Operating Environment

AAR Interchange Agreement

Interchange of freight cars required by law

- AAR Interchange Agreement ensures interoperability, network efficiency, safety and security
- AAR administers and enforces through member committee structure
AAR Certification Process

- Governed by Technical Standards contained in MSRP.
- Certification decisions rest with AAR Technical Committees.
- Process managed by TTCI Technical Standards staff.
- Approval of freight cars and components generally include a service test requirement.
- Some components require both technical approval & quality assurance certification.
- One certification process for all of North America
- One certification body - AAR
AAR Standards are Used in Many Other Parts of the World (AAR certification not available).

- South America
- Australia
- China
- Africa
Research program addresses current /future strategic issues relating to the North American Rail Industry.

- **Improve Efficiency**
  - Productivity and cost reductions

- **Improve reliability**
  - Reduce or eliminate line-of-road failures

- **Improve Safety**
  - Reduce track and equipment-related derailments through technology development
Vehicle-Track System
- Wheel / rail asset life extension
- Vehicle track performance
- Train condition monitoring
- Network Efficiency

Heavy Axle Loads
- Heavy axle load implementation
  - FAST/HAL operations
  - HAL revenue service
  - Monitoring
  - HAL Track Substructure

Mechanical
- Advanced train equipment
- Improved car components
- Improved car performance
- Improved Braking

Engineering
- Track integrity
- Special track work
- Bridge asset life extension
- Improved track components
- Improved performance track
- Improved signal reliability
Automated Safety Appliance Inspection System (ASAIS)

- Locate and identify safety appliances
- Assess safety appliance condition
- Loveland, IA
Automated Inspection of Car Components (AISC)

- Third generation system developed and installed at FAST
  - Manual Review of images aiding algorithm development
- Algorithm testing and development will continue at FAST
- Revenue Service installation on BNSF at Gallup, NM scheduled for Nov/Dec, 2010
Vehicle Health Monitoring Systems

**Wayside Condition Detection**
- Cracked Axle Detector (CAD)
- Cracked Wheel Detector (CWD)
- Thermal Scan (TS)
- Acoustic Bearing Detector (ABD)
- Low Air Hose Detector (LAD)
- Dragging Equipment Detector (DED)

**Wayside Performance Detection**
- Truck Hunting Detector (THD)
- Truck Performance Detector (TPD)
- Wheel Impact Load Detector (WILD)
- Warm Bearing Trending (WBT)
- Wheel Temperature Trending (WTT)

**Database (InteRRIS®)**

**Wayside Machine Vision Technology**
- Wheel Profile Module (WPM)
- Brake Shoe Module (BSM)
- Automated Safety Appliance Inspection System (ASAIS)
- Automated Structural Inspection System (ACIS)
- Fully Automated Train Scanner

**Vehicle Health Report**
Composite Alarms Can Reduce the “Cars of Interest”

- Condition A: 5% of Cars
- Condition B: 5% of Cars
- Condition C: 5% of Cars

Potential to be as low as 1 in 10,000 Cars *

* Condition Interdependencies will result in additional cars identified, but never more than the highest condition percentage