Freight Railway Solutions

Ansaldo STS

A Hitachi Group Company
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Ansaldo STS in brief

Complete Transportation Solutions - Passengers and Freight

All around the world, Ansaldo STS supports its clients to create and develop more reliable and sustainable networks that ease urban mobility and solve the challenges of today’s population and cities rapid growth.

From passenger to freight transportation networks, and from urban to intercity and cross-border high speed lines, we design and deploy cutting-edge technologies to meet operators’ needs and the optimize performance, independent of traffic density and complexity.

Ansaldo STS has left its mark in the rail industry by implementing cutting-edge technologies on major projects such as:

- ERTMS/ETCS solutions combined with High Speed Rail, Conventional lines or Heavy Haul technologies for safer and interoperable networks
- Satellite positioning technology for safer and more accurate rail traffic management

Ansaldo STS is the world’s leading system integration partner in heavy haul mining and freight railways. Our advanced, modular and scalable planning and control systems for heavy haulage and freight railways have taken network safety, reliability and efficiency to new levels.

Ansaldo STS’ Heavy Haul and Freight System Solution Benefits

- Modular, scalable
- Enables users to implement staged cost-effective solutions that can be enhanced and expanded over time
- Allows Optional simple migration to a fully automated system (including Driverless Automatic Train Operation) if required
- Based on Ansaldo STS’ proven knowledge, products and experience in delivering
- New York Air Brake’s proven LEADER system for heavy haul railways.

That’s how Ansaldo STS moves the rail industry forward, that’s how we connect the pieces of your day-to-day life.

End-to-End Freight & Mining Solutions

Ansaldo STS delivers a full range of turn-key solutions aimed to increase the business capabilities of the Railway Lines (e.g., Mine-to-Port, Point-to-Point), decreasing OpEx and regulate the Operations according to the specific Customers’ needs:

- Dynamic business-driven train / fleet scheduling
- Profit-oriented traffic management
- Throughput-efficient operations management.

Ansaldo STS End-to-End Freight Solutions include:

- Scheduling and Signalling
- Telecommunications (Ground and Aerials)
- Power Supply
- Track works
- Operations
- Life Cycle Maintenance.

They also include System Integration with Third-Party elements, like Rolling Stock, Civil Works, etc.
The Communication-Based Signalling System that Ansaldo STS delivers is the Company’s standard solution for Global Freight applications and the latest iteration of a long series of train control systems offered by Ansaldo STS for Freight Applications in the marketplace. It foresees a scalable “staged approach” with efficient reuse of existing installed equipment from the first stage to the next.

- Auto Sat Freight 100
- Auto Sat Freight 200
- Auto Sat Freight 300
- Auto Sat Freight 400

The ASF HUNDRED solution is fully compliant with communication based signalling standards in Europe and CENELEC safety standards EN50128 & EN50129.

Trains are prevented from over speed conditions or exceeding their safe limits of movement, while at the same time being controlled in order to meet the time table in a flexible, robust and energy efficient manner.

The use of satellite location and wireless communication among trackside elements and systems significantly reduces CapEx and OpEx because of the limited amount of elements to be installed wayside.

The Ansaldo STS Freight Business Portfolio covers every need, from simple components to full turnkey solutions. Here are some examples of ASFX00 elements and components.

**ASF X HUNDRED SUITE**

**A Solution for Every Need**

**The Needs**

- A robust and tran solution to quickly perform the “first-good-on-ship” task
- Fleet Monitoring and Tracking
- Wayside Asset Protection
- Increase Throughput
- Increase -Inhab System Safety
- Optimize Network efficient Exploit
- Hi-Rail and Working Squads Management
- Explicit actual Business Goals driven Traffic Management
- Implement energy efficient train driving

**ASTS’ Solution Answer**

- ASF 100
- ASF 200
- ASF 300
- ASF 400

**ASTS Freight Business Portfolio**

Covering all needs, from simple components to full turn-key point-to-point solutions:

- ASF X Hundred Elements and Components
- Office
- Wats, Hi-Rails & Ganga Management
- Throughput
- Definition
- Traffic Planning & Optimization
- Business Scheduling
- Crew Management
- Vital Authority Management

- Vehicle
- Onboard ATP
- Onboard ATO
- Voice & Data Radio
- Driver Cab
- Train Integrity / End-Of-Train
- Brake Systems
**ASF X HUNDRED MAIN FEATURES & BENEFITS**

Ansaldo STS “ASF X Hundred” System Solution suite provides the Customers with the following benefits:

- Based on proven, SIL4 certified Generic Product
- Modular approach
- Minimal Disruption to Train Operation if upgrade is required
- No Need to retrain Drivers / Controllers from beginning
- Same Operating system and Operating philosophy with addition of Train Protection for carrying capacity.

The design of the ASF X Hundred system solution offers a high level of safety and availability in implementing the following principles:

- Vital Safety server is built on a 2x2oo2 Safe (SIL4) and Available platform
- Onboard ATP (ASF 200/300/400) is based on 2oo3 Safe platform (SIL4)
- Onboard ATO (ASF 300/400) based on proven-in-use driverless systems
- The safety protocols implemented by the Vital Safety Server (VSS) and onboard ATP for safety data transfer over the air are compliant with relevant standards
- The hardware platforms of the ASF X Hundred for Freight applications are used on a wide range of projects around the world including projects in Australia, Europe, USA and India
- This design strategy allows Ansaldo STS to offer to our customers equipment proven in diverse railway environments, extremely stable and so very cost-effective in terms of Life Cycle Cost
- The wireless data communication solution is based on proven solution in Railway communications
- All the equipment of the Ansaldo STS solution provides data to the centralized monitoring and maintenance sub-system in real time. This feature offers our customer to know at any time the status of the system equipment and to provide preventive maintenance information in order to carry out equipment replacement before the failure happening.

The product and component standardization has been a strong design constraint in the development of the ASF X Hundred Freight solution to minimize the technology risk for our customers and maximize the robustness of the offered solution:

- Use of common hardware platforms for all vital signalling applications by Ansaldo STS across the World including PTC, ERTMS, Mass Transit applications
- Use of standard protocols such as Profibus, Subset-098, Euroradio
- The highly modular design and the network based architecture of ASF X Hundred Freight system supports a future extension of the line by simply adding components and/or modules to manage the additional double track and trains
- In terms of software, only the application data will need to be updated to reflect the new line topology but the core software of the equipment will not require any modifications.
ASTS Freight Business Portfolio
Covering all needs, from simple components to full turn-key point-to-point solutions:
ASF X Hundred Elements and Components
**ASTS Freight Business Portfolio**

**ASTS Auto Sat Freight “X Hundred” - Summary**

### Central Post

- **ASF 100**
  - Voice System Based
  - VBS for Freight (IXL & PMS)
  - Unified HMI
  - Voice System Based

- **ASF 200**
  - Communication Based Signalling System
  - CBS
  - Unified HMI

- **ASF 300**
  - Communication Based Signalling System with Driver Assist
  - CBS+DA
  - Unified HMI

- **ASF 400**
  - Communication Based Signalling - System with ATO and Driverless Operation
  - CBS+ATO and/or DATO

### Automation

- **Control & Command**
  - Train Order Implemented in VSS
  - MMI
  - Scheduling, Traffic Management
  - Including Traffic Optimization

- **Open or Closed network to connect Central Post to Peripheral Post, Larger bandwidth and faster connections**

### Peripheral Units

(Several possible combinations)

- **OC200**
  - New generation field device units

- **OC300**
  - Gateway to Microlok®
  - New generation field device units

### Onboard

- **OB200**
  - Voice Based Train Orders (VBTO)

- **OB300**
  - ATP

- **OB400**
  - ATP
  - ATO with Driver Assist from VMOB

**Note:**
- **VOICE BASED TRAIN ORDERS (VBTO)**
ASTS Freight Business Portfolio
Covering all needs, from simple components to full turn-key point-to-point solutions:
ASF X Hundred Elements and Components
Examples of Ansaldo STS Satellite-based Signalling systems already deployed across the World

Positive Train Control (PTC) Systems, in North America (USA / Canada) – Various Class I Railroads

**PTC configuration**

*Fallback: IETO → VBTO*

Advanced Train Management System (ATMS), in Australia – Australia Rail Track Corporation (ARTC)

**ATMS system overview**
Ansaldo STS Main Freight References

**Australia**

- Roy Hill Iron Ore Project (Australia) – 350 km Signalling and Telecommunication: Radio-based Signalling with Satellite Localization – Wayside & Onboard
- Fortescue Metal Group Signalling and Telecommunications (Australia) – 250 km Signalling (Interlocking) and Telecommunications
- Hamersley Iron Long Hancock Rail (Australia) – 65 km Signalling (Interlocking, ATP), Telecommunications and Asset Protection
- Aurizon (formerly Queensland Rail National) – Synergy Alliance to design and implement several Signalling projects (Interlocking) in Eastern Australia
- Pilbara Iron 7-Mile Yard (Australia) – Design and implement Signalling systems (Interlocking)
- Australia Rail Track Corporation Alliance – AANCSA Alliance to design and implement several Signalling and Telecommunication projects (Interlocking, Train Control & Dispatching, TLC)
- Australia Rail Track Corporation / Lockheed Martin – 120 km Pilot Project, Design and Supply of Advanced Train Management System ATMS (Interlocking, Train Control, ATP Satellite Localization) – Wayside & Onboard
- Robe River Iron Western Creek to Cape Lambert & Mesa A Projects (Australia) – Signalling (Interlocking, Train Control, ATP Asset Protection) and Telecommunications – Wayside & Onboard
- Brookfield (formerly WestNet Rail) Midwest Rail (Australia) – Signalling Systems (Interlocking and Computer-Assisted Train Control) for several projects
- Newcastle Coal Infrastructure Group Port to Kooragang (Australia) – Signalling Systems (Interlocking and Train Control)
- PTA (formerly Westrail) Kooyanibbing/Kalgoorlie (Australia) – 190 km line Signalling Systems (Interlocking)

**North America**

**Positive Train Control (PTC)**
- VitalNet™ PTC Components and System:
  - Union Pacific
  - CSX Transportation
  - Burlington Northern Santa Fe Railways.

**Office Systems**
- Over 80000 km of freight lines managed by ASTS Office Systems, among which:
  - Union Pacific (Optimizing Traffic Planner)
  - CSX Transportation (Dispatch and Automation System).

**MicroLok II Interlocking & Signalling Components (LED Signals, Level Crossings, Relays, Track Circuits, Switch Machines)**
- Over 10000 units sold to U.S.A. & Canada Freight Railroads, among which:
  - Union Pacific
  - CSX Transportation
  - Burlington Northern Santa Fe Railways
  - Canadian Pacific
  - Canadian National Railway
  - Alaska Railroad
  - Norfolk Southern
  - Kansas City Southern Lines
  - Quebec North Shore & Labrador Railway.

**Why ANSALDO STS?**

Ansaldo STS’s full system approach optimizes strategies, resources and investments and rationalizes technology types to provide state-of-the-art, viable and integrated transportation solutions within a municipality, region or country.

Ansaldo STS acts as lead contractor (or consortium partner) and system integrator for major projects around the world, under the following contractual schemes:

- Contracting for Design & Build
- Build, Operate and Transfer (BOT)
- Project Financing
- Design, Build, Operate and Maintain (DBOM)
- Public Private Partnerships (PPP).

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