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# TECHNOLOGY ASSURANCE LABS

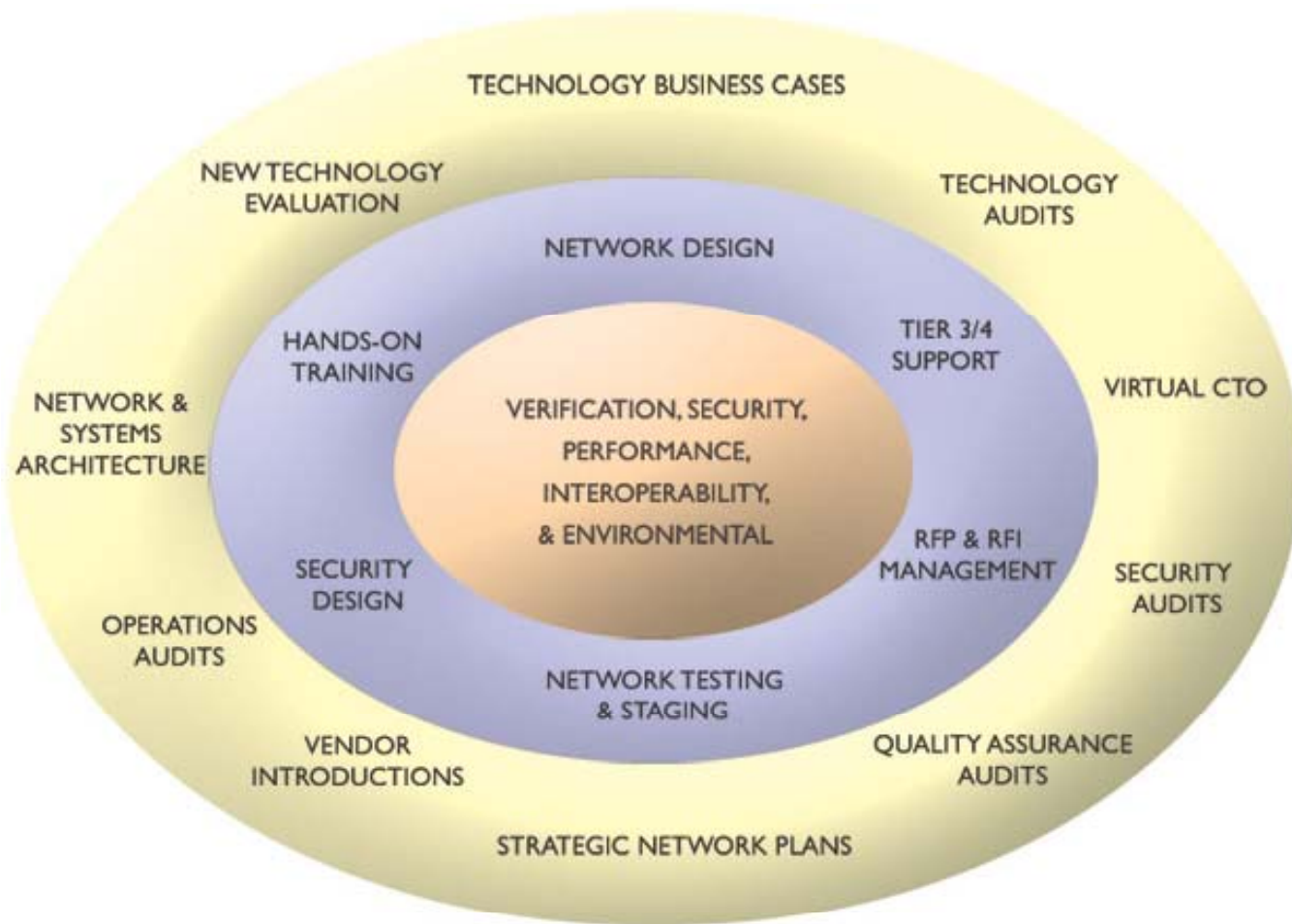


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We'll guide you through the confusion



## Map of Services Research and Development



= TECHNOLOGY CONSULTING



= DESIGN & DEPLOYMENT



= LAB & FIELD TESTING



## Customers (Service Providers)

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### Government

- Anguilla Public Utilities Commission
- Broward County
- City of Palm Coast
- City of Hallandale Beach
- Defense Information Systems Agency
- Florida Dept. of Transportation
- Ft. Lauderdale Executive Airport
- Town of Jupiter Island
- Lamar Independent School District
- Martin County IT Network
- Martin County Airport
- Martin County Sheriff's Office
- Martin County School District
- Orlando International Airport
- Port Everglades Seaport
- South Martin Regional Utility

### Non-Government

- Alinean
- CBS Interactive
- CSX Railroad
- Clark & Daughtery Medical Group
- DNA Communications
- Electa Limited -- Ukraine
- Florida East Coast Industries
- Martin Memorial Hospital
- MIMA Medical Group
- Miniclip
- Pinecrest Schools
- Reliance Infocomm, Ltd -- India
- Shell Oil
- SmartCity Networks
- SmartCity Telecom



We have test equipment and experience with the following – and more

## Technologies

	SERVICE PROVIDERS	EQUIPMENT MANUFACTURERS	VENTURE PARTNERS
IP / ETHERNET VOIP	✓	✓	✓
WIFI, WIMAX	✓	✓	✓
FIBER OPTIC	✓	✓	
VIDEO & SECURITY	✓	✓	

- ❑ Optical (WDM, CWDM, DWDM)
  - ✓ Ultra Long Haul, Long Haul
  - ✓ Metro
  - ✓ Free Space Optical

- ❑ IP/Ethernet
  - ✓ BGP,IS-IS,OSPF, MPLS
  - ✓ VOIP, QOS, VLAN,
  - ✓ Legacy Support LAT,SNA,IPX...

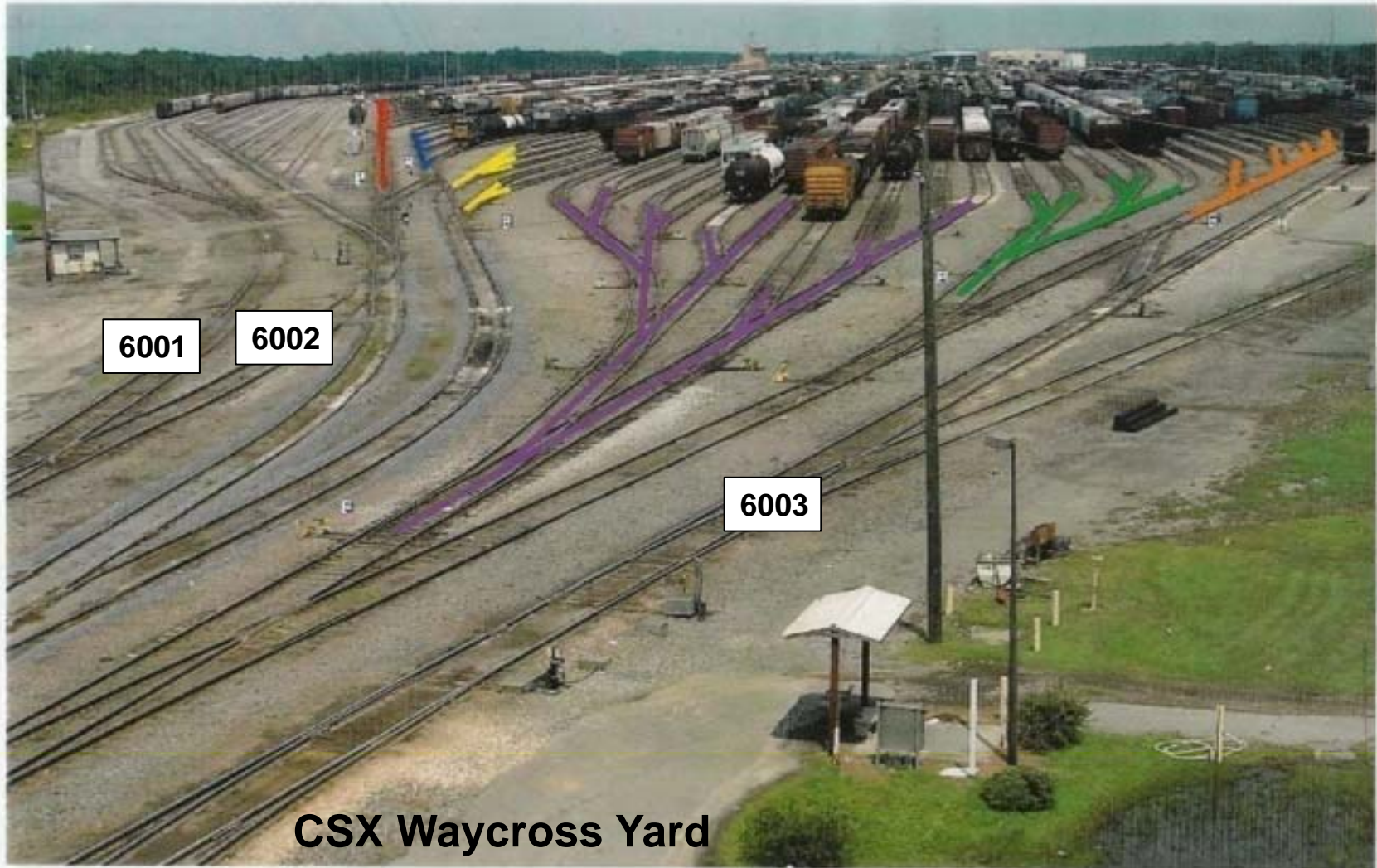
- ❑ Last Mile
  - ✓ DSL / Cable Modem
  - ✓ Microwave
  - ✓ Cellular

- ❑ Wireless
  - ✓ WiFi
  - ✓ WiMax
  - ✓ LTE
  - ✓ RFID

- ❑ Video / Security Networks



# Train Verification System





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- Inability for CSX to verify Train Build vs. Consist on the departure tracks in rail yards due to RF multipath issues
  - Results in
    - ✓ Personnel Cost for Human Verification per Yard
    - ✓ Fines for Inaccurate Consists
    - ✓ Customer Dissatisfaction
    - ✓ Incorrect Consist affecting PTC control systems
    - ✓ etc.





## Our Solution

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- ✓ Used latest generation IP readers
- ✓ Reduced RF footprint
- ✓ Wrote software to decode RFID tags
- ✓ Conducted Lab Trial and Field Trial of the system (2009)
- ✓ Designed logic and wrote software to piece together strings of cars during pulls and pushes on forwarding tracks
- ✓ Copyrighted software in March 2010
- ✓ Implemented a full yard prototype at the RICE YARD in Waycross, GA in May 2010



# Train Verification System







**TECHNOLOGY  
ASSURANCE LABS**

## **CSX Hardware System Components**

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- **Next-Gen IP Reader**
- **Narrow Field Antennas**
- **Tiefenbach Wheel Sensors**
- **Arbor/Cubix Presence Sensors**
- **Ruggedized PC**
- **IP Switch for Comms**
- **24 Volts DC**



# Specifications

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**Supported RFID Protocols:** ISO10374 (ATA), ISO18000-6C, ISO18000-6B, IPx, T21, IT2200, SeGo, IAG

**Communications:** 10/100 Ethernet, RS-232 Serial, Wireless (802.11a/b/g/n, 3G, 4G, Satellite, custom frequency bands)

**Antenna Interface:** 50-ohm, SMA or N-Type (depending on version)

**Antenna Ports:** 2 or 4 depending on configuration

**Input Power:** 24 VDC, 110VAC, 220VAC, Solar power option available

**Power Consumption:** Varies by configuration 60 Watts in worst case

**Environmental:** -40°C - +55°C (Operating) -40°C - +85°C (Storage), 100% Humidity (Condensing)

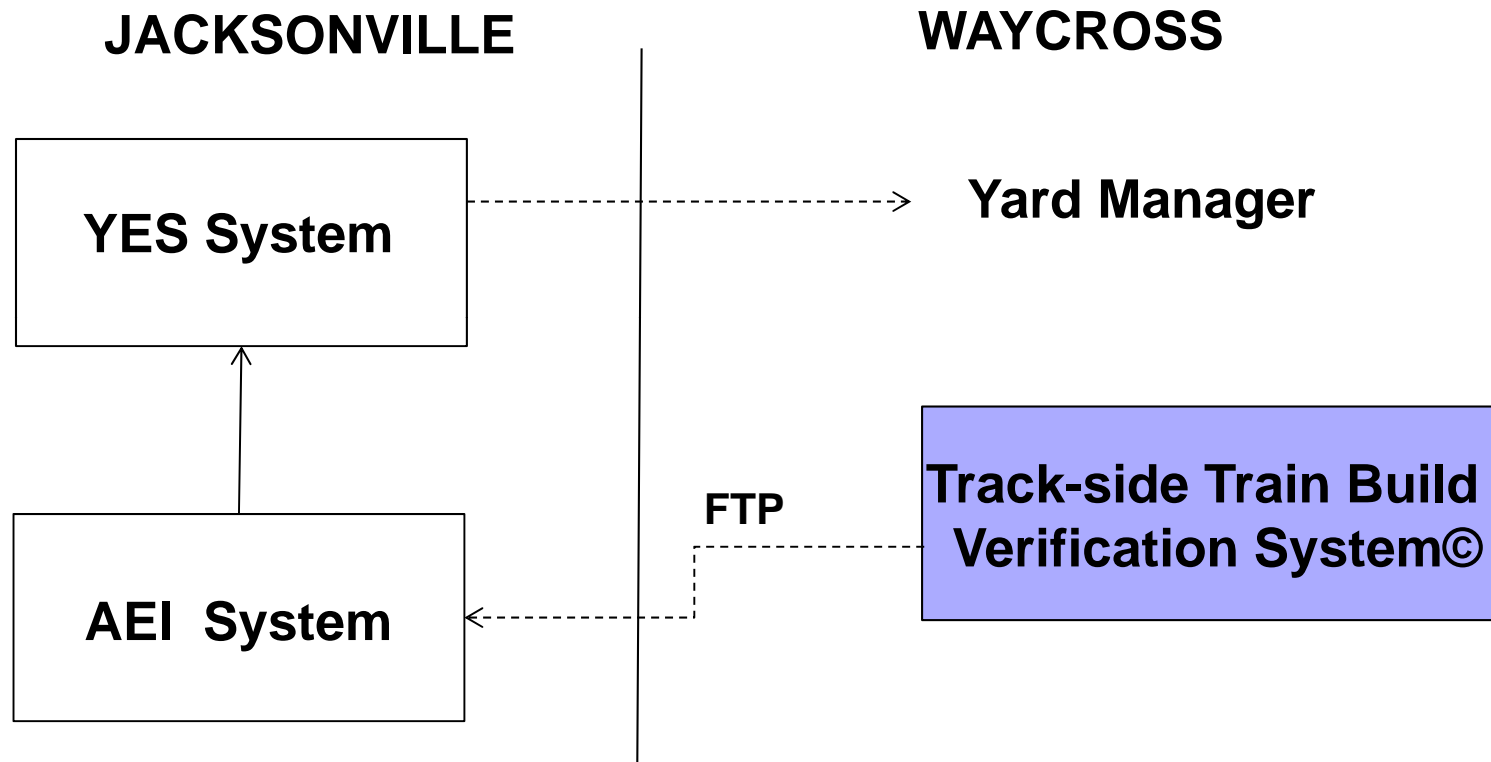
**Supported Readers:** Transcore (E5, E6, AI1200, MPRR), SIRIT Identity Series (ID5200, ID5204)

**Digital IO:** 4 ports (can be extended to 32 ports through add on module)

**Field Upgradeable Software:** Yes

**Output Formats:** AAR S918a (multiple hosts with different formats), custom formats (yard management or billing)

**Track Configurations:** Single or multiple tracks



- Consist information and health messages sent via ftp to AEI system
- AEI System preprocesses consist, then sends info to YES system
- Yard Manager compares consist to double over order



## Sample of Waycross Data

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### Site 6001

Total Cars	Read cars	Missed Cars	% missed	%read
181	181	0	0.00%	100.00%

### Site 6002

Total Cars	Read cars	Missed Cars	% missed	%read
380	379	1	0.26%	99.74%

### Site 6003

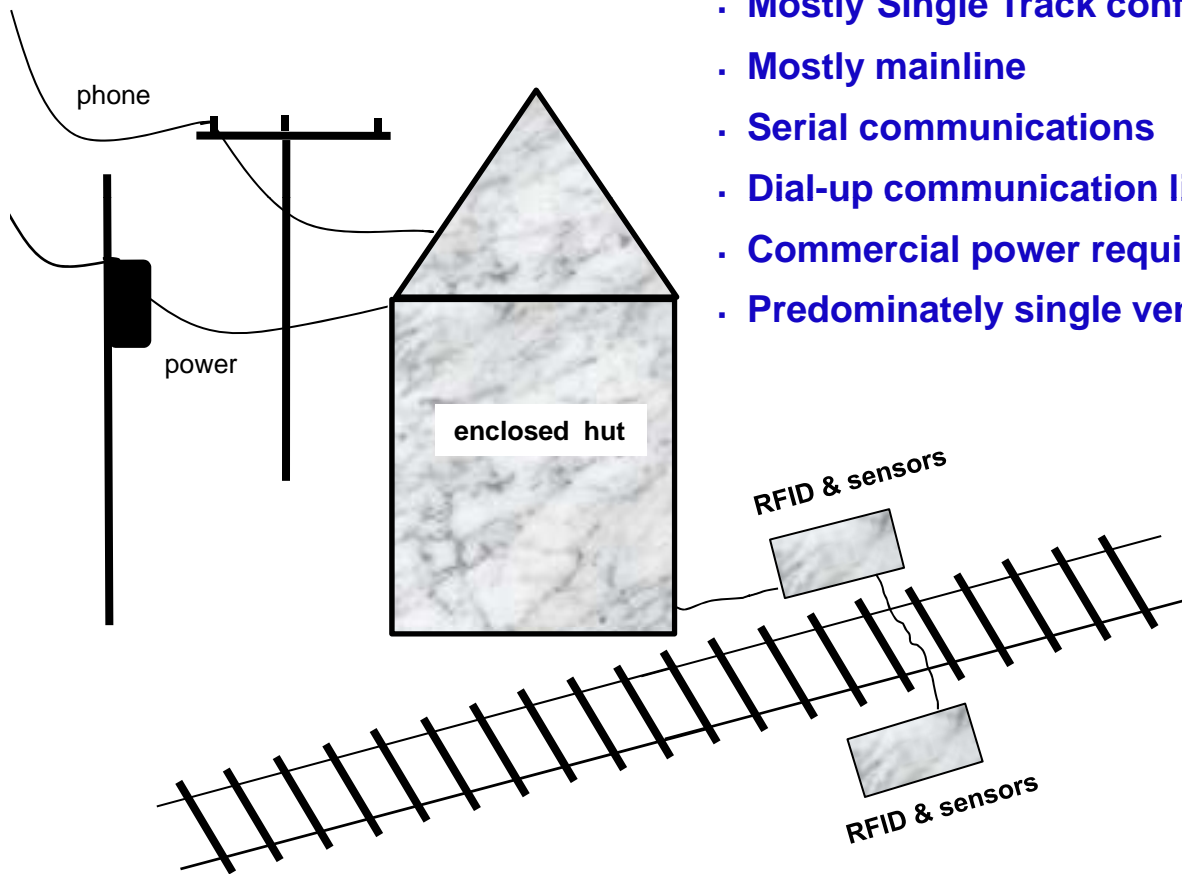
Total Cars	Read cars	Missed Cars	% missed	%read
820	813	7	0.85%	99.15%

### Waycross Total

Total Cars	Read cars	Missed Cars	% missed	%read
1381	1373	8	0.58%	99.42%

# Existing AEI System Architecture

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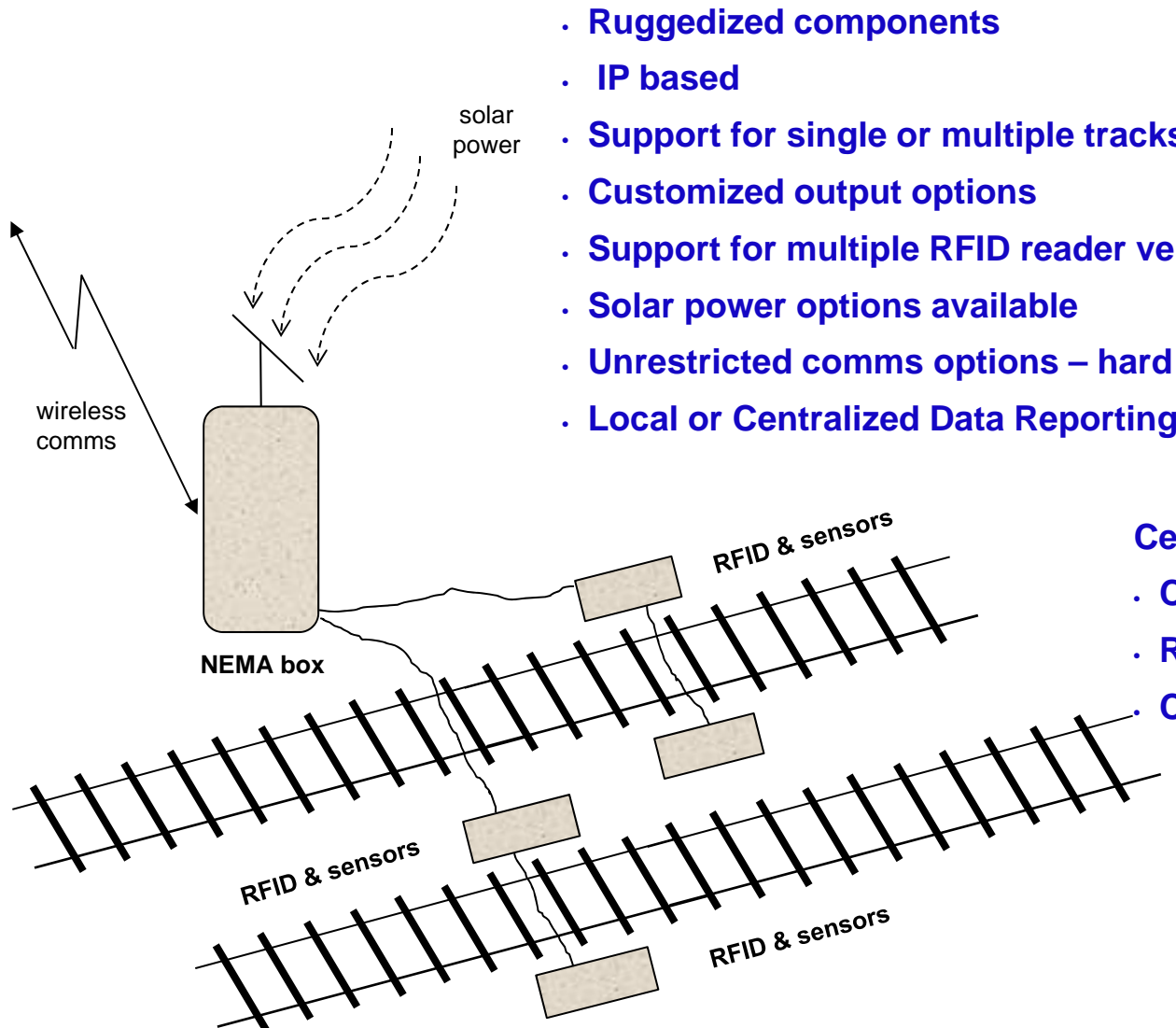


- Aging architecture using AI1200 reader
- Mostly Single Track configurations
- Mostly mainline
- Serial communications
- Dial-up communication lines in most cases
- Commercial power required
- Predominately single vendor for reader





# Next-Gen AEI System Architecture



- Ruggedized components
- IP based
- Support for single or multiple tracks
- Customized output options
- Support for multiple RFID reader vendors
- Solar power options available
- Unrestricted comms options – hard line or wireless
- Local or Centralized Data Reporting

## Centralized Reporting

- Central Controller for All Readers
- Readers Report Each Transaction
- Central Database of all events



## Contact Us

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