

OptiPulse - High Tech Start-up Aims to Propel US into the Lead in Communications Infrastructure

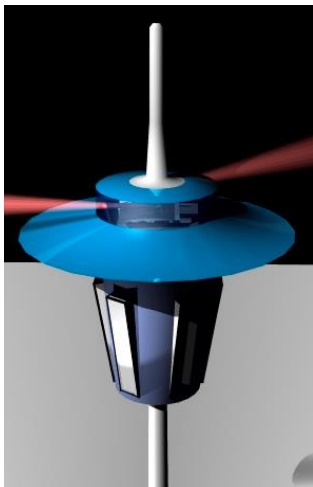
OVERVIEW: The 5G Revolution is ushering in a new era of industrialization, allowing the world to connect with greater ease and speed, propelling IOT infrastructures and enabling human mobility in ways not yet imagined. With 5G offering 20x times the speeds and latency of 4G, global governments are racing to deploy 5G infrastructures as an urgent matter of economic and national security. Countries, communities, and industries lacking 5G infrastructures will quickly be left behind.

PROBLEM: High bandwidth availability and connectivity is slowed by lack of access to 5G infrastructure technologies. Currently, 5G infrastructure depends on fiber, RF wireless technology or microwave to provide connectivity. Fiber, while providing effective infrastructure, is expensive and time intensive considering it requires trenching long distances through densely populated areas. Alternatively, RF wireless technology, while less expensive than fiber, is much slower and has been controversial in some communities. Microwave and mmWave LOS use > 4 times the energy to send the same amount of data.

SOLUTION: OptiPulse offers a tiny photonics light source that produces enough power and speed to form an optical wireless meshed network infrastructure supporting 4G, 5G or even 6G cell phone backhaul, LiFi to customers and edge computing servers distributed throughout communities, enabling cost-effective, rapid deployment high bandwidth connectivity. There is no other comparable technology in the world.

OptiPulse is deep into the planning, development and execution phase of a new prototype of broadband distribution pole and infrastructure. OptiPulse has begun to design, fabricate, build, test and deploy optical mesh network nodes capable of Gbps connections using NIR eye safe light fields. Connections will range from 10s of meters to kilometers at 10Gbps or more. This optical wireless 10Gbps light source has proven high power that can be collimated for long distances or spread out for multiple user LiFi with meshed stable high bandwidth connectivity.

Using its patented photonics light source, OptiPulse seeks to develop a field-ready complete solution for rapid and mass deployment throughout the United States and internationally, enabling ubiquitous access to connection technologies.



BUSINESS CASE: The patented OptiPulse light-source is a compound semiconductor wafer scale process eliminating expensive micro-optical elements all in a chip that costs \$1 in production and can form a 10Gbps link over kilometers distance.

The form factor best representative of the deployment model uses a pole that is set up at a location. The pole is taller than typical streetlamps. Regions can be quickly modeled for a mesh network, then manufactured for quick and optimal deployment. Poles are ordered with specific heights and components with angles for links set at the factory. When installed and turned on, the unit can auto connect the optical mesh network with its pole neighbors within a mile or more. Aesthetic modern forms and decorative shapes with lighting controls create a welcomed user-friendly connection zone.



Figure 1. Laser array chip forms an optical wireless link at 10Gbps which projects an invisible eye safe light field the size of a house stabilizing an optical mesh network



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DEVELOPMENT STATUS: Development of the critical components is underway and proof of concept devices are already operating and being tested in Albuquerque, New Mexico, with more planned in other cities. With support of the National Science Foundation, advancements are being made to demonstrate a solid-state beam directing 10Gbps capable arrayed light sources with enough optical power to reach multiple kilometers. Optical elements direct beams passively through photolithographic optical offsets. With current Department of Defense support, OptiPulse is developing the backhaul links with electro-optical and communications PCBs that can mechanically actively align with large angle directing of beams.

GO-TO-MARKET: Considering the urgency of this technology, OptiPulse seeks a shortened timeline to funding to accomplish as much as possible in parallel efforts to develop the components and support rapid deployment. Additionally, there is increased urgency to support education and Telemedicine with 5G infrastructures in the near term. In the case of 5G infrastructure and OptiPulse technology, time to market is directly correlated with access to funding. Funding is required for the following 1) to develop the final whole product solution, 2) to establish test-beds within targeted cities and communities for optimizing deployment metrics and strategies, 3) to move to high volume production, 4) to develop deployment teams and partnerships with relevant governing bodies and partners.

FUNDING PLAN AND ASK:

- Short Term- Reg D filing complete: raised ~\$4M
 - Awarded one NSF Phase I and one DoD Phase II, More expected with NSF I corps Certification
 - Long Term DoD development commitment to US Army (See Letter)
 - In Process- Reg CF filing for WeFunder website to go live in ~1 month (up to \$1M)
 - Reg A filing after CF, continue crowd funding raise to limit of \$50M
 - Continue to keep prototyping in Abq. to support City of Albuquerque
 - Long Term Funding for establishing production and assembly – considering several states
 - In parallel to Crowdfunding and Reg A+ campaigns, OptiPulse could consider a VC raise of >\$15M so to not delay resources for rapid expansion
- Current Series D raise is @ \$1.25/share with ~20M issued shares including future employee option pools

TEAM: John Joseph, CEO/Founder of Optipulse, has written over 17 major concept issued patents, more pending, on VCSEL array architecture providing a unique light source capable of transmitting significant amounts of data (10Gbps), wireless and over distance. With his expertise in broadband and VCSEL technology, John has founded OptiPulse to use VCSEL technology to bring broadband to underserved communities throughout New Mexico and the United States.

Mathis Shinnick, COO/Co-Founder, has extensive experience in C Level Management in Start-ups, Mid-Market and Large Corporates living and working around the globe as CEO and Managing Director including: Chase's Aerospace and Defense business, a Merchant Banking business based in Hamburg, Germany, and as founder of numerous financial and corporate start-ups. Mathis is excellent at building and guiding teams through challenging business plans.

In addition to John Joseph and Mathis Shinnick, OptiPulse success is supported by an experienced Board of Directors and a talented team of scientists, engineers, and business specialists.