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Canobeam DT-130 Helps Stratasys Create The Shape Of Things To Come

Gigabit Free Space Optics Transmission Ensures Reliable Networking Across Busy Highway for Rapid Prototyping Business

It sounds like science fiction, but it's not. A person at a computer draws a 3-D object, presses a button, and a special machine turns that design into an actual solid item. That machine is called a Rapid Prototyping System, and it's made by Stratasys Inc., of Eden Prairie, Minnesota. And when this high-tech leader recently expanded to a third building they chose Canon's Canobeam DT-130 Free Space Optics Transceiver System to ensure that design files sent across their computer network always result in precision-made prototypes.

"We have a Canon Canobeam connection to a building we recently opened three-quarters of a mile away across a four-lane highway," explained Steve Glennon, Stratasys system administrator. "The four-lane highway ruled out a fiber link, but line-of-sight Free Space Optics was the perfect solution."

Stratasys' rapid prototyping systems enable engineers in high-tech industries such as aerospace and automotive to turn their computer designs into precision models that can be tested for form, fit, and function throughout the product-development process. Stratasys' need to internally network large amounts of computer-design data among its three buildings in addition to its own day-to-day IT requirements necessitated study into the best options for a high-speed data link.

"We brought in Technology Management Corporation, a Sherwood, Minnesota consulting firm," Glennon recalled. "They did a study of what we needed, and presented us with a report on the best methods of connecting the buildings. They analyzed our options and costs, including initial versus long-term. These options included a high-speed radio link, a high-speed data line

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More Users Are Choosing
Canobeam's Free Space Optics

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Canobeam DT-130 Supports Edmonton Economic Development Corporation's Growth

EEDC First In Canada To Install Latest Canobeam System to Expand Data Network to Heritage Building

Edmonton Economic Development Corporation (EEDC) has installed Canada's first Canon Canobeam DT-130 to provide Gigabit connectivity via Free Space Optics between its newly renovated offices.

EEDC, an independent corporation owned by the city of Edmonton, Alberta recently relocated its main offices to a renovated heritage building 500 meters (547 yards) down the street. They sought to extend network operations by implementing a high-speed data link between the two locations. As it turned out, however, it was too expensive and difficult to run a fiber connection between the office buildings.

"Local estimates for new fiber connections were cost-prohibitive in this instance," said John Kratochvil, EEDC's Director of Information Technology. "So we began looking for an alternate, innovative solution."

EEDC outlined several requirements that any proposed solution would have to meet. First, they needed a performance minimum of 100 Mbps. Second, the link had to be highly secure.

"Security is always a priority as our high-profile company manages sensitive information," said Kratochvil. "For many of our mission-critical applications we felt radio was simply not secure enough for our downtown offices because it bounces off everything."

In addition, the new office was in a city-protected historical landmark that had been unoccupied for seven years. The heritage building lacked a data infrastructure and to build one would have been a very expensive undertaking. To solve this, a systems integrator for Canon, brought the Canobeam to Kratchovil's attention. "We are excited about the cost savings and performance enhancements afforded through this technology," said director of market development for the systems integrator in Edmonton. "We strive to ensure that our clients are able to realize competitive advantages through their telecommunications infrastructure. EEDC is enjoying this telecommunications advantage and is now setting new business communication standards in Canada."

"Situations like the one at the EEDC are becoming more common," said Bruce Olynik, Area Sales Vice President for Optelligence Canada, the marketing arm for Canon. "Add the benefits of utilizing light to transmit data with an affordable price tag, and Canon has made Free Space Optics a powerfully viable option for any organization seeking building-to-building network connectivity."

> "Too often technology gives you a suitcase full of oversized expectations. Canobeam, however, is doing exactly what they said it would at an optimal level."
>
> John Kratochvil, EEDC's Director of Information Technology

Canon's Canobeam Free Space Optics system uses a line-of-sight beam of light to transmit data at up to 1.25 Gbps at Gigabit Ethernet speeds. Because Canobeam does not use radio waves, there is no need for radio-frequency licenses, it can be set up quickly, and the data it transmits is secure and can't be intercepted. In addition, Canobeam's exclusive Auto Tracking function automatically adjusts the light beam to compensate for even the slightest variations in the installation base (due to building or traffic vibrations, temperature changes, or wind) and maintain a perfect line-of-sight Free Space Optical connection.

The Canobeam DT-130, which offers economical Gigabit Ethernet connectivity for a capital investment and no subsequent usage charges, easily met EEDC's demanding technical requirements. The systems integrator also had the units up- and-running in a matter of days.

"The systems integrator did a very good job installing the DT-130 and they provided us with a level of expectation that met our needs," said Kratochvil. "Too often technology gives you a suitcase full of oversized expectations. Canobeam, however, is doing exactly what they said it would at an optimal level."

Kratochvil added: "What helped seal the deal for us is the fact that we will end up owning the equipment. If a similar situation ever occurs again we can just reposition the Canobeam. It's a real win-win scenario for us."

Within a few weeks of Canobeam's installation, Edmonton experienced a torrential rainfall that significantly affected much of the city. The 150

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Canobeam DT-110 Keeps Omnispring Connected During Florida Hurricanes

Commercial Wireless Internet Provider Maintains Networking Integrity with Canon's Free Space Optics

Omnispring, LLC, a major wireless broadband and Internet Services Provider in central Florida and Ft. Lauderdale, uses the latest advanced technologies to deliver competitive, high-speed bandwidth to commercial clients. Reliability is vital to their business, which is why they chose Canon's Canobeam DT-110 Free Space Optics transceiver system to deliver the bandwidth from the NOC (Network Operating Center) fiber provider to their network. And Omnispring reports that Canobeam provided dependable service that even the sustained 100 mph winds of three successive hurricanes couldn't disrupt.

"We needed a backhaul device from one of our transmit facilities back to the NOC," explained Tim Bennett, technical co-principal of Omnispring. "We come out of the NOC and then we shoot that across to our Canobeam, which links to our tower. Then from that tower we distribute wireless bandwidth around Orlando."
"We provide wireless commercial-application bandwidth from DSL-type service, to DS3 applications," stated John Rhea, Omnispring's marketing co-principal. "Canobeam delivers the bandwidth we need and it's far less expensive than burying fiber. We're in a very high RF environment, surrounded by several cell towers, and microwave hops, so conventional methods of transmitting wireless broadband can be a challenge." The Canobeam eliminates the RF concern. "We needed higher than 50Mb of bandwidth, and Canobeam gives you large amounts of bandwidth in a relatively short period of install time–you just set it up and it runs," Bennett continued. "Best of all, Canobeam saves us about $1,100 a month over other alternatives."

> "We had three hurricanes come through here this year, complete with wind, rain, and lightning, but Canobeam stayed 'on the air' throughout the storms."
>
> Tim Bennett, technical co-principal of Omnispring

The Canobeam DT-110 delivers a wide range of data speeds from 25Mbps to 156Mbps at a range of 20m to 500m. Other models in the Canobeam DT-100 Series Free Space Optics digital transceiver line include the Canobeam DT-120, with a range of 100m to 2km, and the Canobeam DT-130, which provides data rates up to 1.25Gbps for Gigabit Ethernet networking at a range of 100m to 1,000m.

"We had three hurricanes come through here this year, complete with wind, rain, and lightning," Bennett recalled. "But Canobeam stayed 'on the air' throughout the storms. This speaks volumes of the design and integrity of the Canobeam. It definitely passed the blowing rain test!"

Canobeam's unique Auto Tracking Function constantly maintains beam alignment and compensates for vibrations in the installation base caused by weather and any other factors.

"We had sustained winds of 100 miles an hour and gusts up and down," Bennett observed. "So I'd say that Auto Tracking was a definite benefit to us."

Canobeam systems are protocol-independent (like fiber), require no radio-frequency permits or licenses, and–because they use a line-of-sight light beam–provide a highly secure wireless data link. Canobeam users include a wide range of business, government, and educational institutions.

"The Canobeam is a solid bridge between us and the NOC. And it has Telnet features so you can go log in and see what's going on," Bennett explained.

Canobeam's DT-MNG-100 Management Board is built-in as a standard feature of the DT-120 and DT-130 systems.

This feature enables users to monitor the status of Canobeam transceivers via SNMP or Telnet (for monitoring and setting). In addition, diagnostic logs can be stored in a PC via FTP (for log data transmission).

"We provide large chunks of bandwidth, and Canobeam delivers that reliably," Bennett concluded.

About Omnispring: Omnispring LLC Omnispring LLC is a provider of high-speed wireless broadband and Internet throughout the greater Central Florida and Ft. Lauderdale area. Omnispring specializes in fixed wireless bandwidth for commercial applications requiring bandwidth from 1 to 100 Mbps. Omnispring also offers Business Class DSL equivalent plans, WiFi HotSpots, as well as web hosting, dedicated colo, and tech support. For more information please visit www.omnispring.com or e-mail sales@omnispring.com

Canobeam DT-110 Wins The Data Race For International Speedway Corporation

Canon Free Space Optics Goes The Distance In Satisfying ISC's Need For Fast, Reliable Networking at NASCAR Events

Image courtesy Motorsports Images & Archives

International Speedway Corporation (ISC) knows what being fast is all about. As one of the nation's leading motor sports promoters, ISC is involved in more than 100 stock car, sports car, truck, motorcycle, and other racing events annually. It also owns 12 motor sports facilities, as well as Florida's DAYTONA USA, the official attraction of the sanctioning body known as NASCAR.

"You can set the Canobeams up at a moment's notice, you get connectivity on the fly, and then you can take them to the next event. "

Bob Shafto,
ISC Senior Communications Manager

Crucial to the ISC's promotion of the world's fastest vehicles is fast data access at the many race tracks it operates at throughout the year. While the need for connectivity at those tracks can include everything from the sanctioning body's weather-monitoring requirements, to high-speed Internet access for journalists, to the ISC's own internal computer network, installing fiber at every track would be cost-prohibitive.

So how does ISC solve its fast data-access needs at major motor sport venues? With Free Space Optics using Canon's Canobeam optical transceiver systems.

"A lot of our sites are quite large," explains ISC Senior Communications Manager Bob Shafto. "Daytona, for example, is a two-and-a-half mile oval. The cost of tearing up the ground, installing fiber optics from point A to point B, and then maintaining that infrastructure would be quite cumbersome and costly. But with Free Space Optics we're able to shoot the beam across the entire track from one side to the other at speeds that are as fast as fiber. We use our Canobeams primarily where we need temporary high-speed network access, and we're very pleased with their performance."

ISC uses both a Canobeam DT-110 and a DT-120 Free Space Optics data-transmission system, which provide a communication range of 20m to 500m and from 100m to 2km, respectively. Both offer a wide range of data speeds from 25Mbps to 156Mbps, as well as Canobeam's unique Auto Tracking Function, which constantly maintains beam alignment and compensates for vibrations in the installation base that can be caused by such factors as wind, weather, or even the vibrations of large crowds and auto traffic. Canobeam systems are protocol-independent (like fiber), require no radio-frequency permits or licenses, and—because they use a line-of-sight light beam—provide a highly secure wireless data link. With transmission speeds of up to 1.25Gbps available for Gigabit Ethernet networking, Canobeam users include a wide range of business, government, and educational institutions.

"You can set the Canobeams up at a moment's notice, you get connectivity on the fly, and then you can take them to the next event," Shafto explains. "If you have two events at one track location per year, do you spend $500,000 installing fiber optics or do you set up the Free Space Optics, get the same throughput, and then use it elsewhere? The choice is clear. The locations that we've already used Canobeam at have really paid off. These include Daytona, Watkins Glen, New York, and Brooklyn, Michigan. We own other tracks around the country, too, so we could ship our Canobeams out and get them set up there as well.

"Free Space Optics is a technology that you don't hear about every day but it gives you faster throughput than Wi-Fi or any other wireless-type signal," Shafto adds. "And a lot of Canobeam's speed is quicker even than what you have going to your desktop. Another thing I like about Canobeam is that if something happens to my existing network on our corporate campus I can set it up and 'give network' where it needs to be at a moment's notice. Product support has been fantastic, although we haven't had to use tech support very much." ISC purchased its Canobeams from a major Canon distributor.

Image courtesy Motorsports Images & Archives

Canobeam DT-130 Is A Sound Decision For Dolby Laboratories' Transmission Needs

Canon Free Space Optics Hit The Right Notes With Reliability, Gigabit Speed, Auto Tracking, and Management Utilities

Dolby is a name that's synonymous with the very best in audio quality, and for nearly four decades Dolby Laboratories has excelled as an innovator in high-quality audio technologies for consumer and professional electronics. Dolby defines the very best in audio and surround sound for cinema, broadcast, home entertainment, cars, games, and personal computers. Given this emphasis on quality, it's no surprise that when this world-leading company needed to extend its internal network across a busy San Francisco intersection the technology they chose was Canon's Canobeam DT-130 Free Space Optics transceiver system.

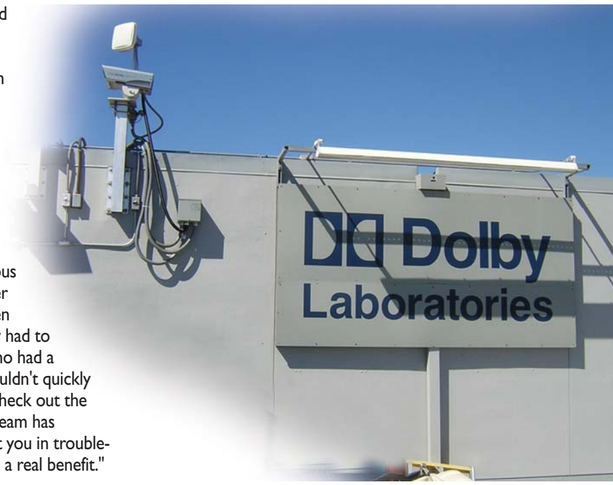
"Definitely when we saw the name Canon it meant a lot more to us than its competitors did. Canobeam has management utilities to assist you in trouble-shooting the system, which is a real benefit."

Richard Graves, Dolby Laboratories' network and telecommunications services manager

"We had three choices," explained Richard Graves, Dolby Laboratories' network and telecommunications services manager. "We could buy or lease space from the city and dig a trench for fiber between two blocks. Or we could rent high-speed data circuits from a telecom carrier. We have Gigabit-plus bandwidth requirements, so the cost of either would be astronomical. Luckily we also had line-of-sight between the two buildings, which gave us a third choice: Free Space Optics. What we would have paid in one month for fiber was the price of a set of Canobeam lasers."

Dolby's choice was also based on previous experience with Free Space Optics in networking another of its San Francisco buildings, and on Canobeam's features.

"Definitely when we saw the name Canon it meant a lot more to us than its competitors did," Graves continued. "There were reliability issues with a previous vendor, a different gigabit laser brand that we had used. When something broke we basically had to call in a service technician who had a special alignment tool. We couldn't quickly get onto an application and check out the system ourselves. But Canobeam has management utilities to assist you in trouble-shooting the system, which is a real benefit."



Canobeam's DT-MNG-100 Management Board is built-in as a standard feature with the DT-120 and DT-130 systems. The feature enables users to monitor the status of the Canobeam transceivers via SNMP or Telnet (for monitoring and setting). In addition, diagnostic logs can be stored in a PC via FTP (for log data transmission).

"Canobeam's auto-alignment feature [Auto Tracking] is another big benefit that the other brand did not have," Graves added. "It's definitely a plus."

Canobeam's unique Auto Tracking Function constantly maintains beam alignment and compensates for vibrations in the installation base that can be caused by such factors as wind and street traffic. Canobeam systems are protocol-independent (like fiber), require no radio-frequency permits or licenses, and–because they use a line-of-sight light beam–provide a highly secure wireless data link. The Canobeam DT-130 offers transmission speeds of up to 1.25Gbps for Gigabit Ethernet networking.

"We have super-high requirements for circuit reliability," Graves noted. "Our local area network and wide area network gear needs to be basically 'five nines,' or 99.999 percent reliable."

"We have super-high requirements for circuit reliability," Graves noted. "Our local area network and wide area network gear needs to be basically 'five nines,' or 99.999 percent reliable."

Richard Graves, Dolby Laboratories' network and telecommunications services manager

"The Canobeam link is a physical extension of our Ethernet IP network that ties buildings A and

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...Stratasys

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leased from the phone company, and a Free-Space Optical connection. Looking at the return on investment versus performance for these options, Free-Space Optical was the clear winner. It had a return on investment of about a year, so it was ideal for us."

Once it was clear that Free-Space Optics was the best solution, the next task was to choose which brand.

"We chose Canon's Canobeam for its active optical (Auto-Tracking) connection," Glennon revealed. "The problem with most Free Space Optical systems is that the beam spreads; the more distant the connection, the wider it gets. Normally the way to handle that or to handle movement and alignment issues is to let the beam spread and take a loss in power, which usually limits the distance that the buildings can be separated.

"What Canon added to the equation is their optical expertise. Canobeam has an active system that aims the beam precisely and spreads it less. This enables Canobeam to handle movement between the buildings as well as vibrations and all the things that a high-precision laser is possibly affected by. After all, you've got this beam precisely aimed while cars and trucks are rumbling by, people are walking around inside the building, and heating & cooling systems are functioning. All of that can be enough to throw a laser beam off. But Canobeam can handle a much tighter-focus beam and optically correct the aiming while it's in use. We need networking to our third building to be reliable, and Canobeam provides that. We also installed a back-up T-1 connection, but we prefer Canobeam's optical connection for its higher speed.

"At three-quarters of a mile we were right at the limit that Canon specifies Free Space Optical for," Glennon added. "But we're seeing very high-quality signal strength at that distance. And although we were most concerned about fog—the bane of optical connections—I checked the reading on a recent foggy morning and found that the signal strength dropped only about 40 percent, which is very good and sufficient to run the connection channel at full speed."

Now in its latest generation, the Canobeam DT-100 series is a proven, reliable, and versatile solution for low-cost, high-security, high-speed data-transmission networking at up to 2km (1.24 miles) at 1.25 Gbps (Gigabits per second). All models in the Canobeam DT-100 series employ Canon's Automatic Tracking Function to maintain beam alignment and compensate for vibrations in the installation base due to temperature, weather, and other factors. Canobeam systems are protocol-independent (like fiber), require no radio-frequency permits or licenses, and are highly secure. Canobeam users include a wide range of business, government, and educational institutions.

"We're happy with the job the consulting firm and the installer did, but we're especially happy with Canobeam," Glennon concluded.

"What Canon added to the equation is their optical expertise. Canobeam has an active system that aims the beam precisely and spreads it less."

Steve Glennon,
Stratasys system administrator

...Edmonton

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millimeters (5.9 inches) of rain that fell in less than two hours put about one-third of the city under water and was described by forecasters as a once-in-200-year storm.

"This storm was enough to put any system to the test and many parts of the city experienced some type of communication failure," said Kratochvil. "The Canobeam, however, never experienced a hiccup. Since then I haven't worried about it because it's been so reliable." There were several benefits from implementing the Canobeam that Kratochvil did not anticipate. First, because the Canobeam can transmit 1.25 Gigabits in either direction, the DT-130 provided a backbone that gives the EEDC end-to-end Gigabit connectivity from their workstation to their server farm. There are no slow-down or stalling systems nodes, which can often occur in networks due to some connections being slower than others.

In addition, EEDC was able to leave its entire server farm in its original location and move 75 percent of its work force to its new building, allowing for their mission-critical infrastructure to remain off site. This arrangement meant that the Canobeam enabled EEDC to provide redundancy without doubling infrastructure costs.

"What helped seal the deal for us is the fact that we will end up owning the equipment. If a similar situation ever occurs again we can just reposition the Canobeam. It's a real win-win scenario for us."

John Kratochvil, EEDC's Director of Information Technology

...Dolby

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B together," Graves added. "And building B has no other telecommunication link. All of its telephones and audio data are through IP, which is carried by Canobeam. Latency and speed are critical when you're dealing with voice communication. Canobeam gives us the performance we need, and in fact we've stress-tested it and haven't yet reached its maximum potential."

Canobeam DT-100 Series Features Auto Tracking In All Models, Compact Design, Lower Cost

The Most Complete, Versatile, and Affordable Free Space Optics (FSO) Ever Introduced by the Advanced Technology Leader

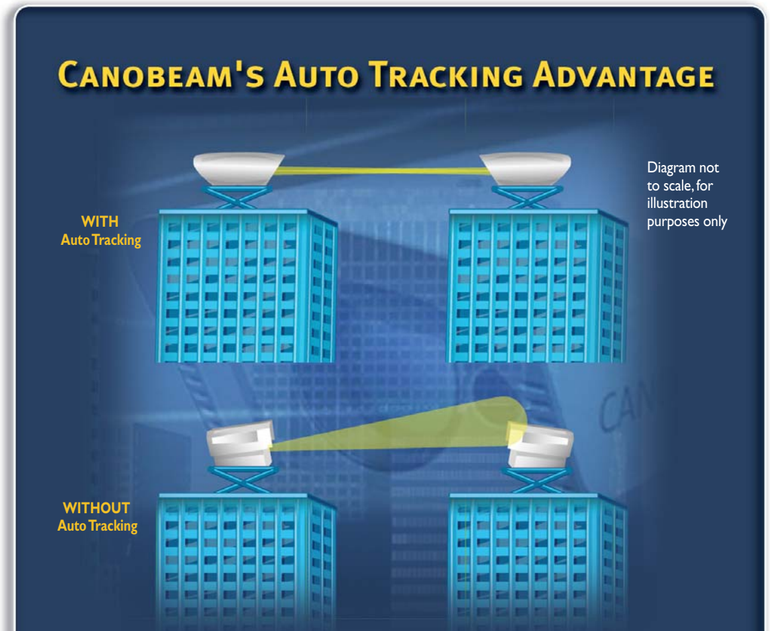
Canon has combined more than 15 years of Free Space Optics (FSO) engineering expertise into its Canobeam DT-100 Series, the highly versatile optical beam transmission system. The fourth generation of Canon's point-to-point optical beam transceivers feature built-in Auto Tracking throughout all three models, compact design, and exceptional affordability.

The DT-100 Series transmits data at speeds from 25 Mbps to 1.25Gbps, over distances from 20m to 2 km, requires no FCC licensing and sets up in minutes. Canobeam technology provides a highly secure and reliable link, which has been proven at college and corporate campuses, government and military facilities and other applications where telecom bandwidth is insufficient, fiber is cost prohibitive or logistically impossible, or a redundant/disaster recovery system is essential.

The DT-100 Series features a new compact optical module, resulting in size and weight reductions of up to 50 percent over previous models. It features the same protocol-independent operation as fiber optic cable, but with much lower installation and operating costs. The units are available in several fiber or twisted pair configurations. Further adding to Canobeam's famous dependability is an expanded weatherproof specification in all three models, for operation in temperatures from -4 to 131 degrees Farenheit (-20 to 55 degrees Celsius).

The flagship of the Canobeam line is the DT-130 model, which achieves transmission speeds of up to 1.25 Gbps, for supporting Gigabit Ethernet networks. Transmission distance is up to 1000m, and the DT-130 also incorporates a 3R Function (Re-shaping, Re-Timing and Re-generating), allowing the data signal to be relayed without loss of strength or quality.

The Canobeam DT-120 unit transmits data from distances of 100m to 2km, and speeds of 25 Mbps to 156Mbps. The Canobeam DT-110 model offers outstanding value and performance for shorter distance applications from 20m to 500m, at speeds of 25Mbps to 156Mbps. With the introduction of the DT-110 unit, built-in Auto Tracking is now standard with even the entry-level Canobeam product and allows the unit to transmit over 500m distance in only 250m visibility. Canon's Canobeam DT-100 Series with Auto Tracking makes the reliability and performance of Canobeam products more affordable than ever. The Canobeam line provides a quick and flexible data transmission solution, while maintaining Canon's high communication quality standards.



Canon's Canobeam DT-100 Series of Free Space Optics data transmission systems provides many unique advantages, and among these is Auto Tracking.

Auto Tracking is an exclusive Canobeam feature, which is now built-in to the complete Canobeam product line, from the high end DT-130 to the even more economical DT-110. Auto Tracking maintains precise beam alignment despite even the slightest movement in the installation base, which can be caused by wind, temperature changes, traffic, or other environmental factors. With built-in Auto Tracking, Canobeam's optical beam axis will self-correct on a continual basis. This will maintain precise and reliable data transmission at all times. Should the Canobeam unit move even slightly due to wind or vibration, its beam axis remains fixed. This freedom from deviation in the optical beam assures continuous, reliable, and stable data transmission.

Incorporating technology from Canon's deep experience in developing many precision optical systems for broadcast lenses, Canobeam's Auto Tracking feature is the most advanced available today in Free Space Optics. This critical feature maintains sensitive communications and is one of the reasons why Canobeam is the leader in the Free Space Optics market.