



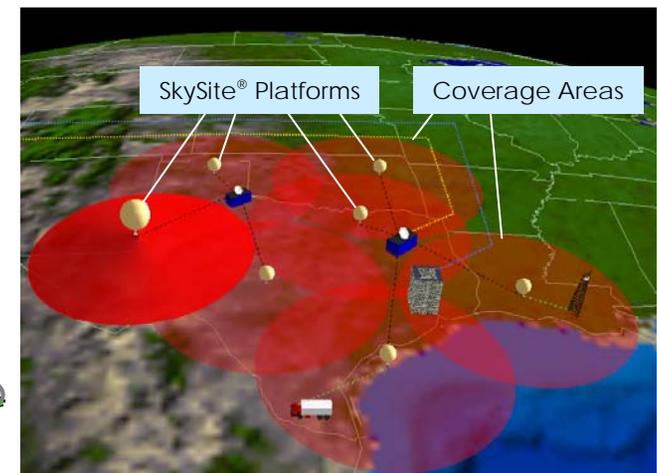
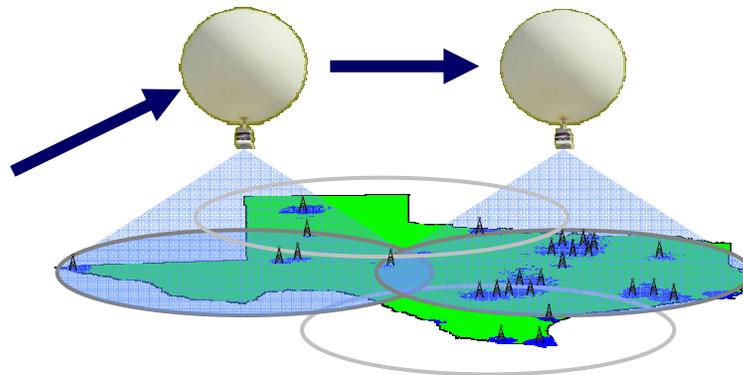
Space Data®

Wide-Area Wireless Technologies Can Bring Ubiquity to 700 MHz D Block & White Space

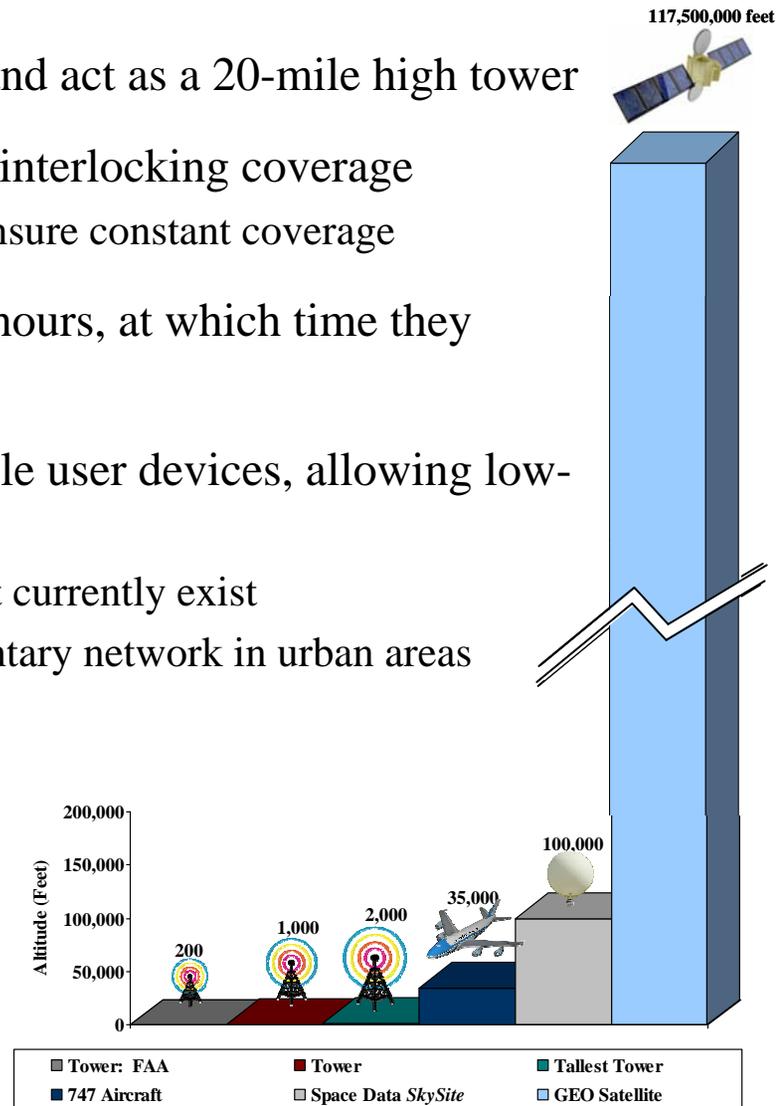
Washington DC Presentation

Spring 2008

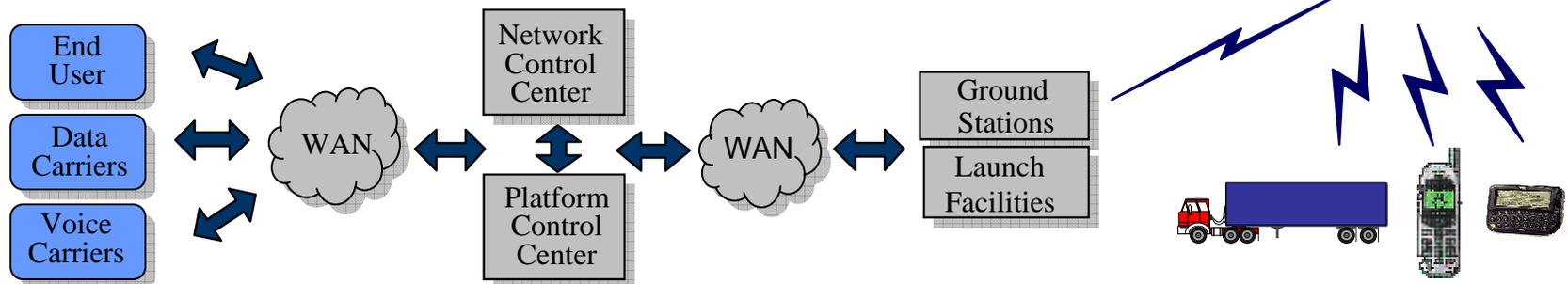
- **SkySite®** Platforms create a wireless network consisting of transceivers on weather balloons that operate in near space from 60,000 to 100,000 feet
 - One *SkySite* covers a 420 mile diameter, the equivalent of 300 terrestrial towers
 - 41 M2M or 200 Voice or 370 Broadband *SkySites* cover the entire continental U.S.
- Space Data technology uses industry standard protocols:
 - Interoperates with tower based wireless networks
 - Interoperates with existing or new users on same frequency band in same modality
- **SkySites** have provided 24 / 7 coverage for over 4 years
 - 200,000+ flight-hours of cumulative near-space operations
 - 15,000+ flights to date providing continuous service
- UHF version is currently deployed by US Air Force



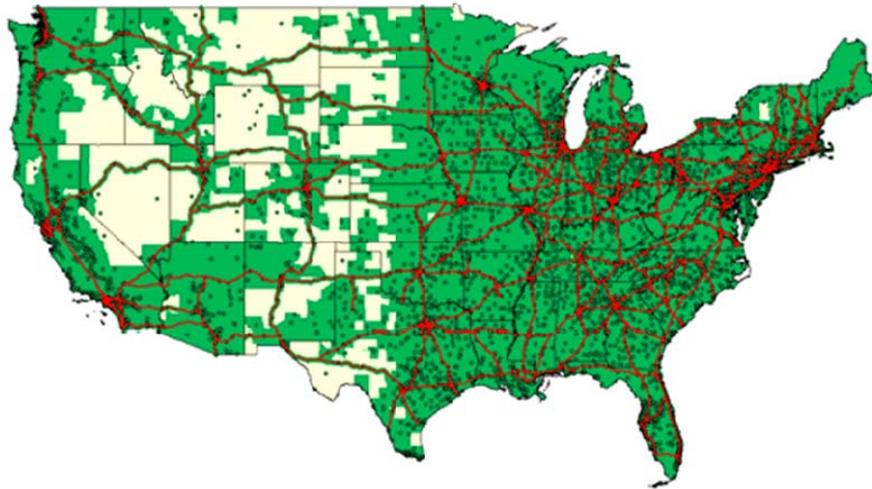
- *SkySites* rise to 100,000 feet then level off, and act as a 20-mile high tower
- *SkySites* float in unison to form a blanket of interlocking coverage
 - *SkySites* are launched every 12-24 hours to ensure constant coverage
- *SkySites* stay in flight for approximately 24 hours, at which time they descend, are recovered and reused
- *SkySites* are compatible with fixed and mobile user devices, allowing low-cost network services to:
 - Rural areas where wireless coverage does not currently exist
 - Existing tower coverage provides complementary network in urban areas



- Large coverage area – 420 mile M2M diameter , 170 mi. Voice, 120 mi. Broadband
- No geographic constraints
- Overlay existing networks – transparent to consumer
 - Compatible with consumer devices
 - Compatible with asset tracking systems
 - Users seamlessly roam on / off *SkySite* network
- Low-cost components
- Proven hardware – wireless technology agnostic
- Works just like tower-based networks
 - Longer radio frequency link but same path loss as terrestrial systems

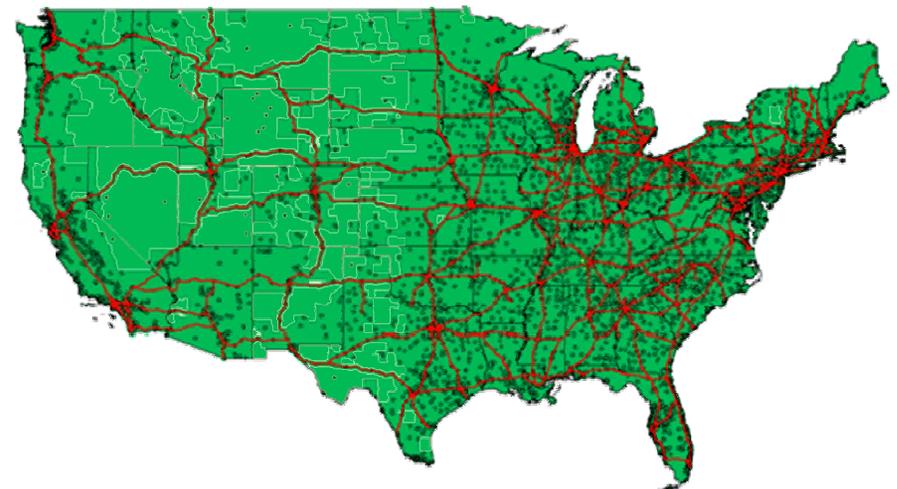


- The 700 MHz interoperable nationwide public safety network faces two significant problems:
 1. Cost of build out and equipment.
 - Estimates in the record regarding constructing a terrestrial network range from \$6-7 billion and higher.
 - Maintenance and equipment costs increase price of public safety network.
 2. Scope of build out.
 - Existing FCC coverage requirements: (a) at least 75% of the population by the end of the fourth year, (b) at least 95% of the population by the end of the seventh year, and (c) at least 99.3% percent of the population by the end of the tenth year.
 - Even by reaching 99.3% of the population, 26.5% of the land mass of the continental U.S. and 37% of the land mass of the entire U.S. (including Alaska, Hawaii) still would be without coverage, presenting a significant public safety issue.
- Proven, non-traditional technologies, such as Skysites or other wide area technologies, can address these problems and should be considered as means to meet the FCC's build out requirements.



Terrestrial Coverage*
at 99.3% Pop Build Out for
Public Safety Network in 2019

99.3% pops = 73.5% CONUS land = 63% US land
Significant gaps remain in coverage of rural areas



Coverage Using Wide Area
Technologies Such as SkySites for
Public Safety Network in 2010

Covers 100% pops & land mass

 Coverage for single-mode terrestrial-only radio

* Map coverage is approximate, source: PSST presentation at International Wireless Communications Exposition February 27, 2008.



Wide Area Technologies Can Achieve Cost Effective D Block Ubiquity

- Improves rollout strategy without compromising public safety's build out needs
 - Ubiquity provided by SkySite overlay from beginning
 - Transparent to user (no special devices needed, thus reduces reliance on dual mode handsets)
 - Users can seamlessly roam on and off the SkySite network
 - Fill in areas with towers as demand increases
- Cost effective method to meet and exceed the FCC build out requirements
 - Some estimate that it will cost \$1-2 billion to cover 75% of the U.S. population, but another \$5 billion to reach 99.3% coverage, using approximately 32,000 terrestrial towers.
 - Using Skysites rather than towers for early bird service and for most all rural areas could bring in \$5 billion more revenue and save \$2+ billion costs.
- Wireless technology agnostic – CDMA / WCDMA / WiMAX
- Wide area technologies are well suited for both regional economic area and nationwide spectrum allocations.

- Nationwide, single frequency control / supervisory channel
 - 3 MHz of Narrowband PCS spectrum is held by nationwide licensees
 - Same frequency everywhere makes for least cost device
 - Same frequency as 900 GSM elsewhere in the world makes for very low cost RF components due to high volume market
 - Ability to transmit at 3500 watts ERP from towers makes for coverage with fewer towers + good building penetration margins
 - Towers already exist and have excess capacity (SkyTel/ USA Mobility)
 - SkySite overlay provides ubiquity to network
 - Ability to intelligently direct devices in each city to White Space
 - Ability to download new firmware to White Space Devices to correct any “misbehavior” discovered after large scale deployment

- Developments in Wide Area Technologies during the past 5 years offer alternatives to solving the 700 MHz Public Safety coverage and build-out cost challenges
 - 100% coverage with low-cost, terrestrial-only user equipment
 - Potential to save \$ billions in build out costs
 - Coverage available much earlier than with a tower-only build = \$ billions early revenue
- Maintain 99.3% build out on 700 MHz D Block
 - This is equivalent to the highly bid A, B and E block's 70% of landmass build out
- Proven combination of existing NPCS towers and the SkySite Network offer a robust, inexpensive, licensed channel for controlling access to TV White Space
- Future discussions must fully explore all proven technologies with potential to address today's vexing problems
- Future Rule Makings should allow flexibility in deployment technology to accommodate both today's options and all foreseen future technical options