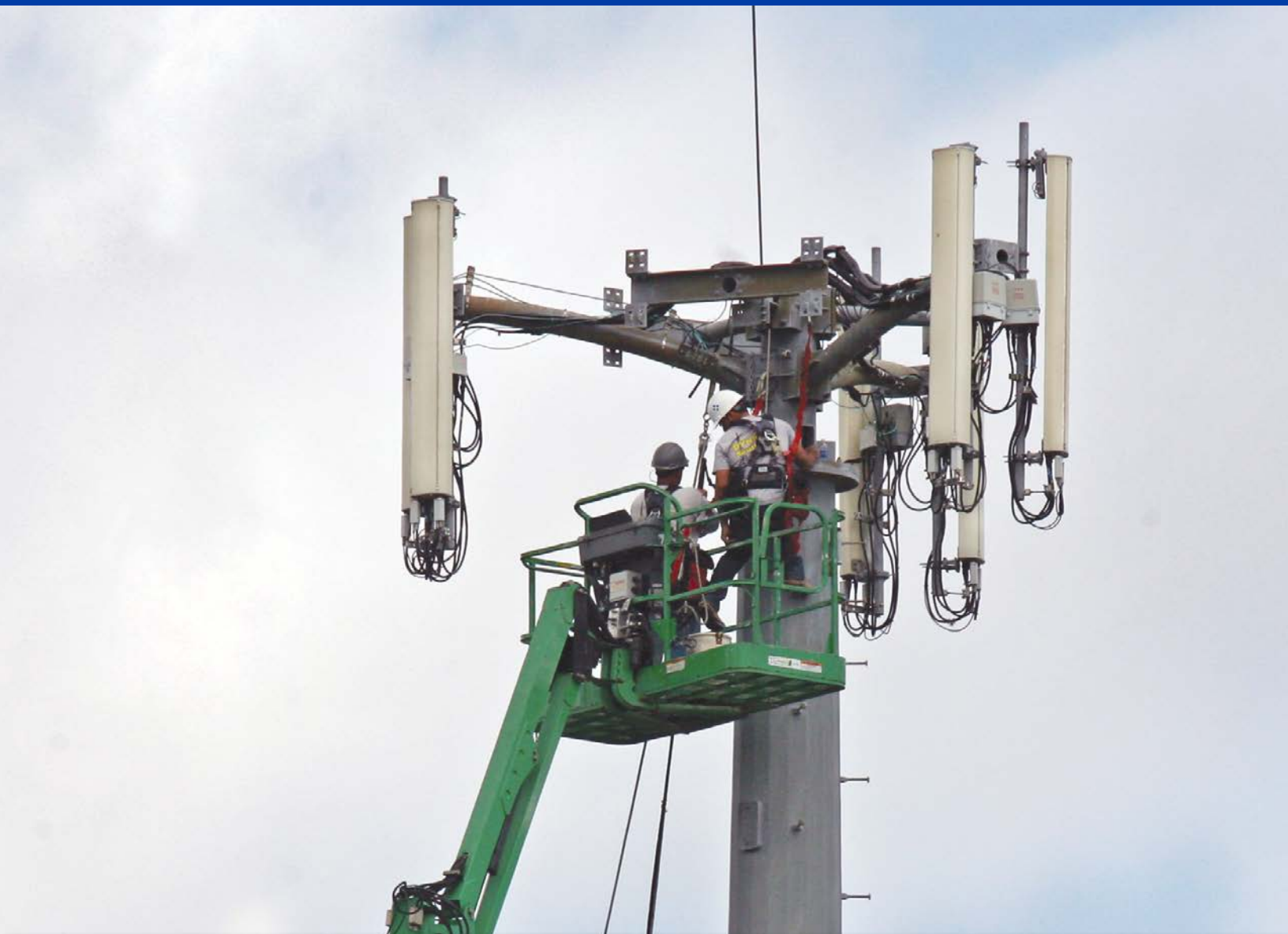# MasTec
Network Solutions

Global Infrastructure Services
Global Innovations

About Us

MasTec Network Solutions (MNS), a wholly-owned subsidiary of MasTec, Inc. (NYSE: MTZ), is a telecommunications infrastructure services company that is uniquely positioned to excel in a challenging business climates. To succeed, we leverage two key principles: Experience and Resources.

Our comprehensive knowledge of telecommunications network infrastructure builds include wireless and wireline network design and engineering, self-performing installation and construction, project and program management, construction management, as well as site maintenance and troubleshooting.

Drawing on decades of experience, our construction management teams self-perform the development of single sites, as well as the build out regional and national sites numbering in the thousands, ensuring on-time and on-budget completion.

MasTec Network Services leverages resources every day to safely deliver quality and value through the efficient utilization of human and financial resources, in-house self-performing teams, experienced vendor management and the financial strength and stability of our parent company, MasTec, Inc.

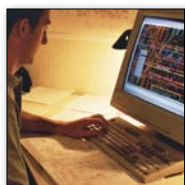*We thrive on challenge and accomplishment.*

GLOBAL INFRASTRUCTURE

Network Design & Planning

Our long-standing relationships with equipment manufacturers provide a comprehensive range of system enhancements and upgrades, including tower-mounted amplifiers, cross-pole and space diversity, in-building coverage design and testing, and E-911 wireless system deployment.
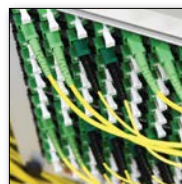
Design and planning services also include:

- Database audit
- Traffic engineering and studies
- Antenna system design
- Equipment installation
- Ancillary system deployment (repeaters, hotel fiber distributions systems, etc.)

- Tower-mounted amplifiers
- RF drive test
- E-911 system deployment and testing
- Frequency planning/PN planning
- WiFi, mesh networking, OFDM design
- Multiple protocol usage in single-frequency block

Network Deployment & Services

REAL ESTATE SERVICES

- Site acquisition program management
- Search ring analysis
- Candidate selection
- Zoning and permitting approvals
- Coordination of site entry and testing
- Lease review

- Tower company application submittal and processing
- Legal package preparation and approval
- Regulatory compliance coordination
- Coordination of architectural and engineering studies and drawings
- Environmental studies (NEPA, SHIPO, THIPO)

DATA/FIBER OPTIC CABLING & INSTALLATION

- Point-to-point, star, ring and logical bus
- Homeland Security systems
- Government and military base surveillance
- Data control and conferencing
- Multi-mode and single-mode system deployment
- Outdoor and indoor cable splicing (mechanical and fusion)

- Cable connectorization (FC/PC, D4, SMA, ST, and SC)
- Building distribution
- Jumper and pigtails
- Cable system planning
- Cable installation and testing (reflection and attenuation)
- Optical time domain reflectometer (OTDR) testing
- Logical versus physical topology design

EF&I

Engineering

- Site Surveys
- Competitive Quotes
- SOW documentation
- Determine site specific materials required

Our strength lies in our ability to source innovative technology solutions and deliver projects on-time, within budget and at the highest quality achievable.

Furnish

- Order key site-specific materials for delivery directly to a site or a staging area
- Order and maintain miscellaneous materials required by crews
- Manage material orders and deliveries to sites or staging areas
- Provide a MOP for approval prior to any required work
- Work with the end client to update scripts and site specifications, and distribute to work crews and management
- Provide specific tools and test equipment as required by SOW
- Provide pre-installation and testing at staging areas prior to delivery to sites

Installation

- Fully trained and experienced professional installers for central office and/or remote locations nationwide
- Provide quality and timely installations, while maintaining a safe and secure work environment
- Handle multiple projects of any scale nationwide, or with multiple end customers for suppliers
- Assist with end-customer contacts to verify site readiness and any special requirements

Equipment Installation & Commissioning

MICROWAVE, CELLULAR, OPTIC TRANSPORT, COLLO AND DATA CENTER

We specialize in installation, de-installation and commissioning of wireless and wireline communication systems. We install DC power systems, enable multi-media transmission systems and create the support infrastructure for new and existing sites by providing:

- Procurement and equipment identification
- Warehousing and inventory control
- Delivery to site
- Sweep testing
- Commissioning
- Optimization
- Integration

- Maintenance
- Configuration databases
- Network management systems
- Battery and rectifier systems
- Training
- System support
- Equipment maintenance and assembly

INFRASTRUCTURE MANAGEMENT

- Accurate scheduling system ensures time-to-market and cost-of-entry-into market
- Identify superior resources and precise logistics management
- MasTec Network Solutions' *Zero Defects Program* ensures superior network performance
- Utilizes historical and predictive analysis to develop trends and elimination of errors

Microwave Engineering

RADIO ENGINEERING SERVICES

- Radio bench testing
- Rack and radio installation
- Circuit/traffic integration
- SIAD Installation, configuration and commissioning
- Preventive maintenance and optimization
- Troubleshooting and repair

ANTENNA SYSTEM INSTALLATION SERVICES

Our COMTRAIN-certified installation crews are able to provide antenna and line (L&A) installation services on a broad range of antenna systems. All of our tower technicians complete customized tower climber safety, fall protection, and rescue programs before beginning their tenure.

Our crews are experienced in the installation of licensed and unlicensed microwave paths utilizing antennas ranging from two to 12 feet in diameter from a variety of manufacturers, including Andrew and RFS. We also employ the use of the latest test equipment from XL Microwave and Anritsu for path alignment and sweep testing.

It is more than just a relationship between supplier and vendor —
it is a relationship between business allies.

MICROWAVE PROJECT ENGINEERING

In addition to in-field personnel, we also have a staff of in-house engineers that specialize in:

- Network mapping using programs such as MapInfo and TopoUSA
- Path engineering using Pathloss 5.0 that includes final path design and report
- Site candidate and donor selection
- FCC licensing and coordination
- Vendor selection and ordering

- FCC regulatory compliance / microwave site audits: display of on-site link license documentation coordinates verification, license status,
- Detailed site surveys
- Elevated, field-verified LOS
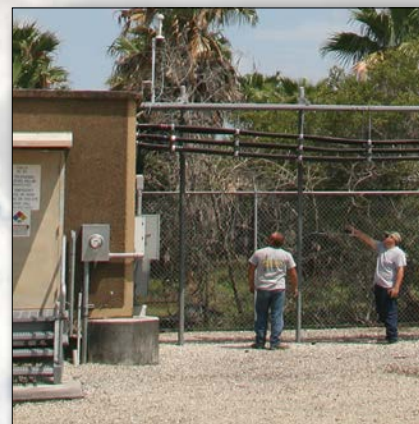- Complete life cycle project management

Microwave Network Services & Maintenance

CUSTOMIZED LEASED BACKHAUL SERVICES

MasTec Network Solutions has created customized leased backhaul services for cellular carriers and network operators. Our customized services can include the temporary or short-term lease of unlicensed microwave backhaul services, such as radio, antenna and outdoor enclosures as a part of the system.

MAINTENANCE / TROUBLESHOOTING

Because not all network operators' needs are alike, MasTec Network Solutions customizes maintenance packages to service your microwave network. From routine monthly maintenance to round-the-clock maintenance of your microwave system, we can deliver a maintenance package that matches your network reliability and financial needs.

Civil Construction

Our construction division employs experienced construction professionals in the telecommunications infrastructure industry. We are geographically positioned to support our growing customer base.

From turnkey tower construction to rooftop installations, CAT 5 and fiber wiring, our construction division can perform any site deployment efficiency and cost effectively.

Our services include:
- Site preparation
- Civil work
- Prefabricated buildings
- Tenant improvement
- Electrical
- Telephone facilities installation
- Monopole and tower construction
- Antenna and coaxial cable installation and testing
- Fiber and T1/DS3 testing and acceptance

Maintenance

Effective maintenance begins with framing and ranking objectives. Planning different phases and tasks, and monitoring and ensuring deliverables are consistent with preventative measures are the cornerstones of a successful outcome.

MasTec Network Solutions' service portfolio enables our customer to focus on their core business – customer service and market development – while ensuring effective network maintenance and yielding significant reduction in operations expenses.

The MasTec Network Solutions maintenance program delivers visibility into the status of every single site in the nation from anywhere and at anytime. Real time information enables predictable budgeting, efficient headcount and performance evaluations.

Our maintenance services include:
- Microwave backhaul/cell site transport maintenance
- Cell site maintenance
- Pre-disaster preventative maintenance
- Disaster recovery

ANTING

ANTING

PIM TESTING

Passive Inter-Modulation (PIM) testing has become synonymous with antenna system installation and maintenance. The activity of testing requires investment in equipment and personnel training which began in 2010 and continues with the rapid deployment of Long Term Evolution (LTE) technology.

GLOBAL INNOVATIONS

DAS Solutions

- Wireless customer satisfaction is driven by excellent coverage where cell phones are used. More than 50 percent of all calls originate or terminate inside buildings. In-building cellular coverage and capacity is a key component of maintaining uniform grade of customer's wireless experience.

- MasTec Network Solutions' active distributed antenna system-based solutions provide consistent technological agnostic coverage. We review criteria such as providing coverage for multiple frequency bands and simultaneously supporting multiple carriers through a complete solution portfolio.

GREEN ENERGY SOLUTIONS

We have developed methods to conserve energy and create broadband infrastructure deployment that is sustainable and overall more environmentally friendly. Our efforts have yielded innovations resulting in minimizing or eliminating equipment shelters associated with HVAC and reducing power and battery usage on each site.

BUILD TO SUIT

MasTec Network Solutions' philosophy – *It's just good business* – evolved by providing quality, customized and comprehensive services to our customers. When developing a build-to-suit project, we provide our customers with exactly what they need while eliminating excessive costs and waste. A build-to-suit can offer several advantages:

- Allows tenants to achieve maximum space efficiency
- Space is designed specifically for the tenant
- New construction allows you to incorporate the most cost-effective energy systems
- Operating and occupancy costs are reduced
- The project's design projects your image
- Provides for future expansion

Network Integration Services

NETWORK SERVICES

The NIS network services team provides an array of services beginning with our NOC Support via our 24/7 cloud-based call center that utilizes advanced VoIP/PBX functionality for call handling. Our customers receive daily, weekly and monthly reports that tracking our support services through our proprietary web-based ticketing systems. Accessible project management teams and the ticketing systems provide real-time visibility into project activity, and is an interactive means of tracking and resolving issues. This transparent level of access and project visibility are invaluable tools for continuously improving project teams.

INTEGRATION SERVICES

Our NIS team specializes in 2G, 3G, 4G base station integration projects, and has an outstanding track record for new site builds, carrier adds, Harvest, DAS and COLTs projects. We deliver superior and cost-effective services to provide end-to-end integration support with one point of contact. Our zero-defect program is a systematic approach to assessing and delivering services on a priority basis. We are committed to complying with all industry regulations and requirements, as well as establishing and supporting specific quality improvement initiatives internally toward continual improvement.

The Center of Professional Excellence

MasTec Network Services Center for Professional Excellence (COPE) provides our team members with high-performance skill development, quality improvement and increased safety awareness. We provide more than 20 courses, including first aid/CPR, RF awareness , Comtrain tower rescue, defensive driving, PIM testing, safety orientation, OSHA 30, OSHA 10 rigging safety, AC DC power, crane safety, DOT training hours of service, crane safety, aerial work platform, electrical safety, microwave, and Anritsu line sweep certification.

Safety & Quality

Safety and quality are an integral part of our operations, benefiting our employees, our clients and our entire company. Our risk-management program is designed to promote training, safety awareness, accident prevention and employee retention throughout every level of our organization.

Our key quality objectives include:
- Internal/external leadership involvement
- Data-informed practice using statistical tools
- Prevention over correction and continuous improvement
- Maintaining OSHA and TL9000 certifications

MasTec Network Solutions' commitment to safety is exemplified by its comprehensive employee training programs and dedication to quality improvements in each of our technical specialties. Our training centers in North Carolina, South Carolina, Florida and Texas are operated by veteran safety and training managers. The centers train our employees in mandatory outside plant, aerial and underground- construction practices, as well as and safety procedures that ensure compliance with OSHA and DOT safety rules.

We reinforce safety and risk management through mandatory training and skill-level improvement programs, including:
- Safety orientation for newly hired employees
- Defensive and DOT seminars for fleet drivers
- Trench safety classes for outside plant workers
- In-depth training programs for electric linemen
- Tailgate safety meetings at the onset of each project

Disaster Recovery

Our teams of disaster recovery experts have responded to thousands of broadband infrastructure engagements with effective contingency plans. Coupling our extensive experience with the constant development of innovative preparation tools we minimize the overall time to restore fully operational networks.

DEPLOYMENT
- Antenna repair/site restoration/generator installation
- Deployment within eight hours
- Additional crews within 74 hours with mission-critical skill sets
- Defensive and DOT seminars for fleet drivers
- Fuel services
  - 20,000 gallons of fuel for generators dispatched within eight hours
  - Mobile and drop tank capability

MANAGING LOGISTICS
- Base camp
- Emergency communications
- Emergency power
- Civil construction team deployment
- Cell tower-specific teams and services

We anticipate challenges and prepare our customers for the unexpected.

Your gateway to
mastecnetworksolutions.com