NAM/MRFAC Presentation:

The Role of Wireless Technology in Manufacturing Productivity and Safety

US Manufacturing Productivity

- Over the past 25 years, U.S. manufacturers have outstripped most of the competition in output per worker hour. Between 1979 and 2005, U.S. productivity gains averaged 4.1% per year (Source: Managing Automation, November 20, 2006).
- U.S. manufacturing productivity continues to grow. Between 2006-2007, the gain was 4.7% which was better than all but three of the 17 nations historically evaluated by the Bureau of Labor Statistics (BLS News Release, March 3, 2009)
- Experts believe that future improvements will focus on maximizing the efficiency of, and hence the return on, manufacturing assets rather than further reducing headcount (Source: Managing Automation)
  - *e.g.*, instead of long, steady production runs, assembly processes will be increasingly shifted to meet spikes in demand for particular products.
  - *wireless networks, both licensed by the FCC and unlicensed, will be critical components in achieving these productivity gains (id. at p. 4).*

The Importance of Wireless in Manufacturing

- Wireless automation boosts productivity by eliminating the need to manually note information and then subsequently input that information into a computer system.
- Data moves faster and more accurately through the business supply chain, connecting salespeople and customers with shipping and receiving, the warehouse, the factory floor, vendors and partners.
- Wireless data collection and bar code scanning eliminate errors in the production process, increasing product quality and reducing inventory levels. Mobile asset maintenance ensures maximum uptime for machinery.
- Wireless-equipped technicians can wirelessly access the entire maintenance history for a specific piece of machinery, increasing asset uptime and savings. Unscheduled stop in assembly lines can cost tens of thousands of dollars.

  (Source: Symbol Technologies)

Examples of Wireless-Enabled Manufacturing

- Automotive Industry
  - Error Proofing – operators can physically scan parts prior to use with handheld computers, enabling operators to verify if the part is correct.
  - Asset maintenance ensures that equipment is timely serviced using correct maintenance routines. Tools and parts can be automatically reserved to ensure availability on the day a certain piece of equipment is scheduled for service. (Source: "Symbol Technologies, supra" at p. 60-62).
- Aerospace Industry
  - Error Proofing and Traceability – mobile automation reduces errors in the manufacturing process by: 1) ensuring that the correct parts are used at every stage of the assembly; 2) providing a complete audit trail of parts, enabling the rapid location of any faulty parts in assembled/delivered aircraft; and 3) providing complete installation history.
  - Mobile Field Service –manufacturers can provide service engineers with instant access to everything from a list of services to be performed, to mechanical drawings, specific instructions, and a step-by-step check box. (Source: *id.* at p. 63-64).

Manufacturers' Radio Use Is Specialized

- Materials handling
- Plant security
- Emergency medical
- Communications Systems for Confined Hazardous Areas ("CSCHA")
- Remote control
- Intrinsically Safe
- Just-in-time
- To name a few . . . .

Regulatory Background

- Private land mobile radio (“PLMR”) licensed by FCC under Part 90 of its Rules
- Unlicensed spectrum authorized under Part 15
- Principal licensed mobile radio bands:
  - VHF (72-76 MHz and 150-170 MHz)
  - UHF (450-470 MHz) (plus 470-512 MHz in a few areas)
  - 800 MHz
  - 900 MHz
- Principal Unlicensed Bands
  - 902 – 928 MHz
  - 2400 – 2483.5 MHz
  - 5150 – 5350 MHz
  - 5470 – 5725 MHz and
  - 5725 – 5850 MHz

Regulatory Background (cont.)

- VHF and most UHF channels shared.
- 800/900 MHz and 470-512 MHz channels exclusive.
- Shared channels coordinated by MRFAC and other entities certified by the FCC for this purpose
- PLMR channels licensed on a site-specific basis, rather than auction/geographic area
  - Since manufacturers are looking to serve their own internal needs, rather than consumers, FCC's predetermined auction areas do not work for PLMR licensing

Typical Large Company B/ILT Radio Facilities

Typical Radio Services Support

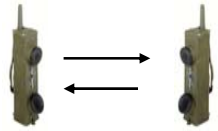
Varied Radio Applications

- CSCHA Safety Radios
- 72/75 MHz RC Cranes
- 150 MHz Facilities Comm
- Emergency Operations Center (”EOC”) 450 MHz Radios
- 450 MHz Lic.Transportation
- 800 MHz Fire/Security
- Various Unlicensed Systems

Typical Radio Services
Radio Usage Timeline

Business & Industrial radio systems

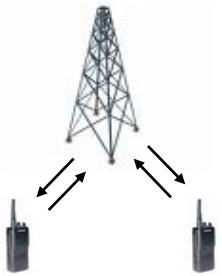
Enables region-wide communication & efficient frequency use



Began use of 2-way Radios 1950's

450 MHz Non-Trunked Radios used

Some Upgrade to trunked 800 MHz systems Early 1980's



800 MHz 3.0 Z Release Upgrade 2005 - 2006

800 MHz Smartzone System Upgrade 1996 - 1998

New Communication System 2012 to 2016

1940's | 1950's | 1960's | 1970's | 1980's | 1990's | 2000's | 2010's

User unique systems

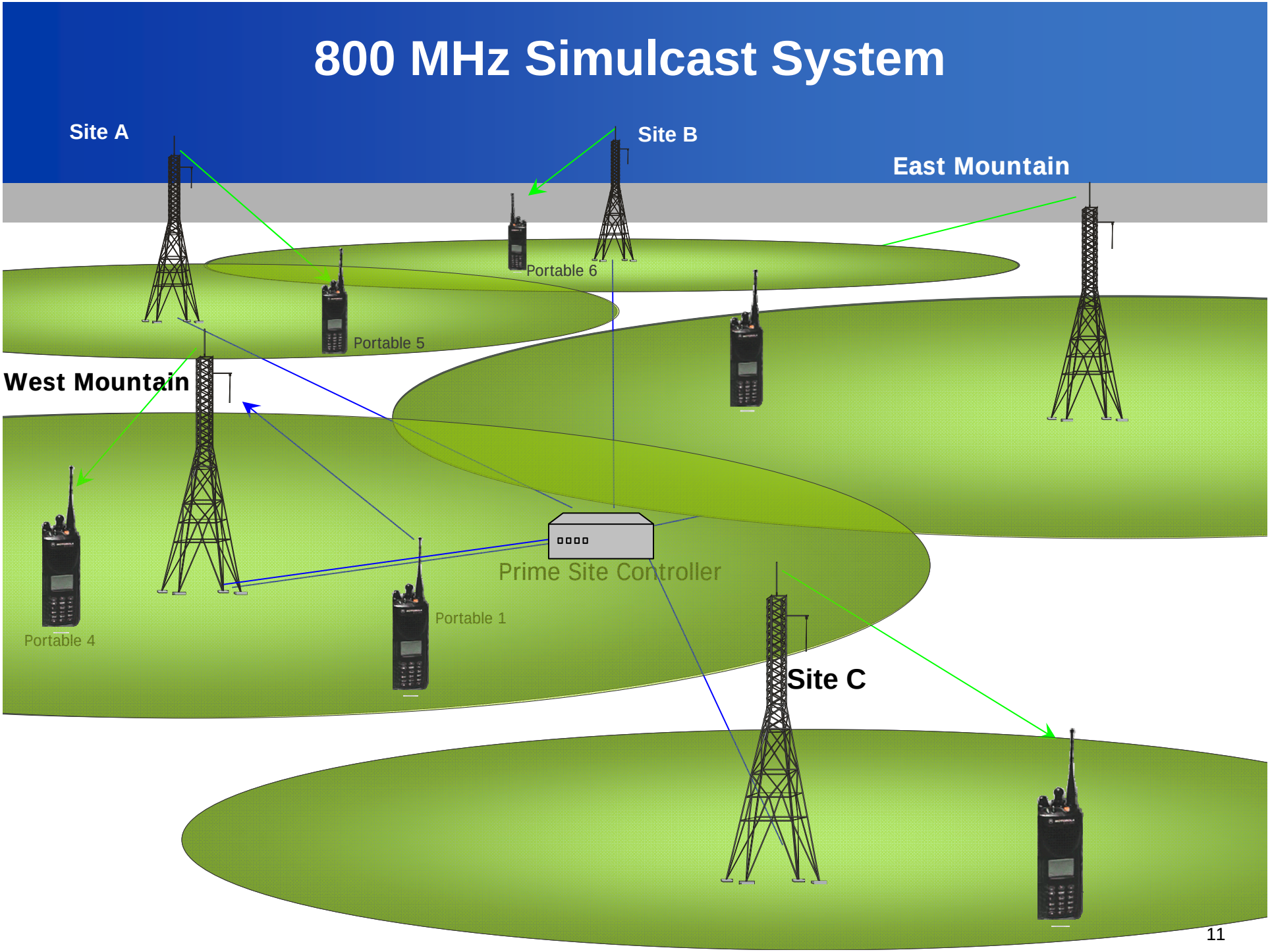
1st Radio Controlled Crane System Late 1960's

1st CSCHA System Early 1980's

2nd CSCHA System 1998

3rd & 4th CSCHA Systems Site 1 – 2007 Site 2 – 2009

800 MHz Simulcast System

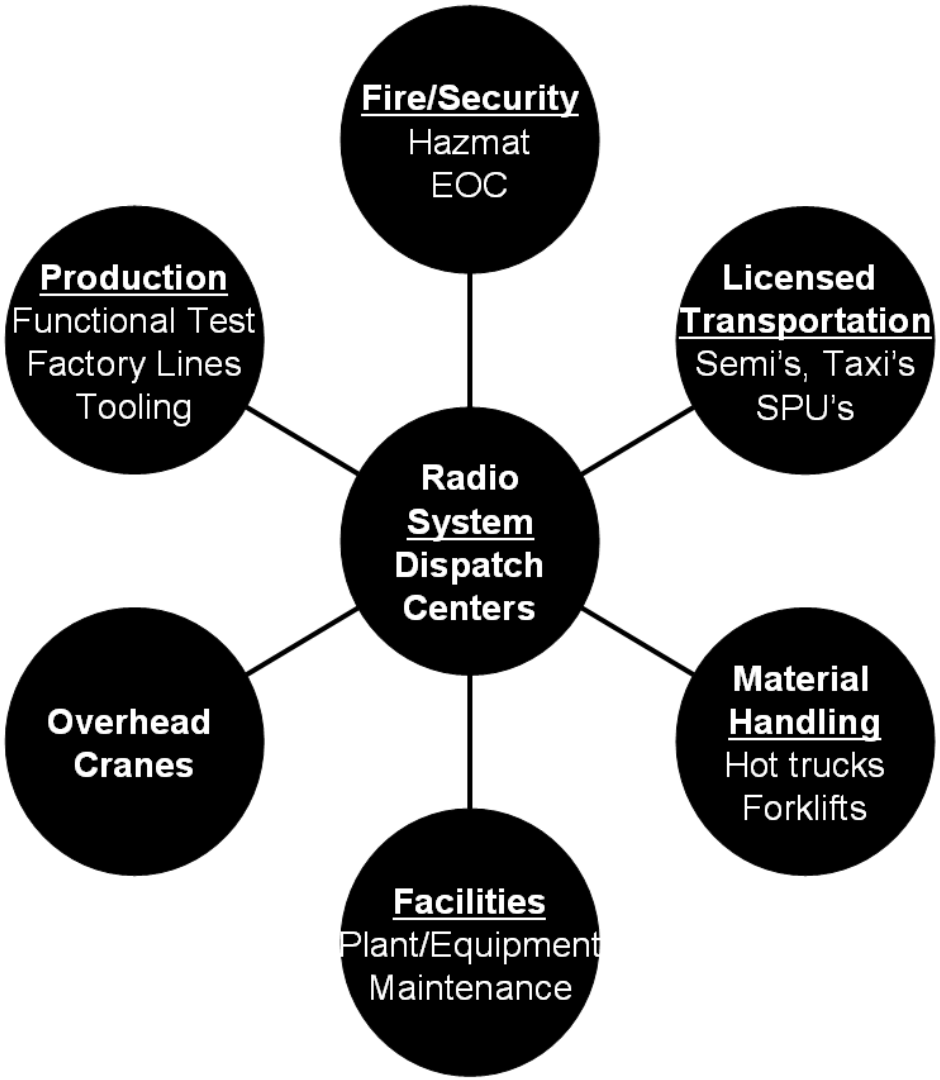


System Statistics

- 11K+ Total Unit ID’s
- 10K+ Active ID’s
- 52K+ PTT’s per day

- Dispatch (One to Many) Operation
  - Multiple Dispatch Centers
- Direct Radio contact with
  - Headquarters Office
  - Washington DC Office

Multiple B/ILT Radio Users



Multiple B/ILT Radio Users

Production Site A - 42.7%
Production Site B - 61.4%

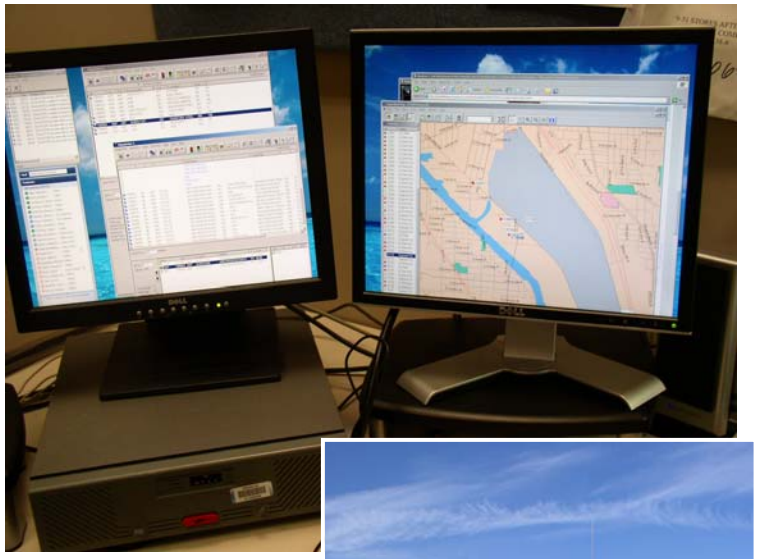
Radio Subscriber Units

Multiple B/ILT Radio Users

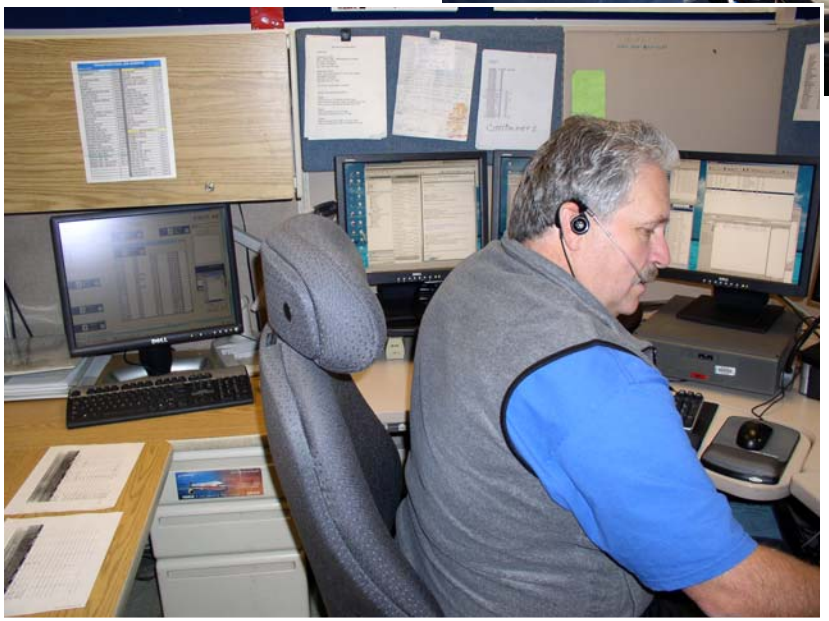
Fire / Security

Over 500 Voice Radios
100 EOC Radios

Transportation



Over 235 Data Radios
Nearly 300 Voice Radios

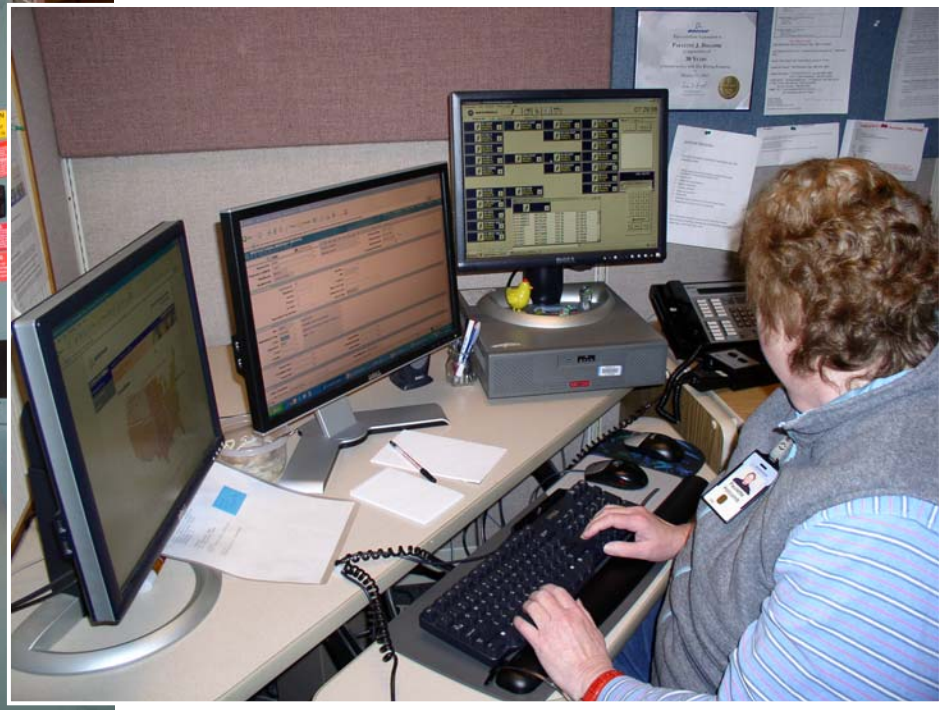


Material Handling

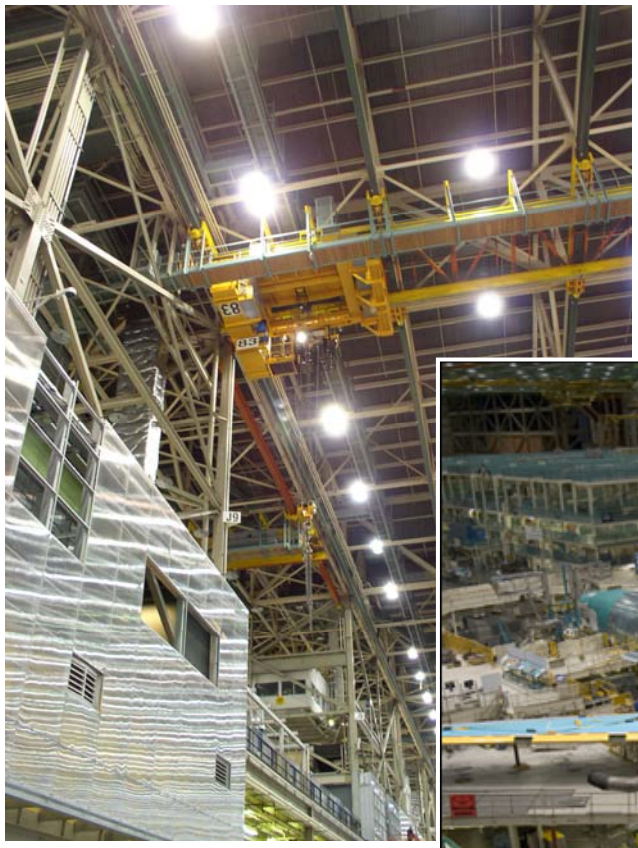
300–plus Voice Radios

Plant & Equipment Services

Over 2000 Voice Radios

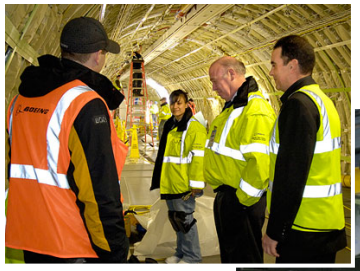


Overhead Cranes



Approximately 270 Voice Radios

Assembly Line Operations



Over 1200 Voice Radios