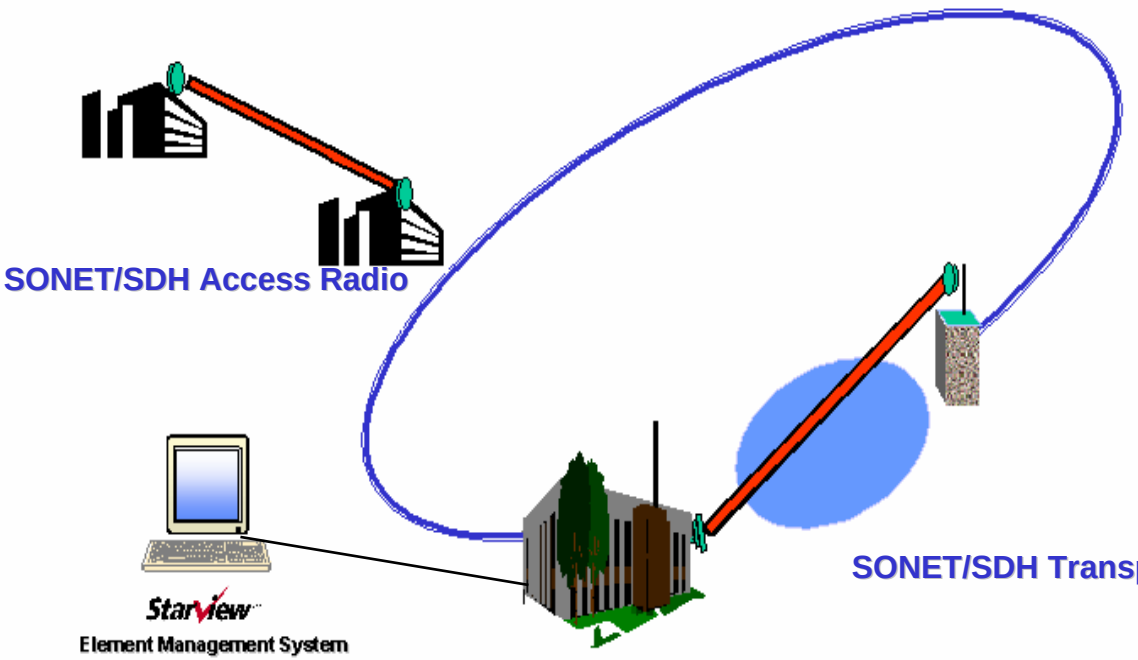
Galaxy

18, 23, 28, 38 GHz
High Capacity
Point to Point Radio

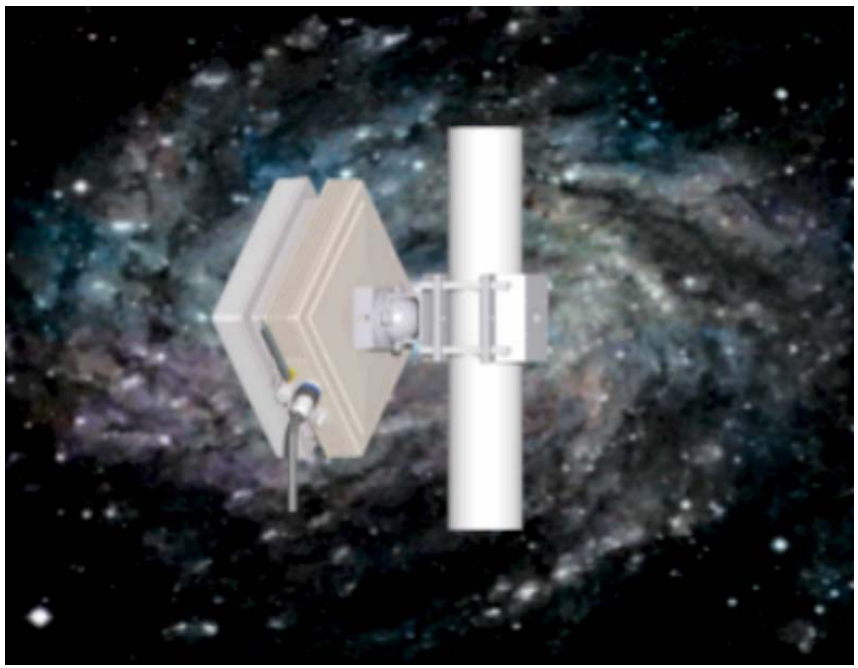
High bandwidth for access & fiber extensions

Ideal for high bandwidth (155mbps) access & fiber extension applications

- Short - medium length hops
- Congested urban environments
- Stringent zoning restricted areas
- High capacity wireless connectivity between base station transceivers

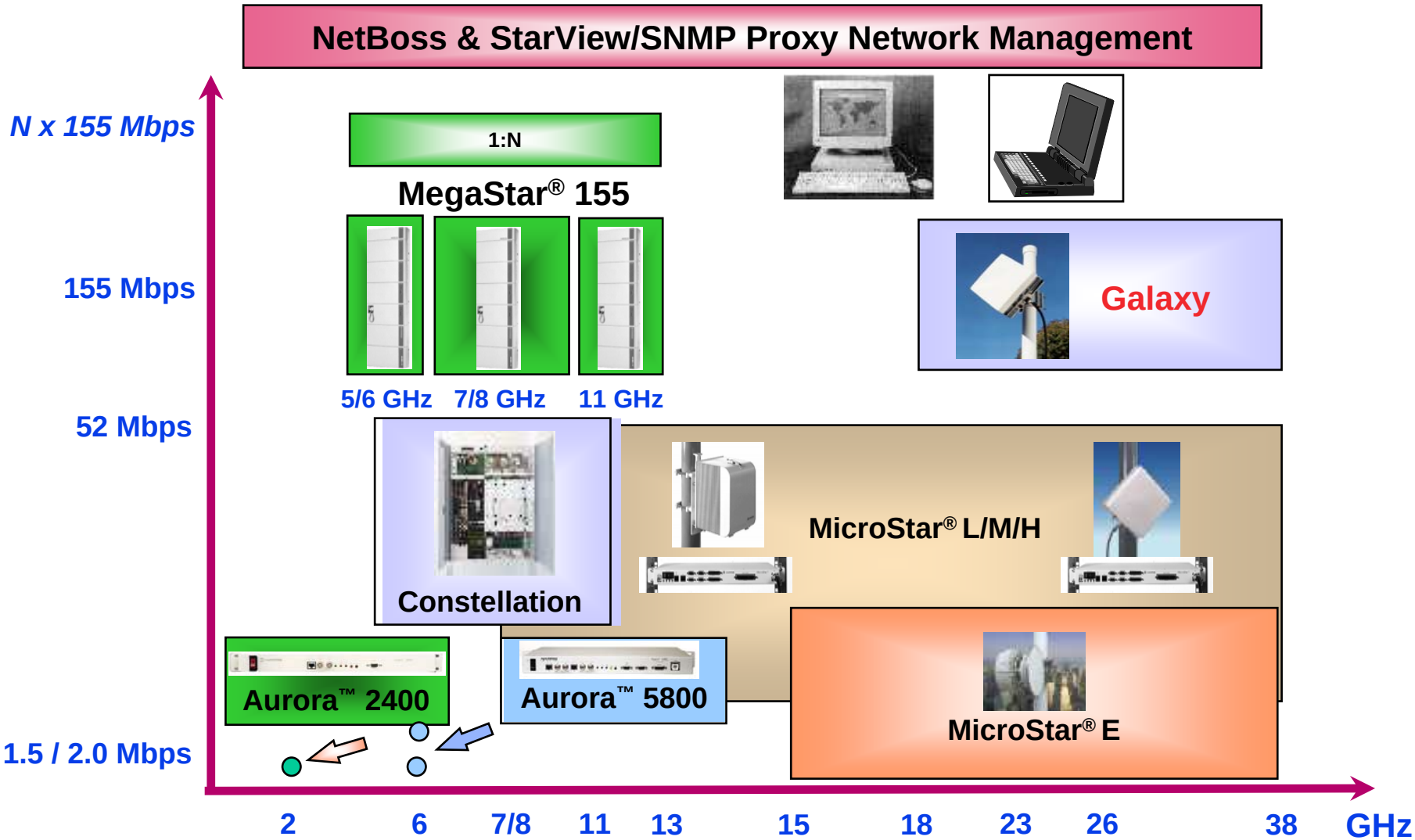


Galaxy™

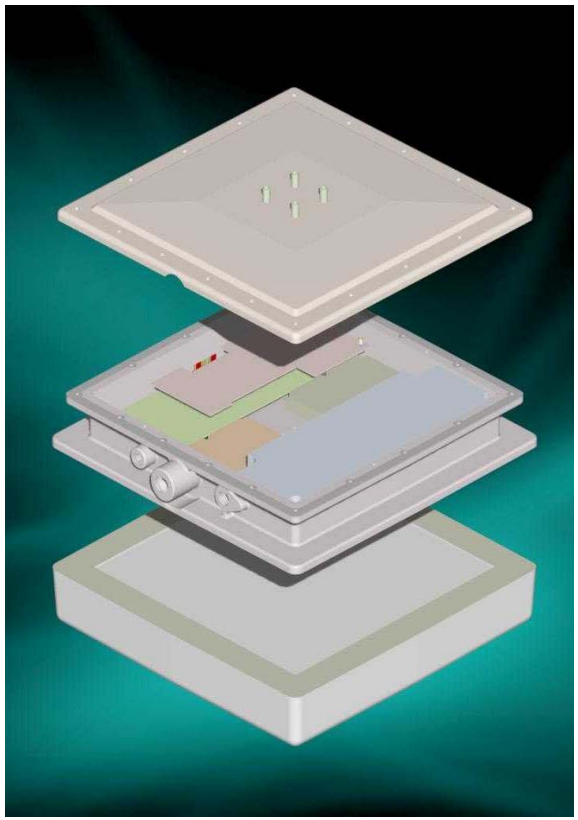


- High Frequency/High Capacity SONET/SDH Radio
- Compact, All-Outdoor Package
- Reliable, Superior Performance
- Local Radio Configuration by Wireless LAN
- Single Integrated Cable Interface
- Compatible Interfaces for 3G, CLEC, ISP, VPN
- Industry Standard SNMP Interface
- Low Power Consumption

MCD Point-to-Point Product portfolio



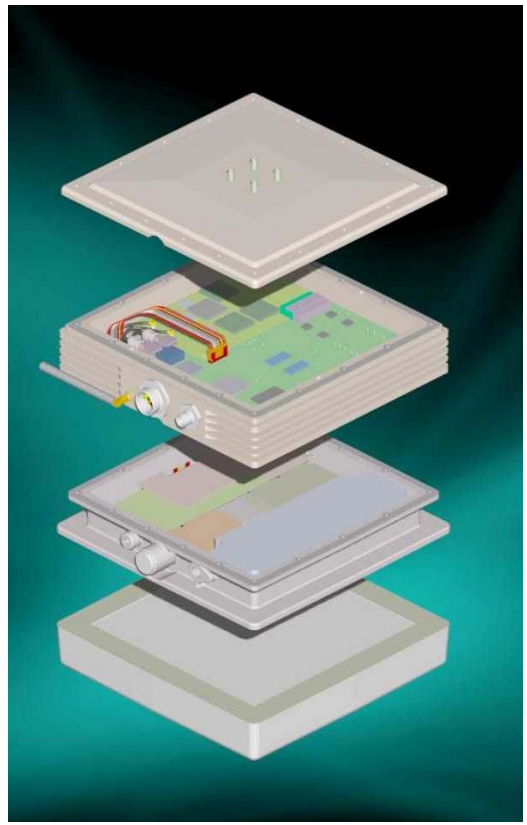
Design Evolution



Reduced RF development time
Leveraging existing design

Unit cost reduced through use of common materials & packaging

Capital investment reduced by modifying existing ATE & utilizing established manufacturing process



MicroStar-M → **Galaxy**

16 Months

Galaxy
Product Line Features

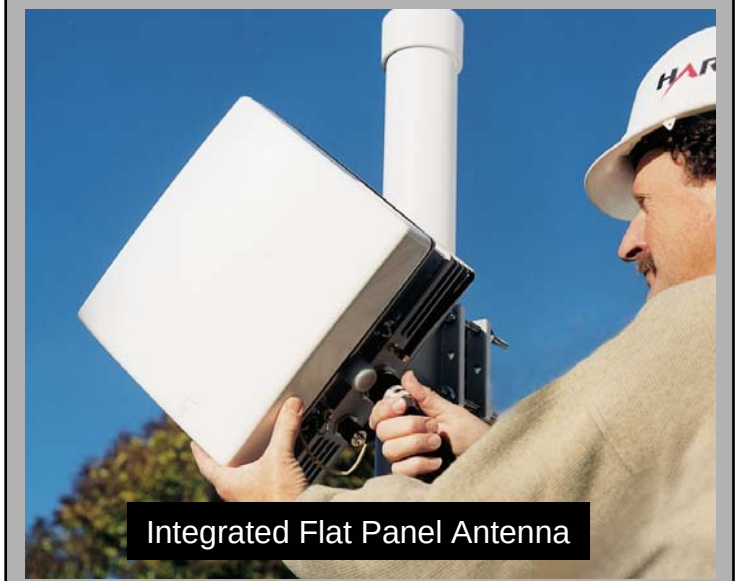
- **Product Line Features**
  - ITU Frequency Plans:
    - 18 GHz (55 MHz Spacing)
    - 23 GHz, 26 GHz, 38 GHz (56 MHz Spacing)
  - 155 Mbps (STS-3 or STM1, optical or electrical)
  - Optional Access Interface Unit
    - *Two* Protected E1/10Base-T Bridge Wayside Channels
    - 10Base-T
    - Payload Access
    - NMS
    - Data Service Channel
    - External Alarms

Outdoor Unit with Integrated
Flat Panel Antenna

Optional Access Interface Unit

Laptop Computer Craft Interface with
2.4 GHz Wireless PCMCIA Card

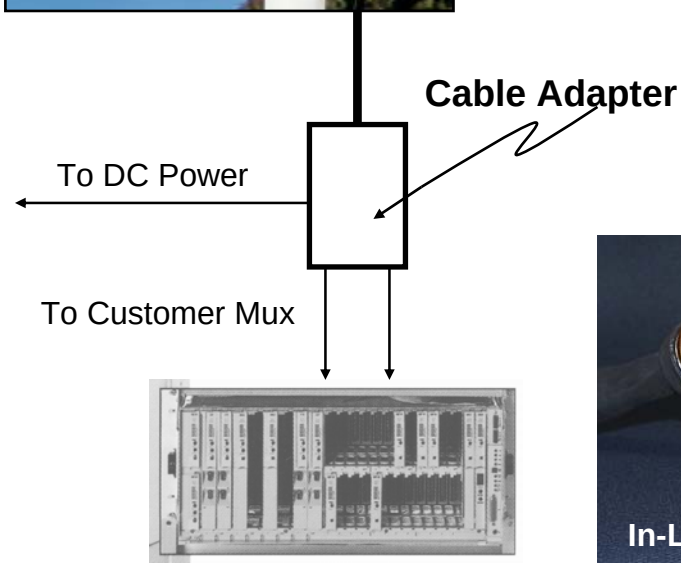
Galaxy
Antenna options



Alternatives for Every Installation

- Integrated Flat Panel Antenna
- Integrated Parabolic
- Split-Mount Parabolic
- Network Combiner (MHSB w/Single Antenna)

Galaxy
Interconnect Cable Interfaces



- Cable Adapter interfaces the Outdoor Unit to DC Power and premises equipment
- Mounted conveniently
- Not environmentally sealed
- Fiber and Coax Cables are available

Optional Galaxy AIU - NP Configuration

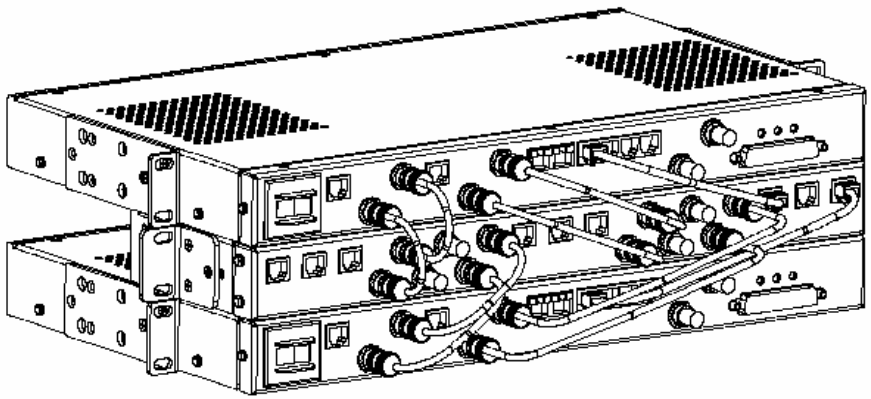
- ***Two*** **Protected E1 Wayside Channels**
- **10Base-T**
- **Payload Access Test Point**
- **NMS**
- **Data Service Channel**
- **External Alarms (8 Site Alarms and 8 Remote Controls)**

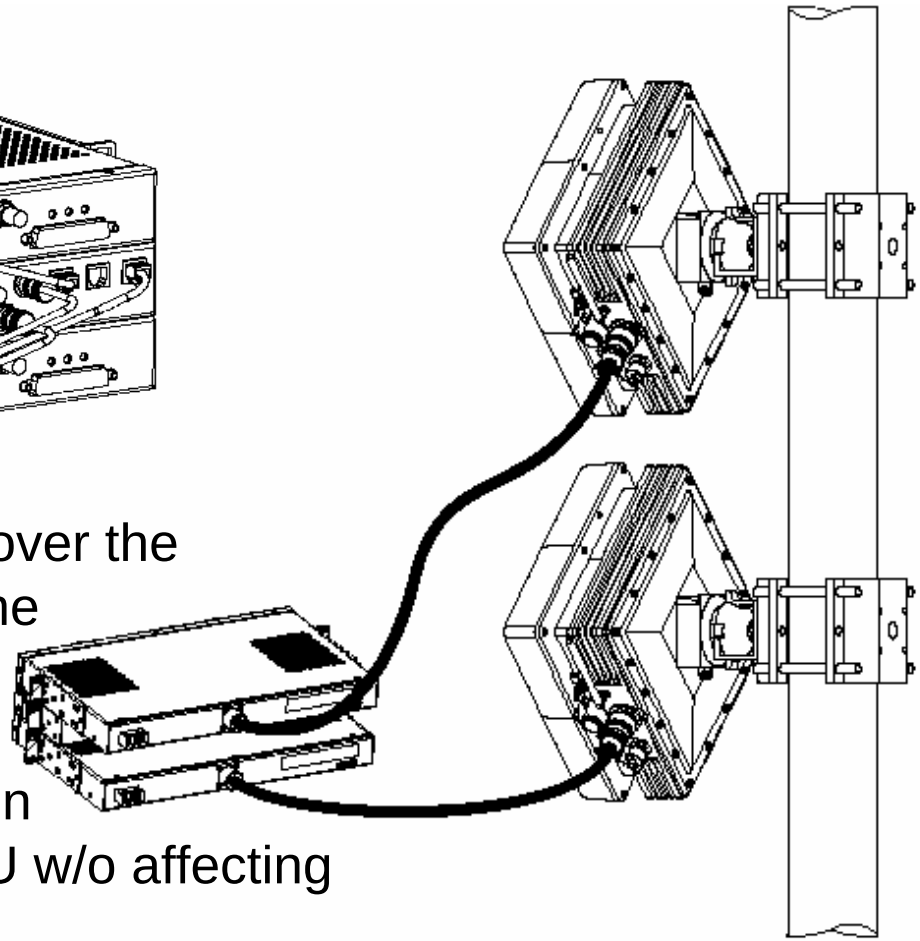
Galaxy
Splitter/Combiner Unit

- Splitter/Combiner Unit is only required for protecting Wayside & Data Service Channel
- 10Base-T Protection requires an OEM Hub device
- Passive Unit

Galaxy AIU - MHSB Configuration w/Splitter/Combiner Unit

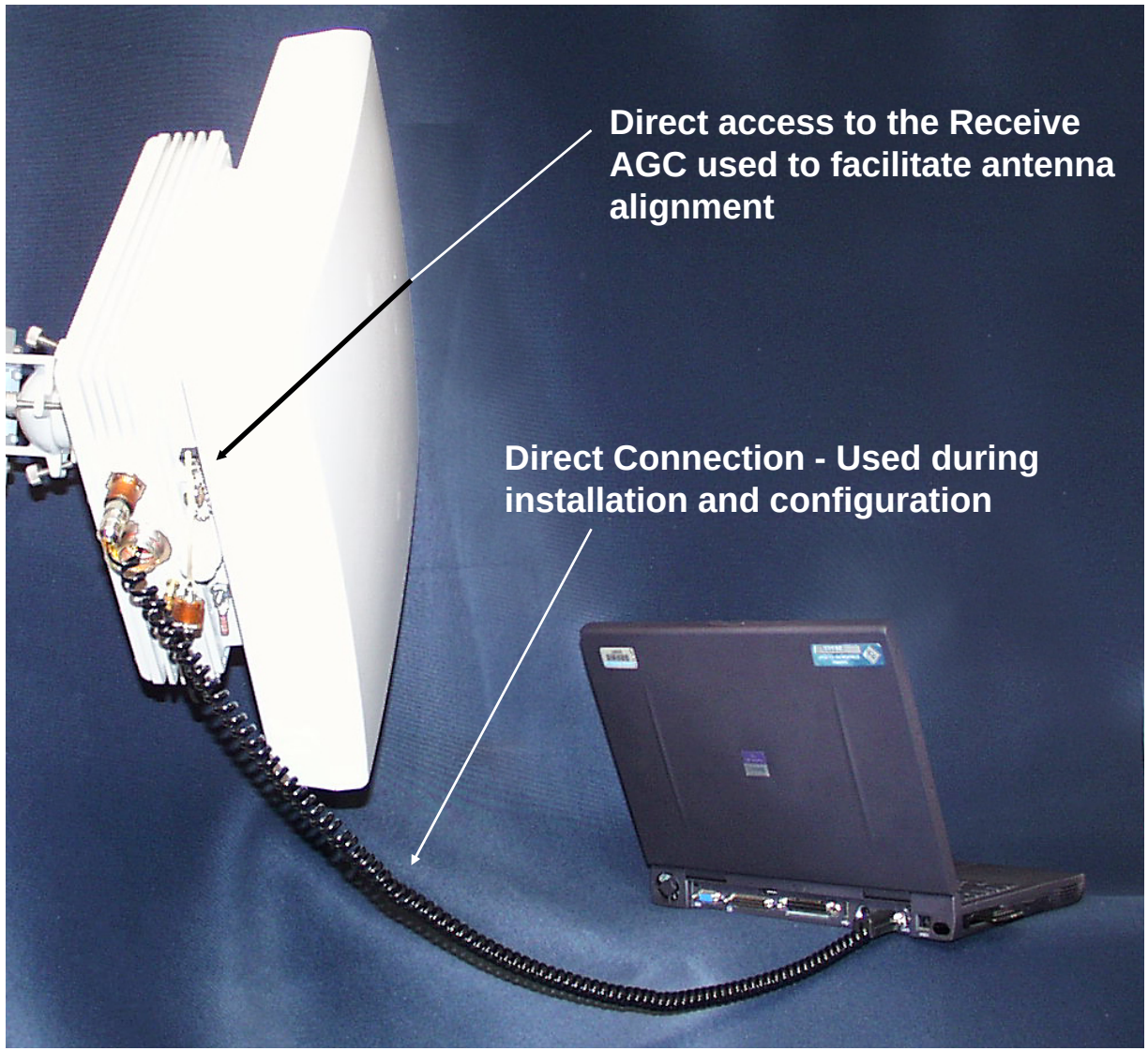
Galaxy - MHSB AIU Configuration w/Splitter/Combiner & Cables



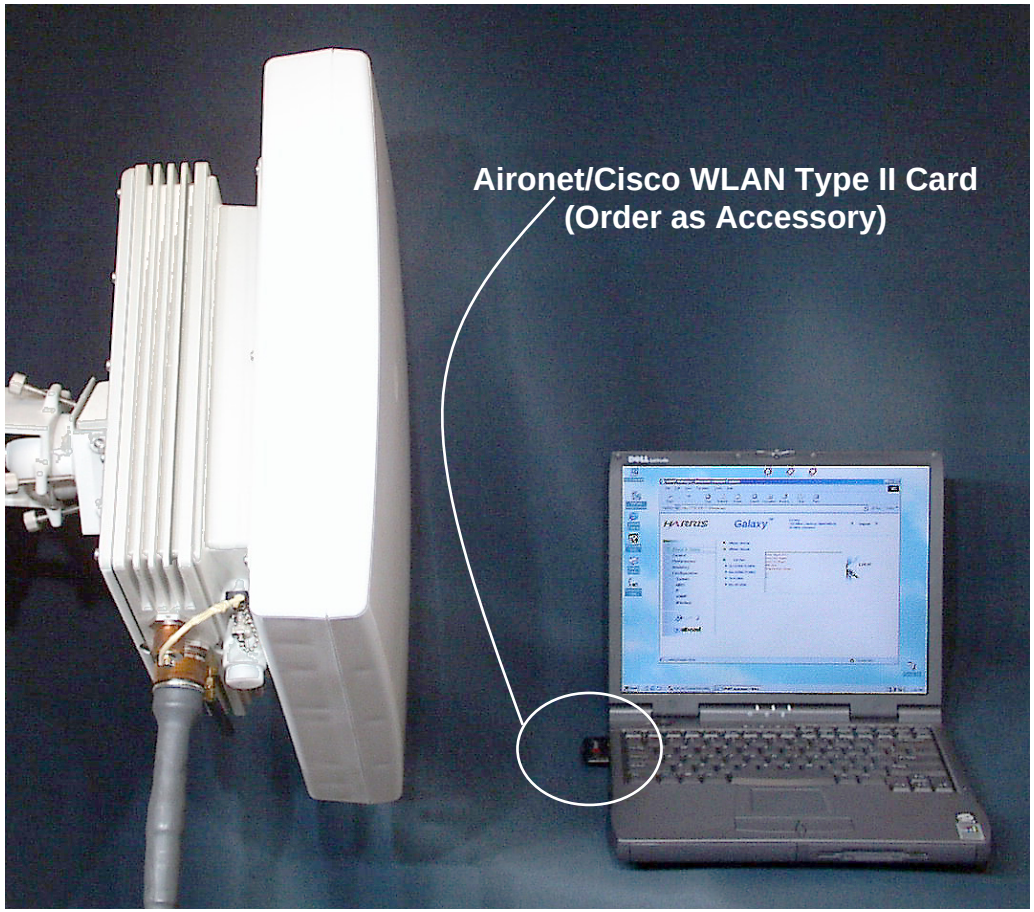


- Galaxy units communicate over the wireless interface to mute the off-line unit
- Protection is not errorless
- Single antenna MHSB option
- Replacement of ODU or AIU w/o affecting traffic

Galaxy - Initial Setup Configuration



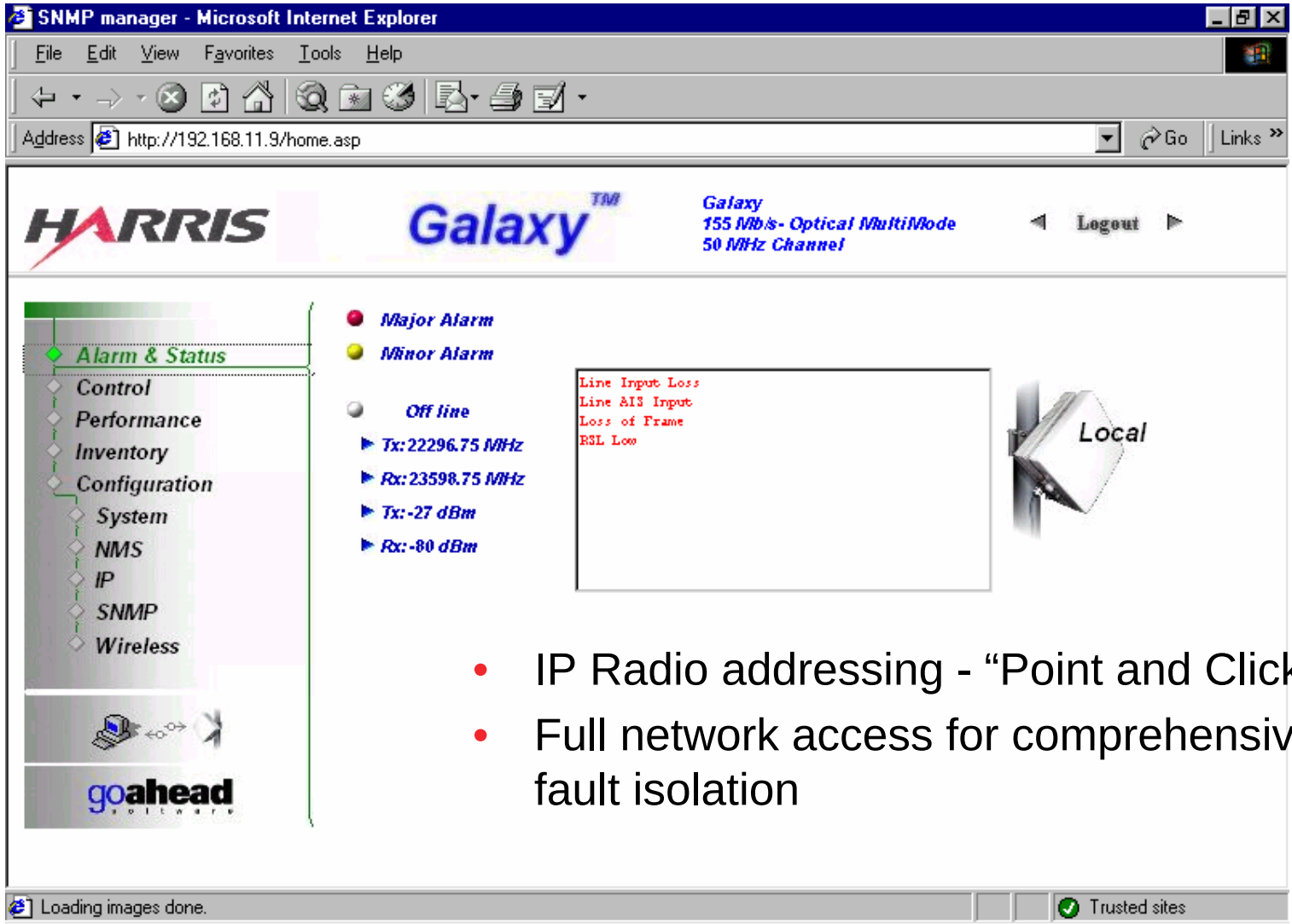
Galaxy
WLAN CIT Configuration



- Wireless CIT access using 2.4 GHz Spread Spectrum interface
- Uses Wireless Equivalent Privacy (WEP) IEEE 802.11 for secure connection
- Access is password protected
- Remote access of up to 300 m depending on obstructions

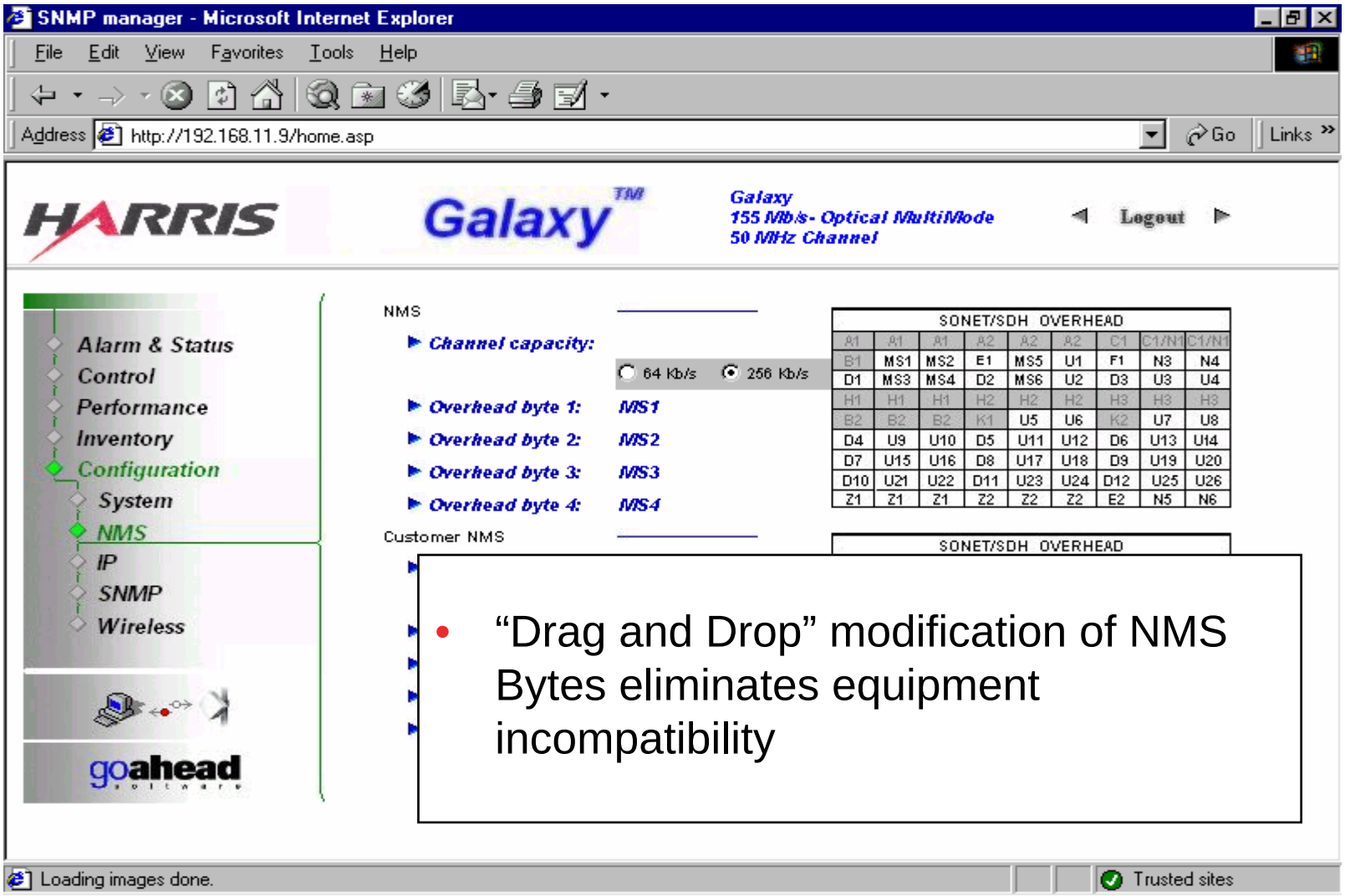
- Enables Service Provider maintenance personnel to connect to the Galaxy without requiring access to the customer building
- Radio repair requires only roof access

Galaxy
CIT Alarm & Status Screen



- IP Radio addressing - “Point and Click”
- Full network access for comprehensive fault isolation

Galaxy
CIT NMS Screen



- "Drag and Drop" modification of NMS Bytes eliminates equipment incompatibility

Product Comparison

Feature	Benefit to Customer	Galaxy 23 GHz	Altium 23 GHz	Giganet 23 GHz
System Gain	System Availability, Infrastructure Cost (# of Repeaters)	95.0 dB – Significant FEC Advantage	81.0 dB	92.0dB (Std Pwr) 94.0 dB (Hi Pwr)
Channel Bandwidth	Regulatory Compliance, Ability to Carry Defined Payload within Minimum Bandwidth	50, 56 MHz	28 MHz	50, 56 MHz
Packaging	Rack Space Requirements, Thermal Requirements	All-Outdoor Radio Optional AIU	ODU/IDU Required	ODU/IDU Required
Size	Aesthetics, Zoning Regulations, Ease of Installation, Maintainability	ODU – 12”x12”x7.25” - .63 cu ft (w/o Antenna)	ODU – 19”x11.8”x9.4” – 1.2 cu ft (w/o Antenna)	ODU – 10” dia x 9” depth (w/o Antenna)
Weight	Ease of Installation, Tower Strength Requirements, Infrastructure Cost	ODU – 21.25 lbs (w/o Antenna)	ODU – 36.3 lbs IDU – 13.2 lbs (w/o Antenna)	ODU - 18 lbs IDU – 7 lbs (w/o Antenna)
Power Consumption	Reduces Power Supply and Battery Plant Requirements	60W	110W	Data Not Available
Antenna	System Availability, Aesthetics, Cost	16.5 inch Flat Panel Included - 37 dBi Gain	No Antenna Included	No Antenna Included
Adaptive Power Control	Lowest Possible Output Power Minimizes Interference & Allows Maximum Frequency Re-Use	Continuous Adaptive Power Control – 30dBm Dynamic Range	Standard ATPC – Single 7 dBm Step	Data Not Available
OAM&P	Standard CIT & Open EMS/NMS Interface Allows Options for Interfacing Local Control & NMS System	Web-Based CIT and SNMP NMS Interface Via Wireless LAN or Hardwire	Web-Based CIT and SNMP NMS Interface via Hardwire	Proprietary CIT and SNMP NMS Interface via Hardwire
Wayside Channels	Allows Additional Bandwidth for System Operator’s Use, e.g. LAN Extension, High Speed NMS Transport, Fee-Bearing Traffic, etc.	Two (One In-Band & One Out-of-Band) E1/T1 Wayside Channels w/capability to use one with 10Base-T (w/AIU)	No Wayside Channel	One In-Band Wayside Channel 10BaseT, T1 or E1
Service Channels	Allows Communication Between Maintenance Personnel at Network Sites	Two Data Service Channels - VF Service if Using VOIP (w/AIU)	Two Data and VF Service Channels	One data and one VF Service Channel
External Alarm Capability	Extends dry contact & TTL alarms from external equipment items such tower lights, door alarms, etc.	8 Input and 8 Output (w/AIU)	8 Input and 4 Output	1 Input and 5 Output
Power Source Adaptability	Permits Variations to Input Voltage and Polarity	Wide-Mouth, Auto-Polarity Sensing (+/-21 to 60 VDC)	Negative Polarity (-40.5 to 72 VDC)	Negative Polarity (-40.5 to 72 VDC)

Q&A