1.7.6 Mobile Satellite Service (MSS) [C.2.15.1]

Agencies' global mobility applications will be fulfilled and end users' requirements for global mobile voice, facsimile (fax), and data services will be satisfied through AT&T's extensive partnerships with various satellite subcontractors and suppliers, including, for example, Telenor Satellite Services, Inc. (Telenor) to provide Mobile Satellite Service (MSS). Through these partnerships, AT&T offers a solution that is global, technologically current, highly reliable, easily manageable, and compatible with leading security measures.

1.7.6.a Reserved [L.34.1.7.5.a]

1.7.6.b Reserved [L.34.1.7.5.b]

1.7.6.c Service Description [L.34.1.7.5.c]

(c) A technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied.

AT&T's proposed MSS solution provides a fully compliant and globally available service, based on Agency requirements for all four major mobile satellite networks. The service includes technical assistance and customer support for both the satellite bandwidth, as well as the required user equipment. The satellite systems are described in **Table 1.7.6.c-1**.

SATELLITE NETWORK	DESCRIPTION	BENEFITS TO AGENCY
inmarsat	• Near-global system (no service available in extreme polar regions) of 10 geostationary satellites (more launches planned in late 2005 and beyond) • Geosynchronous satellite constellation offers time division multiple access (TDMA) service to range of transportable and vehicle-mounted terminals, including HSD capabilities up to 400 kbps	• Subscribers can place and receive calls from all but extreme polar regions • High-speed data (HSD) capabilities for sending and receiving large files and compressed video
THURAYA	• Regional system of two geostationary satellites providing service in Middle East, Europe, North Africa, and West Asia • Constellation offers TDMA service to handsets with capabilities to roam onto terrestrial general system for mobile communications (GSM) networks	• Subscribers can place and receive relatively low-cost calls from Middle East, North Africa, Europe, and West Asia • Subscribers experience seamless roaming onto GSM networks with one phone
IRIDIUM	• Truly global service of 66 satellites in low-earth polar orbits, with cross-satellite links for sending calls between satellites without relay by ground stations • Constellation of low-earth orbit satellites offering TDMA service accessed by handheld, vehicle-mounted, and fixed terminals	Subscribers can place and receive calls at any point on earth with very low-signal propagation latency
Globalstar GO FURTHER. DO MORE.	• Multiregion system of 48 low-earth orbit satellites covering most of earth • Multiregion system offering code division multiple access (CDMA) service to handsets with capabilities to roam onto terrestrial networks	• Subscribers can place and receive relatively low-cost calls from many regions with little-signal propagation latency • Subscribers can roam onto CDMA networks with one phone

Table 1.7.6.c-1: Service Description. *AT&T and our satellite partners, including, for example, Telenor offer service over all four of the requested mobile satellite constellations, providing truly global service and giving Agency personnel the flexibility to connect from anywhere on earth.*

As detailed in **Figure 1.7.6.c-1**, MSS provides Agencies with mobile voice, data, and fax capabilities, without the need to be connected to wired or wireless terrestrial networks.

Figure 1.7.6.c-1: Technical Description Summary. *Proposed MSS solution offers Agency personnel the option of traveling anywhere on earth and connecting to other MSS subscribers, cellular services (CPCS), voice services (VS) subscribers, or any public network destination.*

AT&T's approach to address the technical capabilities specified for MSS are summarized in **Table 1.7.6.c-2**.

APPROACH	DESCRIPTION	BENEFIT TO AGENCIES
Duplex, circuit switched voice, data, and fax	Supported by four mobile satellite constellations – Inmarsat, Iridium, Globalstar, and Thuraya	Government personnel can communicate in variety of ways
Service types	• Land transportable (all services) • Maritime (Inmarsat and Iridium) • Aeronautical (Inmarsat, Iridium, Globalstar)	Government personnel can communicate, regardless of mission type
Service and hardware provisioning	AT&T will operate customer service center that translates Agency missions into appropriate service	Government personnel will receive expert advice on equipment and services that support their mission
Call data records (CDR)	Provided, detailing each placed or received call, service type, satellite used (as applicable), number dialed, etc. (Refer to **Table 1.7.6.c-4** for example of CDRs)	Agencies can easily track usage and costs of service
Call types	End-to-end calling, including: • MSS to/from wireline (public switched telephone network [PSTN]) • MSS to/from MSS • MSS to/from cellular (Networx or public)	Government personnel can contact variety of destination terminals
Dialing compatibility	North American Numbering Plan (NANP) and International Telecommunications Union-Telecommunications Service Sector (ITU-TSS) E-164 World Numbering Plan	Government personnel can dial destinations in familiar manner
Coverage and satellites	• Iridium uses constellation of 66 low-earth orbit satellites • Inmarsat uses constellation 10 geostationary satellites • Thuraya uses constellation of two geostationary satellites • Globalstar uses constellation of 48 low-earth orbit satellites	• Iridium offers complete earth coverage • Inmarsat covers at all areas, except extreme polar regions • Thuraya offers coverage in Middle East, Europe, Central and West Asia, and North Africa • Globalstar provides coverage in North and South America, Europe, northern Asia, and Australia

Table 1.7.6.c-2: Technical Capabilities Summary. *Agencies receive a high-quality MSS solution that is globally available and meets all requirements.*

AT&T's approach to address the features specified for MSS is summarized in **Table 1.7.6.c-3**.

APPROACH	DESCRIPTION	BENEFIT TO AGENCIES
Data	• 9.6 to 16 kbps from handheld devices • 128 kbps on selected Inmarsat terminals • Data rates, up to 400 kbps (shared access burst) with Inmarsat broadband global area network (BGAN) land transportable terminals	Agency personnel can transfer files and access Information Technology (IT) assets and applications from anywhere on earth
Voice Messaging	Included with any MSS solution	Agency personnel can offer callers a message option when they are unavailable

APPROACH	DESCRIPTION	BENEFIT TO AGENCIES
Hybrid Satellite/Cellular	• Thuraya satphones offer GSM terrestrial service, when available • Globalstar system uses compatible Qualcomm phones that can also operate on CDMA IS-95 and analog (advanced mobile phone service [AMPS] or IS-41) cellular systems	Agency personnel can use less expensive terrestrially-based systems when they are available
Security and Encryption	Agency-provided secure telephone units (STU-III) are accommodated, or Government secure hardware modules can be provided, upon request, as applicable for encrypted voice, fax, and data	Agency data is safeguarded from potential eavesdroppers

Table 1.7.6.c-3: Feature Summary. *MSS solution offered to Agencies provides a full feature set with flexibility and security.*

AT&T will translate Agencies' specific needs into hardware and service requirements that help fulfill the mission, regardless of the state or availability of local networks. AT&T's MSS solution provides a single point-of-contact (POC) for service ordering and user provisioning. MSS is often required, on short notice, when Agency personnel are required to travel unexpectedly to locations that do not offer other terrestrial communication systems.

Figure 1.7.6.c-2: Single Point Ordering. *Agencies' mission objectives are translated into global mobility requirements by the Customer Service Center and entered as MSS and hardware orders, which are then realized by a team of MSS partners and delivered to the user.*

Figure 1.7.6.c-2 presents the single point ordering system. The AT&T service ordering staff

can quickly help Agency personnel select the appropriate service and hardware necessary to perform the mission. Agency personnel will quickly receive their MSS terminal and service, and continue to communicate in remote locations.

The proposed MSS solution includes multiple satellite constellations and compatible user terminals for maximum flexibility in addressing Agencies' global roaming needs. MSS offers the additional benefit of reliably providing communications, when other services are damaged or otherwise unavailable.

Each MSS constellation offers a variety of coverages and capabilities ranging from regional to fully global and handheld to transportable – a discussion and coverage maps for each constellation follow. All mobile satellite systems use L-band frequencies (1.6 GHz) for the mobile-to-satellite link, based on worldwide licensing conventions. Examples of subscriber equipment for the respective systems are discussed below.

1.7.6.c.1 Iridium

Iridium provides truly global coverage with 66 low-earth orbit satellites and three gateways (Arizona, USA; Fucino, Italy; and Hawaii, USA). Low-earth satellite orbits using a TDMA scheme deliver Agencies' communications with the minimum radio frequency (RF) propagation delay possible, and conversations are smoother than systems using geosynchronous orbit constellations. The Iridium constellation is capable of relaying calls directly among the satellites using cross links, so subscribers' calls only downlink to the appropriate gateway. With satellite cross links, calls stay on the Iridium network without multiple providers handling the call in many different countries (**Figure 1.7.6.c-3**).

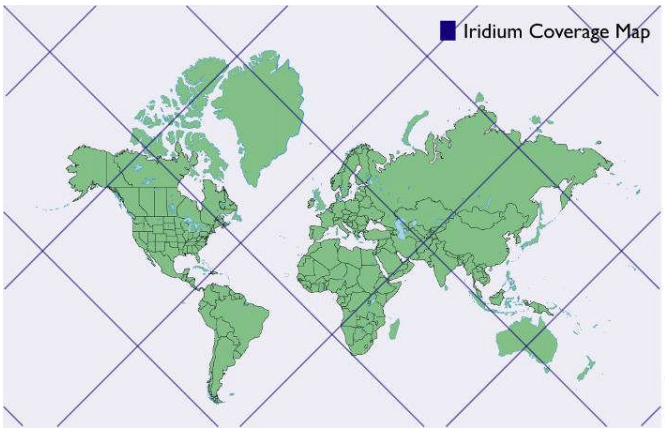

Figure 1.7.6.c-3: Iridium Coverage. *Agencies' requirement for a fully global MSS system is fulfilled by Iridium's coverage footprint.*

Iridium offers service to satellite handsets, fixed units, terminals in vehicles and vessels as well as units in aircraft. Although data rates are relatively low (10 kbps maximum), the service is available at any point on earth, including polar regions. **Figure 1.7.6.c-4** provides an example of a handset.

Figure 1.7.6.c-4: Iridium's Motorola 9500 Handset. *Iridium constellation is typically accessed by low-cost handheld devices that give Agency personnel the freedom to roam anywhere on earth and stay in touch.*

1.7.6.c.2 Inmarsat

The Inmarsat system provides basic TDMA/frequency division multiple access (FDMA) coverage in all but the most extreme polar regions of the constellation's 10 satellites (and Telenor's gateways in the U.S., Australia, and Norway [Figure 1.7.6.c-5]). Telenor's gateways provide reliable entry into public voice and data network, and are accessible by Inmarsat from anywhere in the service area. Inmarsat offers a full range of advanced optional services, such as high-speed data on land and aeronautical services to aircraft.

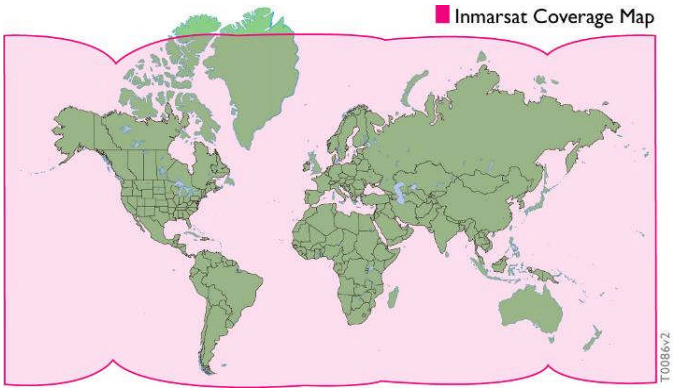

Figure 1.7.6.c-5: Inmarsat Coverage. *Agencies' requirement for a near-global MSS system with capabilities for high-speed data at transportable and vehicle-mounted subscriber terminals is fulfilled by Inmarsat's coverage footprint.*

Although Inmarsat terminals are not handheld like other mobile satellite systems (**Figure 1.7.6.c-6**), they offer users the capability to send and receive data at a variety speeds of up to 400 kbps. Inmarsat terminals are offered in land transportable, fixed, maritime, and aeronautical versions. Maximum data rates at sea and in aircraft are 128 and 64 kbps, respectively.

Figure 1.7.6.c-6: Inmarsat's Regional Broadband Global Area Network (RBGAN) Terminal. *Inmarsat system offers subscribers the ability to use laptop-sized terminals to place or receive calls or even initiate high-speed data sessions, as requested in the RFP.*

1.7.6.c.3 Thuraya

The Thuraya constellation's two TDMA satellites provide single region coverage centered in the Middle East, extending into adjacent regions, downlinking to gateway station located in Sharjah, United Arab Emirates (**Figure 1.7.6.c-7**).

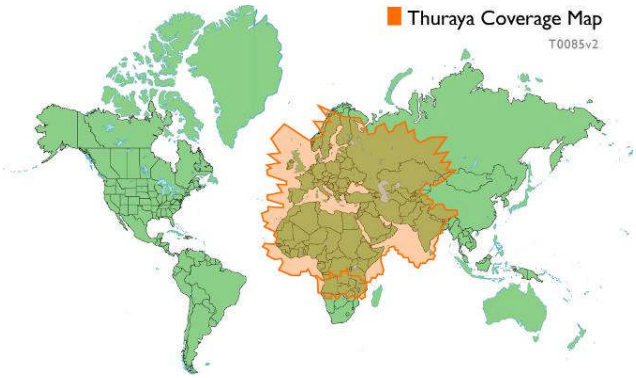

Figure 1.7.6.c-7: Thuraya Coverage. *Agencies' requirement for a low-cost regional MSS service is fulfilled by Thuraya's coverage footprint.*

The Thuraya system's GSM platform allows its subscribers to use dual-mode handsets (Thuraya/GSM) on terrestrial cellular systems anywhere compatible 900 MHz GSM cellular service is offered. This capability effectively extends the area within which subscribers can access service, and provides a lower cost alternative to satellite-based calls, when available (**Figure 1.7.6.c-8**).

Figure 1.7.6.c-8: Thuraya's Hughes 7101 Dual-Mode Satellite Phone. *Thuraya system offers subscribers the ability to use cellular-sized handsets to place and receive voice calls on the constellation as well as on compatible GSM 900 MHz networks.*

1.7.6.c.4 Globalstar

Globalstar's 48 low-earth orbit satellites provide Agency personnel with the capability to roam within several large regions, including the majority of North and South America, Australia, Europe, and northern Asia (**Figure 1.7.6.c-9**). The system's modulation scheme is based on CDMA; the architecture includes many geographically diverse gateways that downlink and forward users' calls to their destinations. The low-earth orbits of the satellite constellation helps keep signal propagation delays to a minimum, providing high-quality voice communications without the substantial delays of geosynchronous systems.

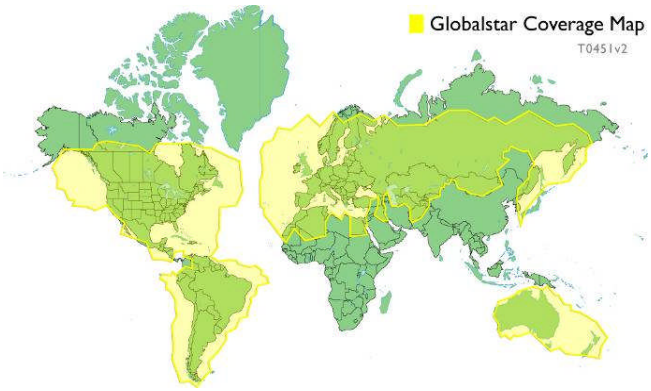

Figure 1.7.6.c-9: Globalstar Coverage. *Agencies' requirement for a low-cost regional MSS service is fulfilled by Globalstar's coverage footprint.*

The Globalstar system allows its subscribers to use tri-mode handsets (Globalstar/CDMA/advanced mobile phone service [AMPS]) on terrestrial cellular systems anywhere compatible 800 MHz CDMA/AMPS cellular service is offered. This capability effectively extends the area within which subscribers can access service, and provides a lower cost alternative to satellite-based calls, when available (**Figure 1.7.6.c-10**).

Figure 1.7.6.c-10: Globalstar's Qualcomm GSP-1600 Tri-Mode Satellite Phone. *Globalstar network provides subscribers the capability to place and receive calls from regions covered by the satellite system, as well as through compatible CDMA and AMPS cellular systems operating at 800 MHz.*

AT&T and Telenor provide CDRs detailing each use of the satellite phone every month, allowing Agencies to track their assets and associated expenses. An example of a CDR is provided in **Table 1.7.6.c-4**.

CALL DATE AND TIME UNIVERSAL TIME CODE (UTC)	ORIGIN	DESTINATION	VOLUME	SERVICE	LES	OCEAN	CLEAR CAUSE
4/25/2005 20:31	872600347370	870600347365	115	HSD	SPA	POR	1F01 (LES_1F01_ONHOOKFROMTERR NETWORK)
4/25/2005 20:31	872763603470	870763603467	20	Telephony	SPA	POR	1001 (MES_1001_TERMINALONHOOK)
4/25/2005 20:30	872763603470	872763603469	0	Telephony	SPA	POR	1511 (LES_1511_MESBUSY)
4/25/2005 20:30	872763603470	870763603469	0	Telephony	SPA	POR	1F11 (LES_1F11_BUSYFROMTERRNE TWORK)
4/25/2005	872763603467	872763603469	0	Telephony	S. SPA	P. POR	1091

CALL DATE AND TIME UNIVERSAL TIME CODE (UTC)	ORIGIN	DESTINATION	VOLUME	SERVICE	LES	OCEAN	CLEAR CAUSE
20:27							(MES_1091_TERMINALOUTOFSERVICE)
4/25/2005 20:26	872763603470	870763603467	12	Telephony	SPA	POR	1001 (MES_1001_TERMINALONHOOK)
4/25/2005 20:23	872763603470	872763603469	0	Telephony	SPA	POR	1511 (LES_1511_MESBUSY)
4/25/2005 20:23	872763603470	870763603469	0	Telephony	SPA	POR	1F11 (LES_1F11_BUSYFROMTERRNETWORK)

Table 1.7.6.c-4: MSS Call Detail Record (CDR). *MSS offering includes monthly statements detailing each use of the terminal and details regarding the transmission. Accurate CDRs help Agencies track assets and control costs.*

AT&T provides an MSS solution that meets all stated Agency requirements by delivering a comprehensive service composed of four major mobile satellite networks.

1.7.6.d Service Quality and Performance [L.34.1.7.5.d]

(d) A description of the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each proposed optional service, and other performance metrics used by the offeror.

AT&T will provide Agencies with MSS that is fully compliant with the required service levels. [redacted] The time to restore (TTR) metric proposed is a function of the subscriber equipment solution appropriate to each Agency requirement (**Table 1.7.6.d-1**).

KEY PERFORMANCE INDICATOR	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
Availability	Routine	99.7%	[redacted]
TTR	With Dispatch	8 hr	[redacted]
	Without Dispatch	4 hr	[redacted]
Grade of Service (GoS) (Call Blockage)	Routine	0.04	[redacted]

Table 1.7.6.d-1: Metrics Compliance. *Proposed MSS solution complies with Agencies' requirements for Availability, TTR, and call blockage – providing reliable communications at requested Agency metrics.*

All specific fixed satellite service (FSS) solutions provided to the Government can be engineered to meet the required TTR. Regardless of where Agencies'

missions will be performed, AT&T and Telenor offer a reliable MSS solution that provides communications to that location.

1.7.6.e Attributes and Values of Service Enhancements [L.34.1.7.5.e]

(e) If the offeror proposes to exceed the specified service requirements (e.g., capabilities, features, interfaces), a description of the attributes and value of the proposed service enhancements.

In addition to the standard services, Agencies can enhance their global roaming with additional features and capabilities for an additional fee.

Table 1.7.6.e-1 highlights service features and capabilities available with MSS.

SERVICE ENHANCEMENT	DESCRIPTION	BENEFIT
[redacted]	[redacted]	[redacted]

Table 1.7.6.e-1: Enhanced Services. *Agencies can opt for SMS by satellite, providing up to 160 characters delivered to the user's handset when registered on the appropriate system.*

1.7.6.f Service Delivery Experience [L.34.1.7.5.f]

(f) A description of the offeror's experience (including major subcontractors) with delivering each proposed optional service

AT&T and its partners provide Government customers with mobile satellite communications through the key contracts listed in **Table 1.7.6.f-1**.

[redacted]		
Client Need	*Solution*	*Created Value*
[redacted]	[redacted]	[redacted]

[redacted]		
Client Need	*Solution*	*Created Value*
[redacted]	[redacted]	[redacted]

[redacted]		
Client Need	*Solution*	*Created Value*
[redacted]	[redacted]	[redacted]

Client Need	Solution	Created Value
[redacted]	[redacted]	[redacted]

Table 1.7.6.f-1: Current Contracts. AT&T partner*Telenor provides many different Agencies mobile satellite communications services that meet a variety of needs, ranging from total earth mobility to high-speed data transmission while on the move.*

Telenor is the largest U.S. domestic supplier of Inmarsat terminals (measured in terminals and airtime) and has provisioned over [redacted] terminals deployed of Iridium, Globalstar, and Thuraya worldwide (**Table 1.7.6.f-2**).

MSS CONSTELLATION	TELENOR EXPERIENCE
[redacted]	[redacted]

Table 1.7.6.f-2: MSS Experience. *Telenor brings extensive experience and value to the MSS solution.*

Our demonstrated ability to provide thousands of successful deployments of mobile satellite terminals and services lowers Agency risk when deploying new MSS solutions.

1.7.6.g Approach to Perform Service Verification [L.34.1.7.5.g]

(g) A description of the offeror's approach to perform verification of individual services delivered under the contract, in particular the testing procedures to verify acceptable performance and Key Performance Indicator (KPI)/Acceptable Quality Level (AQL) compliance.

The first time the service is provided through the Networx contract, the service performance must be verified; key performance indicators (KPIs) will be monitored to certify that the service performance complies with the acceptable quality level (AQL). **Table 1.7.6.g-1** summarizes the verification and testing procedures for MSS.

KPI	VERIFICATION APPROACH	TESTING PROCEDURES

KPI	VERIFICATION APPROACH	TESTING PROCEDURES
Availability	[redacted]	[redacted]
Grade of Service (Call Blockage)	[redacted]	[redacted]
TTR	[redacted]	

Table 1.7.6.g-1: System Monitoring. *MSS system performance is continuously monitored to assess whether Agencies receive the required level of service.*

[redacted]

MSS systems are continuously monitored by a variety of tools and testing regimens that verify service availability. [redacted]

[redacted] (**Figure 1.7.6.g-1**). [redacted]

Figure 1.7.6.g-1: Network [redacted]

[redacted]

Through a comprehensive verification process, Agencies and the GSA will receive concrete data that demonstrates the readiness of MSS. AT&T and our partners, including Telenor follow detailed procedures to verify MSS meets the requirements by comparing the stated KPI data against the AQLs, as described in the Verification Test Plan.

1.7.6.h Optional Services Network Impact [L.34.1.7.5.h]

(h) A description of how the delivery of any optional services would impact the wireless network architecture (e.g., security, quality and reliability, performance).

Agencies receive a low-risk solution by being able to use AT&T's MSS on Day One of the contract because there are no modifications required to the satellite networks or systems to provide MSS to the Government.

1.7.6.i National Capital Region Assured Service Network Architecture [L.34.1.7.5.i]

(i) A description of how the network architecture will satisfy the requirements in Section C.5.2.7 for assured service in the National Capital Region, if applicable.

Information regarding AT&T's plan for National Capital Region service assurance is provided in Section 1.3.5.c.

1.7.6.j Section 508 Requirements [L.34.1.7.5.j]

(j) A description of the offeror's approach for providing the capabilities needed to meet Section 508 provisions identified in Section C.6.4 for the proposed optional services.

Information regarding AT&T's plan for Section 508 requirements is provided in Section 1.3.5.d.

1.7.6.k Approach to Incorporating Optional Services, Enhancements, or Improvements [L.34.1.7.5.k]

(k) A description of the approach for incorporating into the proposed optional services, technological enhancements and improvements that the offeror believes are likely to become commercially available in the timeframe covered by this acquisition, including a discussion of potential problems and solutions.

As mobile satellite operators improve services, AT&T and our partners, including Telenor will make these services available to Agencies. For example, higher power satellites are planned for launch (e.g., the third satellite from the Inmarsat-4 generation will be launched in late 2005, and upon completion of testing and verification, will become part of this offering). These satellites will improve coverage, provide opportunities for new smaller mobile devices, and increase data rates. For additional information on the approach to service enhancements, refer to Section 1.3.3.d.

1.7.6.1 Stipulated Requirements

AT&T takes neither deviation nor exception to the stipulated requirements.