**Vision**

“The steel industry will remain a strong and vibrant sector of the U.S. economy, providing high-quality, value-added products to a wide array of customers in an environmentally friendly, cost-effective manner.”

Steel: A National Resource for the Future, American Iron and Steel Institute (AISI), Steel Manufacturers Association (SMA)

**Roadmap**

Developed through a highly interactive process led by AISI and SMA, the Steel Technology Roadmap outlines a strategy for achieving the goals established in the industry vision. The roadmap establishes an R&D agenda, identifying technologies needed to make the vision a reality.

**R&D Portfolio**

OIT partners with industry, universities, and national laboratories to develop and demonstrate steel processing, production efficiency, environmental engineering, and crosscutting technologies as well as best practices which are identified in the steel roadmap and are broadly applicable to industry.

**Recent Commercial Successes**

- Nickel Aluminide (Ni₃Al) Transfer Rolls for a Steel Plate Mill Furnace (1993)
- Hot Blast Stove Process Model and Model Based Controller (1999)
- Hydrochloric Acid Recovery System (1994)
- Phase Measurement of Galvanneal Steel (1996)
- Post-Combustion in Electric Arc Furnaces (1994)
- Power Line Damage, Electrical Outages, Reduced in the “Sleet Belt” (1992)
- Microstructure Engineering in Hot Strip Mills (1998)
- Recovery of Acids and Metal Salts from Pickling Liquors (1998)
- Temperature Measurement of Galvanneal Steel (1997)

**Recent Technical Successes**

- Continuous Casting Inside Rolling of Hollow Rounds (1994)
- Direct Steelmaking - Pilot Scale (1994)
- Electrochemical De-zincing of Steel Scrap (1999)
- Minimizing NOx Emissions from By-Product Fuels in Steelmaking (1999)

**Best Practices Successes**

- Improving the Efficiency of a Tube Drawing Bench (1998)
- Improving Steam Turbine Performance at a Steel Mill (1998)
- Modernization of Controls to Improve Productivity and Reduce Energy Costs at a Large Steel Plant (2000)
- Ongoing Control System Modernization Project at a Steel Plant Improves Operations (2000)
- Variable Frequency Drive Retrofit, High Efficiency Pumps (1987)
Current Active Projects

• Advanced Control of Operations in the Blast Furnace (start: 11/96)
• Advanced Intermetallic Alloy Development for Steel - Seal and Guide Rolls (start: 10/98)
• Analysis of Incentives, Disincentives, and Alternatives for Steel Industry CO₂ Reductions (start: 10/99)
• Cleaner Manufacturing in the Steel Industry Utilizing Fine Particulate Materials (start: 10/96)
• Cold Work Embrittlement of Interstitial-Free Steels (start: 2/98)
• Constitutive Behavior of High Strength Multiphase Sheet Steels Under High Strain Rate Deformation (start: 9/99)
• Controlled Thermo-Mechanical Processing of Tubes and Pipes for Enhanced Manufacturing and Performance (start: 9/99)
• Dephosphorization When Using Direct Reduced Iron / Hot Briquetted Iron (start: 5/99)
• Development and Application of Laser Assisted Arc Welding to Steel (start: 1/98)
• Development and Demonstration of Novel Low-NOx Burners for Boilers in the Steel Industry (start: 9/99)
• Development of the Automated Steel Cleanliness Analysis Tool (start: 9/99)
• Development of Cost-Effective, Energy-Efficient Steel Framing (start: 7/98)
• Development of an O₂ Enriched Furnace System for Reduced CO₂ and NO₂ Emissions (start: 12/99)
• Development of Submerged Entry Nozzles that Resist Clogging (start: 4/98)
• Dilute Oxygen Combustion (start: 2/95)
• Effect of Residuals in Carbon Steel (start: 2/98)
• Enhanced Inclusion Removal from Steel in the Tundish (start: 5/98)
• Hot Oxygen Injection into the Blast Furnace (start: 3/98)
• Improved Surface Quality of Exposed Automotive Sheet Steels (start: 3/99)
• Improving Refractory Service Life and Recycling Refractory Materials in Electric Arc Furnace Steel Production (start: 12/97)
• Industrial Process Control with Laser-Based Ultrasonics (start: 1/99)
• Infrared-Based Preheating of Strip (start: 10/99)
• Intelligent Inductive Processing (start: 1/96)
• Laser Ultrasonics for On-Line Measurement of Tube Wall and Eccentricity (start: 3/99)
• MAG/GATE System for Molten Metal Flow Control (start: 6/99)
• Novel Method to Process Electric Arc Furnace Dust into Saleable Chemical Products (start: 10/96)
• NOx Emissions Reduction by Oscillating Combustion (start: 9/96)
• Optical Sensor for Electric Arc Furnace Post-Combustion Control (start: 4/93)
• Oxy-Fuel Burners for Steel Reheating (start: 5/96)
• Plant Trial of Non-Chromium Passivation Techniques for Electrolytic Tin Plate (start: 9/99)
• Recycling of Waste Oxides in Steelmaking Furnaces (start: 4/98)
• Reducing the Variability of High Strength Low Alloy Sheet Steels (start: 4/99)
• Removal of Residual Elements in the Steel Ladle (start: 2/98)
• Solidification Control of Stationary Ingots (start: 10/98)
• Steel Manufacturers Association-Department of Energy Cooperative Education Initiative (start: 9/98)
• Strip Casting: Anticipating New Routes to Steel Sheet (start: 4/98)
• Study of Deformation Behavior of Lightweight Steel Structures Under Impact Loading (start: 1/98)
• Technology of Low Coal Rate and High Productivity on Rotary Hearth Furnace Ironmaking (start: 4/99)
• Value Chain Analysis for the Steel Industry (start: 4/98)

PROJECT PARTNERS

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Washington, DC
Participating Steel Producers and Suppliers
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Department of Energy National Laboratories

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