

# ELAN

## Technologies

### Inc.



## UNDERGROUND UTILITIES WIRELESS COMMUNICATIONS

### COMMUNICATIONS



- Traffic Grade
- 450MHz – 6GHz
- Custom Tuned
- Rugged Design
- Lightweight
- Round, Square or Rectangular

**ELAN Technologies**  
14627 Edison Drive  
New Lenox, IL 60451

Phone: 815-463-8105  
Fax: 815-463-8106

[www.ELANTechnologies.net](http://www.ELANTechnologies.net)

ELAN Technologies and GMI Composites introduce a unique and innovative solution for wireless communications with underground utilities: a composite manhole cover with integrated antenna system. The manhole antenna cover system is designed and built to support secure, rugged, industrial wireless communications typically found in harsh underground utility environments. The system is designed to support today's modern communication networks and includes worldwide frequency support for off-the-shelf wireless communication equipment.



**GMI**  
COMPOSITES INC.

#### Applications:

Typical applications include AMI smart metering and distribution automation for electric utilities; sewer flow monitoring and level monitoring for real-time collection system management and control; leak detection, combined and sanitary sewer over flow monitoring.

#### Industry Standards:

Communication standards supported include 802.1x with frequency support for 900 MHz, 2.4 GHz and 850/1900 MHz, 1.8 GHz Canada; 3.5 to 3.8 GHz, 4.9 to 5.8 GHz, including worldwide modern cellular communications frequencies. Future frequencies include support for 700 MHz broadband.

#### Construction:

The cover is made of a unique composite material, designed to be lightweight and able to meet the AASHTO H-20 traffic rated requirements supporting up to 100,000 lbs. The GMI composite cover is fabricated to the shape and size that is required (round, square, rectangular) and can be provided with or without a manhole frame. GMI Composite Covers are corrosion resistant and can withstand water, salt water, sewer environments and petroleum products. GMI composite covers are non-conductive, shielding electricity, heat and steam from pedestrians above.

#### Awards:

ELAN is an early adopter in underground utility monitoring and control with the design of the manhole antenna cover for communicating with underground utility infrastructure. Our design and successful manhole antenna application for Deep Tunnel SCADA in Chicago earned us the prestigious Antenna Systems Most Innovative Antenna Technology Award of 2003.

#### The ELAN Difference:

ELAN provides extreme low power, battery operated instrumentation and radio equipment packaged as SCADA IN-A-BOX™, which integrates seamlessly with existing infrastructure and new facility upgrades. SCADA IN-A BOX™ is certified for IP67 Class 1 Div 1 environment. Available protocols include DNP3 for electric utility applications and Modbus for water and waste water utilities. If real time control and SCADA interface is not required today, ELAN can supply state of the art web based data management software hosted by ELAN or the end user. Our goal is to provide innovative and advanced systems meeting today's requirements with future real-time control capabilities built in to protect your long term technology investment.

Please visit us on the web: [www.elantechnologies.net](http://www.elantechnologies.net) and [www.elanwireless.com](http://www.elanwireless.com), or call us today and speak with an application engineer at 815-463-8105.

## **Specifications for Underground Utility Monitoring and Control System by ELAN Technologies**

This specification describes the integrated components as required for the monitoring and control of underground utility infrastructure. The system is designed for use in water, waste water, electric and gas utilities including Smart Metering and Smart Grid wireless communication networks. The integrated system shall include an ELAN SCADA IN-A-BOX™ Extreme Low Power RTU, GMI Composite Manhole / Access Cover with Integrated antenna system supplied by ELAN Technologies. Optional sensors include loop powered 4-20 ma pressure, ultrasonic and radar sensors as well as digital interface to open channel area x velocity flow measurement systems. The system can be integrated directly into customer owned SCADA networks as well as advanced automated database reporting and archiving software platforms supplied by ELAN Technologies. The frequency range available is 450 MHz to 6 GHz. The system as described here shall be supplied with antenna frequency (enter frequency here) The system supports DNP3 protocol, Modbus, as well as various IP based wireless communication platforms including WiMAX, Wi-Fi MESH, Wireless Ethernet bridge at 900 MHz, licensed MAS, and worldwide cellular fixed IP communications.

### **Manhole Antenna Cover supplied by ELAN Technologies**

#### **1.0 Composite Manhole Cover Description**

GMI Composite Covers are lightweight, heavy duty manhole covers with American Association of State Highway and Transportation Officials (AASHTO) H-20 & HS-25 load ratings, as well as the European EN 124 A15 - D400 load requirements. The GMI Composite Manhole Cover & frame system weighs approximately 80% less than equivalent size cast iron covers; significantly reducing back, hand and foot injuries. GMI Products are available in many sizes, shapes, colors and custom logos. Various retention and security locking options are available installed or for retrofit. All GMI Composite Covers and Access Systems are proudly manufactured in the U.S.A.

#### **2.0 Composite Manhole Design and Materials**

GMI Manhole Access Systems include non-metallic, composite frames and covers. Composite manhole covers and frames are manufactured from Fiber Reinforced Polymers. GMI Composite Covers can also be used as a direct replacement for existing cast iron covers, and can be modified to fit with most existing cast iron frames. GMI Composite Covers are available with retention and security locking options providing retention of the cover to the frame and security from unauthorized entry.

#### **3.0 Composite Manhole Design Criteria Safety**

GMI Composite Covers are light weight and can be managed by one person without the use of special equipment. GMI Composite Covers are non-conductive, shielding heat, steam and electricity from pedestrians at street level. GMI Composite Covers are manufactured with an "anti-slip" top surface.

#### **4.0 Quality and Performance**

GMI Composite Covers are corrosion resistant and can withstand water, salt water, sewer environments and petroleum products. GMI Composite Covers are available in Vinyl Ester resins to meet highly corrosive chemical environments and Class I flammability requirements. GMI Composite Covers are rated to handle arterial traffic flow. GMI Composite Covers are available in a heavy duty version to meet EN124 D-400 requirements of 89,000 lb proof load, as well as, the AASHTO M306-05 test requirements for H20 and H25 requiring a 40,000 lb proof load. GMI Composite Covers are also available in very light weights for light duty and pedestrian applications. GMI Composite Covers have been successfully subjected to accelerated fatigue testing@ 29,000 lbs & 20,000 cycles. GMI Composite Covers have been successfully static and dynamic load tested at both 160°F and -60°F. GMI Composite Covers offer an optional rubber gasket around the perimeter to provide dampening and reduce wear. GMI Composite Covers are available in most common sizes from 12" to 38". Custom Sizes, shapes and colors are available upon request.

#### **5.0 GMI Composite Cover Operation with Liber-T Lock Installation**

GMI Composite Covers require only a simple step allowing the lock lever to snap under the frame flange, locking the cover to the frame. Remove the lock cap and insert in the Liber-T Key Handle into the opening. Depress the Liber-T Key Handle down and towards the center of the cover in order to lift the cover from the frame. Drag cover to a safe location.

#### **6.0 GMI Composite Cover with ELAN Integrated Antenna System**

There shall be an ELAN Integrated antenna systems integrated and molded as part of the of the GMI composite cover. The antenna frequencies available are 450 MHz, 900 MHz, 1.8 GHz, 2.4 GHz, 3.3 to 3.8 GHz and 4.9 to 6 GHz. There shall be a TNC Female connector available for attachment of wireless equipment, as well as ¼" threaded inserts for attachment of ELAN SCADA IN-A-BOX™ Extreme Low Power RTU, as optional instrumentation and telemetry equipment package.

#### **7.0 ELAN SCADA-IN-A-BOX™ Extreme Low Power RTU**

There shall be ELAN SCADA-IN-A-BOX™ Extreme Low Power Telemetry system with wireless communications. SCADA-IN-A-BOX™ shall be accompanied with appropriate sensor technology and shall integrate into off-the-shelf SCADA HMI and integrate into web based data management as supplied by ELAN Technologies. Please contact ELAN Technologies applications engineers at 815-463-8105.

