

Tomorrow's
Technology
in
Today's
Iraq

VSAT
Solutions

2006-2007



www.nashita.net

Table of Contents

1. Introduction	3
1.1. Overview	3
1.2. Benefits	3
1.3. Vendor Information	4
2. Dedicated VSAT Solution	5
2.1. Overview	5
2.2. Service Provider	5
2.3. VSAT Technology and equipment	5
3. Voice over IP Solution	11
3.1. Overview	11
3.2. VoIP Telephony	11
4. High Technology Tachyon VSAT Solution	13
4.1. overview	13
4.2. About Tachyon	13
4.3. Voice Over IP Telephony	17
4.4. Quality of Service	17
5. Complementary Solutions and Services	19
5.1. VSAT Redundancy systems	19
5.2. Private Mesh VSAT Networks	19
5.3. Security	19
6. Installation and Maintenance	21
6.1. VSAT Installation	21
6.2. Full Annual Maintenance	21
6.3. Technical Support	21
6.4. VSAT Training	22

1. Introduction

1.1. Overview

Due to lack of communications infrastructure in Iraq, people, businesses and organizations have been relying more and more on VSAT systems for their everyday essential needs. However, poor technologies, unreliable providers and high costs usually ends in customers' dissatisfaction. **Nashita has changed all this:**

The Force Behind Nashita's VSAT Solutions

Nashita has put much effort to look for and test various VSAT technologies, access schemes and providers and has invested considerably on choosing the best and most reliable providers in the business. We have put together what amounts to be the strongest features that a VSAT company can bring to its clients, in professional, low-cost and easy to maintain solutions. Connecting people is the "art" of Nashita and our VSAT systems offer robust and reliable connectivity with a high level of support.

*"...Your teams have shown absolute commitment in completing the task in difficult circumstances and it is fair to say they have gone beyond our expectations. We have all been impressed by their attitude, determination and energy, an example to us all..." **

1.2. Benefits

Nashita, the leading ICT company based in Iraq is the forerunner of industrial strength, stable and robust VSAT solutions to Government and private establishment in Iraq since 1999.

Please find below an overview of our key differentiates:

- **Top of the line technology**
Nashita communication engineers have hand's on experience with almost all the current VSAT technologies since the early days. The technologies and equipment that we are currently providing to our clients are selected with only one priority in mind: quality and technical superiority. Our Janux solution provides true dedicated bandwidth with much less overhead compared to old technologies such as DVB which was originally developed for Digital Video Transmissions and not Data.
- **Renowned and most reliable service providers**
Through its over 10 years of experience in satellite and VSAT communications, Nashita strongly believes that the right technology on its own, has no use, if not supported by a reliable and trustable service provider. We have worked with and practically tested over ten different VSAT service providers and therefore we can confidently claim that we've selected to partner with two of the most reliable satellite ISPs - Taide Network AS for our professional services with dedicated bandwidth and Tachyon for our VSAT solution with shared bandwidth.

Taide is one of the largest Global Internet Access Providers in Europe, Middle East and Africa (EMEA). Taide Network AS is also a subsidiary of Telenor, one of the leading distributors and suppliers of Information Technology and Telecommunication Services in Scandinavia.
- **Highly qualified personnel**
Despite other service providers, we will not leave you with a set of equipment to install. Through its highly qualified engineers, Nashita will take care of everything that is necessary to have your VSAT link established in the soonest possible timeframe. We will make site visits and provide face to face consultation, will install the equipment at your site and will assure it fully satisfies your expectations before we leave!

- **Turn-key solutions**

As we are not only an ISP, but an ICT Engineering firm that covers all the major fields of Information and Communication Technologies, we don't only provide the necessary hardware and services for your internet connectivity - we do everything that is necessary for your IT infrastructure, integrated into a turn-key solution. From LAN to server setup to internet security and VOIP and even development of electronic business workflow's - all are designed and implemented by Nashita, relieving you to concentrate on your business.

- **Unmatched after-sales support**

In addition to Taide's 24/7 NOC and support services, Nashita provides 12/6 live monitoring in Iraq and continuously controls all links including satellite equipment and access routers. Nashita is the only Iraqi company with a live NOC monitoring facility with 12/6 helpdesk by telephone and email in Iraq. We are renowned for our support and live monitoring services amongst our customers.

We don't wait for you to contact us in case of a problem - our NOC contacts you as soon as an interruption in service (normally due to power failures at client's site) is noticed. This level of service is unique to Nashita.

- **Cost effective solutions**

Through direct relationship with leading service providers and our talented in-house resources, Nashita provides the most cost-effective solutions.

1.3. Vendor Information

As the leading Iraqi IT company with a record of nearly 400 ICT projects in the past 2.5 years and years of experience in working with several VSAT providers, various state-of-the-art technologies and top of the line satellite modem equipments, Nashita is the only Iraqi company that can implement large-scale ICT infrastructure projects.

Nashita invests heavily on the knowledge, experience and expertise of its 120+ highly educated and specialized staff in working closely with its partners to devise the best execution plan for implementing projects. As a company the members of which have been mostly educated and worked in US and European countries, and also as an Iraqi company whose staff are familiar with the culture as well as the present conditions in Iraq, Nashita is in a uniquely qualified position to accompany and implement projects that are tailored exactly to customer specifications.

Due to lack of communications infrastructure in Iraq, people, businesses and organizations have been relying more and more on VSAT systems for their everyday essential needs. However, poor technologies, unreliable providers and high costs usually ends in customers' dissatisfaction. As a result of slow internet speeds, too many downtimes and low quality VoIP telephony, users and especially mission critical operators can not benefit the most from internet and IP telephony access.

This is why Nashita's VSAT and Communications Division has put much effort to look for and test various VSAT technologies, access schemes and providers and has invested considerably on choosing the best and most reliable providers in the business. Connecting people is the "art" of Nashita and our VSAT systems offer robust and reliable connectivity with a high level of support.

Nashita's VSAT and Communications Division provides highly reliable, robust and professional VSAT and VoIP services to many local and foreign organizations and enterprises in Iraq, including the UNDP, the coalition, NATO, private companies, banks, etc. at locations in Baghdad, IZ, BIAP, Victory, Taji, Basra, Erbil, Kirkush, Umm Qasr, Diyala, Al Kasik, Al-Kut, Diwaniyah, Tikrit, Zakho, Mosul, Babylon, and Nassiriya.

A long list of satisfied customers, testifies the quality and reliability of our services.

2. Dedicated VSAT Solution

2.1. Overview

Nashita's VSAT solution for professional links with dedicated bandwidths has established its position as one of the most reliable VSAT services in the region. Our dedicated VSAT services are provided in partnership with **Taide Network AS** one of the largest VSAT service providers in Europe.

Our dedicated solution for VSAT connectivity is briefly reviewed below:

- Top of the line technology in our equipment (JanUX IV & V -M)
- **Dedicated, un-contested bandwidths** – not shared nor DVB or TDMA
- Renowned and most reliable World ISPs as our service providers
- **Intelsat 10- 02** and New Skies NSS6 as satellites with strong coverage on Iraq
- Use of the largest facilities of Earth Stations in Europe
- Up to **52Mbps downlink** and **10Mbps uplink** with no need to change IDU equipment
- Three levels of support and maintenance
- Continuous **365x24x7** monitoring by ISPs' based NOC
- **On-site maintenance** and remote live monitoring in Iraq
- Link availability of **99.5 – 99.9%**
- Advanced IP Telephony solutions with competitive per/min charges
- Centralized Security Solutions for Star and Mesh topologies, firewalls and VPN
- BGP Layer 3 load-balancing for redundancy VSAT links
- **Cost effective compared to other dedicated technologies**

2.2. Service Provider

Nashita's partner ISP (**Taide Network AS**) is a worldwide satellite communications and Internet access provider. Established in 1991 from an academic project, it has grown to be one of the largest Global Internet Access Providers in Europe, Middle East, Asia and Africa. During the last year it has signed up customers in 30 countries and expanded the business in Middle East and Iraq and kept its strong position in Europe.



Based on total sold and available capacity it is one of the leading players in Central and Eastern Europe, Iraq, Asia and Africa. Capacity is to a large extent coming from Intelsat 1002, New Skies and Eutelsat. Customers are connected to both European and US Internet backbone through the Nittedal Teleport. Typical customers are other telecommunications companies and Internet Service Providers (ISPs) who are operating in markets lacking competitive terrestrial infrastructure, as well as NATO, large Government organizations and various military establishments.

2.3. VSAT Technology and equipment

2.3.1. JanUX IV-M & JanUX V-M VSAT Systems

Nashita uses leading **JanUX IV-M** and **JanUX V-M** dedicated VSAT systems for its dedicated solution. The key benefits of JanUX can be summarized as following:



- Higher data throughput compared to DVB/SCPC and TDMA systems.
- A dedicated DVB system has only 23% to max 70% of the total data throughput of our system and TDMA has a throughput of around 85% compared to that of Janux VSAT technology.

- Dedicated, guaranteed bandwidth / QoS.
- Upgradeable to **2Mbps uplink** for Janux-IV-M and **10Mbps uplink** for Janux-V-M versions without any need for software or hardware change or upgrades
- Up to **52Mbps downlink** capacity without any need for hardware or software change or upgrades.
- 3 level prioritization for video-conferencing, VoIP and data utilization
- Remote management and maintenance.
- Configurable DHCP and NAT server.
- Turbo function

Nashita's JanUX IV-M and JanUX V-M VSAT system is a standalone zero maintenance unit that provides access to the Broadband service via regular 10/100BaseT Ethernet interface at sustained data rates up to **52 Mbps receive** and up to **2 Mbps transmit** capacity for Janux IV-M and **10Mbps** for Janux V-M.

The JanUX is managed and monitored remotely by Nashita NOC and no user intervention is required after initial set-up of user specific parameters.

2.3.2. Key Features

- Easy installation, remote management & maintenance
- Guaranteed bandwidth/QoS - any speed up to 52Mbps per customer
- Transparent for dynamic BGP routing (EBGP multi-hop mode)
- Configurable Network Address Translation (NAT) for all network blocks specified in RFC1918
- Configurable DHCP server
- Online reconfiguration without system reload
- Environmental monitoring
- Automatic problem alerting to Nashita's NOC
- Cost efficient solution

2.3.3. Technical Specifications

- Satellite interface directly to LNB (Ku band)
- LAN Interface 10/100BaseT
- Sustained speed 52Mbps
- Power Requirements 115/230V, 50/60Hz, 200W Peak
- Environmental 0° - 55°C

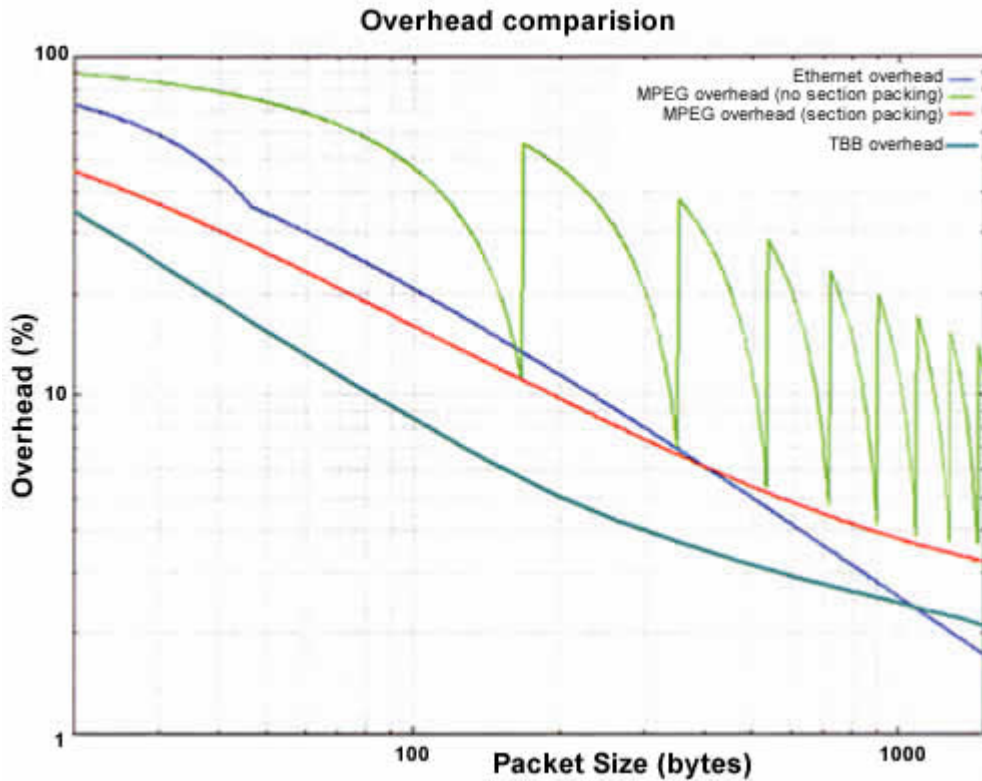
IDU/ODU:

Satellite Modem/Router:	Janux VM
Bandwidth:	TBB/SCPC
Capacity:	Dedicated non-DVB
Band:	Ku-Band
Max transmit:	64 - 10240 kbps
Max receive:	64 - 52000 kbps
Modulation:	QPSK, 8PSK
Ku-band antenna:	Patriot/Andrew 1.8m, 2.4m, 3.6m
BUC:	2W, 3W, 4W, 8W BUC
Teleport:	Nittedal, Norway
Satellite:	Intelsat 10-02

2.3.4. TBB vs. DVB and TDMA

TBB is a high quality, high-speed Receive Only service providing Global Internet Access up to 52 Mbps with full data throughput. It is available in Europe, Middle East, Asia and Africa and is part of the Akamai network.

Following graph compares encapsulation overhead of TBB and DVB MPE:



TBB capacity is fully guaranteed at all time in the same way as having a dedicated SCPC link. Technically a TBB service is even better in particular when comparing to a low-speed SCPC service. The reason is that any latency/jitter effects due to serialisation-delay is avoided because the TBB carriers are running at a clock-rate of 52Mbps.

This Broadband is combined with Taide's SCPC Link for Up-Link over Intelsat satellite system (Dedicated SCPC link). Broadband up-link facility is through Nittedal Teleport outside Oslo, which is the largest Point of Presence to internet connectivity. All major Internet Service Providers can be reached from here through direct fiber connections to the U.S. and European backbones.

DVB access technologies have a significantly low data throughput (23% to 70% depending on the technology). DVB-MPE is the worst, especially for small (VoIP) packets. So despite the fact that it seems a "dedicated" bandwidth is offered most of the times with lower prices compared to SCPC and TBB, the actual throughput can be as low as ¼, thus; even economically the customer loses.

TDMA in its former meaning (slotted ALOHA, random-access medium in predefined/allocated time slots) as a return is not very beneficial.

Very high overhead, very low max. possible utilisation (between 15 - 30 percent, depending on configuration of the system). Useful for transactional systems with high number of terminals that perform data transfers only occasionally (bank transactions from remote sites etc.).

NOT useful for Internet traffic under any condition.

TDMA used in RCS (DVB-RCS) is better because it uses reservation system and burst plans that are broadcast from HUB. Problem with reservation system is that it needs some few round-trips there and back to work.

Due reservation, RCS systems have much more efficient bandwidth utilisation, but at cost of roundtrip delay (this could increase to few seconds, 2 seconds RTT is not exception at all). These systems also have great difficulties in environment where real time traffic (VoIP) is non-marginal in proportion.

The most efficient for terminals with constant sustained throughput (like Internet service provision for larger scale user groups or sites that intend to provide VoIP) is SCPC and TBB.

2.3.5. The Earth Station

Nittedal Earth Station, located just north of Oslo, Norway, is Telenor's largest teleport, employing 50 systems and operations engineers.

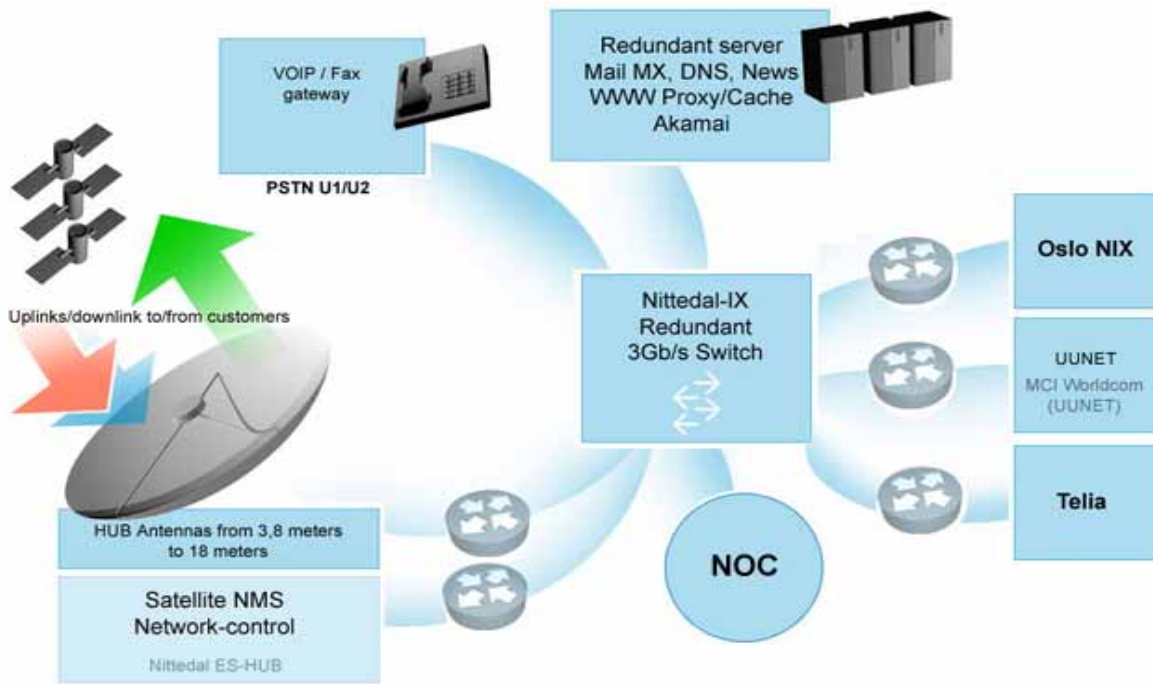
Strategic location of the Network HUB in Nittedal Earth Station, Norway, ensures direct terrestrial connectivity with major US and European networks, as well as global satellite coverage through more than 30 satellite serviced by Nittedal ES.



Nittedal Earth Station, Norway

Taide Network AS provides user equipment hosting services at Nittedal Earth station. This equipment hosting at Nittedal gives access to following services:

- 24x7 local helpdesk
- Internet backbone access, including redundant terrestrial
- 155Mb/s connections to UUNET and Telia
- uninterruptible power supply
- direct connection to satellite transmission equipment
- equipment installation service

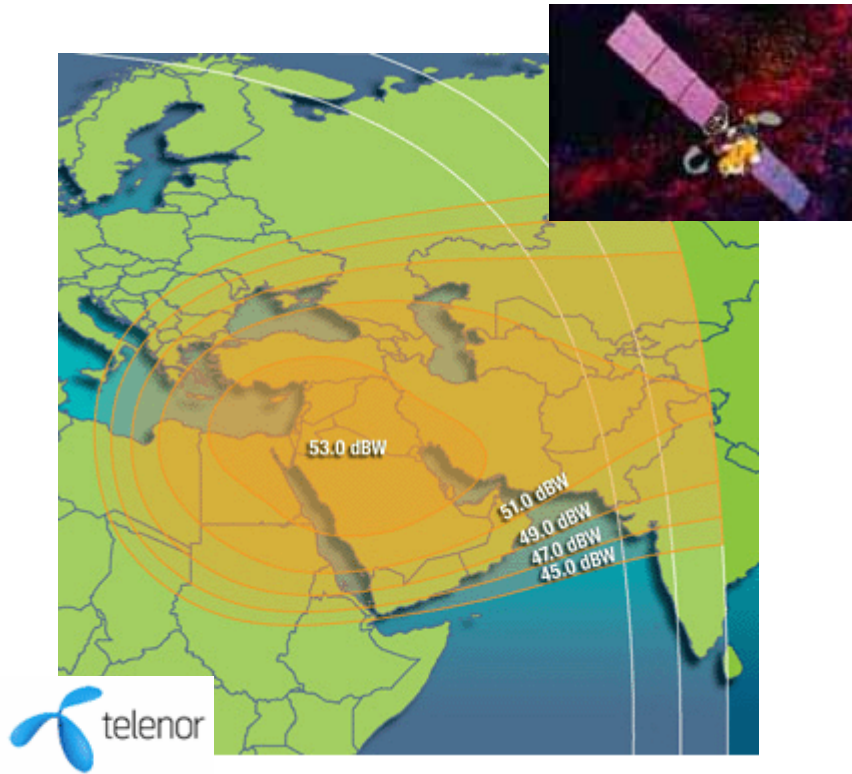


2.3.6. Satellite Coverage

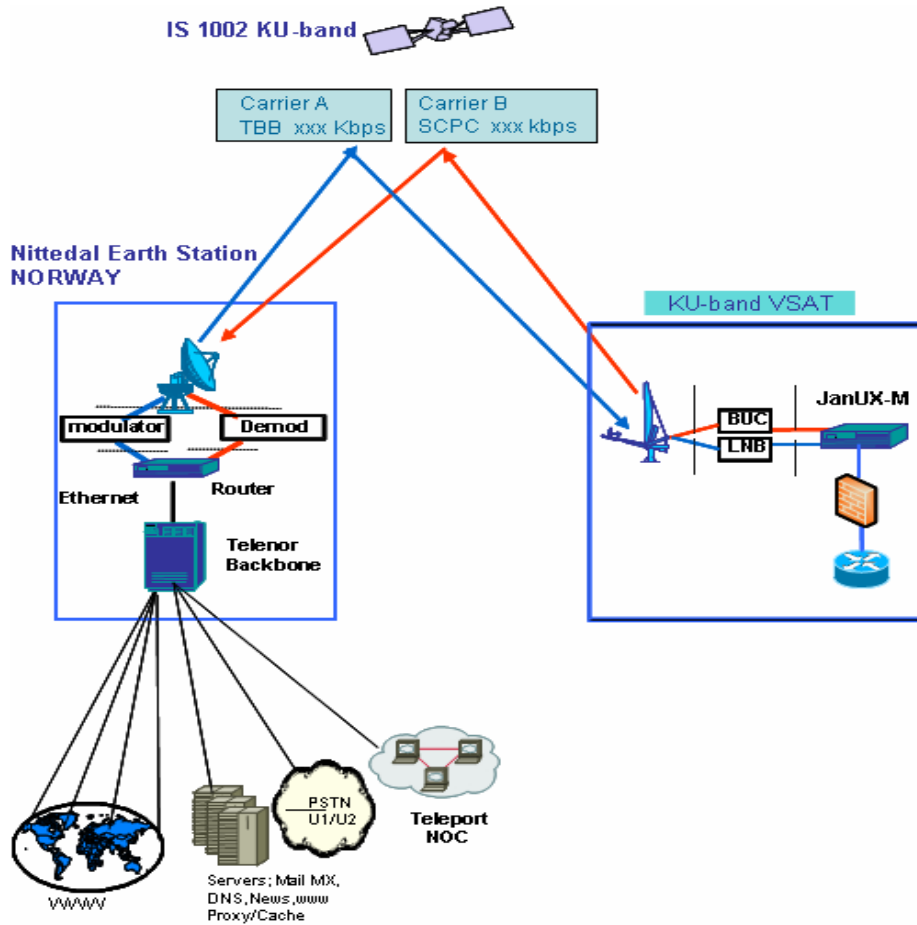
Nashita uses the **Intelsat 1002 Spot 2** for its dedicated VSAT solution which focuses directly on Iraq giving the best coverage and quality throughout the country.

Ku-Band Key Parameters:

Location:	1° West
Target Area:	Middle East
Transponder Capacity:	2 Ku-band (6 in equiv. 36 MHz units)
Transponder Bandwidth:	112 MHz
Uplink Frequency Band:	14.25 - 14.50 GHz
Downlink Frequency Band:	11.45 - 11.70 GHz
Polarization Downlink:	Horizontal



Intelsat 1002 Spot 2 West Hemi Spot



Schematic diagram of Taide's dedicated VSAT solution

3. Voice over IP Solution

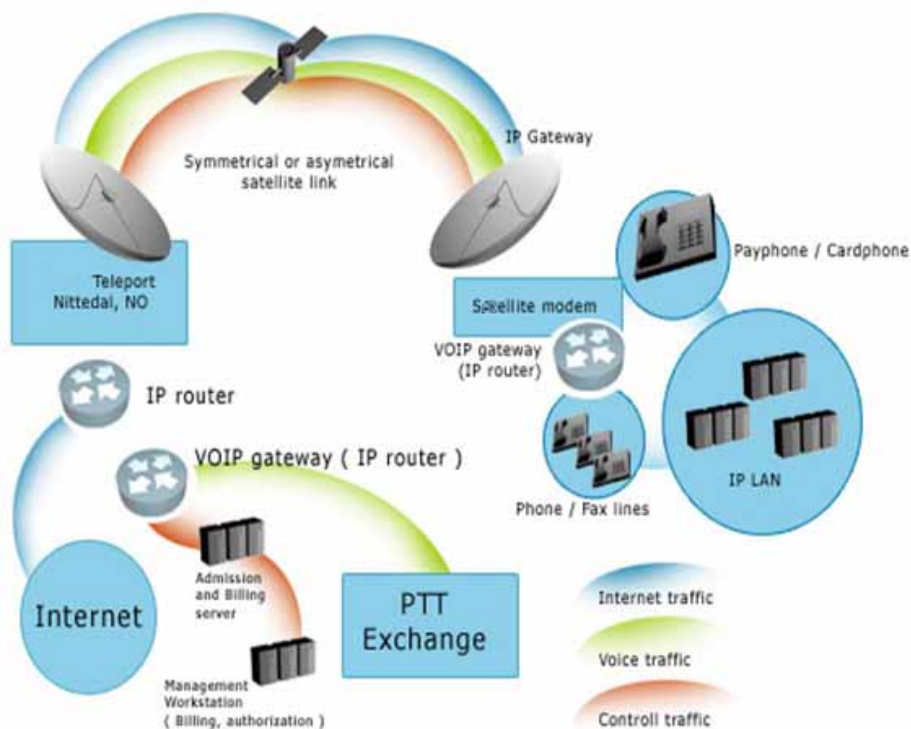
3.1. Overview

Customers can enjoy the full benefit and quality of Nashita’s VoIP solutions. Users can have as many VoIP lines as need be which can be controlled to dial only inside the closed net or be able to make international calls as well. Nashita will establish an IPBX at the Taide/Telenor HUB which will have the following features:

- Free Inter-site (internal) phone calls between sites with star or mesh topologies through a dedicated IPX
- International incoming and outgoing lines (DID or Free phones)
- Call routing control (decide who can call internally, who can call externally)
- 1:1 softphone video conferencing
- Centralized control functionality for billing each line separately
- Billing down to end user level if necessary
- Cisco, Polycom, SIPURA IP phones and Voice G/W

3.2. VoIP Telephony

The IP-voice technology has finally enabled reasonable quality of the voice service, and can be effectively integrated with the ordinary Internet traffic. The Voice traffic in our VoIP solution is based on IP and will be terminated through Telenor international Exchange in Oslo, Norway, therefore we can guarantee the highest quality of our voice service.



The development within the IP-voice area has been very fruitful and expanding. There were a lot of commercial products released, which enables the integration of IP-voice into an existing IP data-stream.

The Taide Network has for a long time experimented and tested IP-voice CISCO routers together with VSAT technology with very good results and experience. These routers offer primary and basic rate ISDN as well as analogue interfaces for connection of PBXs or stand alone phones.

Our VoIP up-link facility is through Nittedal Teleport outside Oslo, which is the largest Point of Presence to Taide.net. All major Internet Service Providers can be reached from here through fiber connections to the US and European backbones.

4. High Technology Tachyon VSAT Solution

4.1. overview

The VSAT Division in Nashita is proud to provide its offer for renowned and reliable VSAT services. As our customers' satisfaction is our first priority, we have put together what amounts to be the strongest features that a VSAT company can bring to its clients, in professional, low-cost and easy to maintain solutions:

- **Top of the line technology in our equipment (Patented Tachyon Technology)**
- **Near dedicated bandwidth through special Monthly Volume Guarantee (MVG)**
- **Renowned and most reliable World ISPs as our service providers**
- **Telstar 12 as satellite with strong coverage on Iraq**
- **Three levels of support and maintenance**
- **Continuous 365x24x7 monitoring by ISPs' based NOC**
- **On-site maintenance and remote live monitoring in Iraq**
- **Terrestrial-like speed and performance**
- **Guaranteed QoS (Quality of Service) for voice and video conferencing**
- **Advanced IP Telephony solutions with competitive per/min charges**
- **Centralized Security Solutions for Star and Mesh topologies, firewalls and VPN**
- **Virus Protection, Deep Inspection and other complete turn-key solutions**
- **BGP Layer 3 load-balancing for redundancy VSAT links**
- **Cost efficient solutions**

4.2. About Tachyon

Tachyon is a key player and a technology leader in the VSAT industry. With over 300 sites in Iraq, many of Tachyon's clients are former iDirect users.

Tachyon is committed to ongoing global access research and development for innovative next generation direct satellite network solutions. The industry's leading satellite, Internet, and data networking pioneers created Tachyon's high-speed, reliable, and secure broadband satellite network, Tachyon.Net™, from the ground up. Tachyon.Net was built specifically to deliver TCP/IP compatible applications for dynamic commercial enterprise and government networks.

In addition to **Tachyon's 24/7 NOC** and support services, Nashita provides **12/6 live monitoring** and controls all links including satellite equipment and access routers. Nashita is the only Iraqi company with a live NOC monitoring facility with 12/6 helpdesk by telephone and email. We are renowned for our support and live monitoring services amongst our customers.

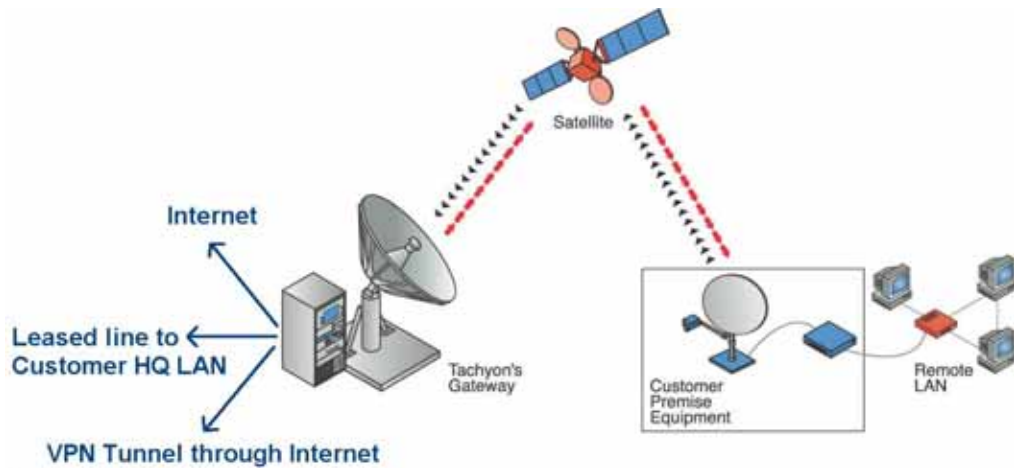
4.2.1. Tachyon Technology

Unlike traditional satellite networks, Tachyon's system was designed from the ground up specifically to deliver TCP/IP connectivity for enterprise networks. From the outset Tachyon recognized that simple adaptations to satellite systems originally optimized for telephone service would not provide the reliable high-speed connectivity needed for data networks.

Instead, significant engineering investment was made to deliver both high-speed data rates over satellite transport and maintain TCP/IP standards compliance to enable plug and play compatibility with terrestrial networks. The result is a system with T1/E1 transmission speeds that takes no more effort to integrate into a corporate network than a typical terrestrial landline. Tachyon's success with Fortune 500 companies, large multinational enterprises, and government agencies

shows their success in meeting these design goals. Tachyon currently has over 300 VSAT sites in Iraq.

Tachyon's patented satellite solutions provide competitively priced, quickly and easily deployed carrier-grade broadband network service that delivers the fastest transmission speeds available. And as an end-to-end network service provider, Tachyon provides 24/7 telephone and Internet support to keep your operation running smoothly.



4.2.2. Tachyon's VSAT Equipment

Tachyon's VSAT equipment includes a small satellite antenna (1.2 meter), radio, and the IPTransport (Indoor Unit) that functions like a TCP/IP standards-compliant router.



The IPTransport Unit is a PC enclosure containing a power supply, Pentium-based motherboard, flash drive, Ethernet card, and Tachyon's satellite modem card. All components, other than the satellite modem card, are commercial off-the-shelf products so there's no need to purchase or configure custom equipment.



The antenna can be mounted on a roof, wall, or on the ground, depending on your site characteristics, and includes the Azimuth-Elevation positioner, feed support beam and rods, and a radio unit to transmit and receive data.

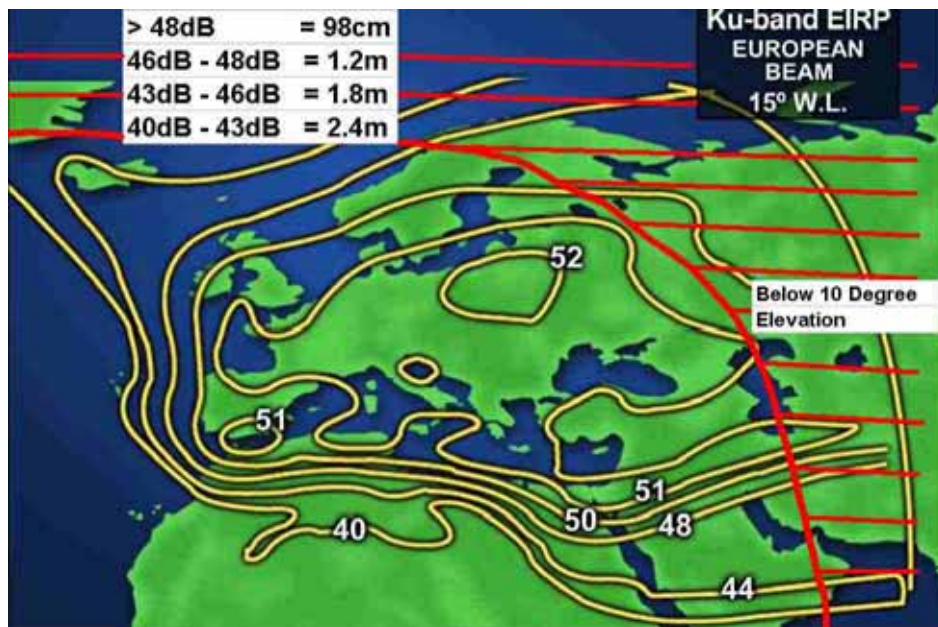


The radio includes an Upconverter Power Amplifier (BUC), Ortho-Mode Transducer, Low-Noise Block Downconverter (LNB), and transmit receive filter (TRF).

The antenna is connected to the IPTransport Unit by two shielded RF coaxial cables, both of which carry signal and power.

4.2.3. Satellites' Coverage

This footprint map shows Tachyon's European satellite coverage and the required antenna sizes. Tachyon also offers satellite coverage on other satellites and therefore servicing North America, Mexico and parts of Central America.



Tachyon European Satellite footprint on the "Telstar 12" (15° West)

4.2.4. Tachyon's TCP/IP Solution

Tachyon engineering employs a variety of technologies to address the issues of TCP over satellite. Tachyon understood the need for their solution to maintain TCP standards compliance in order to deliver an easy to use system for enterprise data networks.

Traditional spoofing techniques that require custom software on client and server computers were deemed unacceptable primarily because spoofing techniques risk incompatibility with applications designed for TCP/IP.

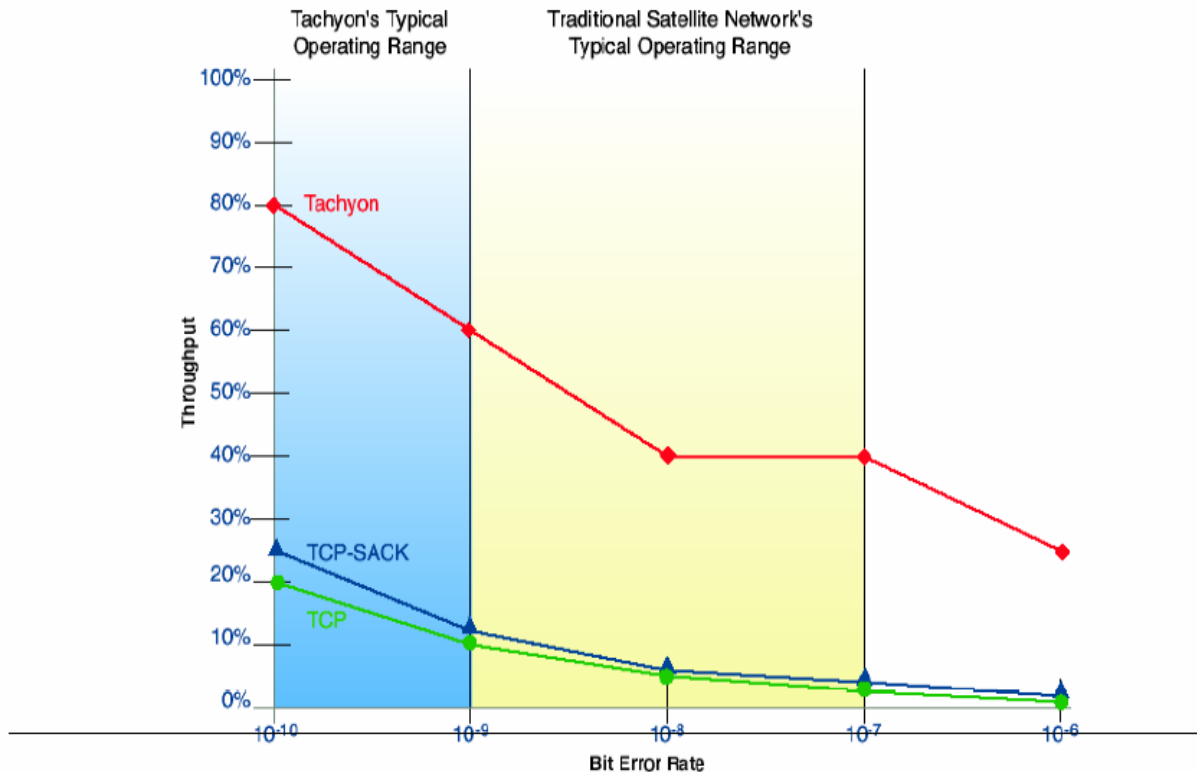
The cornerstones of Tachyon's technology are the implementation of a protocol proxy server network architecture, proprietary signal processing technology, and data encoding techniques that dramatically reduces the Bit Error Rate (BER) over the satellite link.

The result of Tachyon's development efforts is a broadband satellite network that delivers T1/E1 speeds and can be connected to the enterprise network as easily as any terrestrial broadband service. Four patents awarded and 26 patents pending indicate the depth of innovation and technology in Tachyon's broadband satellite network.

4.2.5. Bandwidth Efficiency on Tachyon's Network

The result of the technical innovations at Tachyon is shown in Figure below, Tachyon's Performance Advantage, comparing throughput on Tachyon's broadband satellite infrastructure with standard TCP over satellite (labeled TCP) and TCP with selective acknowledgement (TCP-Sack). Actual operating data show that Tachyon's network typically delivers BERs in the 10-10 range. At this point, Tachyon's system delivers transmission speeds more than three times faster than TCP-Sack and four times faster than standard TCP.

In addition, this graph shows Tachyon's typical operating range versus the typical operating range of traditional satellite equipment. Under the same environmental conditions Tachyon's system typically operates at 10-10 BER versus a range of 10-9 to 10-7 for traditional satellite systems.



4.2.6. Monthly Volume Guarantees vs. CIR

Tachyon does not work with CIR (Committed Information Rate), but instead with MVGs (Monthly Volume Guarantees). Tachyon allows the user to burst to the specific service level. The service level has burst forward (receive) speed, burst reverse (transmit) speed and MVG.

Tachyon bandwidth service levels are based on MVGs (Monthly Volume Guarantees). MVG's are virtual limitations on the amount of traffic (in Megabytes) each site can consume over a period of time (according to their bandwidth service levels). Sites that are within their MVG are prioritized within the Tachyon network and receive the full bandwidth speed most of the time. Should the site exceed its MVG, the Tachyon QoS (Quality of Service) system automatically tags the data packets as "out of profile" and drops these in times of network congestion to ensure that the data packets of the sites within their MVG will get their full performance. This does not mean, that the service stops when reaching the limitation, but instead the site will notice a lower performance and thus the heavy users (those over their MVG) are the only ones affected by satellite bandwidth congestion.

By adding an intelligent QoS based on MVGs, Tachyon can offer a service, that performs extremely well and in most cases users receive their full burst rates, even if there are heavy users "hogging" bandwidth. This QoS feature really sets Tachyon apart from the majority of the shared/contended VSAT services on the market today and enables Tachyon to offer a service priced like a shared service, but offers a performance close to a dedicated service.

4.2.7. Tachyon NOC

Tachyon's Network Operations Center (NOC) provides continuous monitoring and support for Tachyon's network. Using sophisticated monitoring and diagnostic tools, NOC automated processes

can predict and prevent communications issues before they affect subscribers. NOC engineers and support personnel monitor and maintain the network around-the-clock.

4.3. Voice Over IP Telephony

Tachyon's Voice over IP (VoIP) Service offers enterprise, military, and government agencies the ability to connect beyond the limitations of terrestrial networks.

Powered by Tachyon's own patented and ultra-reliable global satellite network, VoIP Service brings users the benefits of converged communication services. Ideally suited for communications in remote locations, Tachyon's VoIP Service provides toll quality voice. It enables the enhanced productivity and cost efficiency that accompany a unified voice and data network. Most importantly, Tachyon's VoIP Service ensures connectivity in the event that traditional terrestrial or wireless networks fail.

Tachyon's VoIP Service is SIP compliant backed by a guaranteed Quality of Service specified by Service Level Agreements (SLAs) that ensure performance. These agreements assure our customers that they can count on our services when they are needed most.

Key Features:

- **Voice prioritized over data**
- **Toll quality voice**
- **Remote management and diagnosis**
- **Voicemail**
- **Call waiting and forwarding**
- **Conference calling**
- **Caller ID**
- **Simple use and setup**
- **Local area codes**

Benefits:

- **Simultaneous support for voice, data and video traffic even on congested networks**
- **One source for your voice and data**
- **Global voice access**
- **Guaranteed quality and performance**
- **Reduced complexity through centralized communications control**

4.4. Quality of Service

Delivering Quality of Service (QoS) over a shared resource like Tachyon's satellite network or a terrestrial frame relay network requires the ability to assign priorities to packets according to service level.

Tachyon's QoS technology prioritizes individual customer packets based on service level purchased, which ensures data throughput even if a shared satellite transponder should become momentarily congested with simultaneous sessions. Tachyon performs rate control and priority based on IP address (i.e. per CPE). Similar to frame relay networks, Tachyon can also control burst speed and average speed settings. The QoS technology developed by Tachyon is a variation of techniques recommended by the Differential Services (Diff-Serv) working group within the Internet Engineering Task Force (IETF).

Tachyon's QoS implementation enables Tachyon to offer priority services at a premium price for enterprise "mission critical" applications, and lower performance throughput at entry-level pricing for organizations with lower performance demands. If Tachyon's standard service offering does not meet the specific needs of an enterprise, custom service levels can be defined.

5. Complementary Solutions and Services

5.1. VSAT Redundancy systems

Nashita can setup redundant VSAT systems for mission critical enterprises, using BGP load-balancing which will control the bandwidth-utilization in both directions. Nashita can setup and configure a layer 3 BGP load-balancing Cisco equipment to provide full redundant systems.

The chart below is a sample of Nashita's redundancy solution, where in order to provide full redundancy for the Internet connection, two complete sets of VSATs were incorporated, with each VSAT on a totally separate satellite and Earth Station (Teleport). Usage of identical set of equipment for both links simplifies training, maintenance and troubleshooting while using different satellite and earth stations guarantees link continuity even at the worse conditions

5.2. Private Mesh VSAT Networks

For clients who need to setup their own private VSAT networks, Nashita engineers with arrange face to face meetings with our clients and after a thorough requirements analysis, will design solutions that are specifically tailored according to our clients' needs.

Through very close cooperation with our service providers, Nashita is able to provide highly professional star and mesh private VSAT networks.

Additionally, we can host client-owned servers and other network equipment at the teleport (earth station) side, achieving very highly reliable network solutions. This is especially of very high importance in Iraq, due to the lack of fiber infrastructure for internet connectivity.

A VPN can be also provided in the Central HUB.

5.3. Security

5.3.1. Overview

There are several methods and devices to use, in order to establish a secured network. By considering the size of the network and the fact that routing will be provided through our service provider, Nashita, as a CISCO Registered Partner, provides Cisco PIX 500 Series Security Appliances in order to provide a robust backbone with high security reliability. As another solution we can use Juniper Systems NetScreen VPN/Firewalls which are established industry standards.

Both devices will establish network security in several subsequent levels and assure maximum confidentiality of the data transmission. First of all, they will establish a robust firewall for preventing any intrusion and unauthorized access to the data. Secondly, they will establish a Virtual Private Network (VPN) which creates a secured and encrypted point-to-point data transfer tunnel that could not be monitored by any third party.

For customers with more than one site – or in star and mesh topologies - Nashita's solution is to install one central VPN/Firewall at the HUB in the earth station.

5.3.2. Cisco PIX 500 Series Appliances

The Cisco® PIX® 500 Series Security Appliances deliver enterprise-class security for small offices and tele-workers to large enterprises in a reliable, plug-and-play purpose-built appliance. Ideal for securing high-speed "always on" broadband environments, the Cisco PIX 500 Series Security Appliances provide robust integrated security capabilities, small office and enterprise networking features, and powerful remote management capabilities in a compact, all-in-one solution.

Cisco PIX 500 Series Security Appliances deliver a multi-layered defense for small offices and enterprises through rich security services including stateful inspection fire-walling, protocol and application inspection, virtual private networking (VPN), in-line intrusion protection, and rich multimedia and voice security in a single device. The state-of-the-art Cisco Adaptive Security Algorithm (ASA) provides rich stateful inspection firewall services, tracking the state of all authorized network communications.



Cisco Firewall Solutions

5.3.3. Juniper Networks NetScreen-5GT

Juniper Networks NetScreen-5GT is a feature rich enterprise-class network security solution with one Untrust 10/100 Ethernet port, four Trust 10/100 Ethernet ports, a console port and a modem port. Using the same firewall, VPN, and DoS mitigation technology as NetScreen's high-end central site products, the NetScreen-5GT is fully capable of securing a remote office, retail outlet, or a broadband telecommuter.



Sipura NetScreen 5GT Firewall

The NetScreen-5GT supports dial-backup or dual Ethernet ports for redundant Internet connections when network uptime is business critical. The NetScreen-5GT supports embedded antivirus scanning which provides an additional layer of application-level protection to help eliminate virus threats from the network.

5.3.4. Flexible VPN Services

Using the full-featured VPN capabilities of the Cisco and Juniper Security Appliances, businesses can securely extend their networks across low-cost Internet connections to mobile users, business partners, and remote offices worldwide. Solutions supported range from standards-based site-to-site VPN using the Internet Key Exchange (IKE) and IP Security (IPSec) VPN standards, to the innovative Cisco Easy VPN capabilities found in Cisco PIX Security Appliances and other Cisco and Juniper security solutions-such as Cisco IOS® routers and Cisco VPN 3000 Series Concentrators.

Cisco Easy VPN delivers a uniquely scalable, cost-effective, easy-to-manage remote-access VPN architecture that eliminates the operational costs associated with maintaining the remote-device configurations that are typically required by traditional VPN solutions. Cisco and Juniper Security Appliances encrypt data using 56-bit Data Encryption Standard (DES), 168-bit Triple DES (3DES), or up to 256-bit Advanced Encryption Standard (AES) encryption.

6. Installation and Maintenance

6.1. VSAT Installation

Nashita runs quality control tests on all VSAT links prior to installation. Having commissioned each VSAT system, the links will undergo routine quality assessment

checks with their firewall and VPN capabilities in Nashita Tech Lab, prior to setup at customer's premises.

Nashita will implement each VSAT project using its expertise in the area. The project timeline, which includes site surveys, commissioning, installation and setup will start immediately after the signing of the contract.



VSATs Installed in Baghdad

Nashita will assign a POC responsible for each VSAT project. Additionally, a team of engineers will supervise and control the implementation.

*"... during the installation, the company staff maintained accountability of their personnel, kept a neat worksite..." **

6.2. Full Annual Maintenance

By our annual maintenance agreement for each site, there will be routine site inspections, 3 monthly and seasonal special maintenance on ODU and IDUs and signal tests and measurements carried out by Nashita's qualified technical teams. A report will be filed to the customer on each site.

The annual maintenance fee includes any repairs needed for the duration of the contract which is not caused deliberately or by electrical faults at customer's location.

As an essential part of the full annual maintenance and a standard support policy, Nashita always has complete sets of VSAT equipments in Iraq, dedicated as standby sets for fast replacement. All equipments provided by Nashita come with 6 months warranty (according to the manufacturer's terms and conditions).

Alternatively, maintenance and repairs can be carried out on a "per visit" agreement with the customer.

6.3. Technical Support

Nashita is the only company with its own unique live NOC in Iraq that monitors and controls all links including satellite equipment and access routers of all our customers.

6.3.1. Nashita's Helpdesk

Nashita provides third level helpdesk technical support including telephone and email. The NOC in Iraq is active everyday (limited support on Fridays). Phone support by a senior engineer is provided outside this timing for emergency cases. The activities of our NOC is also supported by Telenor and Taide's 24/7 NOC and multilingual support services.

Nashita has remote access to JanUX modem through secure SSH link and therefore most of the troubleshooting can be remotely taken care of by the NOC. Our satellite providers' Network Operation Center continuously monitor the quality of the connections of all our clients and will

warn through email, phone or any required system if there is any problem with their VSAT. There will also be routine maintenance of the system remotely, thus freeing our customers from worrying about their equipment.

In addition, Nashita VSAT customer services, provides weekly graphical and statistical reports on the status and utilization of the links. All these features have made Nashita VSAT services renowned amongst our customers, most of whom have mission critical tasks.

*"... Can I pass on my sincere thanks for the work of your team who have successfully installed the new system for our internet connection. You'll be well aware of just how important the internet connection is to our business... and indeed how that relates to the future stability of the country..." **

6.3.2. On-site Support

To ensure proper and continuous service and maintenance, Nashita will make site visits whenever required to ensure that the problem is completely resolved. Nashita is, in turn, in direct contact with the service and solution providers and their regional and international representatives and receives their support and consultation to direct an appropriate technical support.

6.3.3. Monitor and Control Server Setup

As an ideal and unique solution for cases of customers with multi VSAT sites, Nashita can setup as an option, the necessary Monitoring and Control Server and provide easy user friendly web access to the controlling server by customer's central site. This great feature will give detailed control on all VSAT links such as, real time upload and download utilization, bit error rates, signal strength, receive and transmit levels.

*"...Thank you for the update! Again, we are especially grateful for your OUTSTANDING SUPPORT, under especially trying circumstances..." **

6.4. VSAT Training

Nashita has a 4 day professional VSAT training course with detailed tutorials. Qualified trainees will be given certificates at the end of the course.

* Quotation from client testimonials. References are omitted due to security situation and are available upon request.