail to notify the Station Operator that it wishes to purchase the relevant Scenes, MDA and CSA's authorization shall be deemed to be granted and the Station Operator may proceed with the deletion of the selected Scenes.

5.3 No Transfer

Except for distribution of Scenes from the Archive in the ordinary course of business, the Station Operator shall not transfer or sell the Archive or any part thereof without prior written consent of MDA and CSA. In the event that the Station Operator shall be incapable of providing the services of maintaining Data in the Archive or effect Archive Retrieval for any material period, the Station Operator shall promptly notify MDA and CSA. MDA shall, provided the Station Operator has not promptly remedied such default in such event, have the right to immediate transfer of the Archive without any reimbursement to the Station Operator therefor other than the cost of the media, shipment and delivery.

5.4 CSA Right to Archive

The Station Operator acknowledges that CSA retains the right to the transfer of all or part of the Archive to such facilities as may be designated by CSA at any time before or after the expiration or termination of this Agreement. In such event, the Station Operator shall be reimbursed by CSA only for the value of the storage media, copying process and the costs of shipping to such facility as may be designated by CSA. Provided that the Station Operator is not in default of its obligations under this Agreement and complies with the requirements set out in this Article 5 with respect to the transfer of all or part of the Archive to CSA, it may maintain a copy of the Archive so transferred for its own use, and may distribute Data and Data Products therefrom with payment of the appropriate Royalties and fees. The exercise of the right hereunder will not affect the rights and obligations of the Parties set out in this Agreement.

5.5 Worldwide Catalogue Updates and Local Catalogue

The Station Operator shall establish and maintain a Local Catalogue of Data maintained in the Archive by the Network Station and provide MDA and CSA (MCS) with required updates for the Worldwide Catalogue after each acquisition. These Worldwide Catalogue updates shall be in the format and on such media as stipulated in the Technical Appendix. The Station Operator undertakes to maintain all information in the Local Catalogue in such a way that the information can be accessible to the public.

5.6 Level 0 Format requests from MDA/CSA

MDA, or CSA, may request from the Station Operator the delivery of Data in Level 0 Format from the Archive on the medium as specified by MDA, or CSA. The Station Operator will invoice MDA, and MDA will pay the Station Operator the price set out in the schedule of fees described in the Commercial Appendix.

5.7 Global Data Sets: Background Mission

CSA may acquire significant amounts of Data to support the objective of developing a worldwide Data set. Such Data must be maintained in the Archive of the Network Station at no cost to CSA.

5.8 Log

The Station Operator shall maintain a detailed log of Archive Retrievals, such log to be in a form stipulated in the Technical Appendix. The log shall include all Archive Retrievals regardless of the purpose or the requesting Party.

5.9 Archive Maintenance

The Station Operator shall maintain the Archive and implement protection procedures for the Data to a standard complying with Network Station technical requirements for RADARSAT as referred to in the Technical Appendix.

5.10 Archive Restoration

In the case where the Archive is in a format or on a medium that cannot be read and used by MDA or CSA, the Station Operator shall, at its cost, restore the Archive into a format and medium readable and useable by MDA or CSA for Data retrieval in MDA's facilities, with shipment costs to be borne by the defaulting Party.

5.11 Archive Duration

Unless otherwise provided herein or approved by MDA and CSA, the Station Operator shall maintain the Archive for a period of fifteen (15) years after the end of the useful life of the RADARSAT SAR. In the event that the Station Operator wishes to destroy all or part of the Archive, it shall give notice of same to MDA and CSA and unless MDA and CSA request the transfer of the Archive within ninety (90) days of such notice, the Station Operator shall, on expiration of the ninety (90)-day following notice, be deemed to have received approval for such destruction.

Article 6 - Obligation of Station Operator

6.1 Requirement

The Station Operator, at its own cost, apply for and obtain Station Operations certification of the Network Station from CSA and MDA for the purposes of Data reception, processing and archiving, all according to procedures set forth in the Technical Appendix.

6.2 Training

The Station Operator agrees to ensure that its personnel will be familiar with and adequately trained to ensure compliance with MDA and CSA objectives, methods, documentation and procedures relating to RADARSAT operations. These operations are including but not limited to reception, Data handling, reporting to CSA, Data processing, and Data and Data Products distribution as communicated to the Station Operator by MDA.

i) Training prior to Certification

Prior to the beginning of the Certification process, the Station Operator may send at its cost a team of operators to Gatineau, Quebec, and to Vancouver, British Columbia, during a period of two weeks, to be trained by MDA personnel. The details of this training schedule are in Appendix I.

ii) Yearly Training

Each calendar year, at a time to be agreed upon, the Station Operator may send at its cost a team of operators to Gatineau, Quebec, for further training on RADARSAT operations by MDA personnel. The details of this training schedule are given in Appendix I.

6.3 Data Reception

The Station Operator commits to allocate the necessary technical and financial resources to receive and record the Data whenever it has agreed to do so either for accepted programmed orbital slots or pursuant to MDA or CSA's request to the Station Operator for specific acquisitions.

6.4 Time of distribution

The Station Operator shall ensure that all Data and Data Products ordered, unless otherwise agreed, shall be delivered ExWorks, Network Station, within the following periods following the time of the Data acquisition in the case of a Programming Request, or the day the MDA Purchase Order is received in the case of a purchase from the Archive:

Five (5) working days for Regular processing and delivery,
Forty-eight (48) hours for Rush processing and delivery,
Four (4) hours for Near Real Time ("NRT") processing and delivery,

where available and commercially feasible. In the event of a delay as a result of an occurrence of Force Majeure, the Station Operator shall promptly inform MDA of the delay and the expected delivery time.

6.5 Programming on behalf of MDA

The Station Operator agrees to incorporate MDA's Programming Requests into its own when so requested by MDA, at no cost to MDA. MDA will take all means to avoid possible direct programming conflicts with Programming Requests made by the Station Operator. When a conflict does arise, MDA and the Station Operator agree to share, whenever possible and subject to the priorities of the RADARSAT program as set by CSA, the available RADARSAT Satellite resource in a fair and reasonable manner. Such MDA requests are to be transferred together with the relevant processing order for Data or Data Product to the Station Operator, except when previously agreed upon by the Station Operator and MDA.

6.6 Data from Archive

For CSA, NASA and NOAA's use, the Station Operator will deliver, at Cost, Data and Data Products to MDA or CSA for its purposes, with respect to the rights reserved in the Master License Agreement. For MDA's commercial uses, the Station Operator will deliver at the cost stated in the Commercial Appendix Data and Data Products in digital form to MDA. Such orders shall be given equal priority with the Station Operator's commercial orders. The media and format of the products shall be as stipulated in the Technical Appendix or otherwise agreed between MDA and the Station Operator.

6.7 Sale of Products

Station Operator, for itself and its agents, sub-distributors, representatives and employees, agrees to conduct any and all sales activities in connection with the Data or Data Products in a lawful manner, consistent with the standards of fair trade, fair competition and business ethics. Station Operator shall service in a competent and professional manner the Data and Data Product requirements of its customers.

6.8 Marketing and Sales of Products

The Parties will use their best commercial efforts to coordinate marketing activities to advertise the capabilities of the network station to Regional and Provincial Governments within Italy.

Station Operator is responsible for the marketing and distribution of the Data and Data Products in the Territory and undertakes to publish each calendar year at least two articles in a national publication of a good professional standard focusing on the use of RADARSAT data, as well as to place at least two advertisements

in a similar professional publication related to the main market niche(s) served by Station Operator in its Territory.

6.9 Data Supply to MDA for Promotional Purposes

The Station Operator shall supply a maximum of forty (40) Scenes per year to MDA at no cost to MDA other than the cost of the media and shipment. MDA may use these Scenes at its discretion for marketing and promotional efforts, demonstrations, pilot studies or feasibility studies. MDA shall involve the Station Operator when feasible for subsequent commercial sales resulting from these efforts. Such promotional requests shall be treated with a lower priority than commercial requests, except when otherwise agreed upon by the Station Operator and MDA.

Article 7 - Obligations of MDA/CSA

7.1 Station Certification

MDA will coordinate with CSA for the certification of the Network Station for purposes of operating as part of the RADARSAT program, as referred to in the Technical Appendix. There are three stages of Certification.

7.1.1. Station Operations Certification

It is understood that the Station Operations Certification of the Network Station is a condition precedent to the transmission and receipt of Data pursuant to the terms hereof. It is also understood that Data transmitted during testing and certification is free of charge. As soon as the Network Station meets the requirements referred to in the Technical Appendix, MDA and CSA shall grant the Station Operator such Station Operations Certification. At this stage of certification, the Station Operator shall only Commercially Distribute Data Products which have been sent to MDA for processing at the fee set out in the Commercial Appendix (Schedule of Fees - Reception Fees), shipment costs to be borne by the Station Operator.

7.1.2 Product Certification

Following Station Operations Certification, the Station Operator is required to achieve Product Certification, corresponding to the compliance to the CEOS format of the RADARSAT Data Products for all beam modes. Product Certification is a condition precedent to the Commercial Distribution of Data Products processed by the Network Station pursuant to the terms hereof, and for the possibility for MDA to order processed Data Products from the Station Operator. By reaching this Product Certification, the Station Operator takes advantage of a specific telemetry price per Scene detailed in the Commercial Appendix.

7.1.3 Gold Seal Product Endorsement

The Station Operator is encouraged to submit some or all of its Data Products on a per beam mode basis to achieve Gold Seal Product Endorsement, which verifies the digital calibration of the Products for the certified beam mode. No specific financial incentive is attached to this endorsement.

7.2 Data Supply

MDA and CSA will endeavour to permit Data acquisition for the duration of the Agreement under the normal operations of the RADARSAT Satellite and to honour those Programming Requests from the Station Operator which are planned by CSA. The Station Operator acknowledges that Data acquisition is subject to the operational requirements of CSA.

7.3 Orbital Information

CSA will provide to the Station Operator orbital elements for calculating pointing angles necessary to acquire signals transmitted from RADARSAT SAR as well as necessary auxiliary information required to process the Data. CSA will provide timely delivery to the Station Operator a detailed scheduling plan of reception operations when the Data acquisition is within the Circle of Visibility.

7.4 Transmission

The Parties acknowledge and agree that the transmission and/or reception of Data may be temporarily suspended on the space or ground segments for technical or operational reasons. In such case, the Parties shall notify each other in writing of such suspension and advise each other of the projected resumption of transmission and/or reception. The Station Operator shall not be charged for ordered Data not transmitted, or which is defective, provided that the Station Operator notifies MDA of the same within twenty-four (24) hours or thirty (30) days, respectively. Overpayments will be reimbursed.

7.5 Technical Personnel

MDA and CSA will make available for such periods of time and under such reasonable terms and conditions to be agreed upon, the services of its technical personnel to consult with and assist the Station Operator with the RADARSAT operations including reception, processing and quality of Data.

7.6 Non-Discrimination

The Station Operator agrees to make the Data and Data Products available to all residents of the Territory, to MDA and CSA, on an open and non-discriminatory basis consistent with United Nations Resolution A/41/65 of December 3, 1986 on "The Principles Relating to the Remote Sensing of Earth from Space". No Data or Data Products shall be reserved for the exclusive use of the Station Operator or any particular customer.

Article 8 - Fees and Royalties

8.1 Certification Fee and Software Fee

Station Operator shall pay MDA the amount of Forty Three Thousand United States Dollars (USD43,000.00) thirty (30) days from the date of MDA invoice, which will be issued upon signature of the Agreement by Station Operator. This amount includes all expenses related to the Station Operation Certification and Product Certification of the Network Station, for both Canadian and on-site operations, and also covers the delivery and installation of the RIPRI software license, with updates and maintenance, as well as the IQA software license.

8.2 Reception Fees

In consideration of the Sublicense granted to the Station Operator under this Agreement,

i) Station Operator will order Data and Data Products on a per Scene basis from MDA in each calendar year, and pay the invoices issued by MDA according to the rate set out in the Commercial Appendix (Schedule of Fees - Reception Fees).

ii) The minimum cumulated yearly order under Article 8.2.i) above that the Station Operator is committed to pay is One Hundred Thousand United States Dollars (USD100,000.00).

8.3 Royalties

Royalties shall become due to MDA in accordance with the Commercial Appendix for the number of Data and Data Products Commercially Distributed in excess of the number of Data and Data Products ordered, paid and received by Station Operator under this agreement pursuant to its Programming Request.

8.4 Invoicing

MDA will invoice Station Operator in advance for 100% of the yearly minimum order set out in Article 8.2.ii) upon signature of this Agreement by Station Operator. Station Operator shall pay within thirty (30) days from the date of invoice.

8.5 Monthly Statement of Account and Separate Invoicing

Within fifteen (15) days of each month end, MDA shall send a Statement of Account to the Station Operator, reporting the Programming Requests of the month and the resulting account balance, taking into consideration any cancellation credits and/or incentives. In the event that the cumulated amount of the Programming Requests exceeds the minimum yearly order set out in Article 8.2.ii) during the month, MDA will invoice Station Operator for the balance due. Terms of payments are thirty (30) days from the date of invoice.

8.6 Payment

Terms of payment are net thirty (30) days from the date of invoicing, in US dollar currency, unless otherwise agreed in writing. Interest at the rate of one percent (1%) per month will be payable on any late payments from the due date to the payment date.

Payments required under this Agreement are to be net of all taxes, duties and levies of any kind that may be applicable. In the event that any taxes are imposed by any level of government in the paying Party's territory on payments made under this Agreement, the paying Party will add the amount of such taxes to the payments required hereunder.

8.7 Cancellation Credit

When the Station Operator cancels a Programming Request in writing;

i) more than fifteen (15) working days prior to the day scheduled for the transmission of such Data, the Station Operator shall be entitled to a credit of hundred per cent (100%) of the value of the transmission canceled (i.e. all fees and charges the Station Operator should have paid if reception and transmission of the Data had occurred as requested).

ii) less than or equal to fifteen (15) working days prior to the day scheduled for the transmission of such Data, the Station Operator shall be responsible for the full value of the transmission.

8.8 Technical Problems

When the reception of Data fails due to technical problems of the Network Station, the Station Operator shall be responsible for the entire value of the transmission. Where the reception of Data fails due to technical RADARSAT problems beyond the Station Operator's control, the Station Operator shall be entitled to a credit of 100% of the value of the relevant transmission. The Station Operator shall take all reasonable efforts to advise MDA and CSA, by fax or similar means, about defective quality of the telemetry within one hour from the completion of each defective satellite pass.

8.9 Data downlink fee

When MDA or CSA orders Data from the Station Operator, there is no downlink fee to the Station Operator. The Station Operator shall archive the acquired Data and may process and distribute Data and Data Products therefrom.

8.10 Late orders by Station Operator

Should the Station Operator not have ordered enough Scenes or additional Services to match the dollar amount stated in Article 8.2.i) at the end of each year, the Station Operator shall be automatically granted an extra period of 1 (one) month to forward its late orders to MDA, which acquisition dates should be within the same month. Beyond this period, the unused credit for Scenes that the Station Operator may have accumulated in such previous year will be declared nil.

Article 9 – Reports

9.1 Data Reception Reports

Within fifteen (15) days of the end of each quarter, the Station Operator shall report in an approved format, to MDA and CSA, the total number of Scenes purchased from MDA and the number in that quarter.

9.2 Quarterly Report

Within fifteen (15) days of the end of each quarter, Station Operator shall report to MDA the sales and Royalties statistics, together with comparable numbers for the corresponding period in the previous year (if applicable).

9.3 Financial Report

The Station Operator will provide to MDA an annual financial report prepared in accordance with generally accepted accounting principles, of the a preceding year's sales and Royalties with a breakdown of types of Royalties, and other mounts payable under this Agreement, certified by a qualified external auditor or other auditor acceptable to MDA.

Article 10 – Audit

10.1 Audit from Station Operator Auditor

MDA may request auditors of the Station Operator to confirm compliance with any of the requirements of Article 9.

10.2 Audit from an External Auditor

The Station Operator shall keep proper business records concerning its activities pursuant to this Agreement and shall permit a certified Accountant appointed by MDA or CSA (subject to any reasonable objection of the Station Operator), full access during business hours, to such records as may be reasonably necessary to verify compliance with this Agreement. The Station Operator shall, without charge, provide facilities to review such records and to make reasonable copies thereof, the use of which will be governed by Article 18.1.

10.3 Six-Year Retention

These records shall be retained for six (6) years from the date of termination of this Agreement.

Article 11 - No Guarantee

11.1 Data Supply

It is understood and agreed that because of the substantial elements of risk relating to operation of the RADARSAT Satellite and the RADARSAT SAR beyond the control of the CSA, neither CSA nor MDA;

i) guarantees Data continuity, the quality or the availability of Data or its suitability for any purpose.

ii) guarantee or represent the availability of the RADARSAT Satellite tape recorders for the provision of Data.

11.2 Warranty Limitation

Except as expressly stated in this Agreement, the Data is provided and licensed "as is" and there are no warranties, representations or conditions expressed or implied, written or oral, arising by statute, operation of law or otherwise regarding them or any other Data Product or service provided under this Agreement or in connection therewith. Each of the Parties disclaims any implied warranty or condition of merchantable quality, merchantability, durability or fitness for a particular purpose. No representation or other affirmation of fact, including but not limited to statements regarding performance of the Data, which is not contained in this Agreement shall be deemed to be a warranty by either of the Parties. No agreements varying or extending this warranty or the foregoing limitations will be binding on a Party unless in writing and signed by an authorized officer of such Party.

Article 12 – Copyright

12.1 Cooperation

The Station Operator shall cooperate fully and in good faith with MDA or CSA as required for the purpose of securing and preserving CSA's rights in and to the copyright of the Data and Data Products.

12.2 CSA Copyright

All copyright in the Data and Data Products are and remain vested in CSA. In all production, reproduction, distribution and sale of the licensed Data and Data Products, the Station Operator will affirm CSA's copyright and ensure CSA's copyright is properly protected in its contract documents and other license-related documents in respect of its production, reproduction, distribution and sale of such Data and Data Products by the Station Operator. The CSA Copyright refers to RADARSAT Data and to the RADARSAT SAR portion of the Data Products in image format.

12.3 Copyright Marking

All media containing Data and Data Products are to be clearly marked:

RADARSAT Data © Canadian Space Agency / Agence spatiale canadienne ____[Year of acquisition]
Distributed by [Station Operator] under Master License of RADARSAT International, Inc., a subsidiary of MDA
All rights reserved.

12.4 Marking / Official Mark and Logos

Station Operator acknowledges and agrees:

i) to clearly mark all licensed Data and Data Products distributed or sold by the Station Operator with the following inscription: "Distributed under Master License of RADARSAT International Inc.";

ii) that "RADARSAT" and the logos associated therewith are official marks of the Government of Canada, and the sole and exclusive property of CSA under license to MDA;

iii) that the word "MDA" and the logos associated therewith are trademarks and the sole and exclusive property of MDA;

iv) that the Station Operator shall neither have nor acquire any interest in the said marks and logos identified in ii) and iii) above, save and except for a right to use in the manner expressly provided for in this Agreement; and

v) to mark all advertisements for the Data and Data Products, including packaging when applicable, have to be marked with such markings, information and labeling, as may be required by the federal, provincial and national laws of each jurisdiction of the Territory, in accordance with all the relevant codes and industry standards, and as may be reasonably requested by MDA or CSA.

Article 13 – Infringement of Copyright

13.1 No Assignment

Nothing contained in this Agreement shall be construed as an assignment to the Station Operator of any right, title, or interest in or to the copyright of the Data and Data Products. All rights relating to the copyright of the Data and Data Products are expressly reserved by CSA, except for the Master License expressly granted to MDA and the sublicense expressly granted to the Station Operator thereunder in respect of the Data and Data Products. The Station Operator shall not at any time acquire any rights in such copyright of Data and Data Products by virtue of any use it may make of any of them. Upon termination or expiration of the Agreement, the Station Operator shall be deemed to have assigned, transferred, and conveyed back to CSA all rights in and to the copyright of the Data and Data Products, but not Value-Added Products which, irrespective of the provisions contained herein, may have been obtained by, or accrued to or vested in the Station Operator thereunder. The Station Operator shall execute any and all documents reasonably requested by MDA or CSA to confirm the foregoing. Any such assignment, transfer, or conveyance shall be without any consideration other than the mutual covenants and considerations of this Agreement.

13.2 No Attack

The Station Operator acknowledge CSA's exclusive right, title, interest and benefit in and to the copyright of the Data and Data Products in all countries of the world and shall not at any time do or cause to be done any act or thing to dispute, contest, attack, impair or tend to impair, any part of such right, title, interest or benefit. The Station Operator will not at any time, either during the term or after the termination for any reason whatsoever or expiration of this Agreement, directly or indirectly, violate the rights in the copyright of the Data or Data Products, or dispute, contest, attack, impair or tend to impair, the validity of any registration of the copyright or the title thereto, or assist any other Person disputing, contesting, attacking, impairing or tending to impair, the same, or obtain or apply to obtain, or to prevent CSA from obtaining, a registration for the copyright of the Data or Data Products.

13.3 Defense by CSA

CSA is entitled at its discretion, but shall not be obligated, to defend at its own cost, any proceeding instituted, even by way of a counterclaim, for the expungement, or declaration of non-infringement, of the copyright Data and Data Products. Should CSA choose to defend such proceeding, it may give notice to MDA and to the

Station Operator to such effect. In such case, MDA, the Station Operator shall provide all reasonable assistance at the cost of CSA.

13.4 Defense by Station Operator

Should CSA decide not to defend any such proceeding, it shall, within thirty (30) days of service on CSA of the initial pleadings in the proceeding, give such notice to MDA and MDA shall give such notice to the Station Operator, and MDA may, or in the event that MDA decides not to defend , the Station Operator may, defend such proceeding at its own cost. In such case, CSA, the Station Operator and MDA, as the case may be, shall at their expense provide all reasonable assistance.

13.5 Watch

The Station Operator shall keep watch during the term of this Agreement for any products and activities that may, in the opinion of the Station Operator, violate the rights of CSA in any of the copyright of the Data and Data Products. Upon discovery of any such violation, suspected, threatened or actual, the Station Operator shall promptly deliver to MDA and CSA notice of the facts known to the Station Operator and upon which the Station Operator bases its opinion of suspected, threatened or actual infringement and outlining any proceedings considered necessary by the Station Operator to enforce rights in any of the copyright Data and Data Products.

13.6 Action by CSA

Upon receipt of the notice, CSA shall have three months, in its discretion, to institute appropriate proceedings against the alleged violator or to take steps to settle the matter. In no event shall CSA be obliged to institute any proceedings or take any steps to settle. If CSA institutes such proceedings or takes such steps to settle, CSA shall give notice to MDA and MDA shall give such notice to the Station Operator. MDA and the Station Operator shall execute any documents reasonably necessary for such proceedings or settlement and each shall provide any evidence and available information to CSA. The benefits of any settlement efforts and proceedings commenced by CSA shall accrue to, and the costs of any such efforts and proceedings shall be borne by CSA.

13.7 No Action by CSA

If, within such three month period, CSA does not give notice to MDA that it has commenced appropriate proceedings against the alleged violator or has taken and continues to take steps to settle the matter, and if the alleged violation has not ceased, MDA and failing it, the Station Operator, shall have the right, for a period of two months, commencing the day after the last day in such three month period, to institute appropriate proceedings against the alleged violator or to take such steps to settle, unless prior to the expiration of the two month period within which MDA or the Station Operator has the exclusive right to take action, CSA advises MDA that neither MDA nor the Station Operator shall have the right to institute proceedings with respect to the violation or to take such steps to settle. If, within such two month period, neither MDA nor the Station Operator, commence appropriate proceedings against the alleged violator or take such steps to settle, CSA shall thereafter be the only Person entitled to institute such proceedings or to take steps to settle, unless MDA or the Station Operator is specifically authorized in writing to do so by CSA.

13.8 Action by Station Operator

If the Station Operator institutes such proceedings, the Station Operator shall immediately give notice to CSA and MDA, and CSA and MDA shall execute any documents necessary for such proceedings and shall provide any evidence and available information to the Station Operator. The benefits of any settlement or proceedings commenced by the Station Operator shall be borne by it.

13.9 Cooperation

The Parties shall cooperate with each other with respect to any proceeding, settlement negotiations or other actions taken in respect of third Party violators of rights in any of the copyright Data and Data Products and to keep the other Party promptly and fully advised with respect thereto. In the event that any Party elects to institute proceedings, such Party shall, to the extent practicable, furnish to the other Parties copies of all pleadings and other relevant documents.

Article 14 - Indemnity and Liability

14.1 Indemnity and Liability

The Station Operator shall indemnify and save harmless CSA and MDA against any and all claims, demands, costs and liabilities (including legal fees and expenses) of any kind whatsoever arising directly or indirectly by third Parties related to the negligent provision or use by the Station Operator of Data, Data Products and Value-Added Products, excluding claims based on breach of copyright of the Data and Data Products.

14.2 Exclusions

IN NO EVENT WILL A PARTY HERETO BE LIABLE FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE OF THE DATA OR DATA PRODUCTS OR LOSS OF PROFITS ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR THE USE OR PERFORMANCE OF THE DATA OR DATA PRODUCTS OR STORAGE MATERIAL OR OTHER MDA, CSA OR THE STATION OPERATOR PROVIDED MATERIAL, WHETHER IN AN ACTION IN CONTRACT OR TORT, INCLUDING BUT NOT LIMITED TO NEGLIGENCE.

14.3 Limitation

In no event shall the aggregate liability of a Party to the other Parties, whether for negligence, breach of contract, misrepresentation or otherwise, in respect of a single occurrence or a series of occurrences in any circumstances exceed the amount received by such Party in respect of the telemetry ordered, the Scene Distributed, which is the subject matter of the action.

Article 15 - Termination

15.1 Termination for Default

Either Party may, upon written notice to the other, terminate this Agreement because of the material breach by the other of any material provision of this Agreement, or when the situation described in Article 24.4 occurs, including performance undertakings that the other Party fails to remedy within thirty (30) days of receipt of a written notice to this effect, or upon termination of the Master License Agreement, provided that termination may not be invoked where the requisite remedy requires more than 30 days to implement and the defaulting Party initiates within such period the measures necessary to effect said remedy and proceeds diligently thereafter to pursue such remedies to completion.

15.2 Option on Default

In the event of termination under 15.1, 15.3, 15.4, 16.1 or 24.4 and subject to retention of materials necessary to meet orders placed prior to termination;

MDA or CSA shall be entitled to acquire, at the Station Operator's reproduction cost therefor, including cost of the media, all Data and Data Products in digital format and in the Archive in the possession of the Station Operator, provided the shipment costs shall be borne by the defaulting Party.

15.3 Insolvency

Either Party may terminate this Agreement if the other becomes insolvent or bankrupt or avails itself of any statute pertaining to insolvency, or has recourse to statutory avoidance of its obligations under this Agreement.

15.4 Termination for Convenience

Any Party may, by written notice to the others, terminate this Agreement in the event the RADARSAT Satellite is severely damaged or the RADARSAT SAR is damaged and is not functional or pursuant to Article 17 - Force Majeure, in which event the Parties shall have no further liability to each other except that Article 15.2 shall be applied and MDA shall be considered to be the defaulting Party.

Article 16 – Failure to Pay

16.1 Failure to pay

If the Station Operator fails to fulfill annual minimum order for telemetry, MDA shall not refund for the unordered portion. If Station Operator fails to pay the invoiced amount in a timely manner, MDA may, at its discretion, terminate this Agreement in which event the provision of Article 15.2 shall apply with the Station Operator as the defaulting Party.

Article 17 - Force Majeure

17.1 Definition

The events of force majeure include but are not limited to: war, riot, fire, flood, strike, the act of any Government or authority outside of this Agreement, and in the case of MDA, and the Station Operator provided it is a private or publicly owned Company (i.e. not owned directly or indirectly by any Government), any Government or authority having jurisdiction, lockout, strikes or other labour disputes and other events that are unavoidable and beyond the Party's reasonable control.

17.2 Delay

Unless otherwise specifically provided in this Agreement, no default or breach shall be deemed to occur nor shall any Party be liable to the others for any loss, damage, delay in the performance or the non-performance of any obligations caused by an event of force majeure.

17.3 Notice

Upon the occurrence of such an event of force majeure, the Party whose obligation is affected shall provide a notice to the other Parties describing the event, the reasonable means to be used to circumvent the effects of the event as well as any consequences on any existing timetable for the fulfillment of the Party's obligation and the timetable and performance obligations shall be amended accordingly.

17.4 Termination under Force Majeure

Except as provided in Article 15.4, should the event of force majeure continue for a period exceeding three months, then any Party may provide the others with a one-month notice of its intention to terminate this Agreement. The Parties will then meet and discuss the situation including possible alternate means to resume the performance before the termination becomes effective.

Article 18 - Confidentiality

18.1 Restrictions

Each of the Parties hereto agrees to keep confidential without restriction any and all information with respect to the other Party which it has received or may in the future receive in connection with this Agreement which is not otherwise available to the general public.

The receiving party will not disclose, in whole or in part, the disclosing party's Confidential Information to any person , except to;

i) its agents, employees or representatives who have a need to know such Confidential Information for the purpose of performance under this Agreement and exercising the rights granted under this Agreement, providing that such agents, employees or representatives are under an obligation of confidentiality; or

ii) the extent required by applicable law; or

iii) during the course of or in connection with any litigation, arbitration or other proceedings based upon or in connection with the subject matter of this Agreement.

Article 19 - Assignment, Subcontracting and Sublicensing

19.1 Assignment by Station Operator

Except as otherwise provided in this Agreement, the Station Operator shall not assign or subcontract or sublicense any portion of this Agreement or rights granted without the prior consent of MDA and CSA, which consent may be withheld at MDA's unfettered discretion without stating a reason therefor. Any permitted subcontracting or sublicensing by the Station Operator shall not relieve the Station Operator from any of its obligations thereunder including the reporting of sales and the payment of Royalties and other amounts due to MDA. In the event of a change of control of the Station Operator, except for the case as stated in Article 19.2, whether direct or indirect, such change of control shall, for the purposes of this paragraph, be deemed to be an assignment and, in the absence of consent by MDA, the Agreement may thereupon be terminated by MDA as an event of default by the Station Operator. MDA hereby consents to any change of ownership between existing shareholders provided there is no significant negative operational impact on the reception or distribution of Data and Data Products in which event the notification to MDA shall be given as provided herein.

19.2 Transfer of station operation management

The Parties acknowledge that Station Operator is anticipating a transfer of its station operation management to MARSec, a company which is 100% owned and controlled by Provincia di Benevento. Station Operator shall notify the other Parties at least thirty (30) days prior to such transfer. Upon receipt of such notice, MDA shall issue an amendment to this Agreement.

19.3 Assignment to CSA

MDA may, or may be required by CSA pursuant to the Master License Agreement, to without consent of the Station Operator assign this Agreement to CSA, which assignment shall be binding upon the Station Operator. This assignment may occur without restriction: (i) under the Master License Agreement, (ii) as a result of MDA's inability to perform its obligations under the Master License Agreement, or (iii) as a result of MDA's insolvency.

19.2 Change of Control of MDA

The Parties acknowledge that MDA is anticipating an amalgamation with its parent company, MacDONALD DETTWILER AND ASSOCIATES, LTD. and that for greater certainty, any merger, amalgamation, change of control or corporate reorganization among MDA, its parent or affiliated corporations shall not be considered an assignment for the purposes of this Agreement or require consent of the other parties.

Article 20 - Contract Documents

20.1 Conflict

In the event of conflict or inconsistencies between the provisions of this Agreement and its Appendices, the order of precedence shall be as follows:

International Memorandum of Understanding (APPNDIX C)
MDA's obligations in Master License Agreement (APPENDIX D)
The Articles to this Agreement (this document)
Commercial Appendix (APPENDIX A)
End-User License (APPENDIX B)
RADARSAT International Price List (APPENDIX E)
Technical Appendix (APPENDIX H)
Rates Published by Public Works and Government Services Canada (APPENDIX F)
List of Media Acceptable by CSA for RADARSAT Data and Data Products (APPENDIX G)
Training Sessions on RADARSAT Operations (APPENDIX I)

20.2 Procedure

This Agreement supersedes and replaces any previous understandings and agreements between the Parties in relation to the matters dealt with in this Agreement.

Article 21 - Amendments

21.1 Amendment

No amendment to this Agreement shall have any effect unless it is in writing and is duly approved by authorized representatives of the Parties.

21.2 Permitted Amendment

The Station Operator acknowledges that commercial or technical procedures, formats, media specifications, technical parameters and specifications imposed under the terms of this Agreement including, without limitation, the Technical Appendix, the RADARSAT System Specification Documents, the quality specifications of the Data and Data Products, the media and/or format of the Data and Data Products Distributed by the Station Operator to MDA or CSA, the procedure relating to the daily update of the Catalogue, may be amended when necessary, as required by the status of the RADARSAT Satellite, or by reasonable and prudent management of the Data and Data Products and the use and/or distribution or redistribution thereof. The Station Operator will, whenever possible, be notified at least four weeks in advance of such modifications as they may arise and the Station Operator undertakes to comply at its cost with the same with no unreasonable delay and under normal business conditions.

21.3 Consultation

Where MDA is permitted by the terms of this Agreement to determine standards or fix other requirements from time to time, it shall do so acting reasonably and shall, where possible, consult with the Station Operator prior to said determination with respect to the impact or implementation of same. The cost of changes arising as a result of MDA or CSA acting unreasonably need not be borne by the Station Operator. MDA will also consult with the Station Operator with respect to proposed changes in the suggested retail price list.

Article 22 - Applicable Law

22.1 Law

This Agreement shall be interpreted in accordance with the laws in force in the Province of Ontario, Canada. Subject to the provisions of Article 22.3, the Parties irrevocably and specifically attorn to the exclusive jurisdiction of the courts of the Province of Ontario. The parties explicitly agree to exclude the application of United Nations Convention on Contracts for the International Sale of Goods to this Agreement.

22.2 Disputes

The Parties agree that they shall use best commercial efforts to resolve any dispute arising out of this Agreement, including any dispute concerning the meaning of its terms and the Parties' performance or failure to perform their obligations thereunder.

22.3 Arbitration

In the event that the Parties are not able to resolve any such dispute, the Parties agree that within a period of 30 days after written notification of the dispute from one Party to the others, the dispute shall be referred to and finally resolved by an arbitrator and not by judicial proceeding. The Parties agree further that the rules of the Commercial Arbitration Act of Canada and based upon the model law on International Commercial Arbitration as adopted by the United Nations Commission on International Trade Law on June 21st, 1985 shall apply. The arbitration shall be conducted in Strasbourg, France, in English.

Article 23 – Term

23.1 Effective Date

This Agreement shall be effective on the date of last signature. However, the operating terms and obligations shall commence on the Date of Operation and, subject to payment of the annual reception fee as set out in Article 8.2.ii), terminate after a period of one (1) year with reference to the Date of Operation. Three months before the term of this Agreement, the Parties may agree in writing to extend the term of this Agreement for additional one (1) year, subject to the possible modifications in accordance with Article 21.2, as they may arise.

23.2 Survival

Notwithstanding the termination of this Agreement for any reason, the obligations set out in Article 2.2, Article 5 - Archive of Data, Article 8 - Fees and Royalties (excluding 8.2.ii), Article 9 – Reports, , Article 11 - No Guarantee, Article 12 – Copyright, Article 14 - Indemnity and Liability and Article 18 - Confidentiality, shall survive such termination.

Article 24 – Miscellaneous

24.1 Performance

The Parties agree to perform their obligations under this Agreement in a competent and professional manner. Where the Parties have agreed to use best commercial efforts, such term shall, for the purposes of this Agreement, be the obligation of a Party to take all such action as is reasonably practicable, subject to the nature and cost of such actions being commercially viable, having regard to all the circumstances (including without limitation, the extent and nature of the obligation to be fulfilled, the likely success of such action and the effect of such action on the resources and financial position of the Party taking such action). Without prejudice to the foregoing this definition shall not impose an obligation on a Party to take action such as would (or might reasonably be expected to) result in the insolvency of that Party or it being required to suspend its operations.

24.2 Headings

The headings and any subheadings of Articles in this Agreement are for convenience only and shall not be considered in the interpretation of the Agreement.

24.3 Independent Contractors

The Parties to this Agreement are independent contractors. No partnership or relationship of principal to agent, master to servant, employer to employee or franchiser to franchisee, is established hereby between the Parties. No Party has the authority to bind any other party hereto or incur any obligations on its behalf.

24.4 Severability

In the event that any one or more of the provisions of this Agreement shall be found to be illegal or unenforceable, the Parties will consult each other to settle the situation, and this Agreement shall nevertheless remain in full force and effect and such term or provision shall be deemed severed. Each Party may, in the event of any material provision being deemed unenforceable, on 60 days notice terminate the Agreement and thereupon the provisions of Article 15.2 shall apply, in which case the terminating Party shall be considered to be the defaulting Party.

24.5 Waiver

No Party's rights to enforce the provisions of this Agreement shall be affected by any prior course of dealing, waiver, delay, omission or forbearance.

24.6 CSA Consideration

The Station Operator acknowledge that all obligations noted in this Agreement imposed on the Station Operator in respect of CSA are given for value, including the programming of RADARSAT Satellite and supply of the Data therefrom, and the Station Operator acknowledge both receipt and sufficiency of such consideration and agrees to be bound by all such obligations to CSA.

24.7 Language of the Agreement

The Agreement shall be in English and could be translated into Italian by Station Operator at their cost. In the event of any discrepancies, omissions, or errors between the two versions, the English language version shall take precedence.

Article 25 - Official Notification

25.1 All notices required or permitted thereunder shall be in writing and shall be delivered or sent prepaid by airmail, telex, telegram, or facsimile to the following address:

(a) if to MDA

RADARSAT International Inc.,
13800 Commerce Parkway,
Richmond, British Columbia,
CANADA V6V 2J3

Attention: Director, Worldwide Sales and
Manager, Contracts/Subcontracts Dept.

Facsimile: 1-604-231 4900

(b) if to CSA

Satellite Operations
6767 Route de l'Aéroport
St. Hubert, Québec
CANADA J3Y 8Y9

Attention: Director General, Space Operations

Facsimile: 1-450-926 4424

(c) if to Station Operator

Provindia di Benevento
Ufficio Speciale marsec
Dottor Ludovico Barone
Piazza Castello Rocca dei Rettori
82100 Benevento, Italy
~~Attention: Ing. Valentino Melillo~~

Facsimile:

25.2 Notices shall be deemed given upon receipt.

Article 26 - Signature

This Agreement has been executed by the Parties hereto.

Radarsat International Inc.

Signed: _____

Title: _____

Date: _____

Provincia di Benevento	Canadian Space Agency
Signed: _____	Signed: _____
Title: _____	Title: _____
Date: _____	Date: _____

APPENDIX A: Commercial Appendix

All prices mentioned in this Appendix are in U.S. Dollars, ExWorks MDA, Richmond, or ExWorks Network Station premises, as the case may be (ICC Incoterms 2000), local taxes, duties and levies excluded, unless otherwise stated. Standard packaging is included. Shipment costs, or transmission costs are excluded.

1 Schedule of fees - Reception Fees

1.1 Table 1: Reception fees

All Data received and Data Products processed by Network Station and purchased by Station Operator shall be at the rate of 55% of the relevant MDA Public List Price (annexed as Appendix F, listed at www.rsi.ca), subject to Article 3 of this Appendix. The minimum transmission time slot is one (1) Scene. The current rates are set out below:

RADARSAT Beam Mode	Current MDA List Price	Reception fee per Scene (55% of Current MDA List Price)*
Fine mode	USD 3,000	USD 1,650.00
Standard mode	USD 2,750	USD 1,512.50
Wide mode	USD 3,000	USD 1,650.00
ScanSAR Narrow mode	USD 3.000	USD 1,650.00
ScanSAR Wide mode	USD 3,000	USD 1,650.00
High Incidence mode	USD 3,000	USD 1,650.00
Low Incidence mode	USD 3,000	USD 1,650.00

MDA Programming Service	Current MDA List Price	Reception fee per Scene (55% of Current MDA List Price)*
Basic	USD 100	N/A
Priority	USD 500	N/A
Emergency	USD 1,000	USD 550
Meteo	USD 300	N/A

* Subject to change with each new MDA Public List Price.

1.2 Table 2 : Data, Level 0 and Data Products

MDA, CSA, NASA or NOAA for its purposes, may request from the Station Operator the reception, processing, and delivery of Data or Data Products. The Station Operator will invoice MDA, and MDA will pay the Station, unless otherwise agreed in writing.

Data & Data Products including Signal Data

Order by	Item	Purpose	Price in USD	Note
CSA NASA NOAA	Signal Data (raw X-band downlink data)	"At Cost" for Non-commercial use	$200 per Pass	-media cost excluded -transfer of Archive Data which Station Operator wishes to delete from its archive.
CSA MDA	Level 0 Data	"At Cost" for Non-commercial use	$100 per Scene	-media cost excluded -applies to Scenes beyond 40 free Scenes per year pursuant Article 6.9 in the Agreement.
CSA NASA NOAA	Data Products	Non-commercial use	$500 per Scene	-on any media
MDA	Level 0 Data & Data Products	Commercial use	*$500 per Scene	-with regular processing

Services

Order by	Item	Purpose	Price in USD	Note
MDA	Rush Processing	All of the above	*$100 per Scene	
MDA	NRT Processing	All of the above	*$200 per Scene	
MDA	Duplicate/Copy	Any use	*$120 per Scene	-on any media

* For a request of 25 and more Scenes, Revenue Sharing Scheme will apply. MDA shall pay Station Operator 25% of the selling price per Scene.

2 Special Products and Services, Revenue Sharing Scheme

2.1 Table 3: Revenue Sharing Scheme

For those applications require larger volume of Data acquisitions, MDA proposes to work with the Station Operator on the basis of revenue sharing scheme. A minimum order size to which this revenue sharing applies is 25 Scenes and over.

The following revenue sharing reflects what each active partner in such a volume sale would receive for its services, as a portion of the revenues of a sale to a client.

TASK DESCRIPTION	ACTIVE PARTNER	SHARE OF REVENUES
Acquisition of Data*	Station Operator	20%
Processing of Data	Station Operator	5%
Distribution charges	Distributor or MDA**	20%
Telemetry	MDA	55%

(*) "Acquisition" includes Data Level 0 product made available to MDA

(**) Station Operator is entitled to Distribution charges (20%) for orders initiated by Station Operator.

i.e. Station Operator – 45% = 20% (Acquisition of Data)+5% (Processing of Data) + 20% (Distribution charges) / MDA - 55% (Telemetry)

MDA is entitled to Distribution charges (20%) for orders initiated by MDA.

i.e. MDA – 75% = 20% (Distribution charges) + 55% (Telemetry) / Station Operator – 25% = 20% (Acquisition of Data) + 5% (Processing of Data)

2.2 Table 4: Volume Pricing

Volume Pricing refers to orders falling within the guidelines set out in the MDA Public Price List. The current prices to be offered to clients are summarized as follows. MDA's published prices at the time of the order would take precedence in the case of conflict with prices mentioned in this Appendix.

Volume (all Beam Modes)	Selling Price per Scene
25-49 Scenes	$2,000
50-99 Scenes	$1,875
100-199 Scenes	$1,750
200+ Scenes	$1,625

Notes:

(1) Emergency programming, and NRT or Rush processing services are additional charges. For contracts of 50 Scenes or more, processing and programming fees are reduced by 50%

(2) In order to take advantage of these prices, Station Operator must specify a particular project including location, timeframe, and number of Scenes required.

3 Distribution of Data and Data Products outside the Circle of Visibility

3.1 For Data and Data Products of areas outside the Circle of Visibility of the Network Station, Station Operator shall order from MDA, by way of Programming Requests when applicable. The Station Operator shall be entitled to purchase such Data and Data Products at a 20% (twenty per cent) discount on the prices listed on MDA's Price List in effect at the time of the order. Data and Data Products purchased in this manner will be outside Station Operator's annual commitment and will be invoiced separately.

4 Schedule of fees: Royalties

The reception fee for each original Scene in Table 1 – Reception fees under Article 2 in this Appendix includes the Royalty for the initial distribution of the Scene.

4.1 Reporting and Payment

The commercial distribution of Scenes will be reported quarterly by the Station, on a calendar year basis. MDA invoices Station Operator for the Royalties payable, and the default terms of payments apply.

4.2 Method of Calculation for Royalties

Royalties payable to CSA and MDA for the commercial distribution by Station Operator of a number of Data and Data Products are computed at the end of each calendar year using the following calculation method:

A = Number of Scenes ordered by the way of Programming Requests, received and paid for in a specific beam mode by Station Operator in the calendar year.

B = Number of Scenes commercially distributed by Station Operator in the calendar year, which includes the Data downlinked by Station Operator pursuant to Articles 3.2 and 5.7.

When B is larger than A at the end of any calendar year, the difference will be invoiced to Station Operator using the following formula:

[A- B] x USD 1,400.00 (one thousand four hundred U.S. dollars).

When A is larger than B, MDA shall not make a reimbursement to Station Operator for non-distributed scenes.

5 Production Policies

5.1 Data Procurement Policy by MDA

MDA under the terms of its licensing agreement with CSA, has a responsibility to coordinate the procurement of Data and Data Products ordered by the Canadian Government Order Desks and processed by foreign network stations. In order to properly control the flow of and payment for Data processed at the Network Station, MDA will issue Network Station Purchase Orders "NSPOs" to Station Operator for the production of all commercial and government requests which will specify products required, quantities and applicable prices. Station Operator cannot ship the Data to MDA until they have received the corresponding NSPO. The NSPO is a required document by MDA to ensure that Station Operator gets paid for the work performed.

5.2 Routine orders from MDA: Framing of Products

When MDA orders a Product from Station Operator, it will specify the area to be processed and shipped to MDA or its client with a NSPO. That area does not necessarily correspond to the full swath received by the Station, as some data will be received before and after the requested area, as a buffer, and at no additional charge. In order to minimize inconsistencies, MDA will advise Station Operator via the NSPO of the exact area requested together with the number of products, and expected amount to be invoiced by Station Operator, for each order placed.

5.3 Production Order Conflict Resolution

In case of inconsistencies between Processing Order Requests from CSA and NSPOs from MDA, for instance related to start/stop times or otherwise, MDA's parameters shall prevail. MDA reserves the right to refuse invoices from Station Operator which do not comply with MDA's NSPO parameters.

5.4 Shipping Policies and Procedures

In order to maintain the most cost-effective means of shipping, MDA requests that the Station Operator use Federal Express ("Fedex") as the shipping carrier. In case Fedex service is not available, DHL may be considered as an alternative carrier. In the event this carrier does not provide services in the city / country of the business, Station Operator is advised to contact the Manager, Contracts at MDA Headquarters in order to establish the preferred courier.

5.4.1 Shipping from Network Station to MDA-Gatineau

Canadian Customs and excise laws require Station Operator to duly complete Air Waybills otherwise Data or Data Products may be delayed at customs and incorrect charges may be assessed. The Air Waybill must indicate one of the following Harmonized Commodity Codes:

- Exabyte tapes/DLT: 85 24 – 40 00 90
- CD's: 85 24 – 31 00 90
- DVD's: 85 24 – 31 00 90

In the event Station Operator is not sure of what Harmonized Commodity Code to use, Station Operator is advised to contact the Shipping/Receiving at MDA Headquarters:

Mr. Tesfay Berhte Tel # (1-604) 231-2092

Upon shipment of the Data / Data Products, Station Operator is required to fax the completed Air Waybill and Customs Invoice to MDA Gatineau (with copy to MDA Headquarters in Richmond). The following information is required on the Customs Invoice:

- date
- name, address, phone and fax of recipient
- country of export
- country of ultimate destination
- INCOTERMS (ExWorks city of origin)
- MDA Network Station Purchase Order number (NSPO#)
- international Air Waybill number
- carrier ID
- detailed description of goods
- harmonized commodity code
- quantity of goods
- declare value of media for custom purposes (local market value)
- total value of goods (value per piece x quantity)
- total weight of goods
- statement that "value declared is for custom purposes only"
- authorization

5.4.2 Shipping from Network Station to MDA Clients

At MDA's convenience, Station Operator shall process Data and ship Data Products to an address different from MDA's headquarters. The conditions of such orders are discussed in Article 3 in the Agreement.

For shipments from Network Station direct to the clients, Station Operator will use MDA Richmond account for shipping charges, i.e. Fedex account #2419-9383-3 or DHL (please contact MDA to make the appropriate arrangements), and will mark on the Air Waybill "Bill third party MDA Richmond Account #...".

After this, the same procedure as 5.4.1 applies.

5.5 Invoicing Procedures

In order to ensure prompt payment for the work carried out by Station Operator, as outlined in the Data Procurement Policy in Article 5.1 in this Appendix, Station Operator will submit an invoice to MDA within 30 days after the end of each month which identified the purchases made during the month. The invoice shall be addressed to the attention of:

Controller
Radarsat International Inc.
13800 Commerce Parkway
MDA Building
Richmond V6V 2J3
CANADA BC
Tel #(1-604) 231 4958
Fax #(1-604) 231 4900

5.6 Documentation Requirements

In order for MDA to effectively process invoices received from Station Operator, the following information should appear on the invoice:

- MDA Network Station Purchase Order (NSPO) number

- date product shipped to destination
- international Air Waybill number
- carrier ID
- acquisition date and time
- processing level of the Product (Level 0, SGF, etc.)
- processing time
- number of Scenes
- unit cost
- total cost
- banking details

6. Speculative Acquisitions

6.1 The current situation

MDA has undertaken a "speculative acquisition campaign" within the limits of the available SAR on-time and tape recorder allocation. The aim is to acquire ahead of time (that is: before a sale is closed) Data which are identified as a potential commercial sale. The creation of an efficient archive requires help from the network stations. In the case of a speculative acquisition, NSPO would not accompany the downlink request.

In any case, a speculative acquisition is only taken into account when a potential client is identified, with a need which is evaluated in terms of Data volume, beam mode, incidence angle and expected closure date. In some cases, a speculative acquisition can correspond to the creation of a demo product, or a "test period" validating the operation of the requirements.

6.2 Speculative Acquisitions by Station Operator

It is proposed to offer the network stations to receive and request speculative acquisitions for several reasons:

1) make better use of the Station direct downlink capability for potential commercial requests;
2) increase the efficiency of the conflict management within commercial requests, directly handled between MDA and Station Operator;
3) offer potential revenues to the Station Operator, as Data would be ordered from local stations when the relevant sales are closed in the case of a sale by MDA, and the Station would benefit from an existing archive when the sale is made by Station Operator;
4) ease up the feasibility study for specific requirements or the creation of demo products leading to a sale.

Station Operator may contact MDA with similar potential Data requirements, keeping in mind the same conditions: sales oriented acquisitions clients identified with enough details on the applications to select the relevant beam modes, incidence angles, timing, etc.. Such requests are discussed with MDA on a case by case basis and would be integrated into MDA's own requests. The corresponding telemetry is not counted against the contractual yearly minimum order. MDA does not offer any commitment to take Station Operator's requests into account other than on a best commercial effort basis, and Station Operator is expected to do the same for MDA's speculative acquisition requests.

7 Interpretation

7.1 Same meaning

Unless the context otherwise requires, all words and phrases defined in the Network Station License Agreement and used herein shall have the same meaning herein as in the Network License Station Agreement.

APPENDIX B: End User License

Please refer to www.rsi.ca/about/legal/licence.asp

APPENDIX C: International Memorandum of Understanding (IMOU)

Entered into on February 27, 1991

MEMORANDUM OF UNDERSTANDING

BETWEEN

CANADIAN SPACE AGENCY OF CANADA

AND

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

AND

NATIONAL OCEANIC AND ATMOSPHERIC ADMISNISTRATION OF THE DEPARTMENT OF COMMERCE OF THE UNITED STATES OF AMERICA

CONCERNING THE RADARSAT PROJECT

TABLE OF CONTENTS

ARTICLE 1 INTRODUCTION

1.1 The two Parties to this Memorandum of Understanding (MOU), (called the Parties in this MOU), are: the Canadian Space Agency (CSA) of Canada, and the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce of the United States of America.

1.2 During the last decade the Parties have each taken part in various Satellite missions that have demonstrated the value of free flying polar orbiting satellites for gathering remotely sensed data describing the earth's surface and troposphere. In particular the synthetic aperture radar of the SEASAT mission demonstrated the microwave technology and the performance requirements necessary for land use determination, sea ice surveillance, oceanography, and geological mapping. Building on this experience the RADARSAT Project, (called the Project in this MOU), has been conceived as an advanced remote sensing mission with a wide range of objectives.

1.3 The two Parties to this MOU are contributing in different ways to the realization of the Project according to their technical capabilities and agency mandates. As a consequence of these differing mandates the reasons for supporting the Project vary and as a result, the emphasis given to each objectives listed in Article 4 of this MOU also varies from Party to Party. Thus, for example, the CSA primary need is to obtain data for pre-operational purposes, through a program which includes the participation of those Canadian provinces contributing to the Project costs. For the U.S., the NASA primary need is to obtain experimental data to support global research and application demonstration efforts of its own and those of other U.S. Government Departments and Agencies; NOAA's primary interest is to ensure the availability of this data to U.S. government and private users and promote its use on a widespread basis consistent with U.S. law.

1.4 With these considerations in mind, the Parties jointly undertake the Project with the purpose of advancing space science and technology and the applications of remote sensing technology in areas such as research studies of the earth's land, ocean and ice cover, demonstration projects, monitoring the earth's natural resources and environment, and the protection of human life and property from natural disasters. Research investigations utilizing RADARSAT data will be solicited by the Parties themselves through their own means of solicitation and/or via an Experiment Announcement of Opportunity (EAO) in order to pursue studies in these and related areas.

1.5 Coordinated studies in Canada and the U.S. have led to the detailed specification and design of the RADARSAT Satellite, (called the Satellite in this MOU), and of the launch and of the ground segment which will support the Satellite after launch. These studies (Phase B) were conducted through previous arrangements between the Canadian Federal Department of Energy, Mines & Resources (EMR) and NASA. (Arrangement concerning RADARSAT cooperation between the Department of Energy, Mines and Resources and the National Aeronautics and Space administration, dated 29 September 1982.

1.6 The Parties will continue this mutually beneficial cooperation in space science and applications through collaboration to develop, build, launch and operate the Satellite.

1.7 The Satellite will carry a baseline payload consisting of a synthetic aperture radar (SAR). The object of the Satellite mission is to collect, process and distribute data from the SAR. The data will be used for pre-operational and experimental purposes. All data will be made available on a public non-discriminatory basis.

1.8 If the platform accommodation and launch vehicle capability permit, the Parties may make arrangements to fly some small additional instruments.

ARTICLE 2 PURPOSE OF THIS MOU

2.1 The purpose of this MOU is:

i) to define the main Project elements and the respective responsibilities of the Parties,
ii) to define the agreements between the Parties for the coordination and management of the Project,
ii) to define the general provisions for the utilization of RADARSAT data.

ARTICLE 3 RADARSAT PROJECT DESCRIPTION

3.1 The Satellite will weigh approximately 3,200 kg and will be placed in a sun-synchronous orbit at an altitude of about 800 km. The inclination will be approximately 99 degrees and the Satellite will have a descending node (equatorial crossing) of approximately 06:00 local mean time. The launch will be from the Western Test Range by a medium class expendable launch vehicle and is planned for mid-1994.

3.2 The SAR will image the earth at C-band (approximately 5.3 GHz) and will provide data capable of generating four-look processed images with an equivalent spatial resolution of about 28 m. It will also have a high resolution mode giving about 10 m (one look) resolution over a 50 km swath, and a SCANSAR mode giving about 100 m (six look) resolution over a 500 km swath. The SAR beam will be pointed to the north of the ground track and in the vertical plane it will be electrically moveable between 20 degrees and 45 degrees incidence angles, except for the SCANSAR mode which covers this entire range of incidence angles. Power will be provided to operate the SAR for up to 28 minutes in sunlight each orbit.

3.3 Limited on-board recording capability will be provided for SAR data. The tape recorded data will be buffered into the X-Band high bit rate data (HBRD) telemetry system for transmission to the ground. All data processing will take place on the ground.

3.4 After commissioning, data acquisition will commence with the payload operating under the control of an on-board computer programmed from the Mission Control System (MCS). The MCS comprises:

i) the Mission Management Office (MMO) which coordinates all ground services including data quality control and the administration of data policy,

ii) the Mission Control Facility (MCF) which schedules and monitors all communication with the Satellite, including its state of health and,

iii) the Telemetry Tracking and Control Station (TTCS) which is the ground end of the communication link with the satellite.

3.5 The Project will include the following phases:

i) Phase C - the final design, development and construction of all hardware up to and including the final qualified designs for the flight model,

- the specification of software for mission operation,

- the design of the ground stations and data processing and archiving facilities,

- the design of the MCS,

- the design and construction of ground support equipment for checkout of the satellite.

ii) Phase D - the construction, integration and acceptance testing of the flight model, including verification of all interfaces,

- the construction of the launch vehicle interface hardware,
- launch and orbit achievement of the Satellite,
- the construction of the MCS, and the data processing and archiving facilities,
- the writing and testing of mission operation software,
- commissioning of the Satellite and engineering validation of sensor data.

iii) Phase E - routine operation of the Satellite.

ARTICLE 4 RADARASAT OBJECTIVES

4.1 The Objectives of the RADARSAT Project are as follows:

i) to ensure data availability for environmental monitoring,

ii) to create daily sea ice maps based on SAR data collected over the Arctic,

iii) to collect SAR data over selected portions of the globe for the purpose of crop forecasting,

iv) to obtain periodic SAR data coverage of Antarctic sea ice distribution, subject to receiving station or tape recorder availability,

v) to collect a global set of stereographic SAR images for mapping,

vi) to obtain the first comprehensive map of the Antarctic continental ice sheet based on SAR images.

vii) to collect site and time specific SAR data in support of approved research studies or application demonstrations sponsored either individually or jointly by the Parties,

viii) to collect site and time specific SAR data for experiments sponsored by the parties through an EAO,

ix) to collect and make available global data to any persons, or a non-discriminatory basis,

x) to develop applications of SAR data in a pre-operational environment, and

xi) by assigning distribution rights for SAR data to the private sector, to promote the world-wide use of the SAR data.

ARTICLE 5 RESPONSIBILITES OF THE PARTIES

5.1 Each Party is responsible technically, managerially, and financially for the activities specified below.

5.2 For Canada, CSA will use its best efforts to meet the following responsibilities:

i) to design the overall system, including total system design integrity and to provide technical coordination between CSA, NASA and NOAA representatives to ensure

technical compatibility of the elements of the spaceborne and ground system provided by each Party,

ii) to conduct, in consultation with the other Party, the definition studies necessary for the accomplishment of its system responsibilities in the RADARSAT Project,

iii) to design, develop and construct the SAR, and its interface with the platform,

iv) to integrate the SAR with the platform, transfer the satellite to the launch site, and conduct appropriate Satellite level tests on the interface with the launch vehicle, the data acquisition stations, and the MCS,

v) to provide the Satellite communications and management system for the identified and agreed microwave up-links and down-links with the ground station,

vi) to obtain a platform suitable for the RADARSAT mission and to arrange with the supplier for the provision of all necessary mechanical and electrical ground support equipment for the checkout of the platform,

vii) subject to review and acceptance tests, to accept the flight model of the RADARSAT platform from the supplier and all flight hardware and related flight component spares together with all the necessary ground and airborne support equipment and operations handbooks to enable CSA to operate the Satellite,

viii) to provide an uplink transmitter and the associated equipment for the Alaska receiving station in the event that CSA wishes to relay SAR data to Ottawa from Alaska via a communication satellite (See Article 5.3 iv),

ix) to provide and operate the MCS, which includes the RADARSAT MMO. This will provide the principal users' interface, the operating centre for the RADARSAT system, and the coordination for all activities of the RADARSAT system,

x) to control and operate the Satellite after it achieves its normal orbit,

xi) to provide SAR data by direct transmission from the Satellite to designated U.S. data acquisition stations subject only to the operational constraints of the mission,

xii) to provide and operate two data acquisition stations in Canada to receive data on the X-Band downlink from the Satellite, where such provision and operation is consistent with the available staffing and other commitments of the stations,

xiii) to make SAR data available in accordance with the provisions of Article 12,

xiv) to design and construct mission unique training and testing aids,

xv) to provide technical information necessary to ensure safe and effective interfaces with the other Parties responsibilities, and

xvi) to reorient the Satellite, once during a winter season and once during a summer season, so that the SAR beam is directed to the south to enable complete SAR coverage of the Antarctic continent. The scheduling of this activity will be as early as possible in the mission, the exact timing to be decided by the International Steering Committee (ISC).

5.3 For the U.S., NASA will use its best efforts to meet the following responsibilities:

i) to procure a commercial launch for the Satellite, in the 1994 time frame, using a medium class expendable launch vehicle, from the Western Test Range to an agreed altitude and orbit inclination,

ii) to provide or procure the necessary normal and optional launch vehicle services in support of RADARSAT launch planning, launch vehicle accommodation, pre-launch checkout and launch operations,

iii) to make available existing NASA owned ground support equipment (GSE) appropriate to the platform, to the extent that program plans permit,

iv) to provide an operate a data acquisition station in Alaska to receive HBRD on the X-Band downlinks of the Satellite, and, in the event that CSA wishes to relay HBRD from Alaska via a communication satellite and supplies an uplink transmitter and associated equipment, to operate this data relay; such provision or operation being subject to available staffing and other commitments of the station,

v) to provide supporting telemetry, tracking, and control services from available NASA stations to the CSA MCS during the Satellite launch and early orbit period within the limits and capabilities of the NASA stations and resources as they exist at that time,

vi) to provide technical information necessary to ensure safe and effective interfaces with the other Party's responsibilities, and

vii) to support application demonstrations for the use of SAR data for sea ice mapping of the Arctic.

5.4 For the U.S., NOAA, through the National Environment Satellite Data and Information Service (NESDIS), will use its best efforts to meet the following responsibilities:

i) to facilitate U.S. Government use of SAR data and to arrange application demonstrations such as sea ice mapping of the Arctic, and

ii) to facilitate the distribution of SAR data by ensuring that the U.S. private sector has an adequate opportunity to participate in distribution rights to this data and that all such arrangements are consistent with U.S. law.

5.5 In the event that either party is unable to meet the responsibilities described in Article 5, that Party will immediately notify the other Party. The Parties will then consult through the ISC on measure to be taken to continue the Project.

ARTICLE 6 COORDINATION AND MANAGEMENT

6.1 Coordination of the Parties' respective functions will be provided by the ISC chaired by CSA. Membership of the ISC consists of designated and equal representation from each of the countries of the Parties to this MOU and will include at least two representatives from each Party. Meetings will take place at the request of either Party but will not be less than once per year.

6.1 The ISC will be responsible for the following functions:

i) to coordinate the implementation of the provisions of this MOU,

ii) to ensure that the various elements of the Project are proceeding on schedule and, in the event of any difficulty, take appropriate measures to alleviate problems that might ensure,

iii) to approve the Joint Project Implementation Plan (JPIP),

iv) if platform accommodation and launch vehicle capability permit, to approve any additional instrument payload to be carried on the platform,

v) in the event the Parties elect to jointly undertake research studies through an EAO, to approve the science team chairmen and the experiment plan to be supported through the EAO,

iv) to establish Joint Sensor Validation Teams (JSVT),

vii) to establish a subcommittee to coordinate the activities of the change control boards of the Parties,

viii) at the request of a Party, to consult on the distribution of costs resulting from major design changes,

ix) to endeavour to resolve disputes between the Parties,

x) to make arrangements for orderly termination of the project in the event that it should prove necessary,

xi) to set guidelines for changes in operational procedures in the event that the performance of the Satellite falls below nominal at any time during the mission,

xi) to determine the allocation of tape recorder use by the Parties,

xiii) as early as possible in the mission to schedule Satellite maneuvers necessary to obtain SAR imagery of Antarctica once during the winter season and once during the summer season,

xiv) to advise CSA on the interest of the other Party in continuing the mission beyond its nominal five year life if that is possible,

xv) relevant to the rights of the Parties under this MOU, review arrangements relating to the establishment and ongoing activities of the international company that is granted RADARSAT data distribution rights (cf 12.5, 12.6), and

xvi) to perform such other functions as the Parties may from time to time require of it.

6.3 Where there is a disagreement between the Parties on any specific issue within the purview of the ISC, the matter will be referred to the next higher level of authority of the Parties.

6.4 The ISC may establish sub-committees to attend to specific tasks and will determine the terms of reference of those sub-committees.

6.4 The responsibilities of the parties described in this MOU are internal to the agencies concerned. For this purpose the Parties may set up such management structures as they deem necessary.

ARTICLE 7 JOINT PROJECT IMPLEMENTATION PLAN

7.1 A JPIP and amendments thereto that fall within the foregoing general descriptions of the Project, including the methods of system configuration control, the phasing, scheduling, deployment of equipment, managerial and working arrangements and guidelines for data acquisition and management, will be developed by CSA, in consultation with representatives of the other Party and subject to approval by the ISC.

ARTICLE 8 DATA ACQUISITION

8.1 Due to recognized spacecraft power limitations, SAR data acquisition cannot be continuous. Therefore, the Parties agree that the available SAR data acquisition time (nominally estimated to be about 28 minutes per orbit) will be allocated among the Parties subject to the following conditions:

i) Collectively the Parties have a right to the available SAR data acquisition time free of charge.

ii) The allocation of the available SAR data acquisition time between the Parties will be in proportion to the value of their contribution to the space segment and the associated GSE and the MCS, the launch and associated launch services. This proportioning will be as determined by the ISC, based on the "as-built" cost at the time of orbit insertion.

iii) Subject to the provisions of Articles 11 and 12 on data use and data distribution, the Parties are free to share their allocation of SAR data acquisition time with other executive branch agencies within their own country, with any person or organization whose research or application demonstration studies are sponsored by the Parties, and with the Distributor (see Article 12.6).

iv) Guidelines for determining how these proportions are applied to actual SAR data acquisition, i.e., per orbit, per day, per season, etc., and the procedures to be followed in establishing priorities on the requests of the Parties will be elaborated in the JPIP. It is recognized that on occasion, and due usually to a potentially catastrophic environmentally related event, such as a volcanic eruption, earthquake or forest fire, there may be a need to provide special SAR coverage of such phenomena as they unfold. Such requests may be made by either Party, at any time, and will be reviewed and acted on immediately by the CSA in accordance with the special provision for these events contained in the data policy guidelines.

v) If the SAR is able to image a particular spot on the Earth's surface, the only geographical limitations on SAR data acquisition are technical, primarily due to the need to have either a ground receiving station and/or the onboard tape recorder available to receive/record the SAR data or programmatic, primarily arising from allocations of SAR data acquisition time.

8.2 It is recognized that the tape recorder for the SAR has limited life. Therefore, in order to minimize wear and tear, the Parties agree that, outside of its use to acquire global crop information, global stereographic images and the two coverages of Antarctica, they will exercise restraint in requesting the use of the tape recorder. This use will be proportional to the value of their contribution to the project (cf 8.1 ii) and according to guidelines to be elaborated in the JPIP.

ARTICLE 9 DATA RECEPTION

9.1 Parties to this MOU will make their own arrangements for data reception, processing and distribution, except in those specific circumstances described and provided for in this MOU.

9.2 To the extent that the receiving station masks of the ground stations of the Parties may not completely cover the territory of interest to the countries where the stations are located but will usually cover some of the territory of interest to other countries, Parties will try to assist each other in accommodating data reception and distribution needs. A similar provision will be included in any Third Party agreements, made by CSA for direct readout of SAR data.

9.3 In the event that read-out of recorded data cannot take place at a scheduled receiving station, the Parties will try to assist by providing back-up read-out on request from CSA under agreed terms and conditions. The same arrangements will apply for directly transmitted data within overlapping receiving station masks.

ARTICLE 10 DATA QUALITY

10.1 Using data collected during the commissioning phase, the JSVT will verify that the sensors are performing satisfactorily in terms of their specifications and pre-launch tests.

10.2 Throughout the mission, and on request from CSA, the Parties will collect data samples and provide them to CSA for the purpose of quality control of sensor performance and data processing.

10.3 The Parties do not guarantee data continuity and they do not guarantee the quality or availability of any data during the mission. For this reason the Parties do not warrant the suitability of RADARSAT data for any particular purpose.

ARTICLE 11 DATA USE

11.1 Use of SAR data for internal governmental use by the Parties is the choice and privilege of the Parties, provided only that it is not sold, given, or otherwise made available to Third Parties except as provided for by Articles 11.3 and 12.

11.2 Through an EAO, science teams may be established to conduct research programs using SAR data. The terms of reference and representation on such science teams will be approved by the ISC. They will be chaired by science specialists approved by and representing the ISC. The cost of managing this activity will be borne by the sponsors.

11.3 For research studies and application demonstrations approved individually or jointly by the Parties and for experiments approved and supported through an EAO, SAR data will be made available to the Parties under the following conditions:

i) that this use is restricted to named investigators and co-investigators, approved through a formal review process established jointly or individually by the Parties, is for research and applications demonstration purposes only, and the data may not be made available to Third Parties, to the extent permitted by the prevailing laws of the Parties,

ii) that data acquisition for this purpose is subject to technical constraints and to the data acquisition guidelines set out in the JPIP,

iii) that data requests will only be accepted for experiments that are defined and approved, in terms of their objectives and the resources necessary to perform them, before the request for data is made,

iv) that the results of these experiments are made available to the scientific community in general only through publication in appropriate journals or other such established channels. In the event such reports or publications are copyrighted, the Parties will have a royalty-free right under the copyright to reproduce and use such copyrighted work for their own purpose,

v) that the sponsors of these studies or experiments bear the cost of processing, if necessary, and the cost of reproduction of data required by their experimenters, and

vi) that the sponsored investigators and co-investigators sign an agreement with their sponsoring Party undertaking to respect these conditions.

11.4 Besides SAR data acquired at the specific request of a Party, the Parties also have free access to all RADARSAT SAR data in the archives of the other Party, subject only to the conditions that they may not be sold, given or otherwise made available to Third Parties and that the requesting Party bears any costs incurred in reproduction and transmission.

11.5 The Parties may delegate or subcontract their responsibilities for data acquisition, processing, archiving and distribution as they see fit, but they remain responsible for ensuring that the performance of such tasks is in accordance with the provisions of this MOU. In particular, private sector organizations gaining access to SAR data in this way may not use it to create value-added products for distribution except on behalf of the Government or agency concerned through a service contract.

Restrictions on the distribution of the SAR data itself are described in Article 12.

ARTICLE 12 DATA DISTRIBUTION

12.1 SAR data acquired by the RADARSAT Satellite will be made available in accordance with a policy of non-discrimination.

12.2 For the purposes of Article 12.1, data formats will be specified in the JPIP. Data in these formats will be referred to as the Primary Data Set (PDS). In the event that other data formats of a lower or higher level may be generated by the Parties, they will endeavour, to the extent that it is practicable, to make these types compatible, of consistent quality and as freely available as the PDS. In support of this effort the JPIP will also include specifications and procedures for data quality control.

12.3 Data in archives maintained by the Parties will be available in the PDS format. CSA will maintain a total catalogue of these archives based on information provided by the other Party.

12.4 All copyright and ownership rights for SAR data will be vested or reserved solely in or to CSA, the other Party having rights of use as described in this MOU to the extent permitted by the laws of the Parties

12.5 In order to promote the global use of SAR data, an international company (called the Distributor in this MOU) will be given the exclusive right to distribute SAR data to all Third Parties. The Distributor will be composed of Canadian and U.S. private sector entities with equity approximately proportional to the contributions of that country's Parties to the capital costs of the RADARSAT project as determined under Section 8.1.ii. This arrangement is consistent with the applicable national law of the Countries, including, for the U.S., Title V of the U.S. Land Remote Sensing Commercialization Act of 1984 and will be subject to the approval and ongoing review of the ISC.

12.6 Proposals for access to SAR data by agencies or organizations outside of the Governments of the Parties will be a matter for negotiation by the Distributor in cooperation with the CSA and the terms, conditions and arrangements for any such participation will be the subject of a separate agreement with the CSA. Such outside agencies or organizations will agree to support all project objectives, including data sharing responsibilities (Article 9) and restrictions on data distribution (Article 12). They will not have any management role in the Project. Any such agreement between CSA and an outside agency or organization shall be with the concurrence of the Distributor and will not add to the costs or responsibilities nor infringe upon the right of any Party unless that Party expressly agrees.

12.7 To ensure the viability of the Distributor and protect it from competitive harm, the Parties will not sell, give, or otherwise make available RADARSAT SAR data to any Third Party, without the agreement of the Distributor and to the extent that the laws of the Parties permit.

ARTICLE 13 FUNDING ARRANGEMENTS

13.1 Each Party will bear the costs of discharging its responsibilities in the Project and also the costs of travel and subsistence for its personnel and transportation of the material and equipment they are providing. It is understood that the ability of the Parties to carry out their obligations is subject to their respective funding procedures.

13.2 CSA will bear operation costs for the MCS. Part of these costs will be offset by revenue sharing between the Distributor and CSA.

13.3 In the event that either Party finds that non-availability of appropriated funds endangers the orderly conduct of the Project, that Party will notify in writing the other Party.

ARTICLE 14 DESIGN CHANGES

14.1 Whilst the JPIP provides a mechanism for design changes, the Parties recognize that the consequences of design changes by one Party could result in excessive expenditures on the part of the other. For this reason the Parties undertake to use their best efforts to minimize such changes and to provide for mutual representation on the change control boards, which will make decisions by consensus. In the event that such changes are deemed necessary, each Party will normally bear the cost of the variation insofar as it affects its responsibilities in the Project. If either Party considers this apportionment of cost inequitable, it may request a redistribution of costs by the ISC.

14.2 The Parties will use their best efforts to avoid changes in scope which would have an impact on the performance of the mission, the achievement of the objectives or the adherence to the schedule of the Project.

ARTICLE 15 TECHNICAL INFORMATION EXHCNAGE

15.1 The Parties will exchange payload interface, integration and check out technical information necessary for the purpose of launching the RADARSAT satellite. Because such information, commonly known as form, fit and function information, is not restricted or proprietary in nature, it will be exchanged without restrictions.

15.2 In the event it is necessary to exchange technical information other than that provided for in 15.1, and the furnishing Party considers that such technical information is to be protected for proprietary or export control purposes, the following notice will be affixed to such information by the furnishing Party and the receiving Party will protect such information in accordance with the terms of the notice, to the extent permitted under its laws.

NOTICE

This information is submitted in confidence under the RADARSAT MOU. The receiving Party agrees that the information will not be duplicated, used or disclosed by the receiving Party or its contractors for any purpose other than as necessary for the receiving Party to meet its responsibilities under the MOU, nor disclosed or retransferred to any other government, person or entity without prior written permission of the furnishing party. If required by such contractors, the information will only be furnished after the contractors have agreed in writing to protect the information from unauthorized duplication, use and disclosure. This NOTICE will be marked on any reproduction of the information in whole or in part.

15.3 The Parties may use and disclose without restriction, any exchanged proprietary information which does not have the above NOTICE affixed thereto.

ARTICLE 16 PUBLIC INFORMATION

16.1 Each Party may release general information to the public regarding its own portion of the project as desired, and, insofar as the activities of the other Party are concerned, after initial consultation with that Party. Information concerning the Project as a whole will be released by CSA after consultation with the other Party.

16.2 Each Party will use its best efforts to record the progress of the Project in still photos, cine film or video tape as appropriate and will make such material freely available to the other Parties for the purposes of public information.

ARTICLE 17 PROCUREMENT

17.1 The procurement of equipment by the Parties will be in accordance with their respective procurement and approval procedures.

17.2 Each Party will use its best efforts, within its own country, on request and in accordance with its national laws and regulations, to provide reasonable assistance to the other Party with their procurement of equipment or related components including required documentation for this Project.

17.3 Each Party, when taking receipt of equipment or related components or materials, will use its best efforts to arrange free customs clearance when those items must cross national borders, subject to its national laws and regulations.

17.4 All official interaction regarding materials related to the RADARSAT Project will be between the Parties or their delegates and representatives. Direct interaction, other than for the purpose of exchanging information, and related technical communications, will not take place between the various contractors or subcontractors without the approval of the affected Parties.

ARTICLE 18 LIABILITY

18.1 With respect to cooperative activities undertaken pursuant to this MOU, neither Party will bring a claim or suit against the other Party or the other Party's contractors or subcontractors for damages arising out of injury to or death of its employees or damage to or loss of its property whether such injury, death, damage or loss arises through negligence or otherwise. The Parties in their contracts with each other related to this MOU will include the said inter-party waiver of liability. Each Party will stipulate in any contract with a contractor related to cooperative activities under this MOU that that contractor will be responsible for injury to or death of its own employees and for damage to or loss of its own property and that that contractor will not bring a claim or suit against the other Party or the other Party's contractors or subcontractors for such injury, death, damage or loss. Each Party will require the said subcontractors to include the same provisions in contracts with subcontractors related to this MOU.

18.2 Nothing in this Article prohibits a claim or suit between a Party and its own contractors and subcontractors.

18.3 For purposes of Article 18.1, the property and employees of a Party's contractors and subcontractors will be deemed to be the property and employees of that Party.

18.4 In the event of damage resulting to persons or property for which there is joint and several liability under the Convention on International Liability for Damage Caused by Space Objects or otherwise under international law, the Parties, or other designated Government bodies, will consult on an equitable sharing of liability with a view to recommending to their respective governments a course of action.

18.5 Upon taking possession of any items supplied by one Party (the supplying Party) to the other Party (the receiving Party) under a loan arrangement for the purposes of the project, the receiving Party will be responsible for such items and will return such items, except expendables and items authorized for testing to destruction, to the supplying Party in as good condition as when received,

reasonable wear and tear excepted. Possession will pass from the supplying Party to the receiving Party at the point of off-loading. If the receiving Party fails to return such items, except expendables and items authorized for testing to destruction, the receiving Party will pay to the supplying Party an amount equal to the replacement value of such items less the amount determined to represent reasonable wear and tear during the period that the items were loaned.

18.6 NASA, for the U.S., hereby gives its authorization and consent to CSA, and its contractors and subcontractors, for all use and manufacture of any invention or process described in and covered by a patent of the United States in carrying out CSA's responsibilities under this MOU.

18.7 A Party furnishing equipment (the furnishing Party) under this MOU will include in its equipment acquisition contracts indemnity provisions which will reimburse the other Party for any patent infringement costs incurred by the other Party as a result of its use or disposal under the MOU of equipment furnished by the furnishing Party, and if the furnishing Party fails to do so, it will reimburse the other Party for such patent infringement costs. It is further agreed that the other Party will provide the furnishing Party with notice as soon as practicable of any claim or suit alleging infringement of patents concerning such equipment, together with an opportunity under applicable laws, rules or regulations to participate in or undertake the defense of any such claim or suit, and that no settlement of any such claim or suit will be made without the furnishing Party's written consent other than as required by final decree of a court of competent jurisdiction.

ARTICLE 19 FREQUENCY ALLOCATION AND CLEARANCE

19.1 CSA will be responsible for seeking frequency allocation for the microwave sensing frequencies, for data telemetry and for Telemetry Tracking and Command (TT&C). It will be the responsibility of the individual Parties to this MOU, to cooperate with the appropriate competent authorities within their respective countries in obtaining such regional or national clearances, as may be necessary, for the performance of nay data acquisition, data reception or TT &C.

ARTICLE 20 EXTENSION OR REDUCTION OF POST LAUNCH OPERATIONS

20.1 For the purpose of this MOU the nominal lifetime of post launch operation is five years.

20.2 In the event that the performance of the Satellite falls below nominal at any time during the mission, the decisions on changes in operational procedures will be taken by CSA, at the time of the event based on guidelines established by the ISC and direct consultations with the other Party.

20.3 In the event that, at the end of the five year nominal life, the performance of the Satellite seems to warrant extension of RADARSAT operations, the decision to continue will be made by CSA in consultation with the other Party through its representatives on the ISC.

ARTICLE 21 CONFLICTING OBLIGATIONS

21.1 In the event that either Party or its contractors or subcontracts enters into arrangements relating to the RADARSAT Program, whether they predate or antedate this MOU, and such arrangements are in conflict with the provisions of this MOU, it is the responsibility of the Party (or its contractors or subcontractors) to take steps to resolve these conflicts in a manner which does not affect the good of the Project or the interests of the other Party and the provisions of this MOU.

ARTICLE 22 SETTLEMENT OF DISPUTES

22.1 Any dispute which is not settled through the mechanisms provided for in Article 6, or any other issue concerning the interpretation or implementation of the terms of this MOU that cannot be

resolved otherwise, will be referred to the appropriate level of authority of the Parties for consideration and action.

ARTICLE 23 AMENDMENT

23.1 This MOU may be amended at any time by written agreement of the Parties.

ARTICLE 24 ENTRY INTO FORCE, TERMINATION AND WITHDRAWAL

24.1 This MOU shall enter into force upon the conclusion of an agreement between the two Governments and shall remain in force for 5 years after the launch date.

24.2 This MOU may be terminated at any time by mutual consent of the Parties. Either Party may withdraw from this MOU after having given the other Party at least 180 days written notice of its intent to withdraw. All remaining necessary arrangements regarding orderly termination of this MOU will be determined by the ISC.

ARTICLE 25 SIGNATURE

25.1 This MOU consists of Article 1 to 25 inclusive and one Appendix; it is done in duplicate, in the English and French languages, both texts being equally authentic.

Signed at:
Date:

For the National Aeronautics
and Space Administration

Signed at:
Date:

For the Canadian Space
Agency of Canada

Signed at
Date:

For the National Oceanic
and Atmospheric Administration
of the Department of Commerce
Of the United State of America.

APPENDIX ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS

(CSA)	Canadian Space Agency
(EAO)	Experiment Announcement of Opportunity
(EGSE)	Electrical Ground Support Equipment
(EMR)	Department of Energy, Mines and Resources
(GSE)	Ground Support Equipment
(HBRD)	High Bit Rate Data
(JPIP)	Joint Project Implementation Plan
(JSVT)	Joint Sensor Validation Teams
(MGSE)	Mechanical Ground Support Equipment
(MOU)	Memorandum of Understanding
(MCF)	Mission Control Facility
(MCS)	Mission Control System
(MMO)	Mission Management Office
(NASA)	National Aeronautics and Space Administration
(NESDIS)	National Environmental Satellite Data and Information Service
(NOAA)	National Oceanic and Atmospheric Administration
(PDS)	Primary Data Set
(ISC)	International Steering Committee
(SAR)	Synthetic Aperture Radar
(TT&C)	Telemetry, Tracking and Control
(TT&CS)	Telemetry, Tracking and Control Station
(U.S.)	United States of America

DEFINITIONS

CHANGE CONTROL BOARDS

Committees established within the project management structure of each of the Parties to review proposed design changes and to approve, modify, reject them, or refer them to the ISC.

DATA

A generic term referring to the output from sensors and processing levels. It is usually used in conjunction with a noun making its meaning more specific, vis:

- Access

  The opportunity and means of obtaining data for any desired use, subject to the restrictions imposed by the MOU.

- Acquisition

  The generation of signals on board the Satellite representing a measurement of the phenomenon observed. These data may be transmitted directly to a receiving station or tape recorded for a subsequent dump to a receiving station.

- Distribution

  Making SAR data in the PDS format universally available in accordance with the Project policy of non-discrimination. This function will be filed by a Private sector partnership of companies jointly called the Distributor.

- Geocoded

  Data which has been geometrically and radiometrically corrected and registered to a conventional map grid.

- Reception

  The readout of raw data from the Satellite by telemetry link. This may be a direct transmission of the data as they are acquired, or a dump of tape recorded data.

- SAR

  All forms of SAR data from the raw telemetry data stream to processed geocoded data including the various formats of the PDS.

- Use

  Refers to the different uses to which the data may be put. Controls and restrictions on data use are described in the MOU.

DEMONSTRATION PRJECTS

A limited use of certain data in a particular application, generally including samples of the final product. Demonstration projects may be for user education and may include calibration for particular applications. Timeliness of product delivery may not be essential.

EXCLUSIVE RIGHT

Refers to the distribution of SAR data which is reserved to the company (the Distributor) set up for the purpose. No other person or organization is allowed to distribute data (see Article 12.5 and 12.7) although it does allow the Parties themselves such distribution privileges as are necessary to meet their objectives. (See Article 11.5)

GOVERNMENT USE

Includes, but it not restricted to, operational surveillance and monitoring required for operational departments or agencies as well as research uses.

GLOBAL

The entire earths surface which is accessible by a given sensor. Distinction is not made between oceans, land and sea or continental ice sheets.

MISSION CONTROL SYSTEM (MCS)

The MCS comprises:

i) the Mission Management Office (MMO) which coordinates all ground services including data quality control and the administration of data policy,

ii) the Mission Control Facility (MCF) which schedules and monitors all communication with the Satellite, including its state of health, and

iii) the Telemetry Tracking and Control Station (TTCS) which is the ground end of the communication link with the satellite.

NON-DISCRIMINATION

The requirement that data be made available on the same terms to all Third Party users.

PARTIES

The Agencies signatory to the MOU.

RECEIVING MASK

The boundary on the earths surface surrounding a receiving station defining the region within which the nadir point of the Satellite must fall for there to be good data reception.

SPONSORED

Refers to a class of bona fide research and experimental studies and application demonstrations conducted in furtherance of the objectives of the Project and approved by the Parties individually or jointly. They generally result from either agreements between government agencies or a proposal submission and peer review process such as would normally be expected to lead to the acceptance or rejection of funding of the proposal.

THIRD PARTIES

Any person, organization, or agency who is neither a part of nor sponsored by, according to the provisions of Article 11.5, the executive branch of the countries represented by the Parties.

VALUE-ADDED PRODUCTS

Products resulting from the interpretation of SAR data, and/or the addition of data or information from other sources.

AMENDMENT
TO THE
MEMORANDUM OF UNDERSTANDING
BETWEEN
THE CANADIAN SPACE AGENCY OF CANADA
AND
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTARATION
OF THE DEPARMENT OF COMMERCE
OF THE UNITED STATES OF AMERICA

CONCERNING THE RADARSAT PROJECT
SIGNED AT WASHINGTON ON FEBRUARY 27, 1991

WHEREAS the Canadian Space Agency (CSA) of Canada and the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration of the Department of Commerce (NOAA) of the United States of America, hereinafter referred to as 'the Parties", have entered into a Memorandum of Understanding Concerning the RADARSAT Project, signed at Washington on February 27, 1991 (the MOU);

WHEREAS the Parties note the success of their cooperation under the MOU;

WHEREAS the Parties note as well the successful operation of the RADARSAT satellite, which will soon exceed its nominal lifetime;

WHEREAS the Parties recognize that this cooperation will, under the terms of the MOU, come to an end on November 4, 2000 unless extended; and

WHEREAS the Parties now wish to enter into this Amendment to the MOU in order to extend the duration and amend the terms of the MOU and, hence, to continue their mutually beneficial relationship;

THE PARTIES HAVE REACHED THE FOLLOWING UNDERSTANDING:

ARTICLE 1

ARTICLE 5, Clause 5.2, Paragraph xvi, is hereby amended by deleting it in its entirety, and substituting therefor the following;

"xvi) to reorient the Satellite once, so that the SAR beam is directed to the south to enable complete SAR coverage of the Antarctic continent. The scheduling and exact timing of this activity will be decided by the International Steering Committee (ISC)."

ARTICLE 2

ARTICLE 5, Clause 5.2, is hereby amended by adding a new Paragraph xvii) as follows:

"xvii) to provide a Modified Antarctic Mapping Mission (MAMM) subject to the successful completion of activities described under paragraph xvi. The MAMM will be performed between Fall of 2000 and Fall of 2001 using SAR on-time allocation over and above the existing U.S. allocation. CSA and NASA are responsible for establishing the detailed terms and conditions of the MAMM."

ARTICLE 3

ARTICLE 24, Clause 24.1, is hereby amended by deleting it in its entirety and substituting therefor the following:

"24.1 This MOU will take effect upon the conclusion of an agreement between the two Governments, and will remain in effect for ten (10) years after the launch date or until one of the following events occurs;

(a) the termination of RADARSAT satellite operations; or

(b) the launch of the entry into operations of Canada's second RADARSAT satellite, RADARSAT 2."

ARTICLE 4

This Amendment will be read and construed with the MOU, and all terms and conditions of the MOU, except to the extent expressly amended herein, will remain in effect.

This Amendment will come into effect upon signature.

DONE in duplicate at Washington in the English and French languages, both texts being equally valid, this ____ day of _____, 2000.

FOR THE CANADIAN SPACE AGNECY
OF CANADA

_____
W.M. (Mac) Evans
President

FOR THE NATIONAL AERONAUTICS
AND SPACE ADMINISTARTION OF
THE UNITED STATES OF AMERICA

_____
Daniel Goldin
Administrator

FOR THE NATIONAL OCEANIC
AND ATMOSPHERIC
ADMINISTARTION OF THE
DEPARTMENT OF COMMERCE OF THE
UNITED STATES OF AMERICA

_____
D. James Baker
Administrator

APPENDIX D: Obligations of MDA Under the Master License Agreement

1 Provision of Data and Data Products, at Cost, to the Government of Canada for non-commercial use;

2 Reservation of 66% of available RADARSAT Satellite Data acquisition time for non-commercial use;

3 Restrained use of tape recorders for purposes other than global crop information and global stereographic images;

4 CSA may specify other requirements that are consistent with the objectives of the project and the Master License Agreement in order to deal with situations not contemplated when the Master License Agreement was executed.

APPENDIX E: RADARSAT International Price List

Please refer to www.rsi.ca/products/sensor/radarsat/radarsat1.asp

APPENDIX F: Rates Published by Public Works and Government Services Canada

-Extracts-

GENERAL CONDITIONS
DSS-MAS 1031-2 Section 3 page 1- 5 dated 04/92
Contract Cost Principles

Supply and Services Canada

01 General Principle
02 Definition of a Reasonable Cost
03 Direct Costs
04 Indirect Costs
05 Allocation of Indirect Costs
06 Credits
07 Non-applicable Costs

01 General Principle

The total cost of the Contract shall be the sum of the applicable direct and indirect costs which are, or are to be, reasonably and properly incurred and/or allocated in the performance of the contract, less any applicable credits. These costs shall be determined in accordance with the Contractor's cost accounting practices as accepted by the Crown and applied consistently over time.

02 Definition of a Reasonable Cost

1. A cost is reasonable if, in nature and amount, it does not exceed that which would be incurred by an ordinary prudent person in the conduct of a competitive business.

2. In determining the reasonableness of a particular cost, consideration shall be given to:

   A. whether the cost is of a type generally recognized as normal and necessary for the conduct of a contractor's business or performance of the Contract;
   B. the restraints and requirements by such factors as generally accepted sound business practices, arm's length bargaining, federal, provincial and local laws and regulations, and Contract terms;
   C. the action that prudent business persons would take in the circumstances, considering their responsibilities to the owners of the business, their employees, customers, the Government and public at large;
   D. significant deviations from the established practices of the Contractor which may unjustifiably increase the Contract costs; and
   E. the specifications, delivery schedule and quality requirements of the particular contract as they affect costs.

03 Direct Costs

There are three categories of direct costs:

A. Direct Material Cost meaning the cost of materials which can be specifically identified and measured as having been used or to be used on the Contract and which are so identified and measured consistently by the Contractor's cost accounting practices as accepted by the Crown.

1. These materials may include, in addition to materials purchased solely for the Contract and processed by the Contractor, or obtained from subcontractors, any other materials issued from the Contractor's general stocks

2. Materials purchased solely for the Contract or subcontracts shall be charged to the Contract at the net laid-down cost to the Contractor before cash discounts for prompt payment.

3. Materials issued from the Contractor's general stocks shall be charged to the Contract in accordance with the method as used consistently by the Contractor in pricing material inventories

B. Direct Labour Cost meaning that portion of gross wages or salaries incurred for work which can be specifically identified and measured as having been performed or to be performed on the Contract and which is so identified and measured consistently by the Contractor's cost accounting practices as accepted by the Crown.

C. Other Direct Costs meaning those applicable costs, not falling within the categories of direct material or direct labour, but which can be specifically identified and measured as having been incurred or to be incurred in performance of the Contract and which are so identified and measured consistently by the Contractor's costing practices as accepted by the Crown.

04 Indirect Costs

I. Indirect Costs (overhead) meaning those costs which, though necessarily having been incurred during the period of the Contract performance for the conduct of the Contractor's business in general, cannot be identified and measured as directly applicable to contracts.

II. These Indirect Costs may include, but are not necessarily restricted to, such items as:

A. indirect materials and supplies (*);

B. indirect labour;

C. fringe benefits (the Contractor's contribution only);

D. service expenses: expenses of a general nature such as power, heat, light, operation and maintenance of general assets and facilities;

E. fixed/period charges: recurring charges such as property taxes, rentals and reasonable provision for depreciation;

F. general and administrative expenses: including remuneration of executive and corporate officers, office wages and salaries and expenses such as stationery, office supplies, postage and other necessary administration and management expenses;

G. selling and marketing expenses associated with the products or services being acquired under the Contract;

H. general research and development expenses as considered applicable by the Crown.

(*) For supplies of similar low-value, high-usage items the costs of which meet the above definition of Direct Material Costs but for which it is economically expensive to account for these costs in the manner prescribed for direct costs, then they may be deemed to be indirect costs for the Contract purposes.

05 Allocation of Indirect Costs

Indirect costs shall be accumulated in appropriate indirect cost pools, reflecting a contractor's organizational or operational lines and these pools subsequently allocated to contracts in accordance with the following two principles:

A. the costs included in a particular indirect cost pool should have a similarity of relationship with each contract to which that indirect cost pool is subsequently distributed; further, the costs included in an indirect cost pool should be similar enough in their relationship to each other that the allocation of the total costs in the pool provides a result which would be similar to that achieved if each cost within that pool were separately distributed;

B. the allocation basis for each indirect cost pool should reflect, as far as possible, the casual relationship of the pooled costs to the contracts to which these costs are distributed.

06 Credits

The applicable portion of any income, rebate, allowance, or any other credit relating to any applicable direct or indirect cost, received by or accruing to the Contractor, shall be credited to the Contract.

07 Non-applicable Costs

Notwithstanding that the following costs may have been or may be reasonably and properly incurred by the Contractor during the performance of the Contract, they are considered non-applicable costs to the Contract:

A. allowance for interest on invested capital, bonds, debentures, bank or other loans together with related bond discounts and finance charges;

B. legal, accounting and consulting fees in connection with financial reorganization, security issues, capital stock issues, obtaining of patents and licenses and prosecution of claims against the Crown;

C. losses on investments, bad debts and expenses for the collection thereof;

D. losses on other contracts;

E. federal and provincial income taxes, excess profit taxes or surtaxes and/or special expenses in connection therewith;

F. provisions for contingencies;

G. premiums for life insurance on the lives of officers and/or directors where proceeds accrue to the Contractor;

H. amortization of unrealized appreciation of assets;

I. depreciation of assets paid for by the Crown;

J. fines and penalties;

K. expenses and depreciation of excess facilities;

L. unreasonable compensation for officers and employees;

M. product development or improvement expenses not associated with the product being acquired under the Contract;

N. advertising, except reasonable advertising of an industrial or institutional character placed in trade, technical or professional journals for the dissemination of information for the industry or institution;

O. entertainment expenses;

P. donations except those to charities registered under the Income Tax Act;

Q. dues and other memberships other than regular trade and professional associations;

R. fees, extraordinary or abnormal for professional advice in regard to technical, administrative or accounting matters, unless approval from the contracting authority is obtained.

APPENDIX G: List of Media Acceptable by CSA for RADARSAT Data and Data Products

For permanent storage of archive data shipped from Network Stations to CARCH (Canadian Archive Centre) at CDPF, and products that ordered by MDA and CSA, a compatible media is required in order for CDPF to extraction the data. The following media types are compatible with CDPF systems:

- DLT - DLT8000 drive compatible
- 8mm tapes - Exabyte 8500/8505 drive compatible (e.g. 112m MP)
- CD-ROMs
- DVDs

If in doubt on exact models/types, please confirm with MDA.

MDA WILL FAVOUR THE ELECTRONIC EXCHANGE OF DATA WHENEVER POSSIBLE.

APPENDIX H: Technical Appendix

Technical Appendix Revision History

Revision Number	Release Date	Summary of Changes
2/0	1-Feb-1995	Re-order, update document list; Move scenarios to: Network Station to MDA Interface Specification document; Time code format corrected.
3/0	30-Mar-1995	Update applicable document list; Revise list of products offered; add Reception Parameters section in T3; augment Archive Medium section in T4.
4/0	7-Jul-1995	T1: Update applicable document list, define "applicable"; T4: update text in (iv) and (v); T6: Update text referring to other product offerings; Update Figure 1.
4/1	14-Jul-1995	T1: Update Product Spec reference. This release: change pages only.
4/2	6-May-1996	T1: Update release dates and version specifiers for D1, D2, D3, D4, D5, D8, D9, D10, D11. Documents added: D4A-, D4-B and D4-C.
5/0	16-Mar-1997	T5,T6: Update of Level Capabilities Definitions for Certifications and Addition of Recommended and Compulsory Products required for Certification. T7: Addition of defined terms for Membership levels for Certification.
6/0	15-Aug-1997	T1: Update release for D1,D4, D6.
7/0	30-Oct-1997	T1: Update release for D1. Documents added: D7A and D7B.
8/0	30-Dec-1997	T1: Update release for D1, D4. Change to MS-Word format.
9/0	24-Feb-1998	T1: New release of D1, D7a & D11; remove D4c. T2 & Fig. 1: Update to reflect either X.25 or Internet connectivity between MCS and Network Station. T3: Add Post-Pass Summary Report to Reception Administration sequence of events. Remove version numbers throughout document, and instead add as a separate appendix (Supplement A).
10/0	15-Jul-1998	T1, Supplement A: Updates of D1, D2, D6, D8 & D1; re-release of D4c, addition of D3. Update entire document to reflect revised certification process and new document references.
11/0	21-Oct-1998	T1, Supplement A: Updates of D1, & D11, new release of D7a.
12/0	11-Jan-1999	T1, Supplement A: Updates of D1, D2 & D11, new release of D3.
13/0	29-Nov-1999	T1, Supplement A: Updates of D1, D2, D3, D3a, D7, D8 & D11.
14/0	08-May-2000	T1: Added brief descriptions for each document. T1, Supplement A: Update of D1, D2, D4 and Request Form. Added document D15. Removed D0, D4b, D4c, D5, D10, D12, D13 and D14.
15/0	23-Aug-2000	T1, Supplement A: Update of D1, D7, D7a and Request Form.
16/0	12-Sep-2002	T1, Supplement A: Update of D1, D2, D3, D3a, D11 and Request Form.

T1. Applicable Documents

The following documents, or portions of documents as noted, are applicable to Network Stations, and form part of the Network Station License Agreement.

D1 *Technical Appendix to the RADARSAT Network Station License Agreement*, RSI-GS-002. (This document plus Supplement A.)

This document is an appendix to all RADARSAT Network Station License Agreements. It outlines the technical requirements that a Network Station must meet in order to be licensed to receive and process RADARSAT data. The document provides an overview of the following requirements:

- The interface between a Network Station and the RADARSAT Mission Control System (MCS).
- The interface between a Network Station and the MDA Order Desk.
- The interface between a Network Station and the RADARSAT spacecraft.
- The media, format, and content of a Network Station's raw data archive.
- The format, media, and data quality for RAW (i.e. Level 0) products and image (i.e. Level 1) products generated at a Network Station.

D2 *RADARSAT Network Station Certification*, RSI-GS-001.

This document describes in detail the purpose, phases, and materials for all tests during the Network Station Certification Process. This process ensures that a Network Station is able to properly:

- interface with the other components of the RADARSAT system;
- generate RADARSAT products that meet the format and image quality standards of the RADARSAT program.

D3 *RADARSAT Network Station Operations Manual*, RSI-GS-027. [Applicable to fixed stations only]

- *or* -

D3a *RADARSAT Network Station Operations Manual – Mobile Stations*, RSI-GS-028. [Applicable to Mobile Stations only]

This document defines standard practices that enable a station to operate as a RADARSAT Network Station. It provides an overview of routine operational scenarios and requirements, detailing processes and timelines related to:

- User Requests and acquisition planning, using URE and SPA software
- reporting procedures for acquisitions and business operations
- product generation and delivery

D4 *RADARSAT Data Products Specifications*, RSI-GS-026.

This document defines the RADARSAT-specific version of the Committee on Earth Observation Satellites' (CEOS) SAR format. The format is a standard for raw and processed data products on 8mm Exabyte tape and CD-ROM.

D4a *RADARSAT CEOS Product Specification - Technical Supplement: Detailed Processing Parameters Record Description*, RSI-GS-021.

This document provides an in-depth description of the parameters in the Detailed Processing Parameters Record of the CEOS format, as defined in the *RADARSAT Data Products Specifications* (document D4).

D6 *RADARSAT Spacecraft to Data Acquisition Network (X-band) Interface Control Document,* RSCSA-IC0009.

This document defines and describes the parameters of the X-Band downlink interface between the RADARSAT spacecraft and a data reception facility. Specifically, the document describes:

- The type, format and encoding of all baseband binary data transmitted by the spacecraft to the data reception via the X-Band RF downlink
- The X-band RF interface requirements and characteristics for the actual RF modulation and transmission of data to be sent.

D7 *RADARSAT Mission Control System (MCS) to United States & Foreign Data Reception Operation Centres (UFDROC) Interface Control Document,* RSCSA-IC0007.

This document specifies the format and content of the messages and reports sent through electronic interfaces between the Mission Control System and Network Stations. Specifically, it describes the following data flows:

- Reception planning and scheduling by MCS
- Orbit parameters by MCS
- Payload parameters by MCS
- Reception & archival reports required by Network Stations

D7a *RADARSAT Mission Management Office Data Loss Reporting Procedure*, RSCSA-PR0369.

This document describes the reporting procedures for all RADARSAT receiving stations in the event of data loss. This procedure will be an immediate source of information to help find the cause of problems if there is data loss during a pass. Within one hour after acquisition, the Station Operator completes and sends form provided in this document to the RADARSAT Mission Control Centre.

D7b *MCS to UFDROC Interface Implementation Plan,* RSCSA-PL0079.

This document establishes the plan for implementation and reliability testing of the interface between MCS and a Network Station. It describes the test plan, test procedure and process to be followed for implementation of such data communication over the Internet. The MUIIR form included in this document is used to control interface implementation.

D8 *RADARSAT Network Station to MDA Interface Specification,* RSI-GS-003.

This document defines how a RADARSAT Network Station will connect to and interact with RADARSAT International (MDA). It specifies the required business report and message formats. It also describes the User Request Editor (URE), which is the MDA-supplied Internet client server used for order submission, tracking, and catalogue querying. The document also outlines test procedures for this interface.

D9 *RADARSAT System Specification*, RSCSA-SP0002.

This document is a high level specification of the overall RADARSAT Program. All design, development, performance and test requirements for RADARSAT systems, facilities, partners and operators, including the satellite and ground facilities are derived from this document. For Network Stations, special reference should be made to Appendix B "Image Quality Requirements."

Reference documents:

The following document does not form part of the Network Station License Agreement, but is referenced by this and other applicable reference documents.

D11 *RADARSAT Network Station Test Data Manual*, RSI-GS-005.

This document details the test data and tools available to a RADARSAT Network Station to support its integration into the RADARSAT Network. These materials are used in operational and image quality testing toward the various certification levels of a station. They may also be used in the development of a station system prior to RADARSAT operations.

D15 *The Space Segment Operations Handbook, Part 1, Volume 5 - RADARSAT SAR Performance Data, Book 6*, RSCSA-ML0018.

This document provides information on the default chirp definition for each RADARSAT beam.

Supplement A to the Technical Appendix lists the versions of documents D1 - D15 that are applicable to the Network Station License Agreement. RADARSAT International will provide Network Stations with all updates to the *Technical Appendix* and to *Supplement A* as they are made.

T2. Network Station Interfaces

A RADARSAT Network Station is configured with communication links to MDA, the Mission Control System, and the satellite (refer to Figure 1). These links are defined by the following interfaces:

- ***MDA Order Desk / Network Station Interface*** - This interface is defined in document D8. It supports the following data flows:
  - Submission and monitoring of programming requests and data requests from the Network Station
  - Reporting and product confirmation functions
  - Requests for data processing by MDA

  The MDA Order Desk / Network Station Interface will use an Internet connection. Documents D3 and D3a describe how the interfaces are exercised in typical data reception and processing scenarios.
- ***Mission Control System / Network Station Interface*** - This interface is defined in document D7. It supports the following data flows:
  - Reception planning, scheduling, and reporting
  - Orbit data parameters
  - Payload parameters
  - Archive reporting
- ***Satellite / Network Station Interface*** - This interface is defined in document D6. Although document D6 describes two X-band links, Network Stations will receive RADARSAT data via Link 1 only. Link 2 is reserved for downlinking of data recorded on the RADARSAT on-board tape recorder, received exclusively at Canadian stations.

T3. Network Station Reception

Reception Administration

The administration for a reception sequence at a Network Station is as follows.

- A Network Station requests data reception by submitting a User Request to the MDA Order Desk. The *User Request* is defined in document D3 and D3a.
- After the request has been accepted and scheduled by MDA and CSA, it is confirmed via a *Reception Request*, sent from the MCS to the Network Station at least 48 hours prior to reception. The Reception Request provides advance notice of the planned reception activities at the Network Station, and is defined in document D7.
- One day prior to scheduled reception, the MCS sends a *Reception Schedule* to the Network Station. The Reception Schedule details the planned reception activities, and is defined in document D7.

- In case of data loss, the Network Station faxes a *Data Loss Report* to the MMO within one hour after reception. The Data Loss Report provides immediate information to help find the cause of any data loss that may occur during a pass. The Data Loss Report is defined in document D7a.
- Within 24 hours after reception, the Network Station sends a *Reception Report* to the MCS. The Reception Report details the data which has been received and recorded at the Network Station, and is defined in document D7.
- When the data is permanently archived at the Network Station, the Network Station sends an *Archive Storage Report* to the MCS, between two (2) to seven (7) days after acquisition. The Archive Storage Report is defined in document D7.

Reception Parameters

A Network Station shall conform to the Ground Station Parameters for G/T, receiver/demodulator technological degradation, and polarization ellipticity as described in document D6. These parameters are assumptions used in the design of the spacecraft, and are based on a Bit Error Rate (BER) of 10^{-5} for 99% of the time with an elevation angle of 5 degrees or higher.

T4. Network Station Archive

(i) Archive Media

RADARSAT X-band data received at the Network Station shall be recorded on a medium that will reliably store the data for fifteen (15) years, and from which the data can be recovered with a Bit Error Rate (BER) of less than 1×10^{-7}.

(ii) Archive Format and Content

The format of the archive data on non-CEOS media shall include:

- the received X-band data, plus
- the station time track, which will be Universal Time Code in IRIG-A format.

(iii) Archive Release

When archive data is requested by MDA, a copy of the requested data will be transcribed to RADARSAT Level 0 format on 8mm tape (Exabyte) and forwarded to MDA. (Refer to section below on Signal Product.) The mechanics of data transfer are described in documents D3, D3a and D8.

By mutual arrangement for larger data volumes, the data may be provided on Digital Linear Tape (DLT).

(iv) Archive Catalogue Format

The format of the archive catalogue information sent from the Network Station to the MCS is described in document D7, as per the Archive Storage Report definition.

T5. RAW Product (Level 0 Product)

A Network Station must be able to produce a signal product, which consists of raw X-band data for a specific time interval transcribed onto an 8-mm data cartridge (Exabyte cartridge), together with all available auxiliary data.

The format for the RADARSAT RAW product is described in document D4.

T6. Image Products

Image Quality

To meet Product Certification standards, image products produced at the Network Station must conform to the image quality standards in Appendix A of document D4.

Product Format and Processing Levels

To meet Product Certification standards, the following image products must be offered in RADARSAT CEOS format on either Exabyte tape or CD-ROM, according to document D4.

Level 1 Product:

- Georeferenced (SGF/SCN/SCW) products for the following beam modes: Standard, Wide, Fine, Extended High, Extended Low, ScanSAR Narrow, and ScanSAR Wide;
- Georeferenced (SGX) products for the following beam modes: Standard, Wide, and Fine;
- Single Look Complex (SLC) products for the following beam modes: Standard, Wide, and Fine.

All products in magnetic, electronic, hardcopy transparency and photo format shall be marked copyright "© Canadian Space Agency [*year of reception*]".

Network Stations may also offer image products in other formats. These formats shall provide, at a minimum, basic annotation.

T7. Network Station Certification

Network Stations will be verified prior to commissioning them as part of the RADARSAT network. The procedures and criteria for certification are described in document D2.
Test data to support the testing and certification of the Network Station is described in document D11.

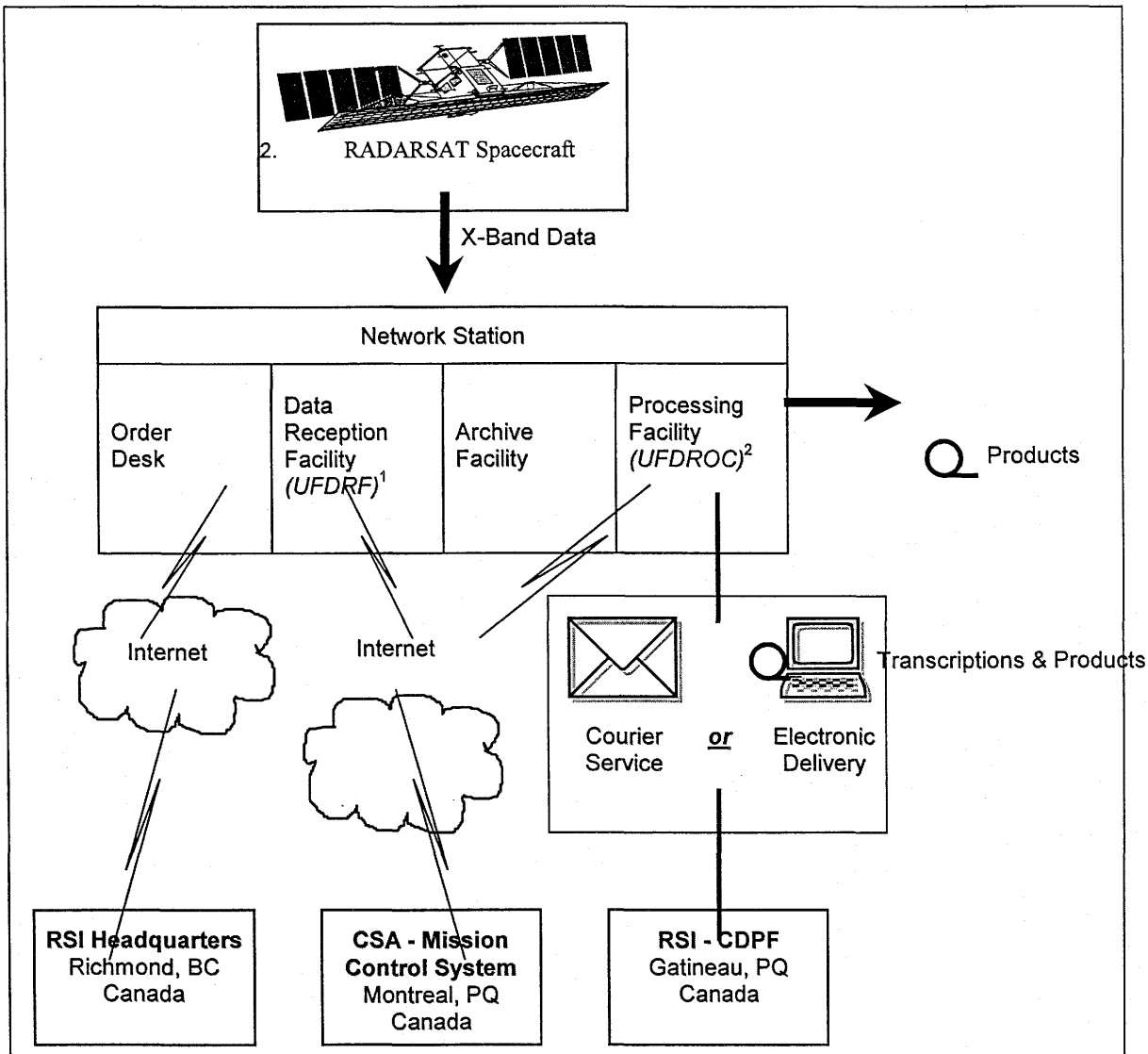

Figure 1 - Network Station Configuration and Interfaces

Notes:
[1] "*UFDRF*" - United States and Foreign Data Reception Facility (referred in D7)
[2] "*UFDROC*" - United States and Foreign Data Operation Centre (referred in D7)

TECHNICAL APPENDIX TO THE NETWORK STATION LICENSE AGREEMENT

SUPPLEMENT A: LIST OF CURRENT DOCUMENT VERSIONS AS OF SEPTEMBER 12, 2002

Bold text indicates documents affected by the latest document update. *Italics indicate future planned releases.*

Ref.	Document	Number	Current Release Date	Comments / *Next Planned Release*
D1	Technical Appendix to the RADARSAT Network Station License Agreement	RSI-GS-002, Revision 16/0	Jun 19, 2002	
D2	RADARSAT Network Station Certification	RSI-GS-001, Revision 7/1	Jun 14, 2002	
D3	RADARSAT Network Station Operations Manual *[for fixed stations only]*	RSI-GS-027, 4/0	Sep 03, 2002	
D3a	RADARSAT Network Station Operations Manual – Mobile Stations *[for mobile stations only]*	RSI-GS-028 4/0	May 13, 2002	
D4	RADARSAT Data Products Specifications	RSI-GS-026, Revision 3/0	May 08, 2000	supersedes former D4c, D10 and D14
D4a	RADARSAT CEOS Product Specification - Technical Supplement: Detailed Processing Parameters Record Description	RSI-GS-021, 1/0	Feb 15, 1997	
D6	RADARSAT Spacecraft to Data Acquisition Network (X-Band) Interface Control Document	RSCSA-IC0009 Rev. J	Jun 16, 1998	
D7	Mission Control System to UFDROC Interface Control Document	RSCSA-IC0007, Rev. A	Jun 12, 2000	Supersedes RW-IS-50-3663
D7a	RADARSAT Mission Management Office Data Loss Reporting Procedure	RSCSA-PR0369, Revision A	Jul 28, 2000	Supersedes RSCSA-PR0357 & RSCSA-PR0366
D7b	MCS to UFDROC Interface Implementation Plan	RSCSA-PL0079, Revision N/C	Oct 24, 1997	
D8	RADARSAT Network Station to MDA Interface Specification	RSI-GS-003, Revision 5/1	Nov 13, 1999	
D9	RADARSAT System Specification	RSCSA-SP0002, C	Mar 28, 1996	
D11	RADARSAT Network Station Test Data Manual	RSI-GS-005, Revision 8/0	Jun 14, 2002	Supersedes former D12
D15	RADARSAT SAR Performance Data (extract - Space Segment Operations Handbook)	RSCSA-ML0018 Rev. F	Feb 21, 1997	ADDED May 8/00
N/A	RADARSAT Request Form: Technical Documents, Test Data & Software for Network Stations	N/A	Sep 10, 2002	

APPENDIX I: Training Sessions on RADARSAT Operations

Proposal of Regular Training to Network Stations

The training will be in two categories: **Pre-Certification Training** and the **Yearly Training**. Pre-Certification Training will be provided after the contract signature and right before the certification process; Yearly Training will be provided on a yearly basis to address special needs from the station.

TRAINING CONTENT, TOPICS, TIMES AND LOCATIONS ARE INDICATIVE AND FOR PLANNING PURPOSES ONLY. SPECIFIC TRAINING TOPICS WOULD BE SUBJECT TO DISCUSSION WITH STATION OPERATOR.

Pre-Certification Training: prior to the certification process:

Organizer:
- Network Stations Department, MDA.

Objectives:
- Giving an overview on what the RADARSAT program network is and how the certification works.
- Providing understanding of how to operate a RADARSAT network station to meet overall operation requirements.

Participants:
- A minimum of two NS station key operators (technical)

Training Contents:

MDA HQ at Vancouver: 5 days
- Network Stations: Certification process and requirements (D2); Operations expectations (D3)
- Acquisition planning: ODSys / User Request Editor; Swath Planner;
- Marketing: Applications; projects; market development: the status of the RADARSAT business and priorities

CSA at Montreal: 2 days
- RADARSAT system
- Mission planning system

GSS and CDPF at Gatineau: (Canadian reception and processing facilities): 3 days
- Reception: hardware / software, archiving; reporting
- Processing: products and production; IAW; quality assurance

Cost: The Station Operator pays US$20,000 for two trainees for two weeks. This includes economy class airfare between Montreal and Vancouver; all hotel costs, transportation in Montreal, Ottawa and Vancouver, a Per Diem and all training materials.

The Station Operator shall be invoiced an additional US$10,000 for the third and each subsequent trainee, for the two week period

This cost does NOT include return airfare from the station's site to Canada.

Typical Pre-Certification Training Agenda:

Week	Day	Location	Activities, Training contents	Travel
0	Saturday	Transition	Weekend	Fly to Vancouver
	Sunday	Richmond	Weekend	
1	Monday	Richmond, MDA	Meeting CEO; and NS dept. Intro Certification (D2) and Operations (D3); RSAT-1 Products (D4);	
	Tuesday	Richmond, MDA	Tour MDA depts: Client service; Finance; Information System; Acquisition planning; Shipping;	
	Wednesday	Richmond, MDA	Applications, RSAT-2	
	Thursday	Richmond, MDA	Acquisition Planning; SPA, ODSYS,	
	Friday	Richmond, MDA	Software intro: RIPRI, NSPO, CAS, ICATOC, SAR IQA etc.	
	Saturday	Transition	Weekend	Fly to Montreal (5h)
	Sunday	Montreal	Weekend	
2	Monday	Montreal, CSA	RADARSAT System, mission planning	
	Tuesday	Montreal, CSA	Certification and interface	Evening: Bus to Ottawa (2h)
	Wednesday	Gatineau, CDPF	Reception at GSS, archiving, Interfacing, production	
	Thursday	Gatineau, CDPF	Processing, QA procedure, IAW,	
	Friday	Gatineau, CDPF	Application projects, NRT delivery	
	Saturday	Gatineau	Weekend	Fly home

Yearly Training sessions

According to the performance of the station operations, the training will be given to the station on a yearly basis to enhance the station operations.

Organizer: Network Stations department, MDA
Either 1-2 staff from NS and Operations will provide 1-2 weeks on-site training, or the station operators travel to Canada for 1-2 weeks.

Objectives: To refresh and enhance the station operations after the station has been running in operation and gained some experience. For some stations, they need further instructions based on the current operation status. Some stations may have changed staff / operators and may need complete training. MDA is committed to provide on-going support after certification.

Training topics:

In general, the training will emphasize the following topics:

1) Station management
- Reliable working procedure is in place and is followed strictly.
- Staff responsibility and reliability
- Introduce new / updated MDA documents on the operational requirements

2) Technical enhancement
- Product quality control: Introduce new tools / methods and strictly follow the requirements
- How to better plan the acquisitions for certain applications

3) Service
- How to improve the service (near real time, standard and fast delivery)
- Communication with MDA and CSA

The training contents can be tailored to the station's needs according to the performance tracked by MDA / CSA.

Cost: **1)** For on-site training at the station for up to 4 trainees, the training fee is US$10,000. This does not include MDA staff expenditures for airfare, hotel and per diem during the on-site training period. The exact amount will be specified in the proposal/contract.

2) If the training takes place in Canada, the training fee is US$20,000 for 2 trainees for two weeks. This includes economy class airfare between Montreal and Vancouver, hotel costs, transportation in Montreal, Ottawa and Vancouver, a per diem and all training materials.

The Station Operator shall be invoiced an additional US$10,000 for the third and each subsequent trainee, for the two week period.

This cost does NOT include return airfare from the station's site to Canada.