Boundless Security Systems, Inc.
the communications bandwidth experts

Wise Use of Cellular Networks for Outdoor Video Surveillance

Steve Morton, CEO, CTO, Boundless Security Systems, Inc.

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The great news is that cellular data networks are continually getting faster, and are almost everywhere you would like outdoor cameras to be. When cellular networks are used *wisely*, there's no need to design, build, maintain and use dedicated wireless wide area networks for outdoor and mobile video surveillance. Outdoor projects can be implemented much faster and less expensively, and the networks are maintained by the majors.

The bad news is that cellular networks are getting faster because smartphone and tablet use is exploding thanks to Apple's **iPhone** and **iPad**. Cellular carriers don't want bandwidth-intensive users of IP-cameras that connect to the Internet with nothing more than a cellular modem to abuse their networks and reduce the quality of service for everyone.

Thus bandwidth-stingy outdoor and mobile video surveillance is increasingly becoming a necessity. It's not just the burst data rate – the mega-bits per second (Mbps) -- that matters, it's also the total amount of data transferred over time -- the mega-bytes (MB) per day and giga-bytes (GB) per month. Cellular networks, which are shared by many users, are intended for short bursts of data, not continuous video, so everyone gets timely access to the Internet. A seemingly mere 150 Kbps continuously uses an astounding 50 GB/month -- 10X the typical 5 GB/month quota of a data card. Even H.264, when sent continuously, needs several times that for standard definition video at a decent frame rate and sharpness. (Forget putting live HD video over the air, it needs 6X as much.) Cellular carriers' *Fair Usage Bandwidth Policies* enable them to throttle, or even discontinue, service when their monthly or even daily bandwidth quotas are exceeded. Data usage over the quota can also incur large surcharges. Even customers with grandfathered so-called "unlimited" data plans face reductions in service, at the expense of greatly reduced video surveillance quality, if not a total dropout of the live video connection because the reduced speed can no longer carry the video.

And it's not just wireless carriers that are concerned about how much data their networks carry. Even some wired services, such as AT&T's DSL, now impose monthly bandwidth quotas and surcharges. More restrictions are coming.

Fortunately, there's a solution. Boundless Security Systems, Inc., www.BoundlessSecurity.com, believes **bandwidth is precious**. Boundless has developed an **ultra low bandwidth** system that uses public wireless wide area networks *wisely*. It takes advantage of cellular networks' high burst speeds, while

respecting the need to minimize total data traffic over time. It was developed in the USA by an MIT electrical engineer with a background in telecommunications. It is made in America and has been used with cellular networks on five continents, wide area WiFi, WiMAX and specialty wireless networks, and VSAT, Inmarsat and Iridium satellite networks.

Boundless uses bandwidth-saving, video-on-demand, with continuous, long-term, near-camera recording of many different video streams for each camera, not bandwidth-wasting, streaming of a single video stream to a distant recorder. In addition, Boundless recognizes the need for a wide range of video resolutions, frame rates, data rates and compression factors to satisfy the widely varying demands of moving and stationary cameras, investigations, monitoring and situation awareness, and team-viewing. Boundless' ultra low bandwidth, *Multi-Stream Video Servers* meet these many different needs by producing typically six different video streams simultaneously for each camera, with different resolutions, frame rates and data rates, spanning a **100:1 range** of data rates. All video streams are available remotely recorded, and, bandwidth-permitting, also live. Even congested and storm-degraded wireless networks don't stop remote access to Boundless' video servers. Boundless' *hyper rapid access video file system* makes it possible to quickly remotely access recorded video from any point in time. Boundless' motion search engine enables searching hours of recorded video for motion in seconds.

One benefit of this attention to bandwidth is that Boundless' outdoor video servers are able to handle two or more PTZ cameras instead of the usual one found in most outdoor equipment. This solves the, "*Where do I point the camera?*" problem. One camera gives a wide-angle situation assessment view, while the other gives a simultaneous close-up view. And, it provides remote access to live and recorded video from multiple cameras for the price of a single cellular connection.
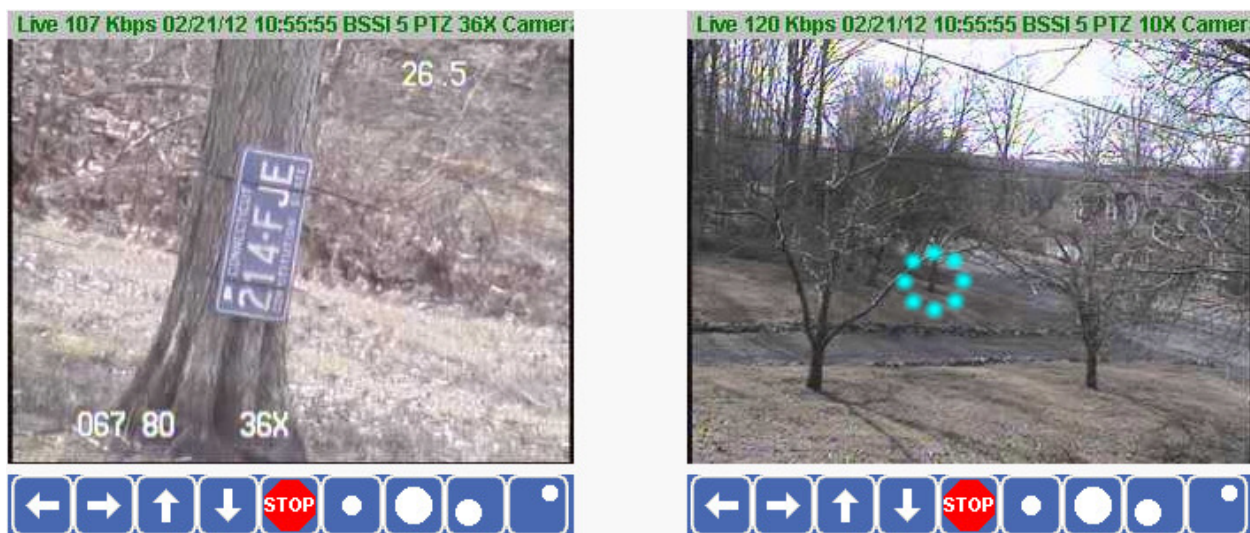
The view above is formatted for a tablet. Cameras can be controlled simply by touching the live video. The wide angle situation-assessment view on the right (a ring of dots has

been added) is from a 10X PTZ camera. The simultaneous close-up view on the left is from a 36X PTZ camera, and clearly shows a license plate that is barely visible in the wide angle view. One can watch a street to see when someone is approaching. One can see the vehicle they are driving while simultaneously watching a close-up view of a building to see when they walk through a door and what they are carrying.

Boundless makes several models of ultra low bandwidth, wireless outdoor video servers. Some have concealed, built-in cameras and are covert, while other models have exposed domes for larger field of view. Other models are smaller and have no internal cameras, and can handle a combination of external CCTV and/or wireless IP-cameras. All use Boundless' thermal management system with a dual-chamber heat exchanger and sealed inner chamber to cool internal equipment while protecting it from dust and environmental pollutants. NASA helped Boundless with its thermal design. Other models are intended for use in vehicles.

Boundless' video servers are fully custom preconfigured for simple installation and ease of use. They take advantage of Boundless' VPN for secure remote management, even when they are behind firewalls such as those between GSM cellular networks and the Internet. And all use heavy-duty, Ubuntu Server Linux and have significant spare x86 computing resources to also run optional functions such as video analytics.

But that's not all. In public safety applications, large mobile teams need to see the situation in real time on their handhelds, and often, to visually compare it to the situation moments ago. Situations change quickly and it's no longer sufficient to rely on a central dispatcher to tell mobile teams, from moment to moment, what lies in front of them, or what has changed. It's not practical for multiple viewers to individually get video directly from equipment in the field due to the amount of bandwidth required, and few want the cyber security risks of installing custom viewing apps on their smartphones and tablets.

Boundless solves these problems by offering its optional **Media Server** and **Video Surveillance as a Service** (VSaaS). This capability enables mobile team-viewing in a browser on a wide variety of devices, without requiring the installation of any viewing software on the viewing device. In addition, its video-on-demand, broadcast capability places minimal bandwidth requirements on Boundless' video servers in the field; dozens can view simultaneously. It also hosts Boundless' web-based application programming interface that makes it easy to place Boundless' live and recorded video in web pages for integration with other systems, and links to it in e-mail and SMS messages. And, it archives recorded video viewed for instant replay.

In today's security-conscious world, with its wide range of team members' skill levels, and need to install systems quickly and economically, outdoor and mobile video surveillance are all about ease of installation, mobility, ease of use, team viewing, and system integration. Boundless' ultra low bandwidth system and *wise* use of ever-faster, ever more widely available, cellular networks makes this practical.

Please call us to discuss your specific requirements.

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