

# Case Study



noax IPCs at The Timken Company



**Efficiency and quality – Vehicle-Mounted Industrial PCs optimize control of steel-making process**



**noax**<sup>®</sup>  
Technologies



*noax industrial PCs provide reliable real-time communications*

## Orchestrating a Vast Steel Making Operation

The view from the cab of the moveable crane suspended 30 feet from the floor at The Timken Company's Faircrest Steel Plant in Canton, OH is spectacular. From that vantage point, Timken employee Jeff Thompson directs the pour as a stream of red-hot molten steel flows into ingot molds below in a display of smoke and flash. Yet high up in the crane he is able to pin-point the pour thanks to easy-to-read information from a noax industrial computer with a 15" touch screen. This is just part of the process at The Timken Company steel mill in Canton, OH. Timken built its reputation on manufacturing tapered roller bearings, but quality alloy steel has become a major portion of its business. Over 1.5 million ingot tons of steel is produced annually. About 90% is shipped to customers located throughout the world. All of it is produced to customer specification using tight control of both chemistry and processes.

### Computers as flexible as the operation they oversee

Steel produced here is made from scrap metal, stored in piles throughout its 26-acre scrap yard north of the plant. The scrap piles are sorted

*"The noax computers with their high-contrast 1024 x 768 resolution touch screens give my crews the easy to read information they need."*

by material type and loaded by Sennebogen cranes into 61-ton capacity Komatsu dump trucks. At this facility Timken uses four cranes and four

trucks, each with a noax C12 vehicle terminal equipped with the rugged N7A all-in-one motherboard developed in-house by noax. These vehicle terminals are wirelessly connected (both cellular and 802.11) through a Cisco military-style 3200 Router to a server in the main Computer Room. According to Jeff Yackley, Timken Steel Principal Process Control Engineer, "all of the terminals are using RDP (Remote Desktop Protocol), but there is a lot of versatility with noax terminals to use xterm, Linux, Citrix ICA, NX and many other protocols as well."

"The noax touch panel computers with their high-contrast 1024 x 768 resolution touch screens give my crews the easy-to-read information they need," says Jeff. "Everything else I looked at fell short at a screen resolution of only 800 x 600, plus the noax terminals offer automatic brightness control through their special micro controller for a wide variety of lighting situations." This controller not only controls the backlight but



*A rugged noax touch screen ThinClient is shock mounted in a 61-ton capacity dump truck and wirelessly connected through a Cisco military-style Router to a server in the main computer room.*

*In today's world of steel making, the profit margins are as thin as sheet metal. That makes the margin of error at the Timken Faircrest plant in Canton, OH even thinner for the utilization of time, equipment, and raw material. All must be coordinated across a site covering dozens of acres. Up in a crane or out in the yard, 18 noax thin client industrial computers efficiently and economically enable crews to coordinate the operations at this vast facility.*

*Simplifying the steel-making process*



also verifies the internal temperature, the internal voltages, the input supply voltage and the RPM of internal fan. It takes on various monitoring and control tasks which provide greatly enhanced operating safety. A user-friendly Windows application allows operating states to be individually configured and monitored. A warning symbol is displayed if a critical operational state occurs which can be followed by an automatic shutdown of the computer.

### Built to take the abuse

The noax computers are shock mounted in the truck cabs to withstand the rough ride in the yard. Operating in extreme temperatures that include not only winter cold and summer heat but the constant high temperatures in the mill, the completely enclosed computer dissipates heat to the environment over a specially designed heat sink. The IP65 (NEMA 4) computer design prevents dirt, moisture and water from entering the unit and damaging the electronic components.

Despite their compact, enclosed design, these waterproof terminals provide high power, high scalability, and tremendous upgradeability. The proprietary noax motherboards are the heart of every noax computer. Standard equipment includes 100% Intel chipsets, various on-board interfaces, and PCI slots, making noax industrial PCs very upgradeable as future needs change.

Moreover, Jeff appreciates that he is using noax thin client terminals. "Computer operation takes place on a 128 MB compact flash card. Not only does this mean I can run my application with just

a small amount of memory, but with compact flash media, I don't have to worry about potential data loss due to shocks and vibrations."

The functions of a pulpit-located console have been replaced by a rack-mounted server, which communicates with the rugged noax computers in the trucks, cranes and at other points along the process. Along with the expansive scrap yard, the

mill operation is a cavernous 21 acres under roof. "What's cool," says Jeff, "is that the noax PCs let the truck drivers see what the crane operators and the main computer see at the same time."

### Rugged noax PC replaces steno pad

During the bottom pouring process, a noax industrial C15 terminal tracks how much weight is going into the ingot molds and enables the operator to avoid pouring the ladle's slag by-product into the molds. Jeff Thompson, the teeming crane operator, relates that calculations previously were done on a steno pad. The computer now improves the manufacturing process. The responsive touch screen allows Thompson to tap in information, even with gloves.

### Total control of the process

During the soaking pits process operations, the noax industrial computers in the two soaking pit cranes enable the operators to accurately and more quickly identify which ingots are in which pits. With each ingot identified, the very hot piece of metal is conveyed into the rolling mill where it is formed into bars and then shipped off to the customer. "The beauty of this system," says Jeff Yackley, "is that we are saving money in scrap costs because we are not limited by what we bring onto the route at any one time. I am not aware of any other plant in the country that has this kind of system."

*"To make this system work well we need the rugged noax PCs to communicate with the trucks and cranes in this demanding environment."*



*The steel is poured into ingots controlled up in the crane by an operator working with a noax TC.*



## Timken Company Profile:

With operations in 26 countries on six continents, and a team of approximately 25,000 employees, Timken is one of the world's leading producers of highly engineered antifriction bearings and related products and services, including alloy steel and components. Along with bearings and related components, customers turn to the company for high-quality alloy steels. They produce carbon steel and microalloy steel mechanical tubing, alloy steel bars, billets, bottom-poured ingots for reforging, plus steel components, and precision deep hole-making products and services. With an annual melt capacity of over 1.5 million tons, Timken is one of the world's largest manufacturers of seamless alloy mechanical steel tubing. And they do it all with the expertise to tailor every production heat to customer specifications.

For more information go to [www.timken.com](http://www.timken.com)

Case Study provided in part by  
The Timken Company

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## Specifications and application

### Objectives:

- ✓ Real-time communications and data collection over vast distances at numerous points in the process
- ✓ Precise control over operations for product quality
- ✓ Ability to control the cost of production and avoid costly errors

### IPC requirements:

- ✓ Reliable communications in a harsh, demanding environment that includes extreme temperatures, high humidity, shock and vibration
- ✓ High level of reliability to eliminate guesswork and human error
- ✓ High-contrast display, readable under poor light conditions
- ✓ Integrated, resistive touch panels to ensure simple and reliable operation even with thick gloves
- ✓ Protection of components against dirt and moisture

## Overview of components

### Hardware:

- Compact C12 industrial PC
- N7A-TC all-in-one motherboard
- Processor: Mobile Intel Celeron 400 MHz
- 12" TFT display with resistive analog touch screen
- Input: Touch screen
- Protection class IP65 (NEMA 4) (incl. plug cover), internal fan

- C15 industrial PC
- N8T all-in-one motherboard
- Processor: Intel Celeron M 800 MHz
- 15" TFT display with resistive analog touch screen
- Input: Touch screen
- Protection class IP65 (NEMA 4) (incl. plug cover), internal fan

### Software:

- Computer operating system: Microsoft Windows Server 2003 communicating over a wireless and cellular network
- Timken application software: Developed in house by Timken

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