

# SYSTIMAX®

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## SOLUTIONS

## Cabling on a Massive Scale: SYSTIMAX® Solutions and Sandia National Laboratories Continue Working Relationship with Ambitious MESA Project

### Microsystems at Sandia National Laboratories

Sandia National Laboratories (SNL) will have a significant role in advancing the “state-of-the-art” in Microsystems research and development and in introducing microsystems into the nuclear stockpile. As the primary nuclear systems integration and ordnance-engineering facility for the nation, SNL is responsible for the design and maintenance of approximately 90 percent of the several thousand parts found in any given weapon system.

The Microsystems and Engineering Sciences

Applications (MESA) Complex at SNL will provide facilities for the continued evolution of research and development activities at the Laboratories. Because they are able to sense, think, act and communicate, integrated microsystems will revolutionize the safety and reliability of weapons systems. The small

size and multiple functions of these systems will allow designers to place more features into a smaller amount of space, ensuring that the nation's nuclear deterrent remains safe, secure and modern.

The MESA Complex consists of three facilities: The Microsystems Fabrication (MicroFab) facility, the Microsystems Laboratory (MicroLab) and the WIF (Weapons Integration Facility), which together encompass approximately 390,000 square feet. At initial startup, these buildings require data, computing and advanced visual display connections with throughput from 100 Mb/s up to 10 Gb/s.



### A Strong Foundation for Advanced Computational Processes

The seven-layer Open Systems Interconnection (OSI) networking reference model places the physical layer (cabling) at level one - the system's foundation. A robust foundation is required to prevent all other layers of the network from collapsing. Industry has recognized that 90 percent of all networking problems are traced to the physical layer. To eliminate these problems, the MESA team engineered MESA's communications cabling infrastructure for stability, reliability, easy growth and rapid bandwidth expansion.

SYSTIMAX Solutions™ met SNL's challenges in the mid-1990s during a massive campus communications re-cabling project involving 8 million feet of interior cabling and 7,500 multimedia communications outlets. A decade later, this infrastructure continues to perform flawlessly. SYSTIMAX Solutions again is furnishing excellent products and support during MESA design and construction. They provided engineering design consultation, best-value affordability throughout broad connectivity speeds via copper and optical fiber cabling, knowledgeable product distributors, flawless high-performance components, certified local VAR businesses for initial installation and future upgrades and the assurance of their SYSTIMAX 20-year extended product warranty.

### MESA MicroFab

The MicroFab will provide clean rooms to replace those in the existing, antiquated Compound Semiconductor Research Laboratory at SNL. The MicroFab will also be an extension of the existing Microelectronics Development Laboratory (MDL), a fabrication facility focused on silicon-based components. The MicroFab will allow SNL to further

develop and prototype gallium-arsenide and other Periodic Table III-V compound-based microsystems components. The MicroFab is designed for flexibility and has the capability to change cleanliness classes within different areas. Adjacent to the MicroFab is the technician area that contains office and meeting support areas for 80 MicroFab technicians. Together these facilities required 200,000 feet of interior communications cabling and 1,200 copper and optical connectors.

#### **MESA MicroLab**

The MicroLab comprises chemical, electrical and laser laboratories, along with an Education and Design Center. The MicroLab provides collaborative workspaces for 275 researchers and engineers for developing, rapidly prototyping and testing microsystems components. This building required 450,000 feet of interior communications cabling and 5,500 copper and optical connectors.

#### **MESA WIF**

The Weapons Integration Facility (WIF) is designed with a classified and an unclassified wing. The unclassified wing is unique among the MESA facilities because it is designed to foster secure collaboration between microsystems designers working on classified missions and external partners. It includes an advanced

scientific visualization laboratory and workspaces to accommodate approximately 100 Sandia personnel and visiting researchers. The classified wing includes a virtual interactive environment workspace (VIEWS) corridor, visualization laboratory, electrical and laser labs and workspaces to accommodate 275 personnel. The WIF building required 700,000 feet of interior communications cabling and 12,000 copper and optical connectors.

#### **Conclusion**

The MESA Complex is the largest capital construction project ever undertaken at SNL. It is also one of the most important. The microsystems developed at MESA will help ensure the safety of the nuclear weapons stockpile through the middle of the century. Without these innovations, the stockpile would continue to rely on technology dating from the 1960s and 1970s. The ambitious MESA project is approximately 70 percent complete and is expected to be completely operational by mid-2008.

The MESA project faced numerous obstacles and challenges. To both launch and see the largest construction project in New Mexico history through to completion, SNL consulted top minds in weapons design, computational and engineering sciences and infrastructure design. A major concern was the vast amount of cabling, telecommunications hubs and data centers required to power such an ambitious and sprawling project. The MESA team trusted long-time partner, SYSTIMAX Solutions to be the main cabling provider for the entire project because SYSTIMAX Solutions supported the substantial broadband needs of the new facility with its SYSTIMAX TeraSPEED™, LazrSPEED® and GigaSPEED® XL cabling solutions. SYSTIMAX Solutions delivered 40,000 feet of outside plant optical fiber cable, 1,350,000 feet of interior copper and fiber cable, and 23,000 copper and optical fiber connectors.

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