

## Terescope 1 (TS1)

### Photonic Air Link (PAL) Technology

All-Optics Wireless Communications without Electronics



### Introduction

*The Terescope 1 (TS1) is an innovative all-optics modular solution for wireless optical communications without electronics. TS1 is an optical transceiver, which sits on rooftops (or behind windows) and provides fiber-like connection and speeds without electronics or electricity power.*

*Terescope 1 responds to today's and tomorrow's users' services demands, while providing higher potential capacity, license free and protocol independent (Ethernet/IP, TDM, SONET, ATM and Cellular) transmission, at lower costs, over the air.*

*MRV has created the first passive Photonic Air Link – based on all-optic technology, paving the way for optical transmission by eliminating the need for electric power on rooftops and expensive Optical-Electrical-Optical (O-E-O) conversion. The MRV's TS1 system takes broadband access technologies to new heights with state-of-the-art wireless passive all-optics transmission, enabling the low-cost wireless bandwidth revolution in "First Mile" applications.*

### Product Description - All Optics Communication Through The Air

TS1 is an optical wireless system without electronics. It provides fiber speed services with all-optic technology. In addition, TS1 provides a groundbreaking approach for reliable, secure, cost-effective and easy to deploy high-speed transmission for enterprise as well as carrier applications.

Easy to install and align, the TS1 system can be deployed almost instantly to expand an existing network. Thanks to the TS1 system, the installation of high-speed optical wireless services is now faster than ever before. The product's cost adds to its being an ideal and highly reliable solution for wireless communication.

MRV's TS1 solution can be implemented in any existing infrastructure, including twisted pair (DSL), CAT-5, fiber and wireless, and enables Open First Mile communication. It is an ideal solution for fast deployment of building-to-building communication, first-mile connectivity, crowded urban environments and campus communication, as well as all-optics wireless communication solutions for difficult terrain (crossing highways, rivers, etc.), disaster recovery and temporary installations.

### What is the key feature that makes the TS1 so unique?

Free Space Optics (FSO) equipment, commercially available today, is generally based on optical-electrical-optical (OEO) conversion, requiring various phases in the process of sending and receiving information through the air and connecting back to the attached networking interface fiber. Although the

OEO feature does not automatically constitute a performance limitation, it can affect the ability to easily scale an FSO system to ultra-high bandwidth capabilities.

TS1 being an all-optic system, it enables transport at very high data rates (fiber-like) using numerous wavelengths simultaneously, within all network topologies (PtP, Ring and Mesh), while maintaining a low total cost of ownership.

MRV was granted a U.S. patent ("Wireless optical communications without electronics") for a technology that eliminates the use of electronics (OEO conversion) and electric power in FSO links. The optical wireless communications without electronics technology affects all optical wireless communication by significantly reducing the cost of network deployment and speeding up the seamless integration of next generation services into the broadband access arena.

### Unique Properties:

- No electric power is needed on the rooftops (whereas electronically based FSO on rooftops is subject to tough environmental conditions)
- No need for grounding and lightning protection
- No opto-electronic transducers are used
- 100% immunity to EMI/RFI (due to the absence of electronic components)
- MTBF of over 10 years!
- Enhanced reliability without electronic components
- Less complex, less parts resulting in a lower-cost solution

### How does TS1 contribute to the state of the art of networking and how does it differentiate itself from other available products by MRV or other companies?

The TS1 system is the first to define a new class of "All-Optics Wireless Communication Products" which eliminates the need for electronics and power in first mile access solutions. This innovative approach opens new possibilities for both operators and users. TS1 is the first wireless solution in the world, which provides the opportunity to build a "green" environment, while enabling pure optical multi-services convergence, Voice, SONET, Ethernet and IP transmission over the air and eliminating grounding and lightening protection, as well as electro-magnetic fields on rooftops. In addition, TS1 releases the operator requirements for frequency licenses.

### Sample Applications

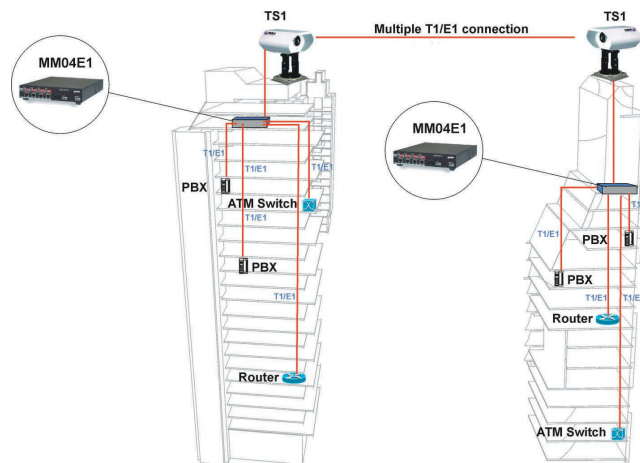
The organizations that can benefit from TS1 range from hospitals, banks and telecommunications companies to municipal and military installations, TS1 systems are filling a

variety of all-optics wireless communication needs the world over. For private corporate networks, the TS1 systems provide a very high bandwidth link between sites without the recurring costs of leased lines and no electrical power on the roof.

For high bandwidth applications such as telemedicine or videoconferencing, TS1 provides new alternatives to installing "virtual" passive fiber optic cable between sites where it is very expensive or impossible to trench.

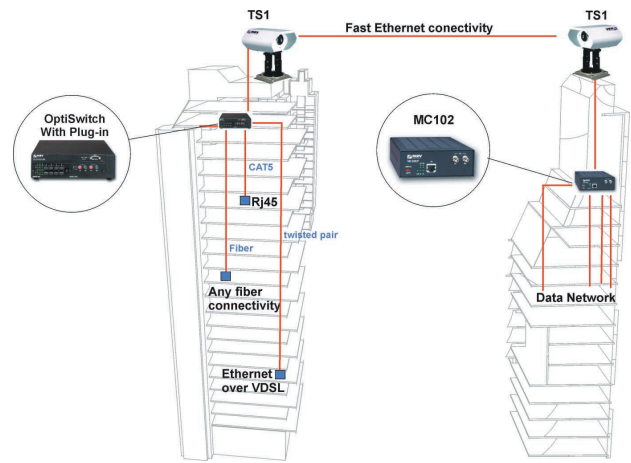
For temporary network connectivity needs, such as exhibitions, conventions, sporting events, or for disaster recovery, high bandwidth links can be easily and quickly provided using portable TS1 systems. In addition, the TS1 systems are also used as high-speed PON backup for fiber optic cable and as "First Mile" solutions, connecting customer sites to fiber backbones.

It is also the ideal solution for anybody who needs the immediate deployment of a secure, highly available connectivity over a short distance at a more than reasonable cost, without the use of electric power, lightning protection and opto-electric transmission on the roof top.



**Multiple T1/E1 Building-to-Building connectivity:** The solution is built using the TereScope 1 Photonic Air Link (PAL) systems, directly connected via optical fibers to an MM04 T1/E1 multiplexer that functions as the TereScope 1 network interface unit (NIU).

Offering up to 4 T1/E1 connections, these solutions avoid the need for costly and time-consuming fiber runs. Easy to install and align, these systems can be deployed almost instantly to expand your network as needed.



**Fast Ethernet Data Connectivity:** Rather than waiting for a communications provider to run fiber to buildings, the TereScope systems, integrated with OptiSwitch™ service aware system, allow you to expand your network by yourself, according to the evolution of your needs. The solution is optimized for providing broadband networks that swiftly adapt to changes and empower the delivery of future applications throughout the enterprise. It enables connectivity to any fiber, CAT5 or twisted pair (using Ethernet over VDSL).

### Summary

MRV, focusing on today's Broadband Access providers' real needs, is a successful pioneer in the integration of cutting-edge Photonic Air Link technology and First Mile Access solutions, which offer the promise of an exceptional variety of broadband media services built with the TS1 all-optics wireless link.

TS1 enables the transmission of next generation Voice, Ethernet, SONET and IP high-speed bandwidth without electronics through the air. The TS1 bridges the all-optics network gaps effectively with reduced sunk-costs and almost-zero time installation.

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