

### Wireless Dynamics, Inc. Lufkin, Texas

#### The Nacogdoches City Wide Communications and Public Safety Network Meets the Goals of the “Digital Future.”

The Historic City of Nacogdoches, Texas Gets a 21st Century Upgrade.

Founded in the 1700s by European settlers, Nacogdoches is the oldest town in Texas. Nacogdoches is named for the Caddo family of Indians who once lived in the area. Nacogdoches is a historical city that increases in size during tourist season with visitors from around the world. It is considered one of the most historic towns in Texas with its rich Native American and Spanish heritage. Nacogdoches has a population of about 30,000 and is located approximately 130 miles SE of Dallas with a total area of 25.3 square miles (65.5 km<sup>2</sup>). Nacogdoches has a rich history that includes the state’s introduction to forward-thinking technological innovations such as the state’s first oil well drill and pipeline, and the country’s first ceiling fan. Nacogdoches is now focused on meeting the goals of the “Digital Future,” tasked with bringing internet connectivity to its government agencies and services. Nacogdoches turned to AIRAYA and its partner Wireless Dynamics to accomplish a seemingly impossible goal; design and deploy a broadband wireless network for the historic city that was to “mimic” a fiber optic ring that would connect the city’s government offices and provide stable uptime for the city’s AMR project. The progressive City of Nacogdoches is in the process of installing 16,000+ new wireless water meters that will be connected to the AIRAYA backbone. Nacogdoches will depend on the AIRAYA network to collect meter data each month to bill customers for water usage.

“The City of Nacogdoches needed a Fast, Low latency connection in order to utilize VoIP, Internet and Corporate data to their city offices. We chose AIRAYA’s Full Duplex backhaul radios because of their high speed and very low latency. The GUI interface was very user friendly for the customer to maintain and the Telnet interface was a MUST for the install

guys,” said Ronny Johnston, Lead Systems Engineer for Wireless Dynamics.

AIRAYA’s and Wireless Dynamics engineers faced several obstacles to a successful design and implementation; 1) the need to respect the historical integrity of the city, with many of the buildings and streets designated as historical landmarks, and 2) the need to connect and support the transmission of data between the city’s offices and other city services, while achieving maximum long-rang backhaul throughput over a long distances at far lower costs in time and money than Nacogdoches could have achieved using fiber optic cables or other wireless broadband solutions. The AIRAYA backbone was designed and built in a “ring” in order to provide fail over in case of power outage or other network outages. The fail over ring gives near 100% uptime as the water meter data is transferred at key intervals throughout the day from different locations within the city. Several vendors were considered for the project, but only AIRAYA’s backhaul radios proved capable of solving the interference issues surrounding the deployment. Another key driver was the efficiency of the innovative AIRAYA equipment, which is able to deliver predictable performance and service with less equipment than competing solutions while also supporting a larger number of users.

#### The Challenge

Creating Municipal Business Opportunities with Wireless Broadband.

The stated goal of the Nacogdoches City Government was to connect city offices without incurring the high cost of a fiber optics deployment while providing high speed network performance and predictability at an affordable price. The first and foremost challenges were the stated regulations prohibiting visible external antennas and wires in the Historical District as well as high interference at several locations. And finally, meeting high expectations and providing proof-of-concept for how a broadband wireless network can accelerate municipal business development and enhance quality of life and city services.

AIRAYA and Wireless Dynamics were responsible for the full design, channelization and deployment of the entire network, including system optimization and channelization for each bridge. Nacogdoches was particularly impressed by AIRAYA’s unique ability to provide complete plug-n-play, easy to use interface and configurable systems. The Nacogdoches project benefits from sophisticated 24 x 7 technical support, which is provided by the AIRAYA Support Center in Morgan Hill, California. Through the partnership with AIRAYA and Wireless Dynamics, Nacogdoches benefits from a powerful time-to-market advantage, and the ability to quickly evolve their network to meet new demands through the use of advanced technologies and services.

#### The Solution

Challenged with Connectivity and Obstacles AIRAYA Technology Meets the Challenge and Proves Instrumental in Nacogdoches Disaster Recovery.

Unlike conventional wireless broadband bridges, AIRAYA’s WirelessGRID™ backhaul radios are outdoor-ready WirelessGRID™ full-duplex links that are specifically designed for rapid deployment in harsh environments. Rugged and fully weatherproof AIRAYA radios are designed for ease of configuration, diagnostics and management. Proven in thousands of private networks worldwide, WirelessGRID™ radios are ideally suited for bandwidth-hungry applications that require robust, predictable, and secure connectivity. AIRAYA radios maximize range and capacity, as well as deliver ultra-low latency and outstanding performance in a dual-radio, single antenna configuration with asymmetrical dedicated transmit (TX) and receive (RX) radio paths. Purpose-built to boost signal strength and enhance network performance, this powerful, innovative technology was instrumental in the success of the Nacogdoches



#### The Freedom of Wireless Broadband

##### Customer Facts

##### Wireless Dynamics, Inc.

Headquarters: Lufkin, Texas  
 Contact: Ronny Johnston  
 Founded: 2002

Networks and Services: Provides advanced wireless, Internet Protocol (IP), and communications technology and services to commercial, government, and LEC customers.

# AIRAYA



WirelessGRID™ Full-Duplex Backhaul Link with 29dBi Antenna

## Fully Integrated Radio and Antenna Technology

Outdoor-ready WirelessGRID™ full-duplex links are designed to simplify installation, maximize range and capacity, and deliver ultra-low latency and outstanding performance in a dual-radio, single antenna configuration with asymmetrical dedicated transmit (TX) and receive (RX) radio paths.

Utilizing OFDM technology in the 4.90-5.85 Ghz frequency range, WirelessGRID™ Full Duplex links operate in Backhaul (Point to Point) mode at ranges of up to 12 miles\* and at speeds up to 108 Mbps per radio.

Proven in thousands of networks worldwide, WirelessGRID™ radios are ideally suited for low-latency bandwidth-hungry applications that require robust, reliable, and secure connectivity.

### Benefits:

- Data rates up to 108 Mbps full duplex
- 5 layers of security
- Asymmetrical user-selectable 5, 10, 20 and 40 MHz wide channels for each Transmit (TX) and Receive (RX) path
- Enhances transmit/receive sensitivity by reducing multipath interference
- Integrated network sniffer for advanced Ethernet and Radio network diagnostics

For further information, please download the AIRAYA WirelessGRID™:  
<http://www.airaya.com>

project. Even in areas with high interference, the superior capabilities of the backhaul radios paved the way for a successful service rollout.

AIRAYA's WirelessGRID™ backhaul radios with user-selectable 5, 10, 20 and 40 MHz wide channel and power settings, allowed for the more than 500 channels in the 4.9-5.8 GHz frequency range solving the problem of mitigating the high RF interference in the area. The flexibility of the AIRAYA products removed the contention of frequency interference in the area and allowed the city to open more channels which allowed the network to operate more efficiently with greater throughput. The channel configurations of the radios were accomplished without having to uninstall the equipment that was deployed. The channels upgrade was entirely done in the software and as a result the Nacogdoches network achieves a high throughput of 30Mbps of Full Duplex performance.

AIRAYA's WirelessGRID™ backhaul radios proved their reputation for reliability and rugged design after the eye of hurricane Ike passed just west of Nacogdoches, all electricity in the city was knocked out by the powerful storm. As soon as power in the city was restored, the AIRAYA backhaul radio came up without any failure or loss of equipment and provided data and communications to the city immediately without any interruptions.

To ensure the success of wireless projects of any size, planning is critical. The City of Nacogdoches had a clear view of its needs from the start. Cost and performance were important, considering the wide area of deployment. In addition, the network needed to provide:

- Predictable connectivity in a diverse geographical area
- Hassel free installation and configuration
- Intuitive system management interface
- Flexibility and value

AIRAYA's WirelessGRID™ technologies were particularly well suited for the types of challenges the City of Nacogdoches was facing by providing, predictable packet delivery, high performance, and software definable flexibility at an economical price. Nacogdoches' dispersed geographic and high interference areas required a "cost efficient" and "no disruptions to the city" solution which are not possible with current wired networks. AIRAYA was pleased to partner with Wireless Dynamics on this project and look forward to working together in the future.

### Network Architecture

Wireless Dynamics has selected AIRAYA's WirelessGRID™ Full-Duplex Backhaul Links as the workhorse of the Nacogdoches network. To enhance network performance, the WirelessGRID™ 29 dBi Dual Polarity Dish Antenna was also deployed to reinforce and provide the coverage and throughput of the requirement of the infrastructure and provide backhaul connectivity to the network. Currently the network provides coverage to the perimeter of the City and to all of its government offices.

### About Airaya

#### Predictable, Fast and Affordable Technology.

Founded in 2001, AIRAYA is a world-class designer of proven, fast and affordable outdoor wireless multipoint and backhaul products for high capacity public safety, service provider, and enterprise networks. The company is located in Morgan Hill, California and is privately held. AIRAYA products are available through a network of experienced North American and International distributors and reseller partners. For more information, please visit AIRAYA's web site at: <http://www.airaya.com>, email [info@airaya.com](mailto:info@airaya.com), or call toll free 1.866.2AIRAYA (224.7292) - International 1.408.776.2846.

For information on how your business can benefit from the innovative approaches being developed by



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