Broadband is always a relative term, understood according to its context; Broadband in telecommunications is a term that refers to a signaling method that includes or handles a relatively wide range of frequencies, as you might remember from previous articles, the wider the bandwidth, the greater is the information carrying capacity.

However, broadband in wireless data communications is frequently used in a more technical sense to refer to data transmission where multiple pieces of data are sent simultaneously to increase the effective rate of transmission, wireless Broadband in data communications for ITS is used predominantly as a mean to control and monitor video cameras, however, more and more often the Broadband wireless technologies are used to transfer controller interconnect information, and with the emergent technologies, it is possible to use them for city-wide installations. The City of Burnaby B.C. provides us with a great example of a wireless Broadband installation.

Project Background

The City of Burnaby, BC is located in the Great Vancouver Regional District which is home to the 2010 Winter Olympic Games. Burnaby occupies 98.60 square kilometers (38.07 square miles) and is located at the geographical centre of the Greater Vancouver Regional District. The elevation of Burnaby ranges from sea level to a maximum of 1,200 feet atop Burnaby Mountain. Overall, the physical landscape of Burnaby is one of hills, ridges, valleys and an alluvial plain. The land features and their relative locations have had an influence on the location, type and form of development in the City.

While Burnaby occupies about 4 percent of the land area of the Greater Vancouver Regional District, it accounted for about 10% of the Region’s population in 2006. It is the third most populated urban centre in B.C. with an estimated population of 202,799.

The traffic management system in Burnaby utilizes Econolite ASC/2 Traffic Controllers and has been upgraded recently to the iCONS ATMS. The City did not have any fiber optic communication lines and previously relied on dial-up phone lines to communicate with field devices. There are some 453 miles of roads and 134 miles of lanes in the City that vary from local residential streets to major arterials ENCOM Wireless has been supplying the City of Burnaby, BC with wireless equipment since 2000, mainly for wireless interconnect of their closed loop traffic management system. In order to implement a Central Control ITS System (iCONS), a dedicated broadband wireless broadband mesh network was required.

Project Description

Given the challenging terrain, dense foliage, and large amount of rainfall, an 802.11 a/b/g wireless mesh network was chosen to complement the existing wireless serial links (ENCOM’s 5200 series), in order to ease the migration path and to avoid extra costs in infrastructure development, Wireless Serial Gateways (ENCOM’s 5000 ESS) were used to link the serial devices to the IP-based network. The high bandwidth, flexibility, redundancy and local support were all factors in choosing the wireless radio system expansion.

What is a Mesh Network?

Mesh networking is a particular way of routing between nodes; it allows for continuous connections and reconfiguration around broken or blocked paths by “hopping” from node to node until the destination is reached. A mesh network whose nodes are all connected to each other is known as a fully connected network. Mesh networks differ from other networks in that the component parts can all connect to each other via multiple hops. One of the most important characteristics of these kinds of networks is the fact that Mesh networks
are self-healing: the network can still operate even when a node breaks down or a connection goes bad. As a result, a very reliable network is formed.

In Burnaby’s case, it was determine that the best way to implement connectivity was to use a dual band wireless mesh network that would blanket most parts of the city. A dual band mesh network provides excellent coverage, even in near line of sight applications where foliage and building penetration is needed. The frequencies selected were the 900 MHz and the 5.8 GHz, ensuring the network will maintain adequate bandwidth and minimize latency.

**Results**

Currently there are over 100 mesh nodes in the network that provide coverage throughout the City. The City of Burnaby and their full time maintenance contractor, are 100% self sufficient at expanding the mesh network. The current mesh network provides second-by-second communications to over 100 traffic controllers and will be expanded to 300 over the next 2 years. At each intersection on the mesh network the City of Burnaby also has the capability to view video from their Autoscope cameras and from Pan, Tilt, Zoom Surveillance cameras. Secure mobile broadband connectivity has been granted to key personnel working within the Traffic Engineering department and has increased efficiency within the department. Future goals are to provide additional access to other city resources such as water/waste water management and parks and recreation.

Bob Baillie, Supervisor of Traffic Engineering, City of Burnaby states that “The broadband MESH network from ENCOM has allowed the City of Burnaby to implement advanced traffic management systems; our partnership with the wireless company was the key to success on this project.”

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**References**

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