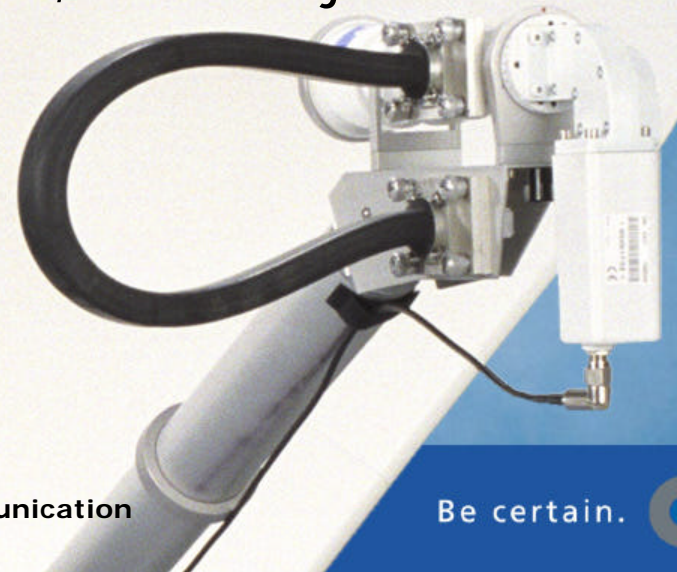




Norsat®
International Inc.

A Portable Satellite Terminals for News Gathering or Two-way Data Communication

Michael Schefter, Pervez Siddiqui, Sasa Trajkovic



Introduction

This presentation describes Norsat® OmniLink™ family of portable satellite terminals – NewsLink™ and SecureLink™.

The NewsLink™ is designed for live audio and video content transmission, while the SecureLink™ is designed for two-way IP data communication, from remote locations anywhere in the world, over geostationary (GEO) satellites.



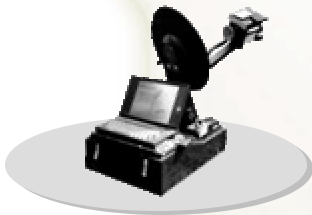
Corporate Overview – Who We Are

- 25 years in the satellite industry
- Over 2.5 million products shipped to 87 countries world-wide
- Commercial Products:
 - Microwave components
 - OmniLink Portable Terminals
- Publicly Listed
 - TSX: NII
 - OTC: NSATF
- Headquartered in Vancouver, Canada



Norsat® Portable Terminal Evolution

Early
Experimental - G1



1995
(ESA)

Norsat
Pico Terminal - G2



2001
(Client Project)

Norsat
NewsLink 3100 – G3



2002
(CBS/FOX – Iraq)

Norsat
NewsLink 3200/
SecureLink 3210



2003/04

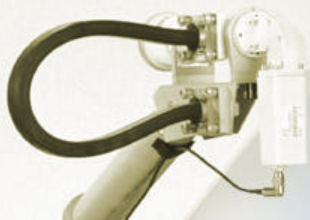


The Origins

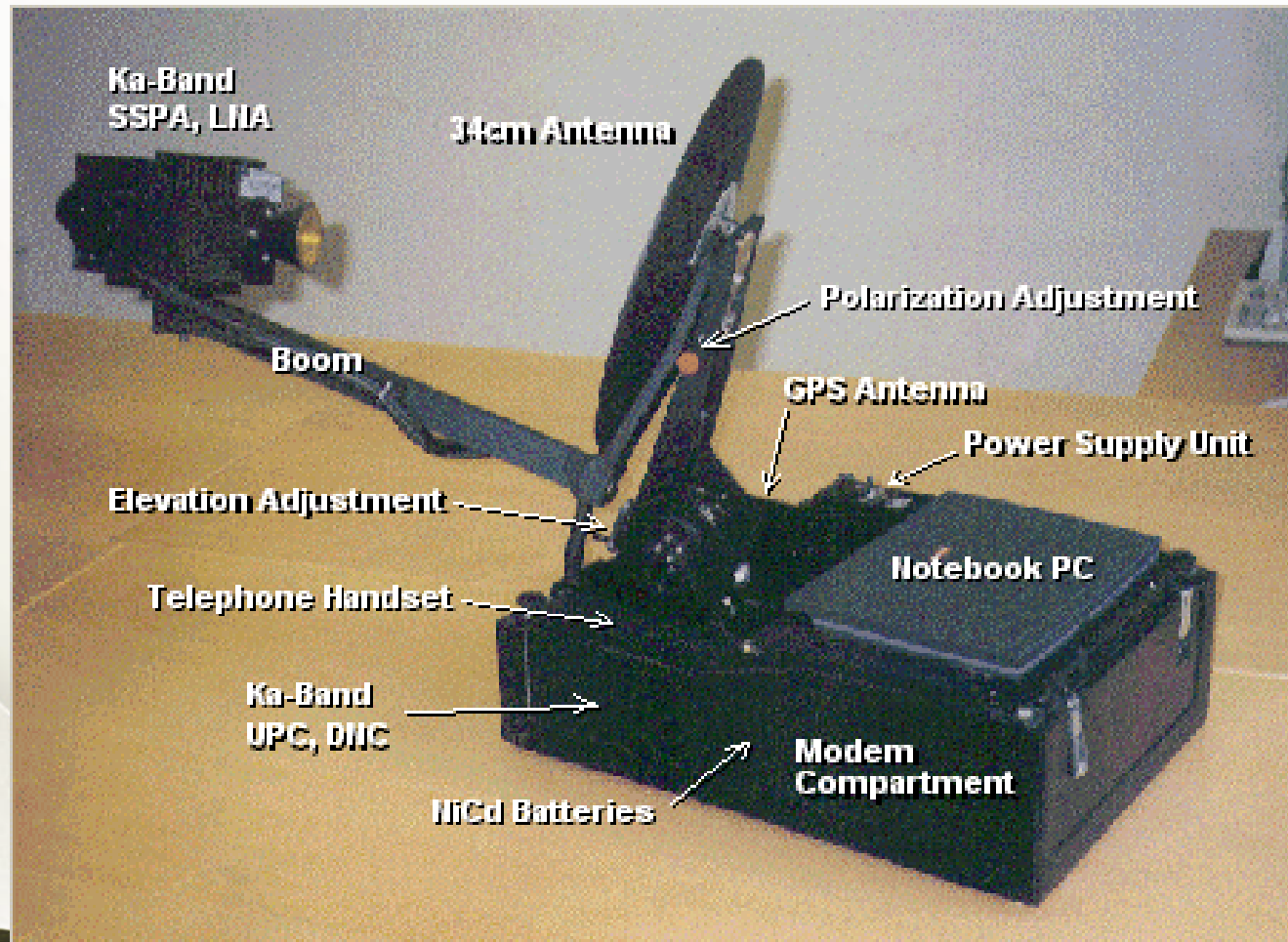
- 1995 - Ka-band Portable Terminal – Generation 1



User Interface	Phone/laptop
Data rate	4.8 kb/s
Spectrum spreading	to 128 kcps
Satellite	Kopernikus, Italsat
Tx frequency range	29.5 – 30 GHz
Rx frequency range	19.7 – 20.2 GHz
Polarisation (Tx/Rx)	Linear, V/H or V/V
EIRP:	35 dBW min (3W)
G/T:	10 dB/K min.
Briefcase size:	50 x 35 x 25 cm
Weight	18 kg
Power	12V DC (battery)



The Origins



The Origins

- 2001 - Ku-band Pico Terminal – Generation 2



User Interface	Phone/laptop
Data rate	9.6/19.2 kb/s
Spectrum spreading	2 – 30 Mcps (1.5 – 22.5 MHz BW)
Satellite	ST1 (Asia)
Tx frequency range	14 – 14.5 GHz
Rx frequency range	11.45 – 11.7 GHz
Polarisation (Tx/Rx)	Linear V/H or H/V
EIRP:	36 dBW (4 W) min.
G/T:	9 dB/K min.
Suitcase size (max):	66 x 62 x 34 cm
Weight	29 Kg and 24 Kg
Power	110/220V AC or 12V DC



Norsat OmniLink™ Key Features

- **Portable:** packaged in airline checkable cases
- **Rugged:** able to survive shock caused by 1m drop
- **Integrated:** custom design and packaging to achieve light weight and small size
- **Quick to Deploy:** 5 - 10 minutes setup without tools
- **Easy to Use:** operated by non-technical personnel with minimal training (cameraman)
- **All-In-One:** All necessary components and pointing /M&C tools included
- **Live Video:** 1.5 to 10 Mbps
- **High IP Data Rates:** up to 9.1 Mbps



OmniLink™ Applications

• Broadcasters

- International Events
- Election Coverage
- Iditarod Dog Sled Race
- Breaking News

• Military

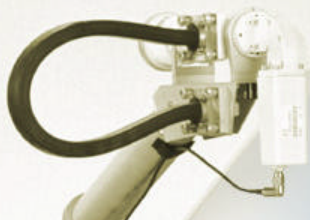
- Internal News Service
- Field Communications

• Government

- Embassies
- Drug Enforcement
- Homeland Security



From KTUU-TV in Alaska, an NBC affiliate using the Norsat NewsLink: The **first ever** live shot from Kahiltna Glacier, base of Mt. McKinley.



OmniLink™ Applications

•Telemedicine

- University Hospitals and Health Centers (e.g., UC Davis – currently using a Norsat SecureLink for telemedicine pilot project)

•Disaster Relief

- Insurance Companies
- Government

•Resources & Exploration

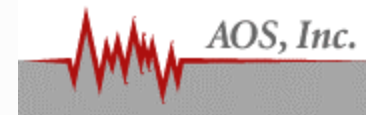
- Oil & Gas
- Mining
- Forestry



Kuwait City



Norsat OmniLink™ Customers/Partners





OmniLink™ Terminal Overview

The terminal consists of an Outdoor Unit (ODU) and an “Indoor Unit” (IDU), interconnected via Interfacility Link (IFL).

ODU - main components:

- 1x1 m, Diamond shaped, segmented (4) antenna and two section plug-in boom arm with built-in Tx waveguide
- Custom built RF electronics located at the back of the main antenna segment
- Lightweight aluminium tripod with Elevation over Azimuth support structure



IFL contains three coaxial (Tx, Rx and Tx-monitor), and multi-conductor Control and Power links. 10m and 30m versions are available.



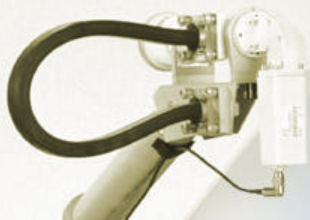
OmniLink™ Terminals Overview

IDU - main components:

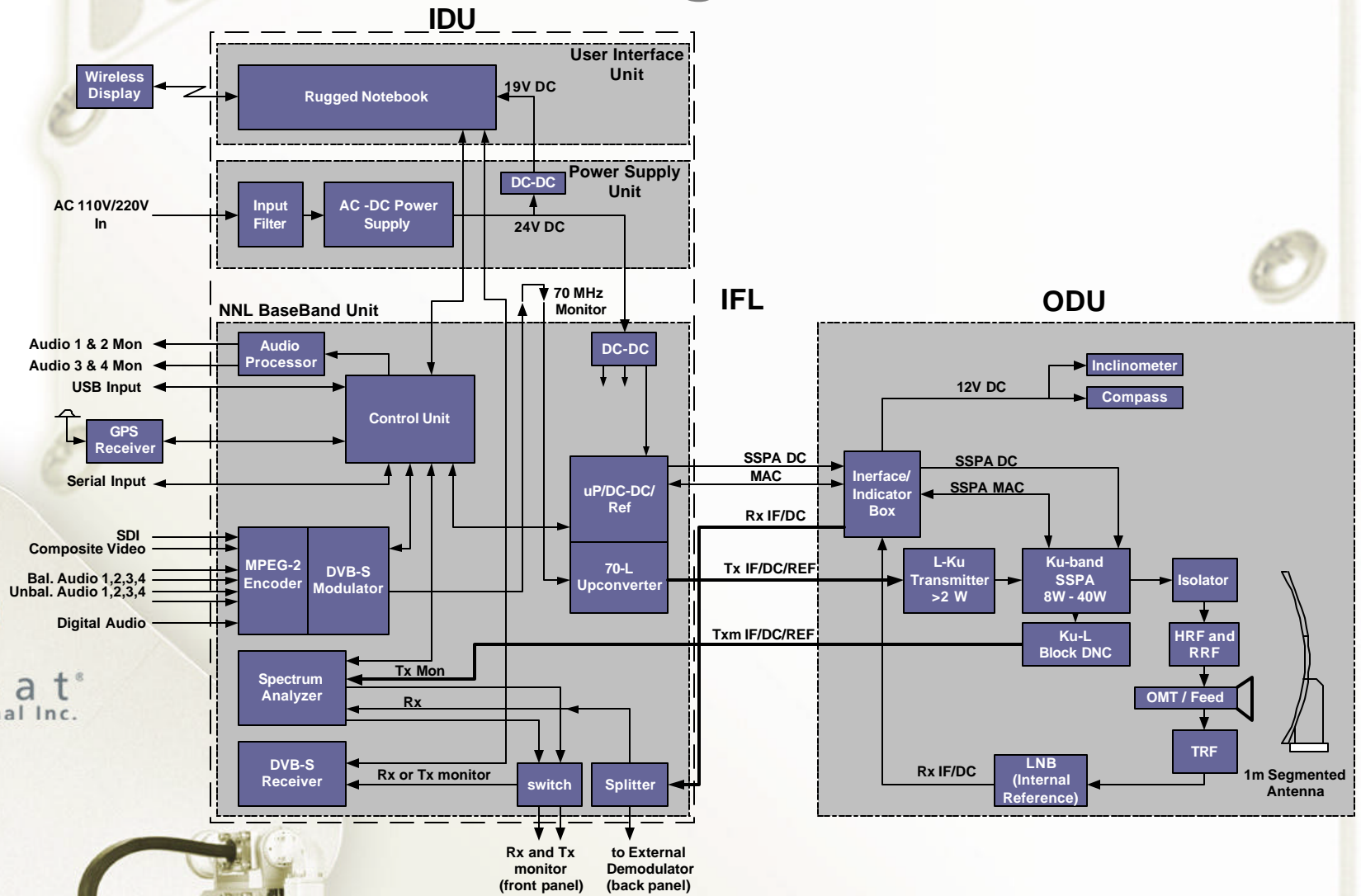
- User Interface Unit (1RU 19" chassis, 10" deep) – rugged laptop with GUI application providing control, monitoring and pointing tools
- System AC-DC Power Supply Unit (1RU 19" chassis, 6" deep)
- Baseband (BB) Unit (1RU 19" chassis, 17" deep)
 - NewsLink™ BB: MPEG-2 Encoder, DVB-S Modulator, Agile 70-L Up-converter, Spectrum Analyzer, DVB-S Receiver and GPS Receiver
 - SecureLink™ BB: L-band Modem (SCPC or TDMA), Spectrum Analyzer and GPS receiver



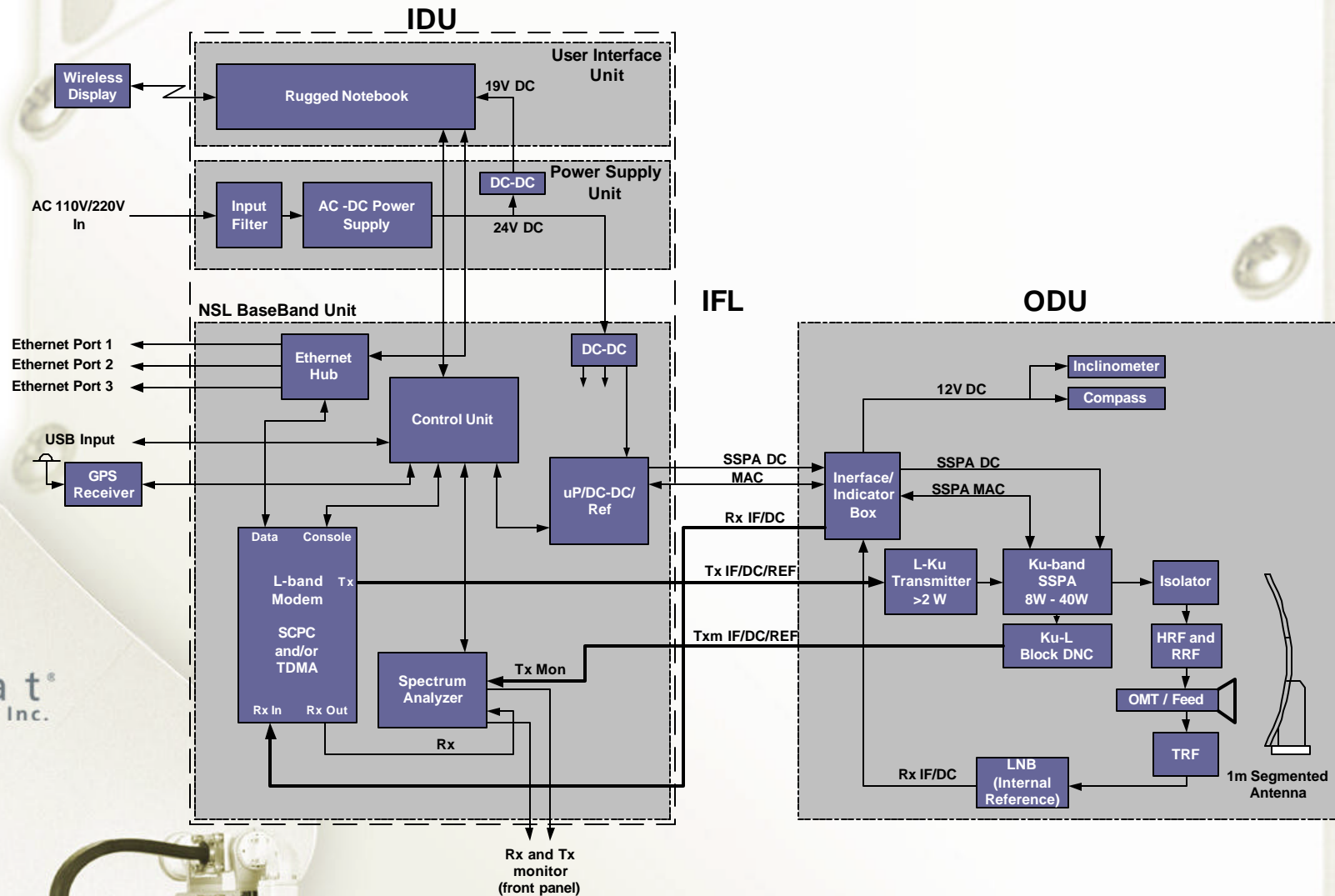
Terminals, up to 25W, are packaged into three (3) airline checkable industrial cases, each weighting approximately 32 Kg. The 40W terminal uses four (4) cases.



NewsLink™ Block Diagram



SecureLink™ Block Diagram

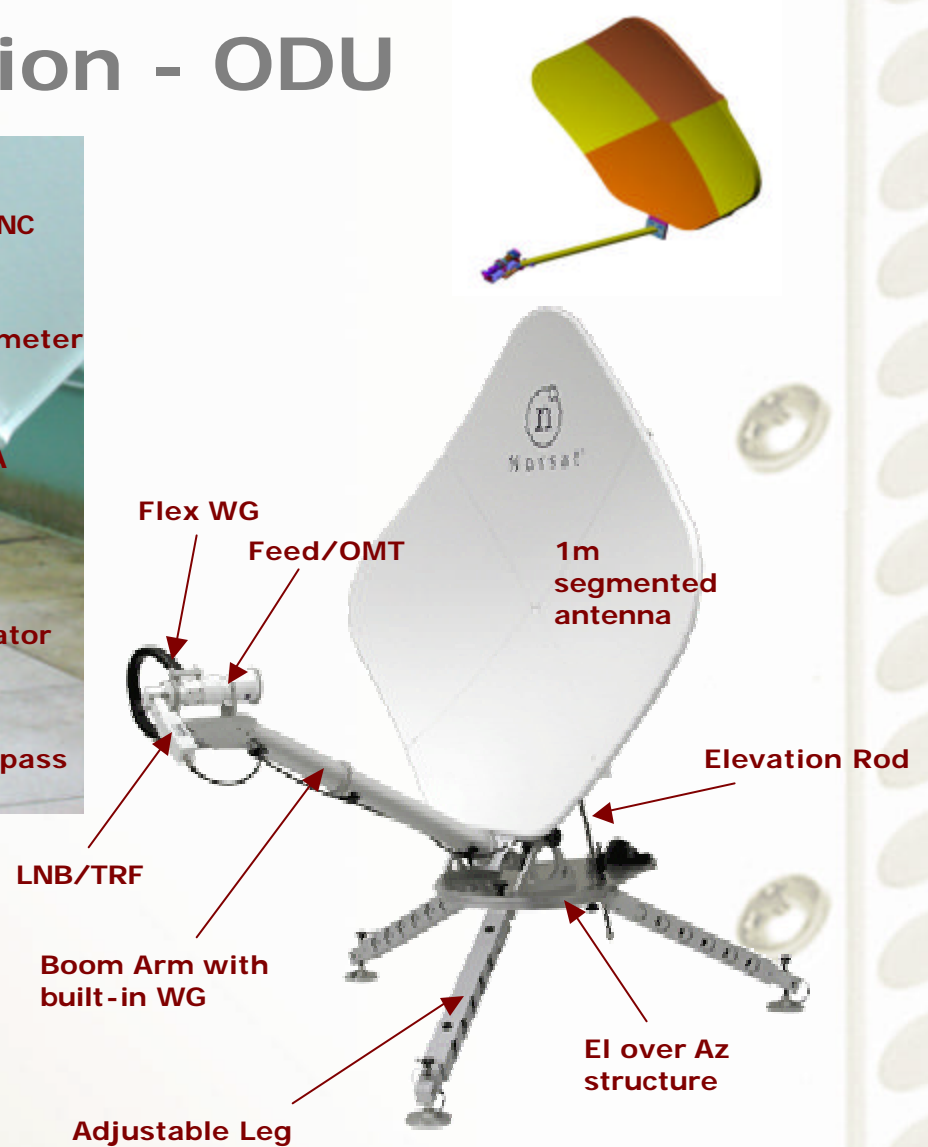
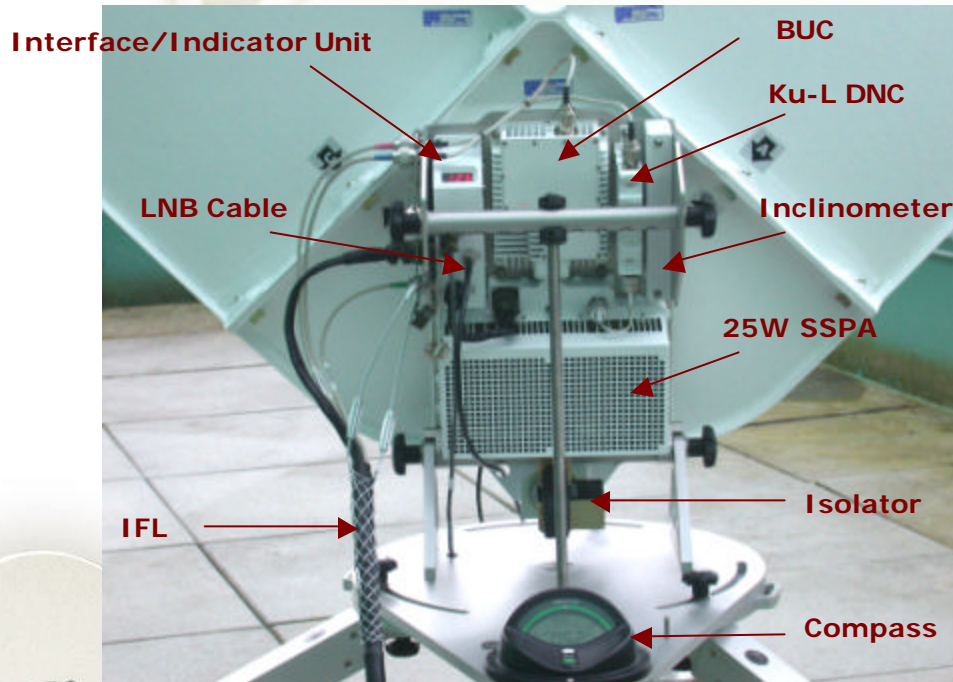


System Level Parameters

Ref.	Parameter	Specification
1	Tx Frequency	14.0 - 14.5GHz
2	Rx Frequency	10.95 – 12.75 GHz
3	Polarization (Tx/Rx)	V/H or H/V
4	EIRP (at P1dBcp)	≥ 57 dBW (40W SSPA option) > 55 dBW (25W SSPA option) > 53 dBW (16W SSPA option) > 50 dBW (8W SSPA option)
5	Tx Output Power variation	< 0.5 dB
6	G/T (clear sky)	21 dB/K (LNB NF=0.8 dB)
7	Prime Power Source	90 – 138 VAC and 190 – 260 VAC, 47 – 63 Hz
8	Optional Power Source	12 or 24 VDC – with inverter
9	Power Consumption	From 500 W (8W) to 1000 W (40W)
10	Operating Temperature	-30 to +50 °C – ODU 0 to +50 °C – IDU
11	Wind	60 Km/h Operational 100 Km/h Survival
12	Rain	15 mm/h Operational (link budget dependant) 30 mm/h Survival
13	Humidity	Up to 95% non-condensing
14	Shock/Vibration	MIL-STD-810F – Control System 1m Drop - ODU
15	Antenna Type Approval	Eutelsat (EA-A022)
16	System certifications	FCC (Q6C-NSLK3200) CE



OmniLink™ Description - ODU



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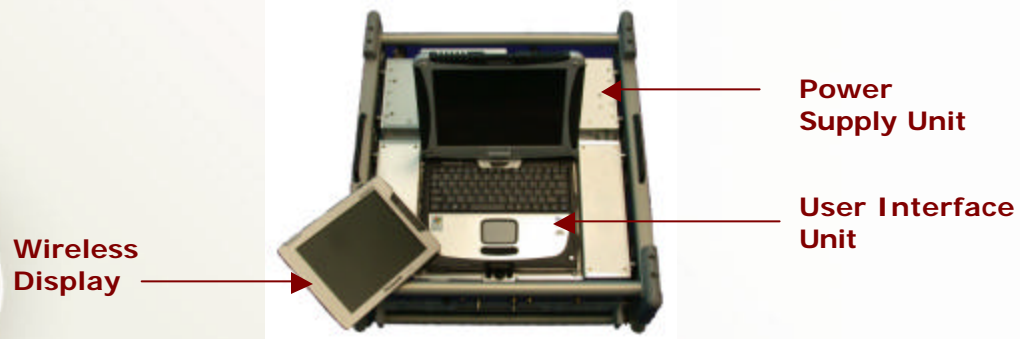
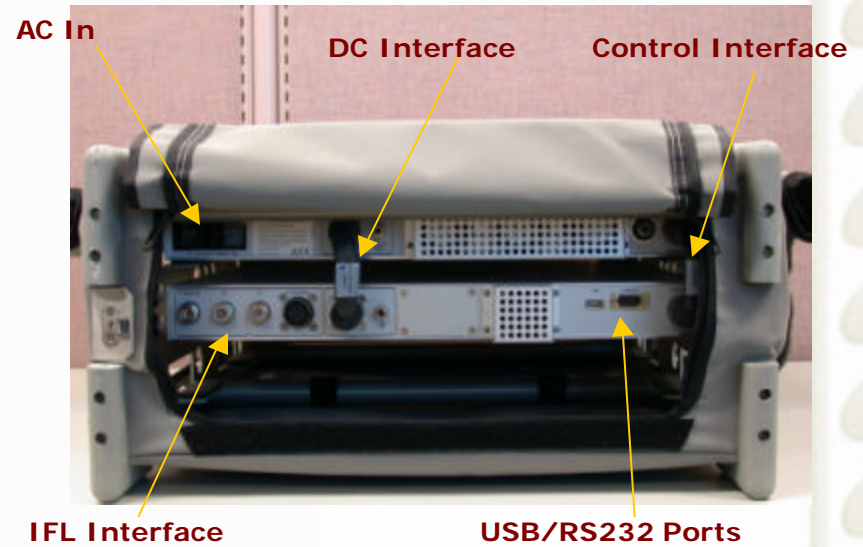
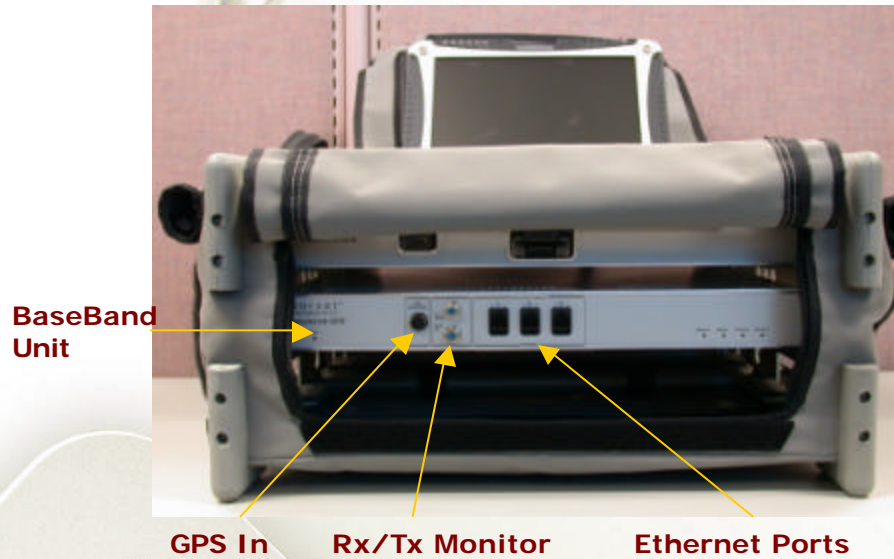


OmniLink™ Description - IDU

- SecureLink™ IDU

Front View

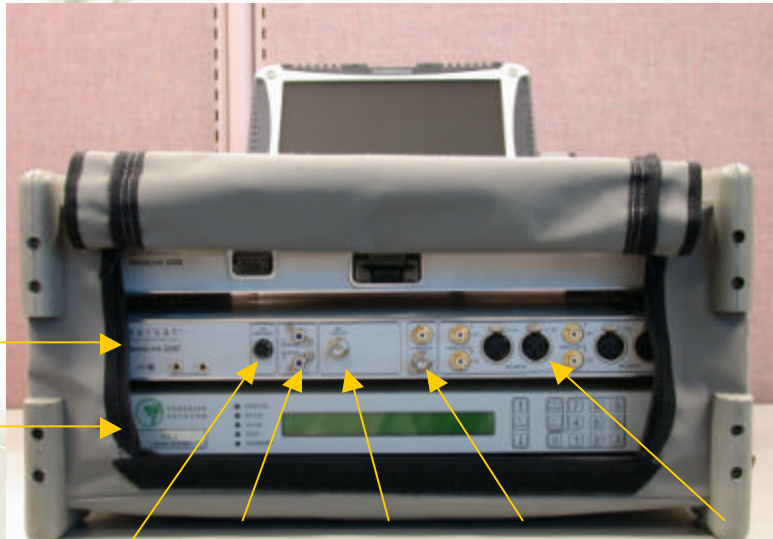
Back View



OmniLink™ Description - IDU

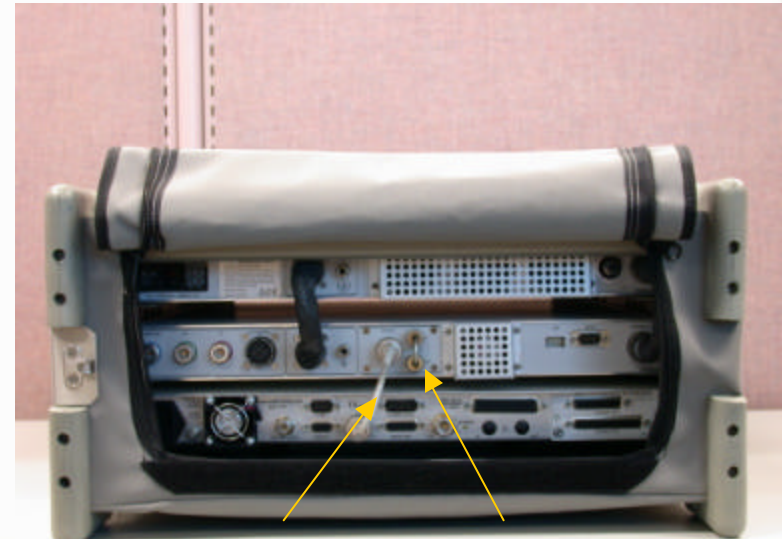
- NewsLink™ with Comms Modem

Front View



BaseBand Unit
Comms Modem

Back View



Rx Interface
Tx 70MHz loop

GPS In
Rx/Tx Monitor
SDI Video In
Composite Video In
Analog Audio In



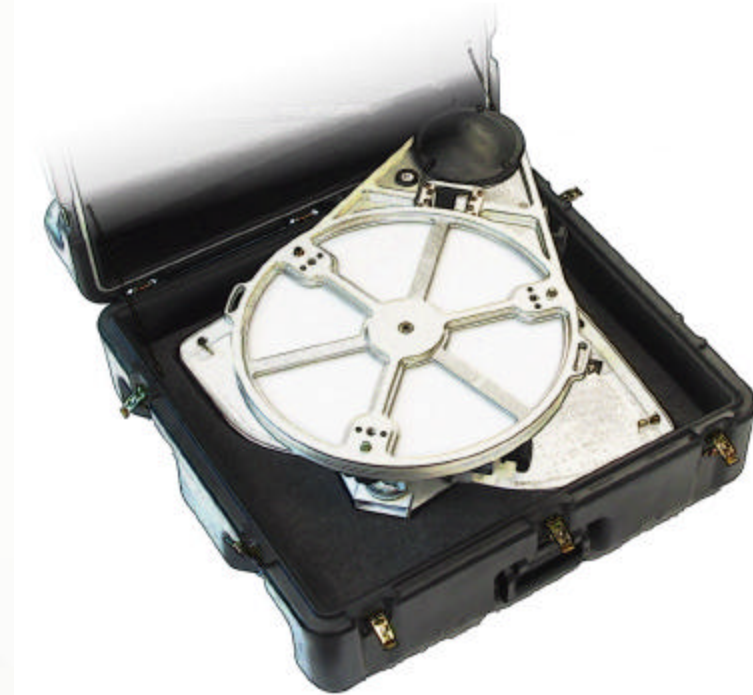
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International Inc.



Packaging – ODU RF Case

RF case content:

- Main antenna segment with RF electronics
- Az/EI structure with compass
- Custom foam inserts



All packages utilize rugged roto-molded cases

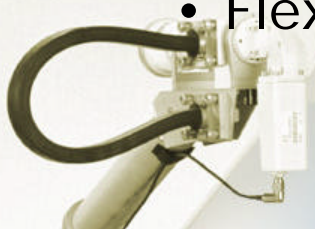


Packaging – ODU Accessory Case



Accessory case content:

- Boom arm segments with Feed/OMT/TRF assembly
- LNB KIT
- Flex waveguide
- Bag with 3 antenna segments
- 10m IFL
- Tripod legs (3)
- Custom foam inserts



Packaging – IDU Case

IDU case content:

- Custom 3RU Frame with User Interface, Power Supply and Baseband Unit
- Protective jacket
- Custom foam inserts



Questions



For more information, contact

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Tel. 604.292.9000

Toll-free 1.877.611.2911

sales@norsat.com

Visit us on the web...

www.norsat.com



OmniLink™ Demonstration

- NewsLink™ setup and alignment
- Hardware description
- Control GUI presentation
 - Antenna pointing tools
 - Transmission in loop-back mode
 - Monitoring tools
- Packaging



Norsat OmniLink™ – Setup



Norsat®
International Inc.

Setup of the OmniLink portable terminal can be done in 5 – 10 minutes with minimal training and tools.

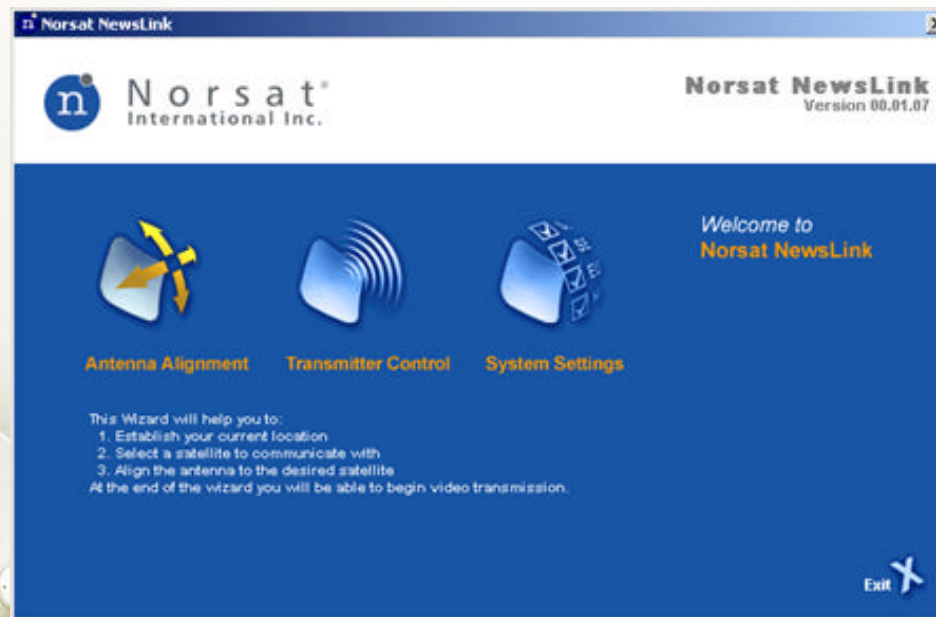


Norsat OmniLink™ Software

- Control and Monitoring GUI

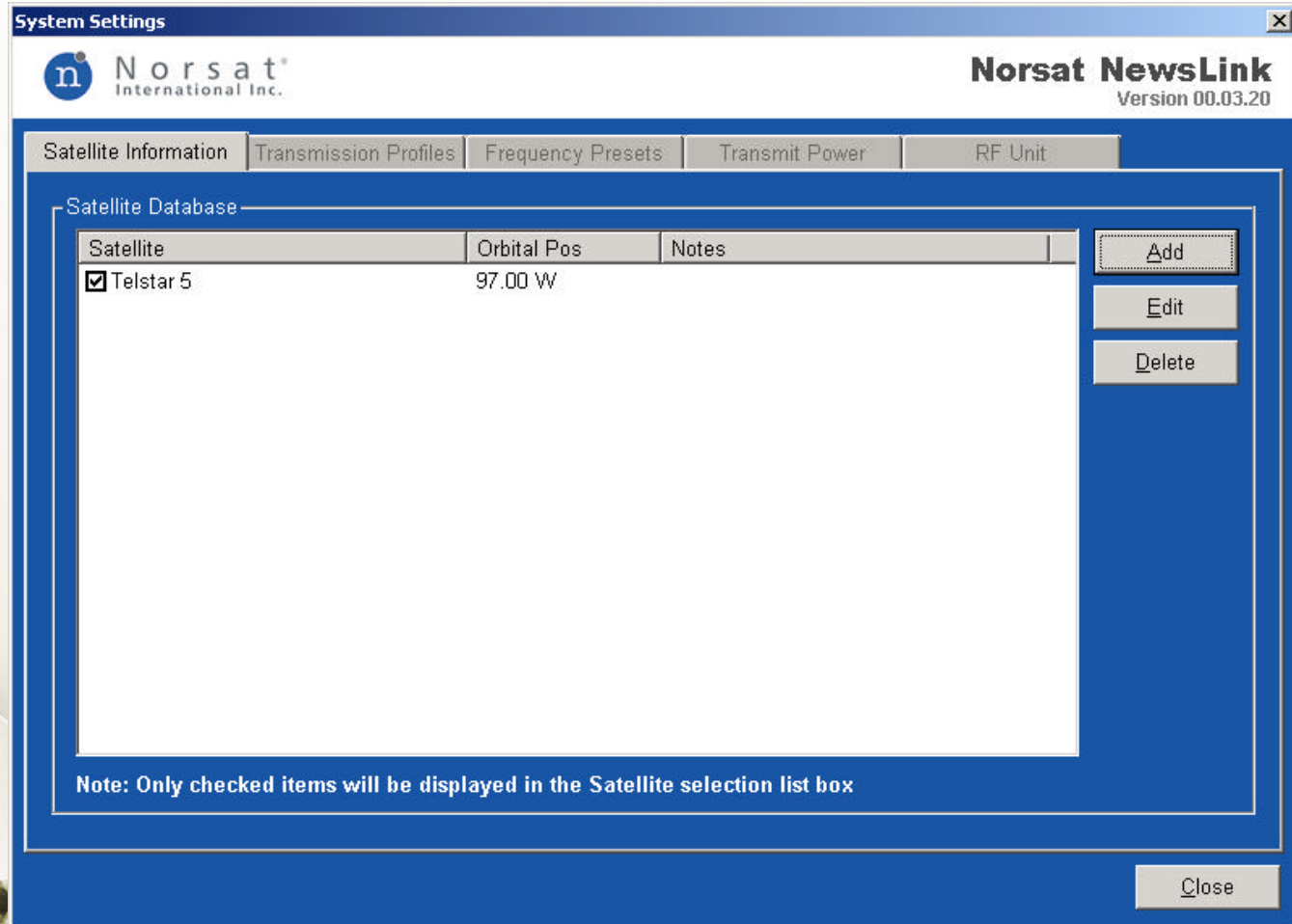
- Master Control Application
- Satellite Almanac
- Antenna Alignment Wizard
- Carrier/Beacon Detector
- Spectrum Analyzer

- Transmission Profile Settings
- Transmitter Control
- DVB Receiver Control
- Status, Alarms, Logging
- Help Files



Norsat OmniLink™ Software

- System Setup



Norsat OmniLink™ Software

- Antenna Alignment 1

The screenshot shows the 'Norsat NewsLink' software window, version 00.03.20. The interface is blue and contains the following sections:

- Current Location:** Includes radio buttons for 'Use GPS' (selected) and 'Manual Coordinates'. An 'Obtain Lock' button is next to the 'Use GPS' option. Latitude is set to 49.54 N and Longitude to 97.15 W.
- Desired Satellite:** Includes radio buttons for 'Select From List' (selected) and 'Enter Orbital Position'. A dropdown menu shows 'Telstar 5'. Below it, a field contains '97.00' and a dropdown shows 'W'.
- Tx Polarization:** Includes radio buttons for 'Horizontal' (selected) and 'Vertical'.

At the bottom of the window are three buttons: '< Back', 'Next >', and 'Cancel'.



Norsat OmniLink™ Software

- Antenna Alignment 2

The screenshot displays the 'Norsat NewsLink' software interface, version 00.03.20. The interface is divided into several sections:

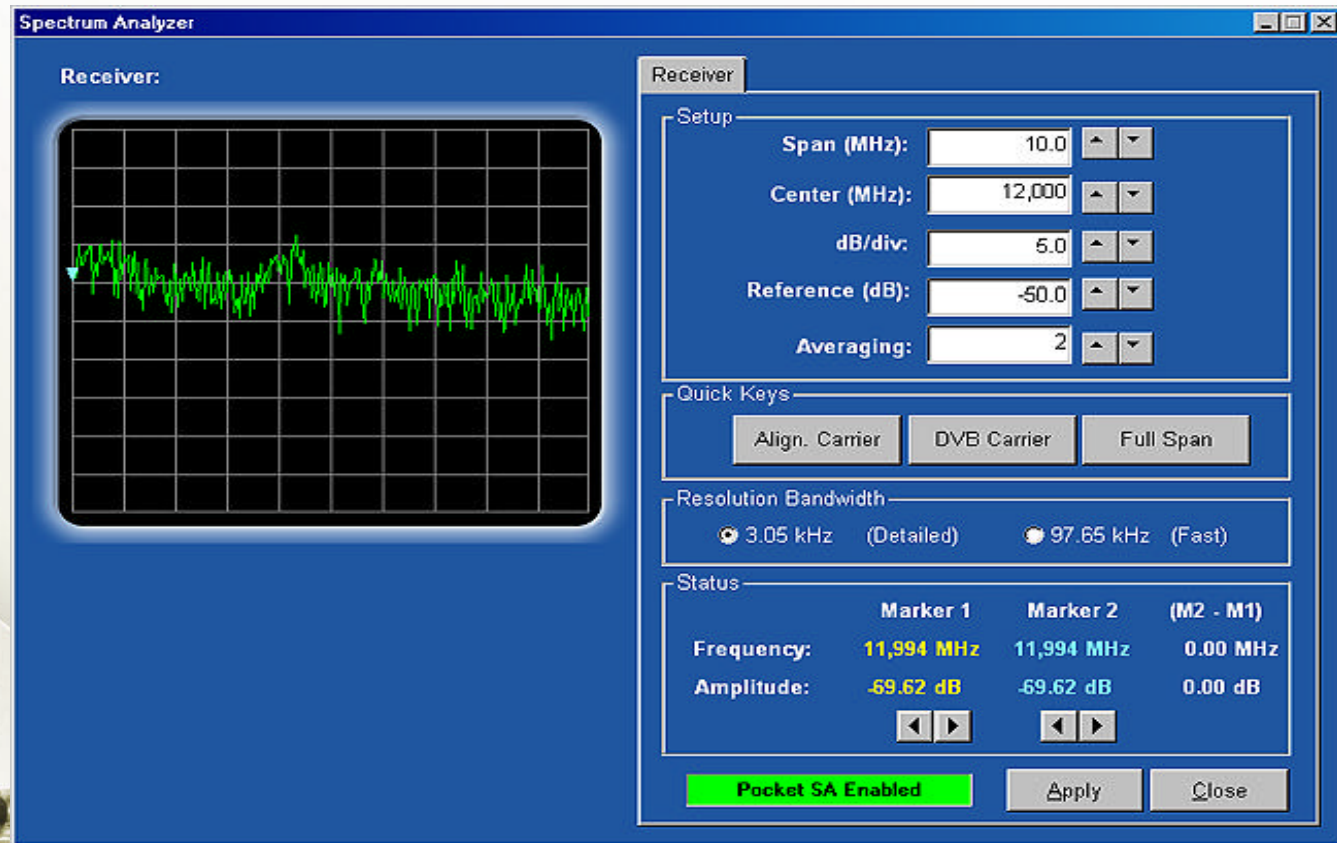
- Antenna Alignment Settings:** Includes input fields for Azimuth (175.05), Elevation (33.19), Polarization (-0.13), and Tx H/V (TxH). Each field has a corresponding instruction: '(match compass)', '(match inclinometer)', '(match feed rotation)', and '(match feed rotation)'. There is also a 'Notes' text area.
- Carrier Detector:** Shows 'Satellite' set to 'Telstar 5', 'Current LNB' set to 'Custom', and 'Carrier Freq. (MHz)' set to '11,750'. A 'Carrier Signal Strength (11,750 MHz)' is displayed as '152'. A 'Spectrum Analyzer...' button is located below.
- DVB Carrier Search:** Shows 'Tuning: Telstar 5: 12750 MHz, 4500 kS, 97.00 W'. The 'Signal Quality' is shown as a progress bar at 0%. The 'Lock Status' is 'No Lock'. There is a 'Search Adjacent Satellites' checkbox, a 'Range' of +/- 10 deg., and a 'Timeout' of 2 sec.

Navigation buttons at the bottom include '< Back', 'Finish', and 'Cancel'.



Norsat OmniLink™ Software

- Rx Spectrum Analyzer



Norsat OmniLink™ Software

- Transmitter Control

Transmitter Control

Norsat International Inc. **Norsat NewsLink** Version 00.03.20

Transmission Settings

Transmission Profile: Test Edit...

Frequency (MHz): 14,000.00 + - Presets: Select One... Edit...

Symbol Rate: 4,500 kS Video Bitrate: Auto Satellite: Telstar 5

FEC: 3/4 Audio 1 Bitrate: 224,000 bps Orbital Position: 97.00 W

Sig. Type: NTSC Audio 2 Bitrate: 224,000 bps Tx. Polarization: H

Sig. Source: Composite Operator Phone #: 1-204-123-4567

Quick Keys

CW (30.0 dBm)

CW (40.0 dBm)

QPSK (40.0 dBm)

Edit...

Transmitter Control

OFF ON

Modulation: CW (mod. OFF) QPSK (mod. ON)

Power (dBm): 20.0 + - Set

Watts: 0.10

Transmitter Status

Transmitter Off

Actual Power (W): OFF

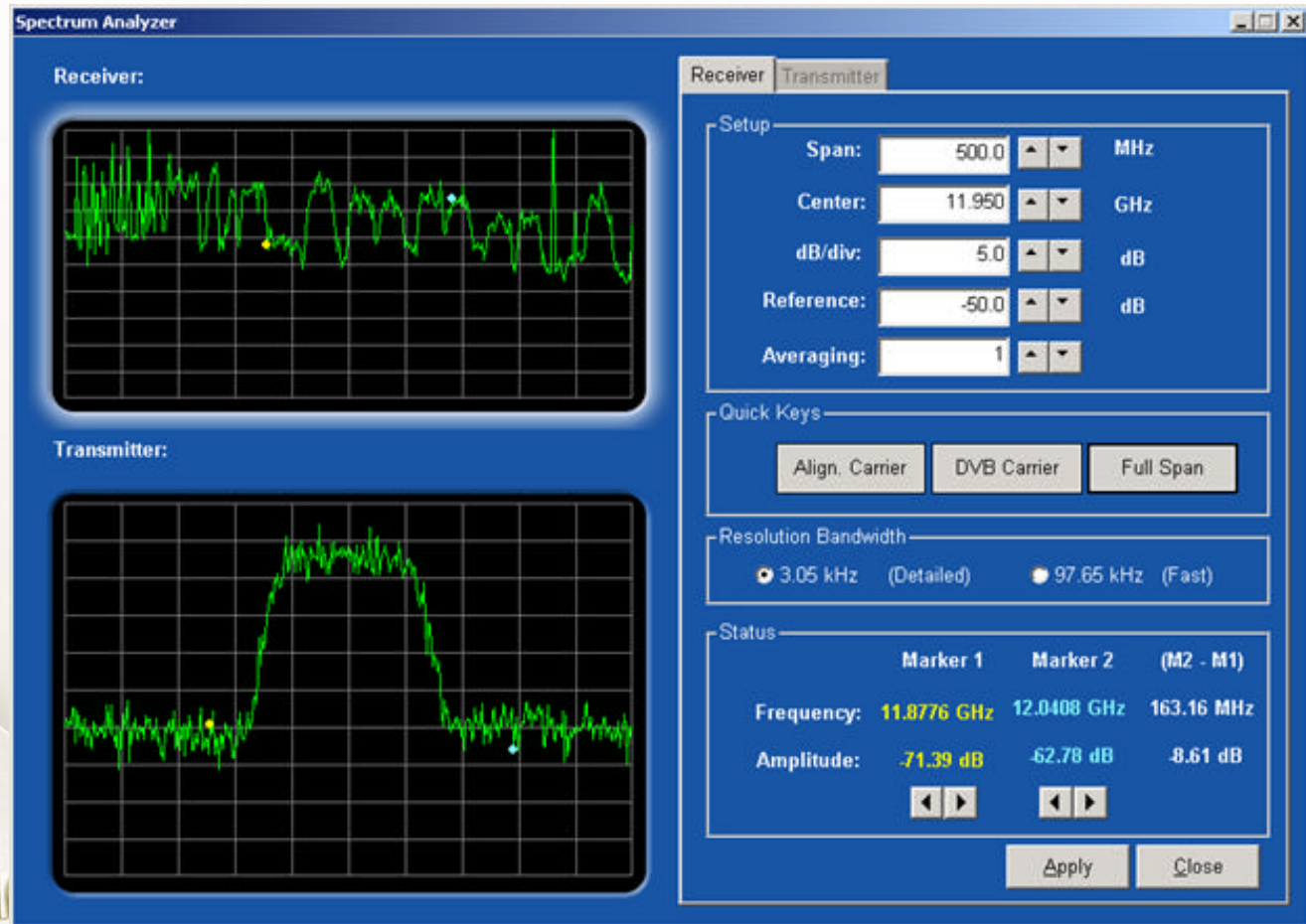
EIRP (dBW): OFF

<Control Status > Spectrum Analyzer... Close



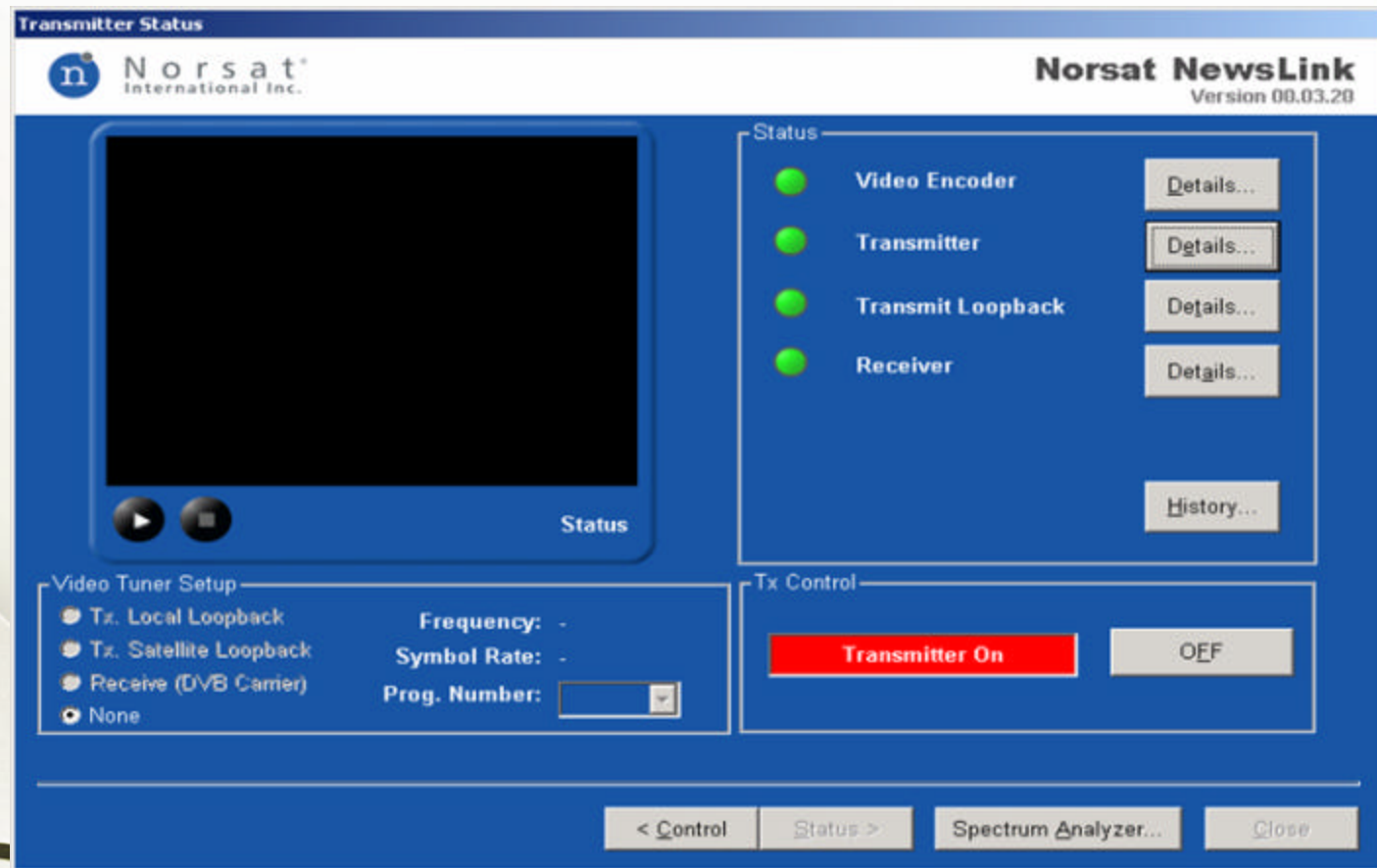
Norsat OmniLink™ Software

- Spectrum Analyzer – Rx and Tx



Norsat OmniLink™ Software

- Monitoring and Status



Norsat OmniLink™ Software

- Alarms and Logging

The screenshot displays the 'Alarm Details' window of the Norsat NewsLink software. The window has a blue header with the Norsat International Inc. logo on the left and 'Norsat NewsLink Version 00.03.26' on the right. Below the header, there are three sections: 'Status', 'Description', and 'History'. The 'Status' section contains a list of parameters with corresponding progress bars and numerical values: Tx UPC Current (141.00 mA), SSPA Current (5761.00 mA), SSPA Temp (47.00 C), SSPA Fan (1), PLL Lock (1), and Tx Power. The 'Description' section contains a text box with the following text: 'Transmitter & Upconverter Current', 'Description: The transmitter, located at the base of the antenna, converts the L-band signal to a Ku-band signal. Operating Range: 800 - 1200 mA. Note that when the transmitter is OFF, this indicator bar is always GREEN regardless of how much current is being'. The 'History' section is currently empty. A 'Close' button is located at the bottom right of the window.

Parameter	Value
Tx UPC Current:	141.00 mA
SSPA Current:	5761.00 mA
SSPA Temp:	47.00 C
SSPA Fan:	1
PLL Lock:	1
Tx Power:	

