Boeing Timing & Location (BTL)

Presented To:

Federal Communications Commission Workshop,
Public Safety and Homeland Security Bureau,
Test Bed to Improve Indoor Location Accuracy for Wireless 911 Calls

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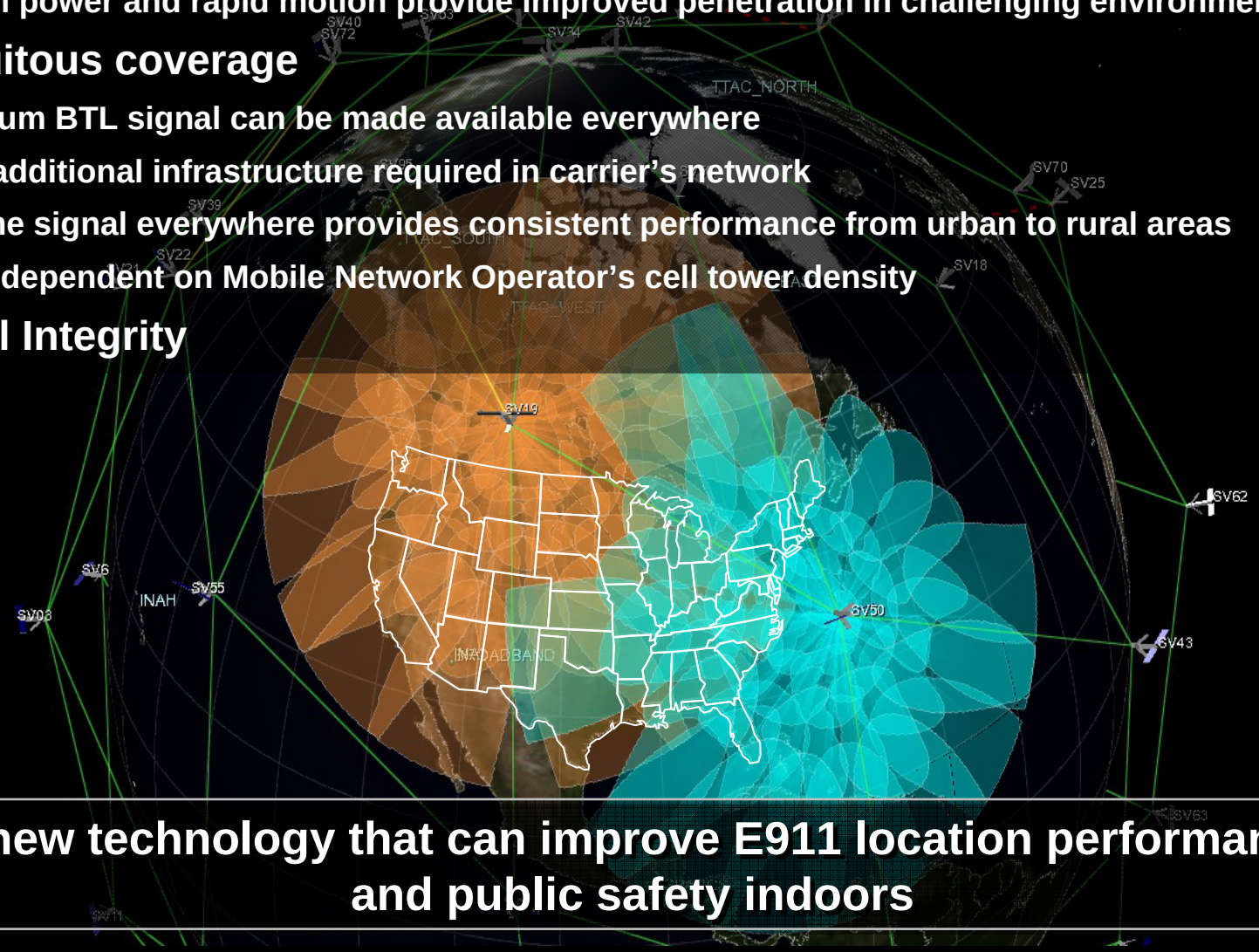
Boeing Timing & Location *(BTL)*

- **Leverages Iridium Communication Inc's Low Earth Orbit (LEO) Constellation**
- **Deep Indoor Penetration**
  - **High power and rapid motion provide improved penetration in challenging environments**
- **Ubiquitous coverage**
  - **Iridium BTL signal can be made available everywhere**
  - **No additional infrastructure required in carrier's network**
  - **Same signal everywhere provides consistent performance from urban to rural areas**
  - **Not dependent on Mobile Network Operator's cell tower density**
- **Signal Integrity**



A new technology that can improve E911 location performance and public safety indoors

BTL Positioning Modes & Chip Options

Multi-Sensor Chip (Iridium, GPS, Glonass, Wi-Fi, Bluetooth, NFC, etc)

Iridium-Only Chip

1. "Iridium-Only Positioning" mode - Deep indoor timing & positioning

2. "Assisted-GNSS" mode – Precise time & frequency aiding of GNSS receiver for increased GNSS signal sensitivity & quicker time to first fix

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3. Hybrid Iridium/GNSS satellite mode
   - Augment with Iridium SVs when insufficient GNSS SVs in view

BTL provides a deep indoor timing & positioning capability

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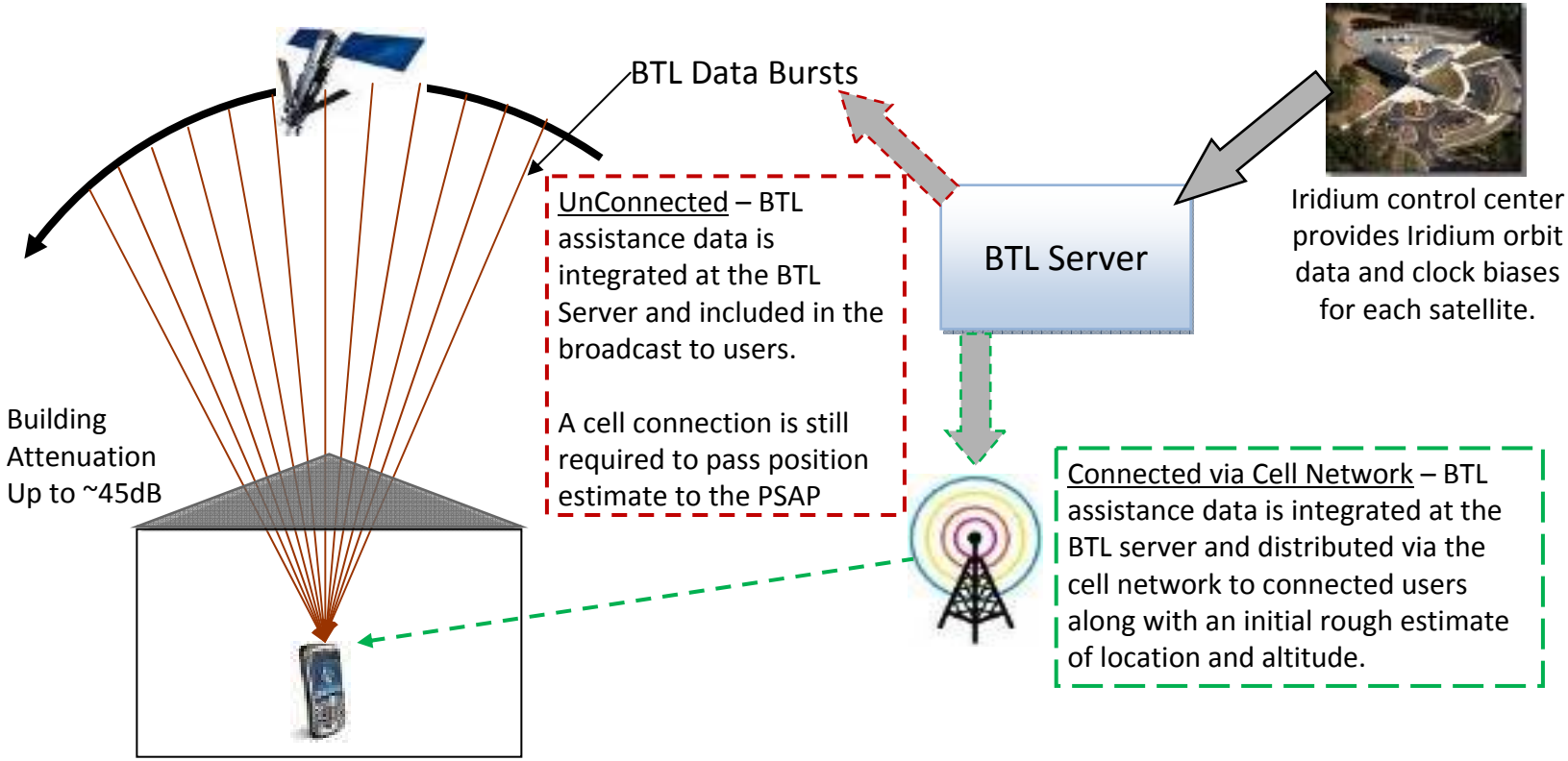
BTL Operational Architecture

Assistance data can be provided through cell network or via BTL signal



Handset receives BTL bursts and uses it to perform geo-location using Iridium alone deep indoors even where GPS is not available

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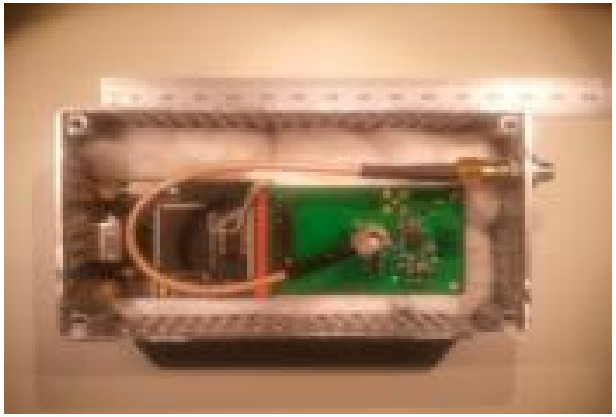
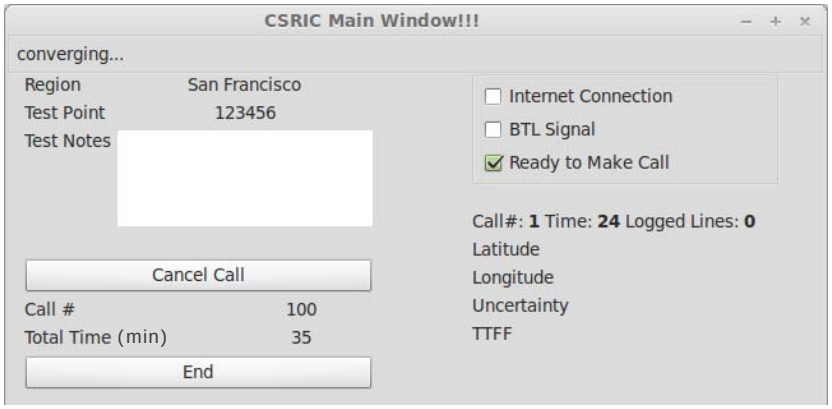
BTL Common Indoor Test Bed Configuration

- L-Band Patch Antenna
- 5 dB Attenuator
- BTL receiver –
  - Down converts Iridium RF signal into baseband samples



- BTL Laptop –
  - Graphical user interface
  - Baseband processing
  - Positioning engine (PE) software
  - Test data log output



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