



Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW | Washington, DC 20037-1122 | tel 202.663.8000 | fax 202.663.8007

John K. Hane
Phone: 202.663.8116
john.hane@pillsburylaw.com

December 11, 2008

By Electronic Filing (ECFS)

Marlene H. Dortch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: SkyTerra Subsidiary LLC
***Ex Parte* Letter**
Docket Nos. 06-150 and 06-229

Dear Ms. Dortch:

On December 3, 2008, Jennifer Manner, Ajay Parikh, and Christian Gates of SkyTerra Subsidiary LLC (“SkyTerra”), as well as the undersigned, counsel for SkyTerra, met with Nese Guendelsberger, Paul Murray, Ziad Sleem, and Peter Trachtenberg of the Wireless Telecommunications Bureau. The parties discussed the positions advocated by SkyTerra in its comments filed in the above-referenced proceedings, and SkyTerra provided the attached handouts.

Very truly yours,

/s/

John K. Hane

Attachments

cc: Nese Guendelsberger
Paul Murray
Ziad Sleem
Peter Trachtenberg



Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW | Washington, DC 20037-1122 | tel 202.663.8000 | fax 202.663.8007

December 10, 2008

John K. Hane
Phone: 202.663.8116
john.hane@pillsburylaw.com

By Electronic Filing (ECFS)

Marlene H. Dortch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: SkyTerra Subsidiary LLC
***Ex Parte* Presentation**
Docket Nos. 06-150 and 06-229

Dear Ms. Dortch:

In response to the *Third Further Notice of Proposed Rulemaking* released by the Commission,¹ SkyTerra Subsidiary LLC (“SkyTerra”) filed Comments in the above-referenced proceedings on November 3, 2008 urging the Commission to assure that the benefits of satellite-enabled service will accrue to the broadest possible subset of public safety users.² SkyTerra proposed that the D block licensee make available at least one model of each major device type (PC card, voice handset, and PDA) that includes satellite capability, and that at least 50% of all models include satellite capability.

¹ See *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, FCC 09-230 (Sept. 25, 2008) (“*Third FNPRM*”).

² *Comments of Mobile Satellite Ventures Subsidiary LLC*, WT Docket No. 06-150, PS Docket No. 06-229 (filed Nov. 3, 2008) (demonstrating that satellite services are well suited to providing service to areas that the terrestrial network will not reach and to providing reliable communications services when terrestrial facilities have been damaged or destroyed). On December 9, 2008 the name of the entity formerly known as Mobile Satellite Ventures Subsidiary LLC changed to SkyTerra Subsidiary LLC.

Upon review of the record as a whole and based on feedback SkyTerra has received from various stakeholders, SkyTerra is submitting as an attachment a slightly modified version of its proposed rules. The revised draft rules propose that the Commission modify its “one satellite handset” rule to require that at least two models of each major device type (e.g. data-only devices, voice handsets, and integrated voice/data handheld devices) available for use on an upper 700 MHz D Block licensee’s network are capable of establishing two-way communications links with a satellite service. SkyTerra proposes that this requirement should be phased in over two years, such that the first satellite-enabled device type must be made available within 36 months of the award of the D block license, and a licensee must fully comply with the “two of each device type” requirement within 60 months of the award of the license.

The attached, revised version of SkyTerra’s proposed rules is intended to provide a more accurate depiction of the types of devices that first responders will use to access the public safety broadband network in their day to day operations. In addition, SkyTerra submits that the “two of each device type” requirement strikes a reasonable and clearly defined balance between the one handset requirement and more comprehensive proposals. Ideally, every device used on the public safety broadband network would be capable of establishing communications links with satellites when the terrestrial network is not available. However, if at least two different satellite-capable models are available for each device type, public safety agencies generally can be expected to be able to select satellite-capable models that meet their day to day communications needs.

Very truly yours,

/s/

John K. Hane

Attachment

Proposed Rules

Parts 27 and 90 of Title 47 of the Code of Federal Regulations are amended as follows:

1. The authority citation for Part 27 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 307, 309, 332, 336, and 337 unless otherwise noted.

2. The following new section to subpart N of Part 27 is added, immediately after § 27.1305, to read as follows:

§ 27.1306 Satellite Capability Requirements

An upper 700 MHz D Block licensee shall ensure that at least two models of each major device type available for use on its network are capable of establishing two-way communications links with a satellite service. For purposes of this rule, the major device types are: (i) a data only device; (ii) a voice handset; and (iii) an integrated voice/data handheld device (such as a PDA). The first satellite-enabled device type must be made available within 36 months of the award of the D block license and an upper 700 MHz D Block licensee must fully comply with this section within 60 months of the award of its license.

Section 27.1310(g) is amended to read as follows:

§ 27.1310 Network sharing agreement

(g) The terms, conditions, and timeframes pursuant to which an upper 700 MHz D Block licensee must incorporate satellite communications capabilities pursuant to 27.1306.

3. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), and 332(c)(7).

4. The following new section to subpart AA of Part 90 is added, immediately after § 90.1405, to read as follows:

§ 90.1406 Satellite Capability Requirements

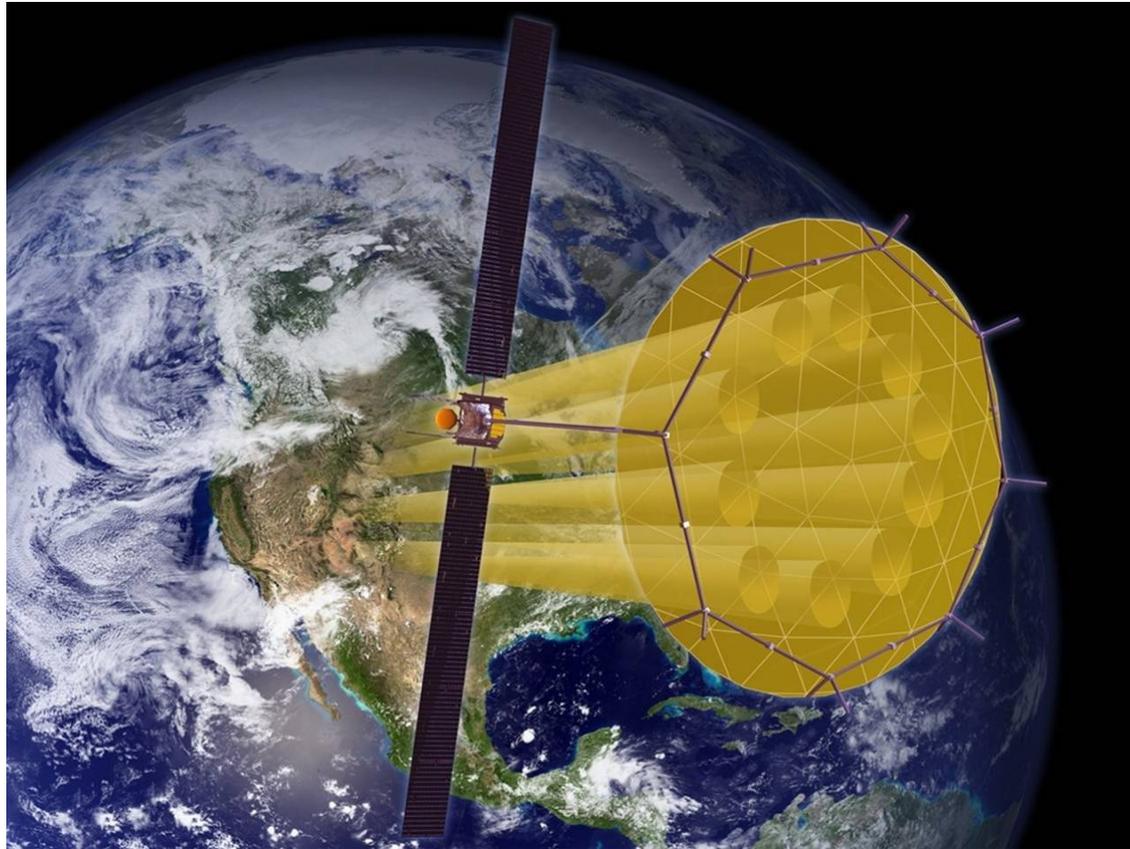
An upper 700 MHz D Block licensee shall ensure that at least two models of each major device type available for use on its network are capable of establishing two-way communications links with a satellite service. For purposes of this rule, the major device types are: (i) a data only device; (ii) a voice handset; and (iii) an integrated voice/data handheld device (such as a PDA). The first satellite-enabled device type must be made available within 36 months of the award of the D block license, and an upper 700 MHz D Block licensee must fully comply with this section within 60 months of the award of its license.

5. Section 90.1410(g) is amended to read as follows:

§ 90.1410 Network sharing agreement

(g) The terms, conditions, and timeframes pursuant to which an upper 700 MHz D Block licensee must incorporate satellite communications capabilities pursuant to 90.1406.

Next Generation Mobile Satellite Services and the 700 MHz Public Safety Broadband Network



December 11, 2008

1

Agenda



- Limitations of current generation MSS systems
- Approach to next generation MSS systems
- Services supported
- Implementation
- SkyTerra deployment timeline

MSS Service Evolution



- **MSS has remained a niche service, primarily serving vertical markets, in large part because MSS devices have been large and expensive**
 - Large antennas and high power needed to close links with existing satellites
 - Satellite protocols have required specialized high power amplifiers and expensive, custom-designed, separate chipsets that are produced in lower volumes
 - Expense and “emergency use only” status of devices have limited MSS potential, particularly for public safety users
- **Next generation MSS systems are designed to address these issues**

MSS provided the most reliable links after Katrina, but many satellite phones intended only for emergency use were uncharged and some personnel did not know how to use them

SkyTerra Approach: Put MSS in low cost, mainstream, commercial, terrestrial wireless devices



- 19 dB additional link margin from higher power satellite used to reduce handset size: SkyTerra satellites can close the link with devices carrying normal form-factor terrestrial (linearly polarized) antennas (including internal antennas)
- Reduce handset BOM cost by getting mainstream chipset vendors to include a satellite protocol stack in baseband chipsets and satellite bands into multi-band RFIC's
- Dual-mode BOM cost delta relative to PCS is < \$ 5 and diminishes over time
- Resources used by a satellite stack are small compared to MIPS and memory of present cell phone processors; cost delta driven by discreet RF components, not by burden of carrying protocol

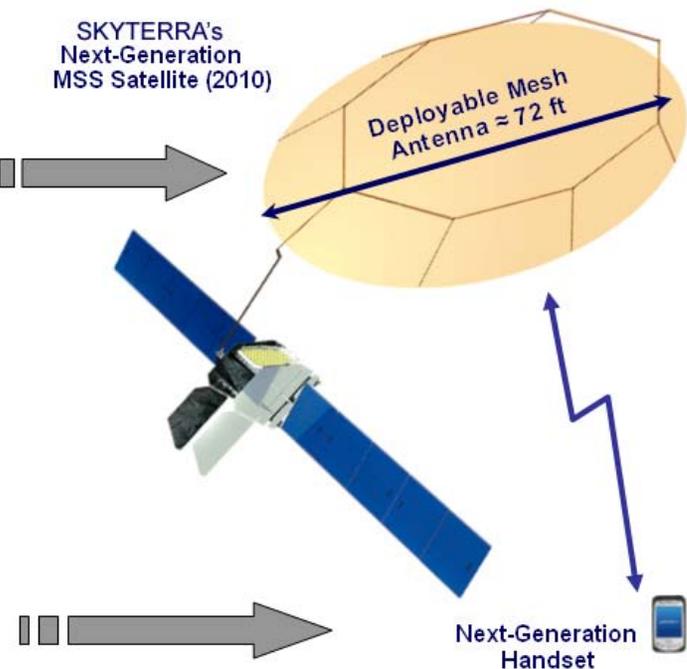
Legacy System

SKYTERRA's Legacy MSAT Satellites (launched 1995/96)



Next-Gen System

SKYTERRA's Next-Generation MSS Satellite (2010)



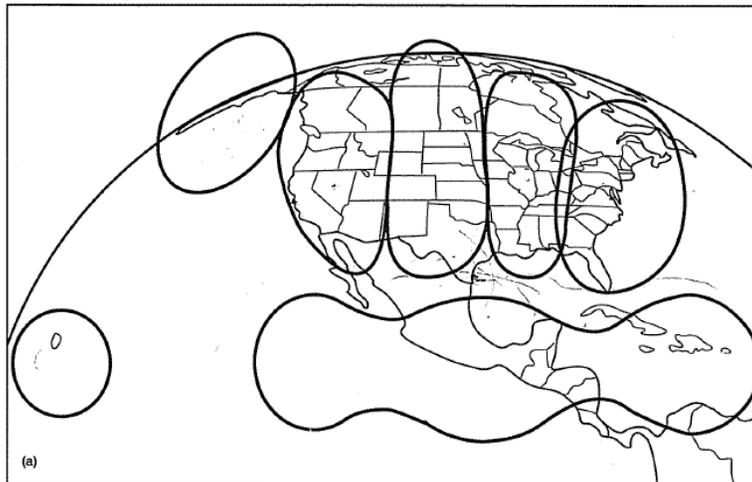
System Coverage Comparison: Legacy vs. Next-Generation



- To a first order approximation, and for a comparable coverage area, the link margin increases \approx as the ratio of beam count (e.g., $\Delta \text{Link Margin} \cong 10\text{Log}(500/6) = 19 \text{ dB}$)
 - This 19 dB is then used to reduce the size of the user handset:

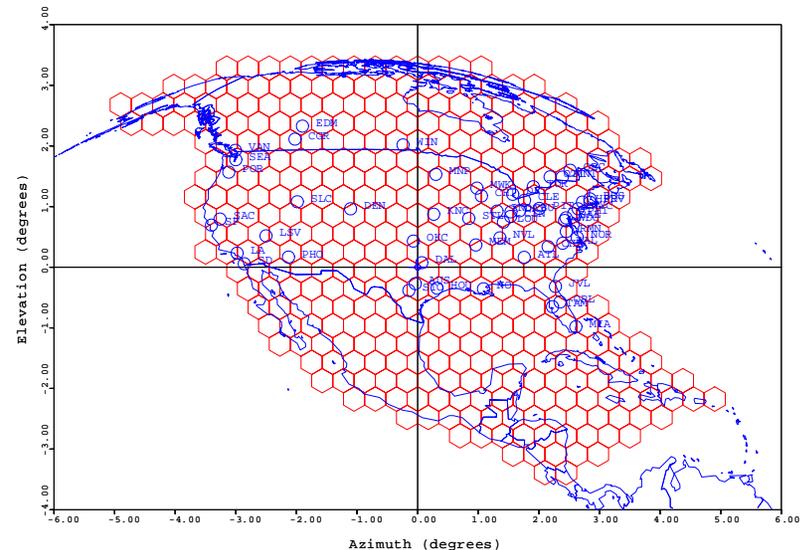
▪ Legacy MSAT Satellites

- Six L-band coverage beams (Note: Alaska and Hawaii are physically coupled)
- Return link G/T at edge of beam $\approx 2 \text{ dB}$
- Link closure requires laptop sized terminal with significant antenna gain



▪ Next-Gen SkyTerra Satellites

- 500 L-band coverage beams (Note: Hawaii not shown)
- Return link G/T at edge of beam $\approx 20 \text{ dB}$
- Link closure possible with CMRS-sized handset and Tx power levels ($\approx 250 \text{ mW}$)



Supported Services

- **The following services are planned to be offered from cellular-sized handsets and wireless access cards**
 - Voice (VoIP), SMS, email, web browsing
 - Data speeds: 25 kbps uplink (max per user), 300 kbps downlink (max burst throughput to an individual user)
 - IP based data services up to 500 kbps uplink and downlink (max burst throughput) can be supported with BGAN-like transportable data terminals (notebook sized)

- **Single-hop channel latency (device-application to core network output) of under 350 ms**
 - Latency has been proven to be acceptable for useful voice service in legacy GEO MSS (MSAT, Thuraya and ACeS) and is acceptable for many data services – position/data reporting, dispatch, email, SMS, web browsing, file transfer, etc.
 - Propagation characteristics addressed through adaptation of terrestrial air interface, baseband processor chipset customization and spoofing

- **Provision for Indoor/In Car coverage**
 - Special products (femtocell, repeater etc.) will be introduced to extend the satellite coverage in enclosed areas

Satellite links can ensure first responders have immediate access to critical applications on the devices they use every day, regardless of conditions on the ground

Handset Implementation



- **In September 2008 SkyTerra and ICO signed a technology development agreement with Qualcomm**
 - Starting in 2010, all¹ Qualcomm baseband processor chips carrying EVDO will also carry a satellite protocol based on EVDO called GMSA (GEO Mobile Satellite Air interface) – GMSA would become an extension of EVDO
 - After 2010 Qualcomm will incorporate L-band and S-band MSS into all Multiband RFIC's

¹ An exception may be made for very low cost chips targeted at developing markets

Next-Gen System Deployment Timeline



System Deliverable	Delivery Date
Boeing Contract Award	Jan 2006
Gateway 1 Facility Complete (Napa)	Oct. 2008
Gateway 2 Facility Complete (Saskatoon)	Dec. 2008
Gateway 3 Facility Complete (Dallas)	1 st Qtr 2009
Gateway 4 Facility Complete (Ottawa)	2 nd Qtr 2009
GBBF Ready to Ship to GWs	2 nd Qtr 2009
22m Reflector Delivered to Boeing	2 nd Qtr 2009
Ground Segment Complete	3 rd Qtr 2009
MSV-1 Launch	4 th Qtr 2009
Qualcomm Chipset Engineering Samples	4 th Qtr 2009
SBN-1 Acceptance	4 th Qtr 2009
Qualcomm Commercial Chip Availability	2 nd Qtr 2010
MSV-2 Launch	2 nd Half 2010
Next-Gen Two-Satellite System Availability	2 nd Half 2010

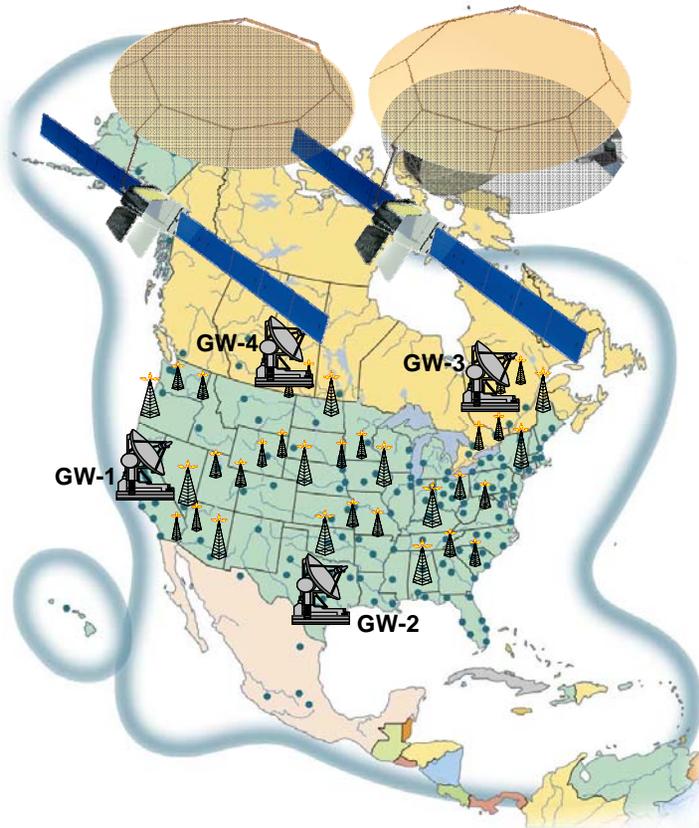
Next-generation MSS service available early in early stages of public safety network deployment



Backup Slides

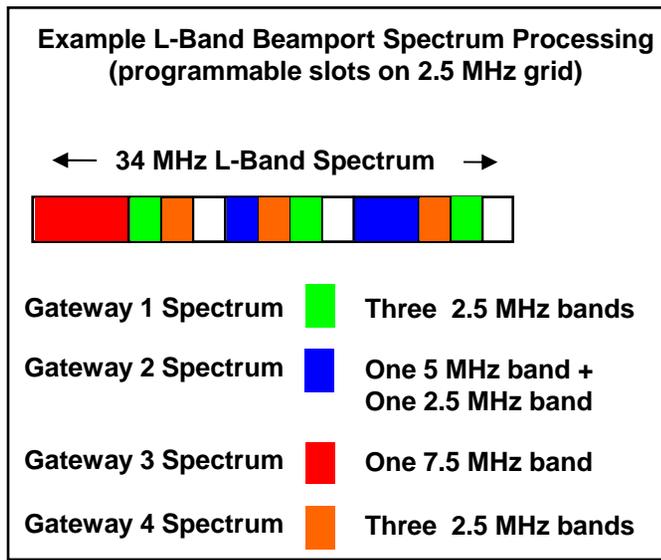


SkyTerra's Next-Gen System Overview

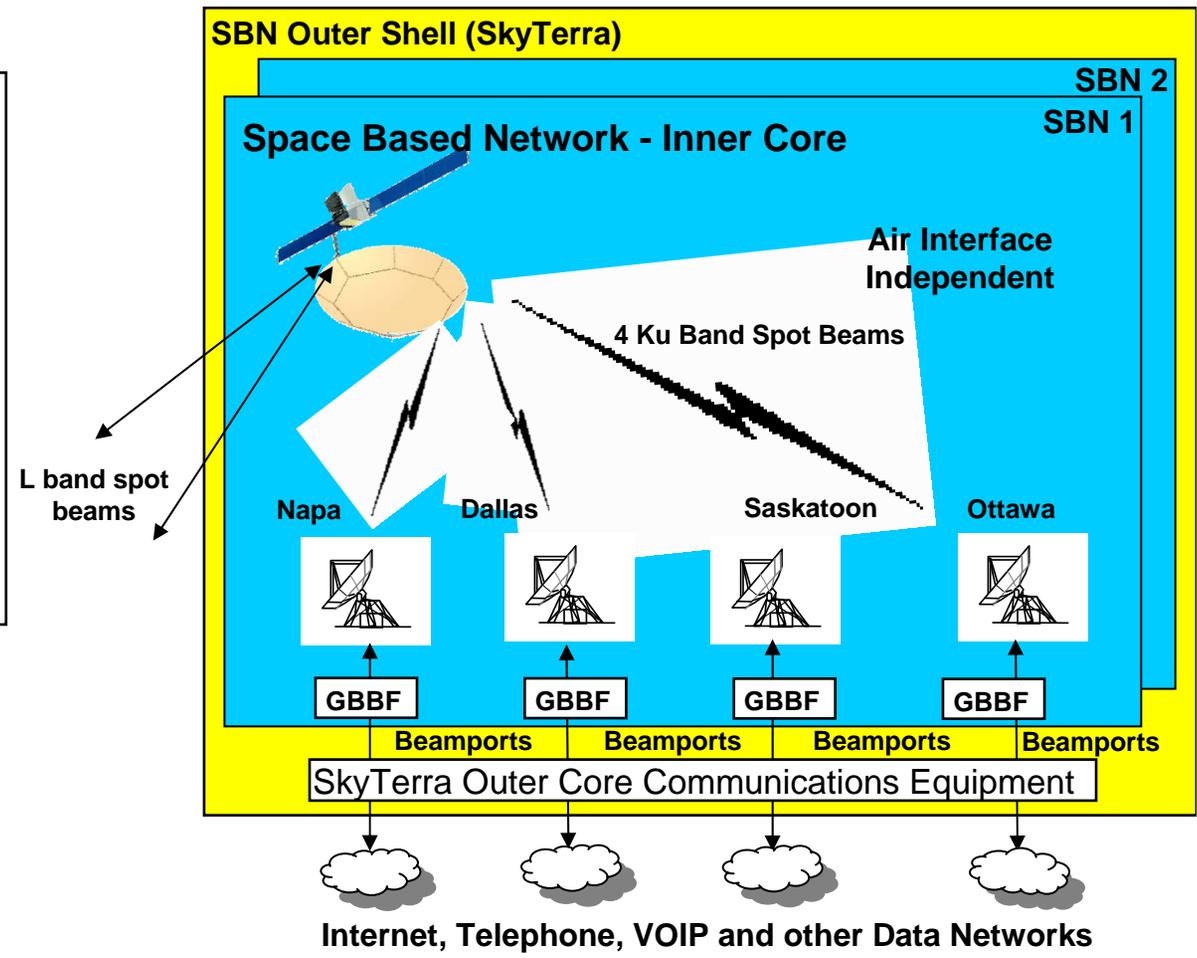


- **Next-Generation System includes Two Satellites and Four Gateways**
- **Each Satellite is Connected via Ku-band Links to all Four GWs**
 - Both satellites use the same gateway locations - each satellite Ku-band feederlink supports 7.5 MHz of L band spectrum
 - System can process 30 MHz of L band spectrum (both forward and return)
- **Each Gateway includes a Fully Digital, FPGA Based, Ground Based Beamformer (GBBF)**
 - Each GBBF is capable of forming L-band spot beams anywhere over the service area
- **Beamforming is Performed with Integrated Satellite and Ground Processing**
 - Beamformer (which is traditionally on the satellite) is moved to the ground
 - Satellite channelizer payload routes the forward and return link spectrum of L-band antenna feeds signals (i.e., not “beam signals”)
- **Design Permits Significant Increase in Overall End-User Capacity, and Greatly Increased Flexibility in Beamforming Operation**
- **Overall System Design Permits Combining of Return Link Power from Both Satellites** (i.e., two satellite antennas plus two polarizations = four diversity signal paths)
 - Power combining enables simple, lower cost, linear polarization on user handset
- **Forward Link Tx Power Requirements is Shared by Two Satellites**
 - Aggregate system EIRP is significantly higher than that available in previous MSS systems

Four Gateways Support 30 MHz of L-Band Spectrum



- Each gateway processes up to 7.5 MHz of L-band spectrum
- Allocation of 2.5, 5.0 or 7.5 MHz slots between GWs is fully reconfigurable



Satellite channels different L band spectrum for each gateway. Each gateway GBBF can process all beams in a different portion of L band spectrum