# ADC Wireless Overview

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## Introduction

ADC is a leading global provider of network infrastructure equipment and professional services needed to deliver voice, video, Internet and data communications around the world. Wireline, wireless, cable, enterprise, and broadcast network operators rely on ADC offerings to deliver bandwidth intensive, high-speed services to residential, business and mobile subscribers. ADC (NASDAQ: ADCT) has sales into more than 130 countries.

## Commitment

ADC is dedicated to working with you to quickly deploy your products. We provide global service and support to assist you with everything from day-to-day inquiries to emergencies. Our Account Specialists, Systems and Applications Engineers are readily available to support you as you analyze and configure products, train your personnel, place orders, manage delivery schedules and track shipments.

## Financial Performance and Stability

ADC was founded in 1935 and has served the communications industry for more than half a century. With the company holding thousands of patents, its products and services are used by telecommunications service providers, wireless and broadcast operators, and Fortune 500 enterprises around the globe. Today, ADC is a world leader in providing global network infrastructure products and services that enable the profitable delivery of high-speed Internet, data, video, and voice services to consumers and businesses worldwide. With the acquisition of the KRONE Group in 2004, ADC now offers global copper- and fiber-based connectivity solutions and cabling products used in public access and enterprise networks and provides global scale and expanded products and services to better serve customers anywhere in the world.

ADC is focused on connecting communications in every type of network – from within communications providers' operations centers through the "last mile/kilometer" to residential, business and mobile subscribers, and inside business enterprises and broadcast facilities. For our continuing operations, fiscal 2006 sales of $1.3 billion increased by 13.5% and earnings per share were $0.80 compared to $0.81 in fiscal 2005. We believe that we are executing the right strategy of focusing on growth opportunities in our key customer segments.

## ADC Wireless Solutions

ADC's wireless products and systems perform critical functions that ensure the quality and reliability of our customers' wireless networks worldwide. In addition, ADC serves as a strategic partner for wireless service providers, providing unmatched technical expertise and support for the development and maintenance of our customers' wireless networks.

With the increasing popularity of wireless devices, service providers' customers expect to have coverage at anytime, anywhere. This capability requires service providers to increase network capacity, which is typically done by adding new cell sites. However, with city center areas becoming more congested and local government zoning regulations increasingly more stringent, obtaining permits for new wireless cell sites is becoming nearly impossible. Extending service to these hard-to-reach areas can provide challenges. ADC's wireless solutions support wireless carriers by providing reliable, expanded coverage and capacity.

## Deliver better performance everywhere your wireless customers go.

ADC's wireless solutions portfolio consists of the new FlexWave™ line of All-IP RAN products, the Digivance® line of digital radio-over-fiber transport products as well as the ClearGain® Tower- and Ground-Mounted Amplifier products.

The new FlexWave portfolio is ADC's complete line of turn-key broadband and carrier wireless solutions that are transforming the way next-generation mobile service delivery networks are created, deployed and used for new mobile applications. The portfolio consists of the Base Station System (BSS), the Universal Radio Head (URH), WMX WiMAX, and the Millimeter Wave (MMW).

The Digivance digital distributed antenna systems (D-DAS) product line includes the Long-Range Coverage Solution (LRCS), the Street-Level Coverage Solution (SCS), the Indoor Coverage Solution (ICS), the NXD for neutral host applications, the CXD for compact, multi-band applications. Wireless service providers deploy ADC's solutions to guarantee a strong, clear signal and deliver higher data rate services in hard-to-reach areas — such as dense urban areas, subways and sports arenas as well as corporate offices and campuses or rural highways.

## FlexWave IP-RAN Portfolio:

- FlexWave Base Station System (BSS)
- FlexWave Universal Radio Head (URH)
- FlexWave WMX WiMAX
- FlexWave Millimeter Wave (MMW)

## FlexWave Base Station System

The FlexWave Base Station System (BSS) is a complete base station system providing converged in-building and outdoor GSM and EDGE coverage and capacity. It includes the FlexWave nanoBTS™ and the FlexWave microBTS together with a common base station controller and common operation management software needed to integrate with existing mobile networks.

Taking advantage of the more than two billion GSM handsets in use globally together with existing IP-based broadband infrastructure for backhaul, the FlexWave BSS enables operators to provide cost-effective, tailored capacity and coverage for target customers, and deliver excellent return on investment.

## FlexWave BSS System Components

### nanoBTS

The new FlexWave nanoBTS EDGE/AMR picocellular base station represents a significant step on the migration path to higher data rates and more supported users. Based on the FlexWave nanoBTS GSM/GPRS base station, it delivers the same features and functionality for GSM voice and GPRS but with the addition of high-speed EDGE data, improved voice quality and capacity using AMR coding.

For operators moving to higher speed data networks by deploying EDGE, there is a strong requirement to provide high quality coverage in buildings. With industry-leading GSM-over-IP technology, it is possible to bring cost-effective high-speed coverage to users where they need and use it most.

### microBTS

ADC's FlexWave microBTS is an IP-based outdoor solution designed to increase coverage and capacity while significantly reducing backhaul costs. The solution is designed for service providers to reduce deployment, maintenance and installation costs as well as reduce OPEX. The FlexWave microBTS supports EDGE/AMR at 1800 and 1900 MHz frequencies. The microBTS is perfect for outdoor macro network hot spots (capacity), outdoor macro network hole fill (coverage), business campuses, hospitals and universities, stadiums and other public venues, highway corridors, tunnels and subways and rural communities.

The microBTS is part of ADC's FlexWave Base Station System product line and supports up to four GSM transceivers in one unit. By combining the FlexWave microBTS with ADC's FlexWave BSC and FlexWave indoor nanoBTS, a wireless operator can provide cost-effective coverage and capacity for a wide variety of indoor, outdoor, and hybrid applications.

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### Base Station Controller (BSC)

The FlexWave Base Station Controller (BSC) provides common control for both the indoor FlexWave nanoBTS and the outdoor FlexWave microBTS. Built with a modular and flexible IP- based architecture, the FlexWave BSC uses IP connectivity to communicate with the FlexWave BTS units, while offering a standard circuit-based A-interface to the MSC and a standard circuit-based Gb interface to the SGSN. There is also an option to connect into core network architectures that employ a softswitch MSC.

The FlexWave BSC provides channel allocation functions, GPRS/EDGE support and also controls the power level algorithms and handover procedures for the BTS units. The BSC is engineered to have a high level of availability by combining selective redundancy with fast restart capabilities.

### Operations and Maintenance Center – Radio (OMC-R)

The FlexWave Operations and Maintenance Center – Radio (OMC-R) is a complete management solution for the FlexWave Base Station System (BSS), providing total control of the FlexWave Base Station Controller (BSC), FlexWave nanoBTS, and FlexWave microBTS elements. The OMC-R provides everything needed for the operation and maintenance of the FlexWave solution, including provisioning, alarm management, and performance management. The simple and intuitive user-interface is highly configurable, employing a familiar tree-based environment.
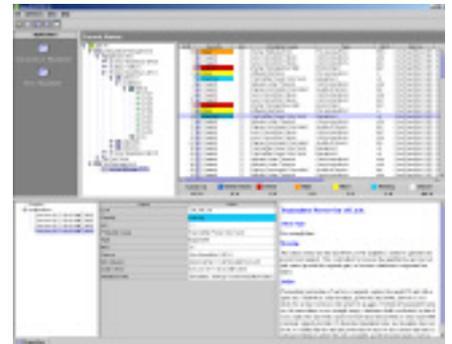
#### BSS Features:

*   Smallest, fully functional GSM/EDGE picocell BTS in the industry
*   Fully sealed, maintenance free microBTS for outdoor applications
*   IP-based backhaul reduces costs
*   Available for 900, 1900 and 1900MHz bands
*   Compliant with GSM specifications
*   Integrates with existing TMD-based or softswitch MSC
*   Alarm management integration
*   Single Ethernet connection to BTS

## FlexWave Universal Radio Head

The FlexWave Universal Radio Head (URH) improves wireless network coverage by extending services from existing cell sites to hard-to-reach areas and improves wireless capacity by distributing coverage from centralized radio suites. The URH offers flexible, scalable solutions to fit various applications from a dense urban center, to a dense suburban area, to a campus, to subways and tunnels. The FlexWave URH can be installed in conjunction with existing cell sites to increase capacity or in lieu of standard cell sites where zoning restriction or site acquisitions become an issue.

#### URH Features:

*   Fully sealed, maintenance free for harsh outdoor applications
*   Flexible architecture supports multiple frequency bands and wireless protocols in one enclosure
*   Embedded element management system
*   Cost effective

## FlexWave WMX WiMAX

The FlexWave WMX WiMAX system is built on proven technologies and incorporates the latest WiMAX-compliant features, giving network operators the multi-services infrastructure they need to take full advantage of the business opportunities offered by broadband wireless. The FlexWave WMX solution delivers the critical elements required to extend services to a wide range of subscribers-ranging from large enterprises and public-sector organizations to multi-tenet buildings and residences-using a single, standards-based platform.

### FlexWave WMX Features:

- Offers operators several types of base station elements allowing them to cost-effectively grow from very small to very large subscriber densities
- Provides a future-proof platform designed to support both IEEE.802. 16-2004 and IEEE.802 16e standards
- Supports fixed and emerging mobile devices without large additional capital investment
- Provides the level of redundancy and fault-tolerant operation to ensure uninterrupted service and stringent service level agreements (SLAs)
- Increases overall system link-budget and enlarge cell range at higher modulations
- Produces higher capacities over more expansive areas, reduces the number of cells required and lowers infrastructure costs

## FlexWave Millimeter Wave

The FlexWave Millimeter Wave (MMW) is a point-to-point millimeter wave transmission system that operates in the licensed 71 GHz to 86 GHz spectrum and provides fiber-speed wireless Line of Sight (LoS) communication links within a 1-6 km range.

FlexWave MMW addresses the increasing shortage in metro access capacity by taking advantage of the recently allocated licenses 71-86 GHz spectrum. By using the unique propagation characteristics and the wide bandwidth of that spectrum, FlexWave MMW can support extremely high speed data transmission or short communication links.

### FlexWave MMW Features:

- High availability (99.999%)
- Best-in-class link performance
- High capacity (full duplex Gigabit E performance)
- Reduced cost per bit due to the inherent cost- and data-efficiency of native Ethernet
- Same cost as microwave with 10 times higher bandwidth
- Simple and quick to install

## Digivance® Wireless Coverage Portfolio:

- Digivance Long-Range Coverage Solution (LRCS)
- Digivance Street-Level Coverage Solution (SCS)
- Digivance Indoor Coverage Solution (ICS)
- Digivance NXD Digital Distributed RF
- Digivance CXD Digital Distributed RF

## Digivance Long-Range Coverage Solution

The Digivance Long-Range Coverage Solution (LRCS) is an all-digital RF distribution system that optically transports RF signals to difficult coverage areas such as tunnels, canyons, large open structures such as stadiums or speedways, and congested city center locations. A typical point-to-point RF transportation link, as used in one of the above-mentioned difficult coverage areas, would consist of a host unit, remote unit - cabinet, linear power amplifier, and spectrum transport module (STM), and element management software.

**LRCS Features:**

- Flexible architecture enables macro network coverage to be distributed over individual or multiple point-to-point optical RF transport links
- Digital platform enables transition to new capabilities such as free space optics links and coarse wavelength division multiplexing (CWDM)
- Digital RF transport is transparent to air modulation standards; e.g., GSM, CDMA, etc.
- Remote alarm monitoring from the network operations center reduces troubleshooting time
- Local alarm networking of multiple systems for monitoring and control

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## Digivance Element Management System (EMS)

Digivance EMS provides operational and maintenance capability for the Digivance LRCS. Digivance EMS consists of a personal computer (PC) using a Windows® operating system, ADC-furnished Java-based software package, an ASCIIbased RS-232 capable terminal, and RS-232 cables.

## ADC StarGazer® EMS

The StarGazer product is a scalable, multi-user, client-server application for monitoring and managing network elements. StarGazer provides network and device views of managed elements, along with a comprehensive set of configuration, performance, and fault management capabilities on behalf of managed elements. Network views include IP and user-defined site topology trees, geographic maps, a site and node alarm summary, and a highly flexible browser for viewing and managing alarms and events. Device views include hardware inventory, dynamic graphical views of equipment faceplates and active components (e.g., LEDs), a device/component navigation tree, user dialogs, performance charts, and alarm/event details. StarGazer supports both manual creation and auto-discovery of network nodes and can be configured to discover only certain types of network elements. StarGazer supports different levels of access control to help protect the security and reliability of network operations.
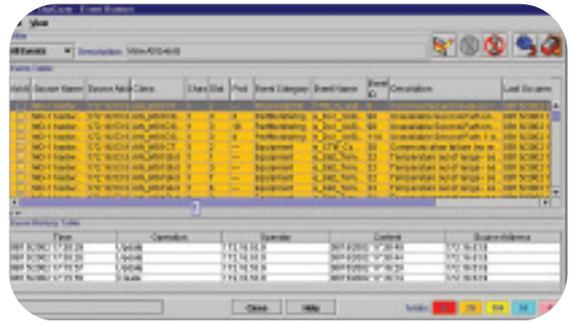
## Digivance Street-Level Coverage Solution

ADC's Digivance Street-Level Coverage Solution (SCS) helps wireless service providers improve capacity in dense urban areas where restrictive zoning requirements prohibit deployment of necessary network equipment. This digital distributed antenna system (D-DAS) utilizes patented RF transport-over-fiber technology to distribute wireless service between existing cell sites and SCS remote antenna units. The small-form-factor remote units offer an unobtrusive design and multiple mounting options that easily blend into the environment. The maintenance-free design of the remote units makes the SCS ideal for improving capacity in hard-to-access areas such as tunnels, subways, and urban canyons.

### SCS Features:

- Supports 800 cellular, 800 SMR, 900 SMR, and 1900 PCS
- Single-band and dual-band solutions in a compact remote unit
- Maintenance-free operation with sealed unit, no fans or filters
- Industry's highest available optical loss budget - 25 dB
- Digital transport is transparent to air modulation standards; e.g., iDEN®, GSM, CDMA, W-CDMA, IxEV-DO
- All-digital transport enables transition to optional capabilities such as free space optics links and coarse wavelength division multiplexing (CWDM)
- Noiseless (no fans) remote is sealed NEMA 6/IP-67 rated enclosure with passive cooling
- Remote units mount vertically or horizontally - inside pole, pole wrap, wall mount, and strand mount
- Remote alarm monitoring and SNMP support
- Local alarm networking of multiple systems for monitoring and control
- Remote unit features integrated WDM to minimize fiber connections

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## Digivance Indoor Coverage Solution

ADC's Digivance Indoor Coverage Solution (ICS) uses advanced technology, setting our solution apart from all other indoor coverage systems. ADC's ICS system is the only system to distribute wireless coverage digitally over optical fiber. Optical fiber is the best choice for signal quality, flexibility and overall performance for an indoor coverage solution. The Digivance ICS system consists of a Digital Host Unit (DHU), optional Digital Expansion Units (DEU), and Digital Remote Units (DRU).

### ICS Features:

- Configure-to-order, plug-in transceiver design lowers initial installation costs
- Pay-as-you-grow approach to indoor coverage
- Accommodates single-mode or multi-mode fiber for maximum utilization of existing fiber and flexibility in fiber distribution
- Digital transport maintains superior signal quality even over long distance fiber runs
- High dynamic range increases capability for data throughput, enabling higher data rate broadband services
- Universal air interface is transparent to modulation technology

## In-building Wireless Repeaters

### 850 MHz Cellular and 1900 MHz PCS

ADC's new in-building wireless repeaters are powerful and cost-effective solutions to enhance indoor coverage for small to medium-size enterprise environments. These simple-to-use devices are optimal for augmenting RF coverage in office buildings, retail stores, warehouses, and other facilities less than 50,000 square feet. These repeaters feature a compact design, blend easily into any facility, and are easy to set up through a simple GUI interface. These devices offer the flexibility to program band selection and optimize alarm and performance settings as desired. The repeaters may also be used in conjunction with a distributed antenna system (DAS).

### Repeater Features:

- Easy installation
- User-friendly GUI interface
- Band selectivity for Cellular and PCS
    - Choose either a 5MHz block, a 15MHz block or any combination of a 5 and 15MHz block: A, D, B, E, F and C
    - Choose either Cellular A, A', A" or B and B'
- Excellent selectivity — each band has discrete IF SAW filters to mitigate interference
- Provides product performance status via LED lights and optional enhanced alarm and
- management through on-board modem
- Low maintenance RF repeater system — 'set it and forget about it'

## Digivance NXD and CXD

The Digivance NXD and CXD are fully Digital Distributed Antenna Systems (D-DAS) designed to specifically meet a service provider's current network needs and provide a fully flexible path to future network migration. The NXD and CXD improve wireless networks by extending seamless wireless coverage from existing cell sites to hard-to-reach areas, or distributing capacity from centralized radio suites. The NXD is optimized for neutral host deployments.

### NXD and CXD Features:

- Flexible architecture enables macro network coverage to be distributed over individual or multiple point-to-point optical RF transport links
- Digital RF transport is transparent to air modulation standards; e.g., GSM, CDMA, etc.
- Individual modules for 800, 850, and 1900 MHz frequency blocks
- Field upgradeable in single block increments
- Digital simulcasting, system capable of digital switching of radio sectors
- Fully digital transport for precise system settings and management
- Open standard SNMP-based interface, remote control and alarming using commercial Network Management Systems (NMS)
- Local alarming and control using embedded Element Management System (EMS)

### NXD and CXD Applications Include:

- Wide area and medium range urban and suburban microcells
- Capacity and coverage underlay to existing 2G and 3G sites
- Multi-frequency, multi-operator deployments
- Campus environments and business parks
- Stadium and convention centers

## ClearGain® Antenna Amplifiers

ADC's ClearGain Tower-Mounted Amplifiers (TMAs) and Ground-Mounted Amplifiers (GMAs) improve signal quality by boosting the uplink signal of a mobile system to increase receiver performance and improve overall coverage. The improvements in quality of service (QoS) allow mobile subscribers to place more calls, make longer calls, and successfully complete calls in an expanded geographic area, thus resulting in increased revenue for service providers. The main purpose of a tower top amplifier is to amplify the receive (uplink) signal of a mobile communication system. Amplifying the receive signal before the long cable drop from the tower top results in a substantial increase in receive sensitivity and increases overall coverage.

### TMA Features:

- Tower-mounted amplifier system for wideband applications
- Slim, stackable design to conserve tower space
- Highly advanced LNA amplifies RX signal for improved receiver performance and increased coverage
- Advanced filtering maintains the lowest possible noise figure for improved QoS
- Aluminum sleeve construction protects components from the elements
- Integrated lightning protection

### GMA Features:

- Slim, stackable design conserves rack space and eliminates tower climbs
- Highly advanced LNA amplifies RX signal for improved receiver performance and increase in coverage
- Modular system is fully compatible with all base stations
- Power and alarming for up to three GMA units

## ADC Wireless Professional Services

ADC's Professional Services organization, customer service and systems engineering provide a range of services for the deployment of our wireless products.

- Site development and fiber surveys
- System design and configuration
- Commissioning and integration
- Program and project management
- Material management
- Network and inventory audit
- Maintenance contracts

ADC has developed integration solutions that are specifically tailored for wireless carriers. For example, our switching experience ranges from the design of the switch environment to the installation and commissioning of cross-connects, fiber distribution frames, converter equipment, routers and base station controller equipment. ADC also has extensive experience in cell-site environments. We've completed hundreds of cell site builds in the United States and more than 5,000 deployments for Tier 1 wireless carriers in Europe. ADC is known for its superior service, on-time and on-budget performance and fully integrated solutions. Based on our years of expertise, we offer solutions that can help our customers be more successful.

## Manufacturing Capabilities

A world-class manufacturer, ADC operates manufacturing facilities in North America, Mexico, and Germany. While geographically dispersed, each ADC manufacturing facility practices universal/uniform disciplines to ensure quality control, speed-of-delivery, and customer satisfaction. A centralized materials management and business system enables control of worldwide manufacturing resources, while the company's advanced manufacturing techniques group focuses on continually enhancing and seeking efficiencies in ADC's manufacturing processes.

## Account Specialists

ADC's Account Specialists are responsible for all day-to-day support including pricing, availability, quotations, order placement, order status, and any other inquiries. ADC is committed to providing world-class customer service that exceeds expectations every time. Account Representatives provide service in the following locations: U.S., Canada, Europe, Mexico, Australia, Singapore and China.

## Technical Assistance

ADC offers global technical assistance to meet customers' needs and timelines. A representative is available 24/7 to assist in emergency situations. Technical Assistance Centers (TAC) are staffed with experienced telecom engineers ready to answer any network, product, or application question.

## Thank You

Thank you for considering the high quality products and services ADC provides. We look forward to continuing a successful, long-term partnership that meets your needs today and in the future.