



## Norwegian Cruise Line Goes 100% Wireless with TerraWave Solutions®

### Executive Summary

#### Company Focus

- Innovative cruise travel organization with a 40-year-plus history

#### Business Challenge

- Going 100% wireless in a challenging environment that includes steel infrastructures, locations exposed to the elements and constant corrosive environment
- Providing wireless services from the ship to a private island over 2 miles of water
- Delivering the solution in a timely manner
- Maintaining the relaxing environment aesthetics with the addition of the wireless network equipment

#### Solutions

- Cisco 1252 Access Point in a TerraWave 12" x 10" x 6" Polycarbonate Enclosure with a Solid Door and Latch Locks
- Various versions of 802.11n 2.4/5 GHz 2.5/4 dBi Mini MIMO Ceiling Mount Antennas
- 802.11n 2.4/5 GHz 6 dBi Outdoor MIMO Omnidirectional Antennas
- Various versions of the Outdoor Mast Mount Omnidirectional Antennas

#### Benefits

- Successfully deployed the first 100% wireless vessel on the Norwegian Gem including providing all wireless point-of-sale services
- Internet Café service has increased revenue from 60% to 100% depending on the season



#### Challenge

Since 1966, Norwegian Cruise Line (NCL) has been a leader in the travel/hospitality industry. From being the first to provide a cruise in the Caribbean region to being the first cruise line with its own private island, NCL has established itself as an innovative and forward-thinking company.

The "Freestyle Cruising" concept is another pioneering initiative started by NCL that began in 2000 and is a way for passengers to have more freedom and accessibility to all amenities being offered. This initiative involved the addition of new ships and numerous on-board improvements including Wi-Fi service to create a more enjoyable and connected experience for the guests and to add additional productivity efficiency for the staff.

With this Freestyle initiative, NCL recognized a growing need for expanding their wireless services, from simple internet access in public areas to currently using Voice over IP (VoIP), internet access for both public and private use, corporate and ship network access, point of sale (PoS), safety tracking and cashless vending and arcade.

#### Solution

TerraWave Solutions worked closely with NCL and implemented the wireless solutions progressively through phases. Initially, NCL utilized outdoor mast mount or 'stick' omnidirectional antennas but needed to update these due to the need for further protection from the elements and smaller form factors.

NCL then moved on to the more durable Outdoor MIMO omnidirectional antennas which also uses multiple input multiple output (MIMO) technology to support the next generation IEEE 802.11n wireless communication systems.

For detailed product information and to purchase product, please contact a TerraWave Solutions wireless networking solutions sales engineer at 210-375-8482, 800-851-4965, [sales@terrawave.com](mailto:sales@terrawave.com) or visit [www.terrawave.com](http://www.terrawave.com).

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12" x 10" x 6" Polycarbonate Enclosure with Solid Door, Latch Locks and Cisco 1252 AP



Outdoor MIMO Omnidirectional Antenna Installed With The 12" x 10" x 6" Polycarbonate Enclosure



2.4/5 Ghz Mini MIMO Omnidirectional Antenna

The NCL and TerraWave Solutions team worked in conjunction with the "Freestyle Cruising" initiative to provide 100% wireless services. The Norwegian Gem became the first ship to provide 100% wireless services for both passengers and crew. It was also the first ship to provide wireless point-of-sale functionality. Establishing this service helped increase the Internet Café revenue from 60% to 100% during the busy seasons.

There was also the challenge of establishing wireless functionality to NCL's private island to provide full ship services from the ship to the island over two miles of water. NCL used some of TerraWave Solutions' panel antennas with horizontal polarization to maximize the coverage area.

With the installation of Cisco access points and TerraWave Solutions' enclosures & antennas, NCL achieved their goal of becoming 100% wireless and the solutions were deployed in a timely manner.

### Further Development

NCL continues to remain current with their wireless technology by upgrading some of their APs with the latest releases from Cisco. The new 1260 AP series from Cisco worked for NCL since they are specifically designed for challenging environments, support external antennas and have a broad operating temperature range. The 3500 AP series uses Cisco's CleanAir technology for maximum optimization of the wireless network.

In the near future, NCL will also start updating the indoor MIMO antennas with the latest version - TerraWave's new Micro MIMO ceiling mount omnidirectional antenna with dual-band leads which is the most compact of its kind and will provide maximum wireless coverage. NCL has also started retrofitting some of the larger ships with the polycarbonate enclosures and Outdoor MIMO Omnidirectional antennas. This upgrade has been completed on the Jewel, the Jade, the Dawn, the Star, the Pearl and the Sun ships - creating a more enhanced wireless experience for all.



2.4/5 GHz Micro MIMO Omni Antenna



12" x 10" x 6" Polycarbonate Enclosure with Solid Door, Latch Locks, Cisco 3500 AP Series and Installed Outdoor MIMO Omni Antenna

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