Corporate Backgrounder

Business Summary

Aperto® Networks is a leading provider of 802.16 class multiservice broadband wireless access systems for global markets. It was founded to provide a breakthrough solution to one of today's critical network bottlenecks – limited availability of last mile broadband access to millions of prospective users worldwide. Aperto's PacketWave® system provides a family of base stations, subscriber units and associated radios and antennas in 2.5, 3.5 and 5 GHz frequency bands for point-to-point and point-to-multipoint deployments. Its scalable systems and patented technology support new wireless builds and complement existing wireline broadband access technology.

The company's technical experts bring strong system-level understanding of applications, carrier services, signaling, network protocols, physical and upper layer technologies. Principals have successfully developed and delivered multiple generations of carrier and enterprise wireless infrastructure. Aperto was a founding member and leading contributor to IEEE 802.16. It is a member of the ETSI-BRAN standards body, a WiMAX Forum Board Member, and chair of the Forum's Service Provider Working Group.

The PacketWave system provides a single coherent platform for delivering converged data, voice, and video services over an IP network. The IP-based system design allows service providers to develop end-to-end applications, such as Virtual Private Networks (VPNs) and web hosting, without the complexity of intervening transport protocols. PacketWave fits seamlessly into the service provider's overall network architecture without altering the existing routing and server infrastructure. The systems are also being used in diverse applications such as high capacity overlay networks for shorter-reach or lower-capacity networks; hot spot backhaul; and transport infrastructures for multiple service providers (carrier-of-carriers' networks).

Service providers in more than 50 countries have deployed PacketWave systems, because they meet carriers' needs for ease of installation, IP-rich network functionality and cost effectiveness, while enabling rapid provisioning and interference-resilient operation in dense urban to suburban locations. Aperto-powered networks serve broadband access services to thousands of demanding end users, including small and medium enterprises, multiple tenant buildings, and public sector organizations (schools, universities and government agencies).

Market Dynamics

The well-entrenched dynamics of runaway Internet access growth have been counterbalanced by increased margin pressure in broadband access services and market restructuring among broadband access providers worldwide.

Broadband wireless access, or BWA, has become a critical alternative as service providers and users realize that neither DSL nor cable broadband are a panacea, and that Wi-Fi success demands a wireless MAN complement. Both wireless and wireline service providers face new needs:

- Rapid delivery of T-1/E-1 and Ethernet speed connectivity to enterprise end users
- Efficient use of scarce spectrum resources
- Deployment of highly complementary access technologies to minimize dependence on any one medium (e.g., license-free spectrum to augment/substitute for scarce licensed bands)
- Increased broadband convergence between different LAN, MAN and WAN standards (e.g., Wi-Fi, wireline, UMTS, IEEE 802.16).

Value Proposition
Aperto Networks is dedicated to delivering these benefits to service providers worldwide:
- Rapid network deployment
- Network scalability with high spectral efficiency
- Multiservice scalability with Quality of Service
- Ease of installation, configuration and monitoring/troubleshooting
- Demonstrated rapid payback for each cell
- Leadership and commitment in emerging standards (e.g. WiMAX)

This commitment means that Aperto is dedicated to delivering standards-based access systems supporting dense cellular deployments, high scalability, line-of-sight (LOS) and non-line-of-sight (NLOS) operations, and QoS management. Aperto defined its architecture to meet these parameters and deliver characteristics carriers see as "must-haves" for next-generation, cost-effective broadband networks, i.e., service-intelligent IP architectures, personalized multiservice delivery, an adaptive physical layer (radio and modem), an advanced Media Access Control (MAC) layer, and high cellular frequency reuse.

Building on this open, 802.16 class architecture, Aperto developed three unique technical innovations to extend per-subscriber manageability and cost-effective, personalized service delivery:

- **OptimaLink®** performs dynamic control of link parameters to optimize each subscriber connection in a multi-user, point-to-multipoint environment. Ten multi-layer link parameters are adjusted on a burst-by-burst basis, to maximize coverage and capacity while maintaining high spectral efficiency.

- **ServiceQ®** enables carrier-class multiservice Quality of Service (QoS), per-flow service and bandwidth management across the wireless (air) interface.

- **RapidBurst®** delivers high-capacity (up to 20Mbps), flexible two-way burst-mode TDMA. It achieves unprecedented flexibility in allowing control of transmission parameters, enabling both OptimaLink and ServiceQ to function effectively.

These capabilities and Aperto's unique channelization approach (6 MHz and smaller channel widths) have become even more important as broadband wireless access has gained in popularity among new service providers, and as multiple carrier deployments have occurred within limited frequency bands. Aperto's PacketWave system has become a platform of choice for carriers concerned about frequency contention, interference resilience and QoS, such as those operating in top-tier metro markets.

Aperto plays prominent roles in the IEEE 802.16 Task Groups and in ETSI BRAN[1], to further develop interoperable air interface standards. The company is also a founding Board Member of the WiMAX Forum (World Interoperability for Microwave Access) to ensure that industry certification to standards and cross-vendor interoperability proceeds as quickly and effectively as possible. Aperto was also recently appointed chair of the Service Provider Working Group. The company applies its open architecture approach to wireless access systems for global markets in the 2.5 GHz, 3.5 GHz and 5 GHz frequency bands. It has US Federal Communications Commission (FCC) approval to operate in the 2.5 GHz and 5 GHz bands, Industry Canada approval to operate in the 2.5 GHz, 3.5 GHz and 5 GHz bands, ETSI approval for 3.5 GHz systems in member countries, and Russian Ministry of Communications certification for operation in all Russian Federation countries.

ETSI BRAN is the European Telecommunications Standards Institute project on Broadband Radio Access Networks. For more information, please visit http://www.etsi.org/bran/Summary.htm.

By operating in the preferred global bands of the main carriers, Aperto ensures that it will meet the stringent requirements, regulations and standards of carriers worldwide with a single, integrated product family. In frequency bands where structured channel pairs do not exist, TDD provides a highly flexible and efficient duplexing scheme where a single channel is used for both upstream and downstream transmissions. These systems make use of every available channel in a well-designed cell-based deployment, for optimum capacity, coverage and cost.

Funding History
Aperto Networks was founded in 1999 and is privately held. The company has raised $77 million in private equity financing from Alliance Ventures, Canaan Partners, JK&B Capital, Innovacom (France Telecom), Labrador Ventures, Satwik Ventures, Tyco Ventures, Redwood Ventures, JAFCO Ventures, Mitsubishi International Corporation, Stratex Networks, Oki Electric Industry Company, Ridgewood Capital and other strategic private investors.