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

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The Origins

- 1995 - Ka-band Portable Terminal – Generation 1

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

- 2001 - Ku-band Pico Terminal – Generation 2

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

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

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OmniLink™ Description - ODU

- Interface/Indicator Unit
- BUC
- Ku-L DNC
- Inclinometer
- 25W SSPA
- Compass
- IFL
- Isolator
- Flex WG
- LNB Cable
- Feed/OMT
- LNB/TRF
- Boom Arm with built-in WG
- 1m segmented antenna
- Adjustable Leg
- El over Az structure
- Elevation Rod
OmniLink™ Description - IDU

- SecureLink™ IDU

**Front View**
- BaseBand Unit
- GPS In
- Rx/Tx Monitor
- Ethernet Ports

**Back View**
- AC In
- DC Interface
- Control Interface
- IFL Interface
- USB/RS232 Ports
- Power Supply Unit
- User Interface Unit
- Wireless Display

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OmniLink™ Description - IDU
• NewsLink™ with Comms Modem
Packaging – ODU RF Case

RF case content:

- Main antenna segment with RF electronics
- Az/El 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
Norsat International Inc.
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

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
Norsat OmniLink™ Software

- Antenna Alignment 2
Norsat OmniLink™ Software

- Rx Spectrum Analyzer
Norsat OmniLink™ Software

- Transmitter Control
Norsat OmniLink™ Software

- Spectrum Analyzer – Rx and Tx
Norsat OmniLink™ Software

- Monitoring and Status
Norsat OmniLink™ Software

- Alarms and Logging