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**Optical Wireless Networks**

**3D Sensing**

**Building 5G Optical Wireless Networks**  
***for Backhaul, “Smart Cities,” LiDAR, IoT, and more . . .***  
***via our VCSEL “LightGrid” Platform Technology***

OptiPulse.com |

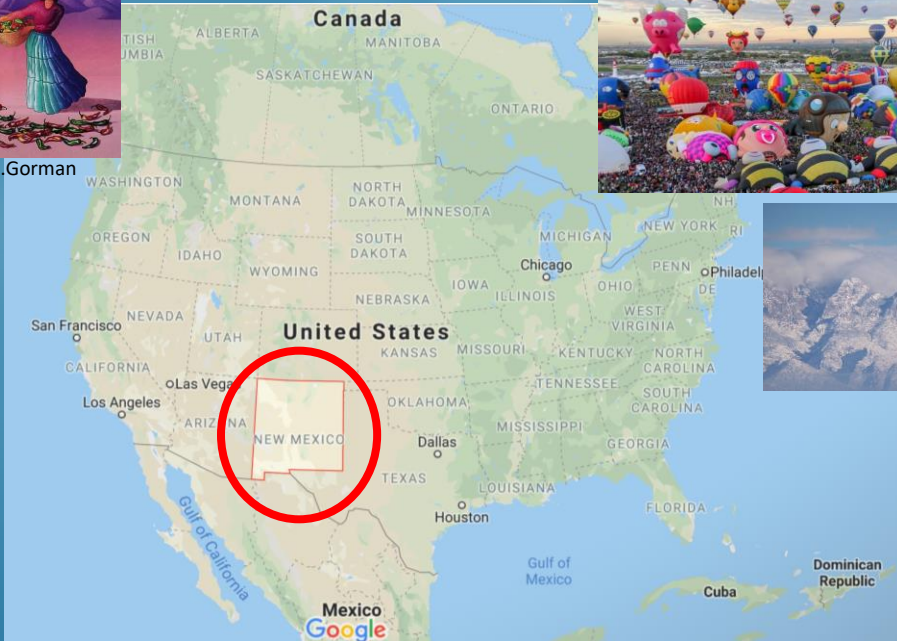
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# OptiPulse Inc., Albuquerque, New Mexico, USA



R.C. Gorman



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<http://www.gcmap.com>



John Joseph  
President  
Founder  
Inventor  
Chairman of the Board



Mathis Shinnick  
CEO  
Co-Founder  
Investor  
Board Director



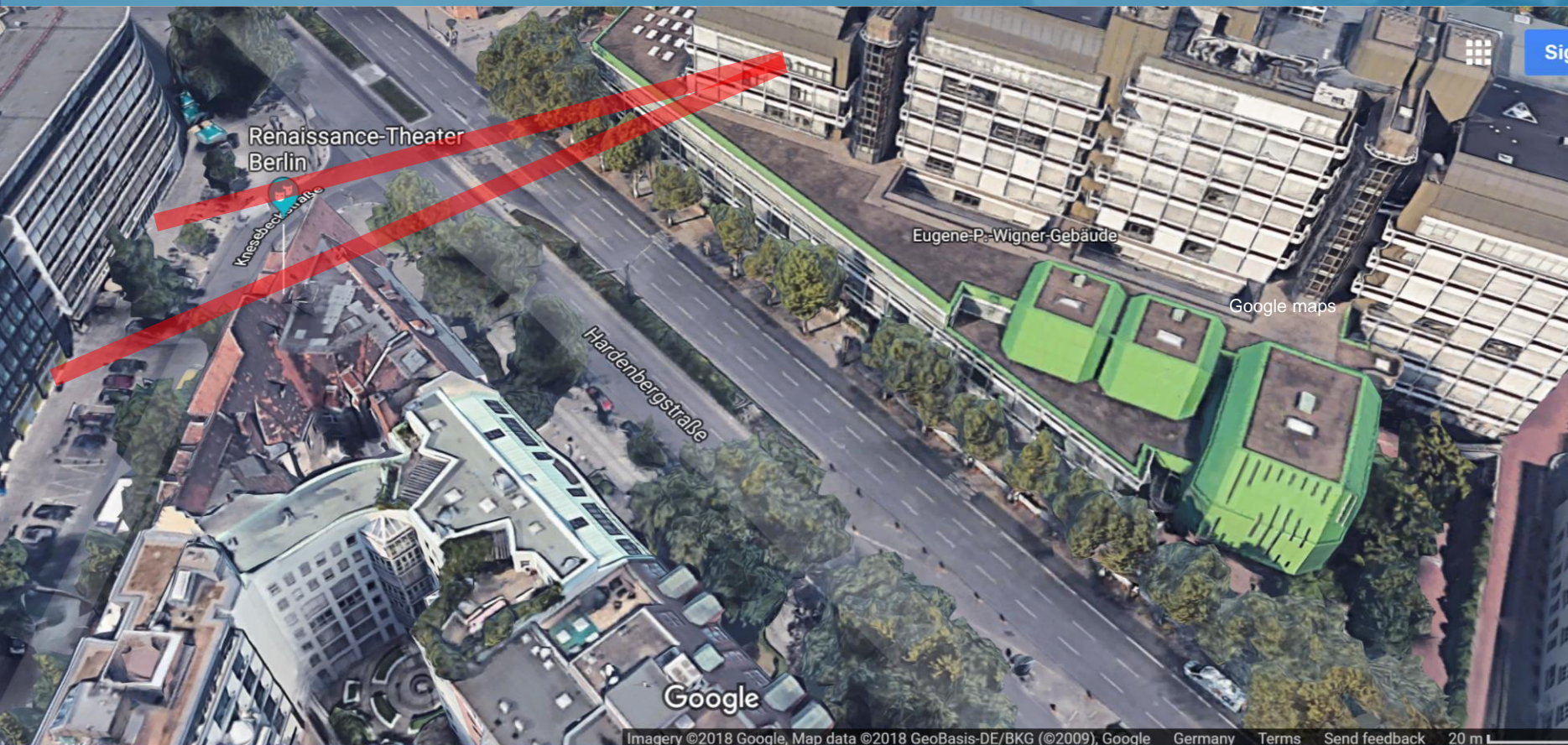
Jim Lott  
CTO (acting)  
Co-Founder

15 VCSEL and VCSEL  
array patents, 30  
years in VCSEL  
processing, quality  
control, and facilities

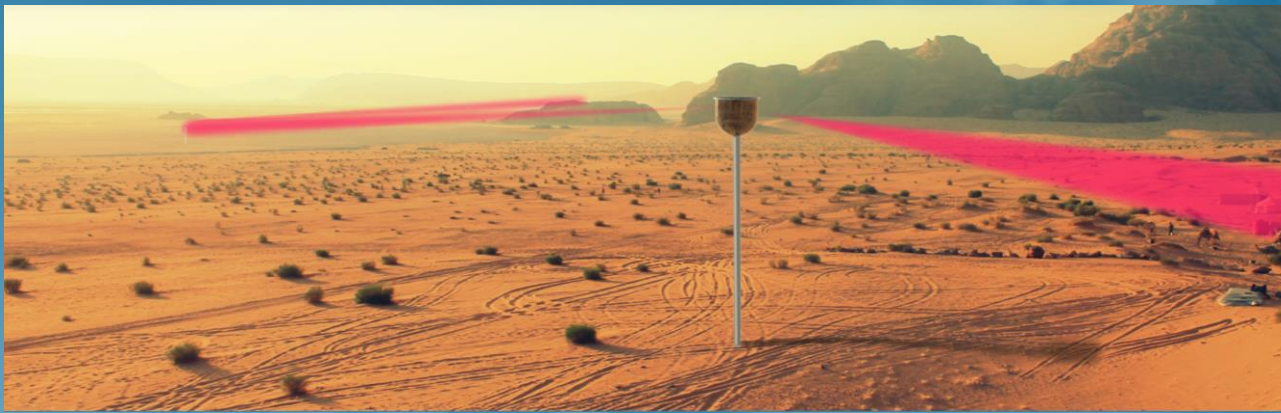
Extensive C-level  
experience, finance,  
start-ups, strategic  
partnerships

Professor,  
photonics  
technology, solid-  
state physics,  
VCSEL and device  
R&D

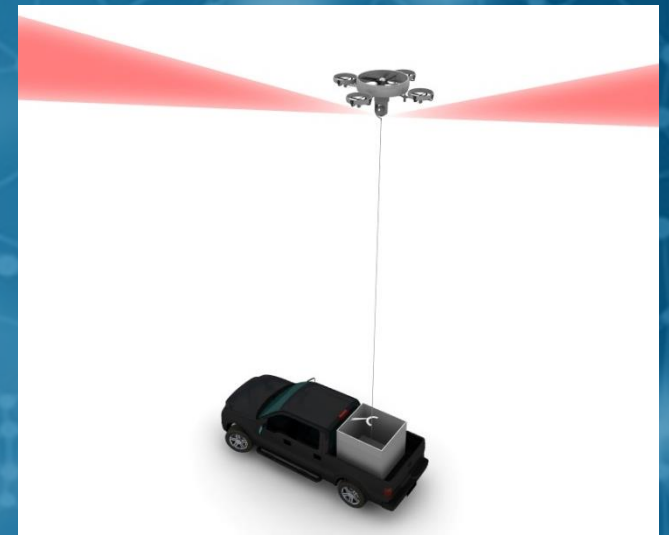
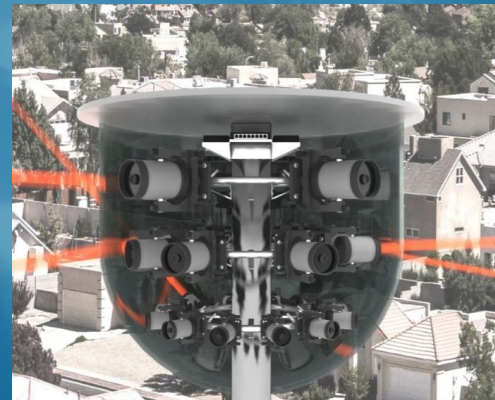




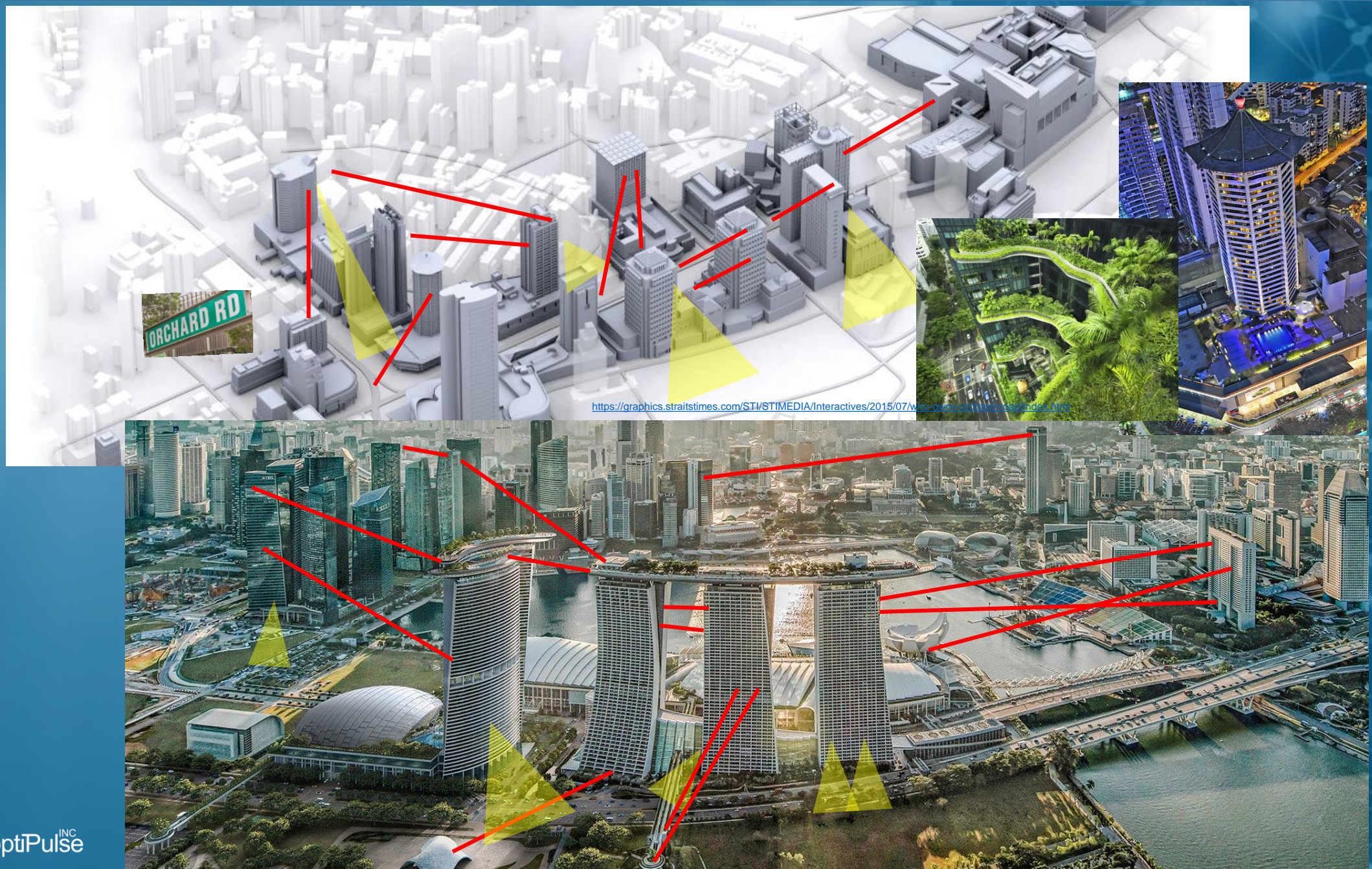




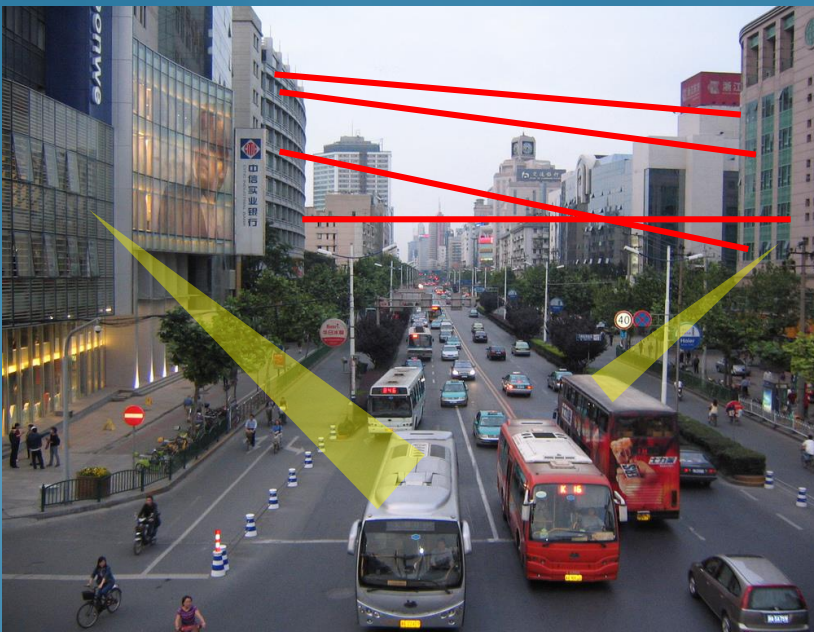
<http://optipulse.com/>



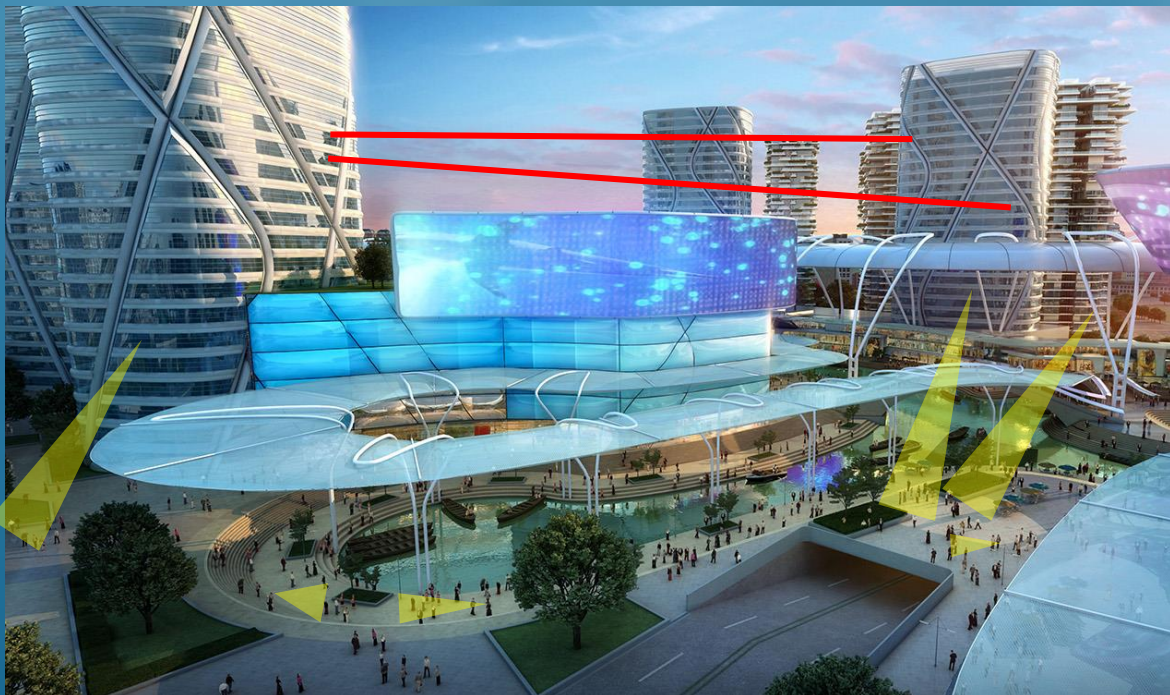






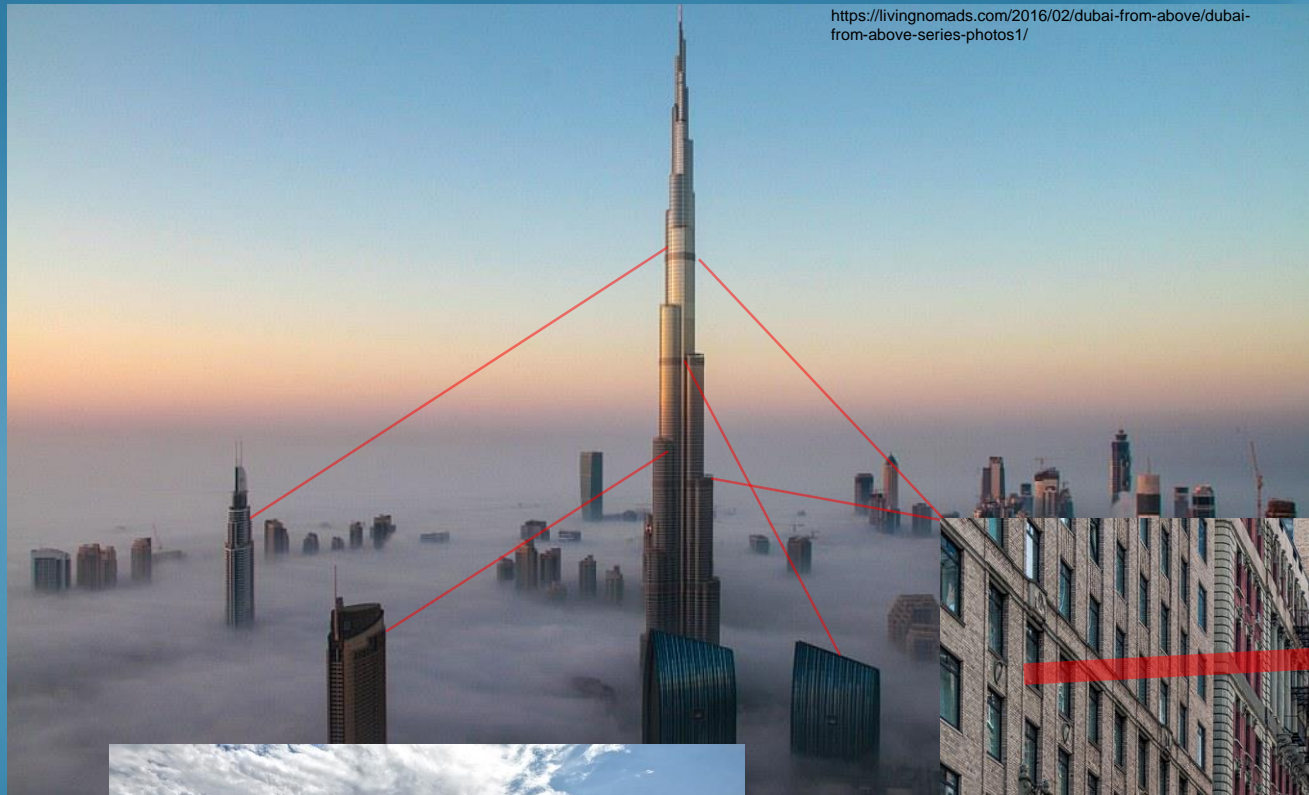


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<https://livingnomads.com/2016/02/dubai-from-above/dubai-from-above-series-photos1/>



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# Optical Wireless - 5G Backhaul and Beyond

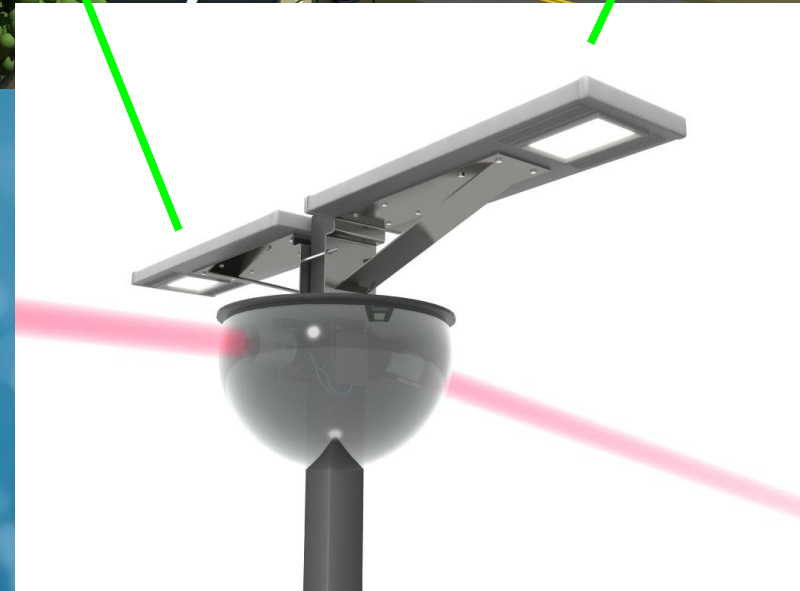
- **Provides low or no Backhaul interruption**
- **Serve as communication arteries within a city**
- **Provides control and distribution of Internet traffic with an IP address and may serve as a micro- data center at each node**
  - **Fast Backhaul**
  - **Easy to install (no digging)**
  - **Lower cost per Gbit**
  - **Redundant connections**
  - **Security**
  - **Fast enough for 5G**
  - **Big data collection and distribution point – a mini edge data center**



**> 10 Gbps optical  
wireless 5G capable  
broadband**

**On-site controller adds security  
to mesh network Infrastructure**

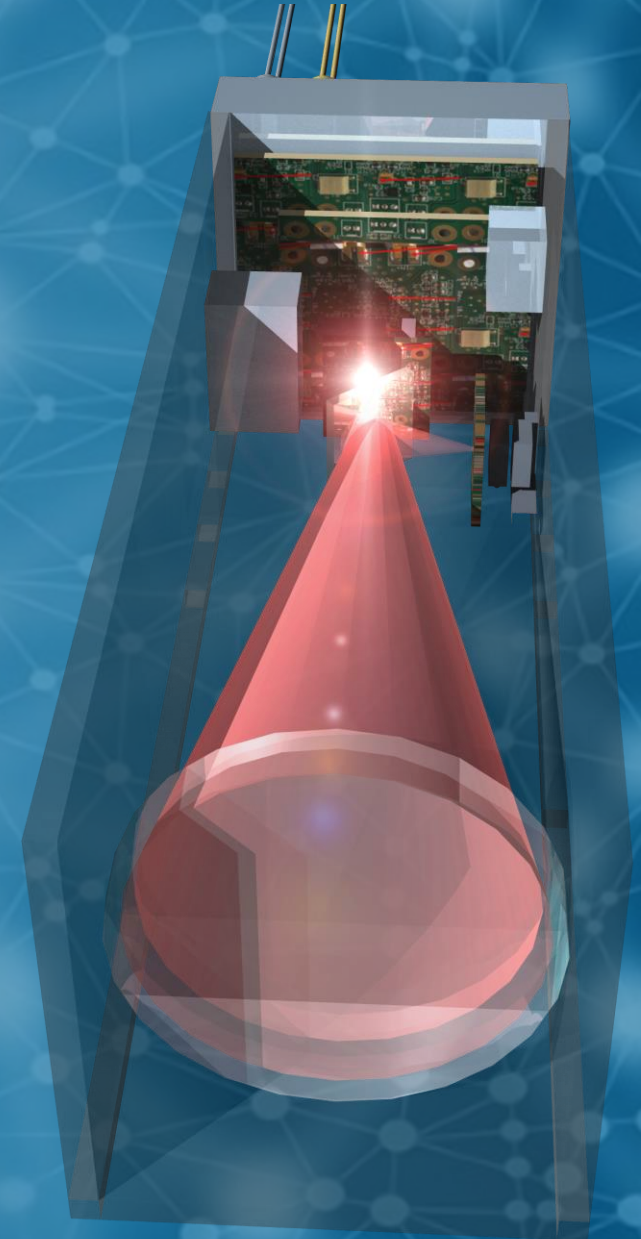
**Enables  
reliable  
connectivity  
for all**





# First Product Focus

- **Largest Market ~300m Metro Market (building to building or smart nodes)**
- **Wireless makes deployment relatively simple**
- **Auto-alignment and self healing power increase simplicity of deployment**
- **May prove valuable as well for the control of peripheral system components such as cell radios, WiFi, curb to home, cameras**



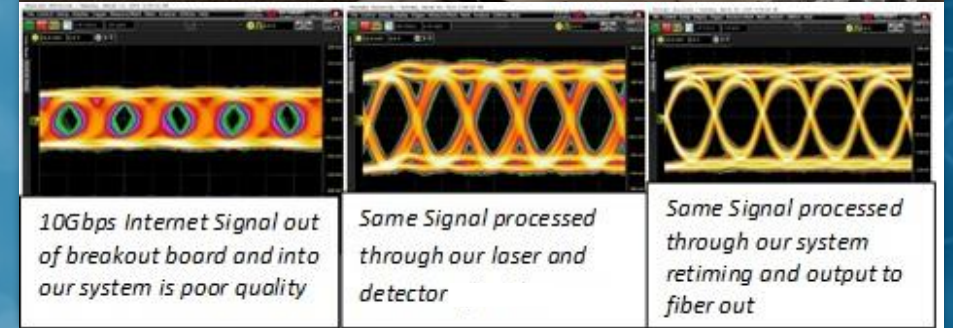
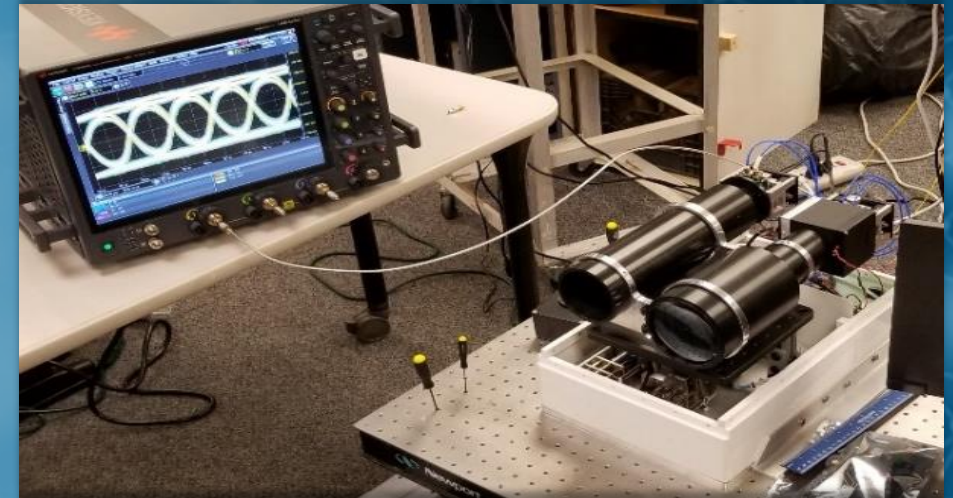


# System Performance and Development



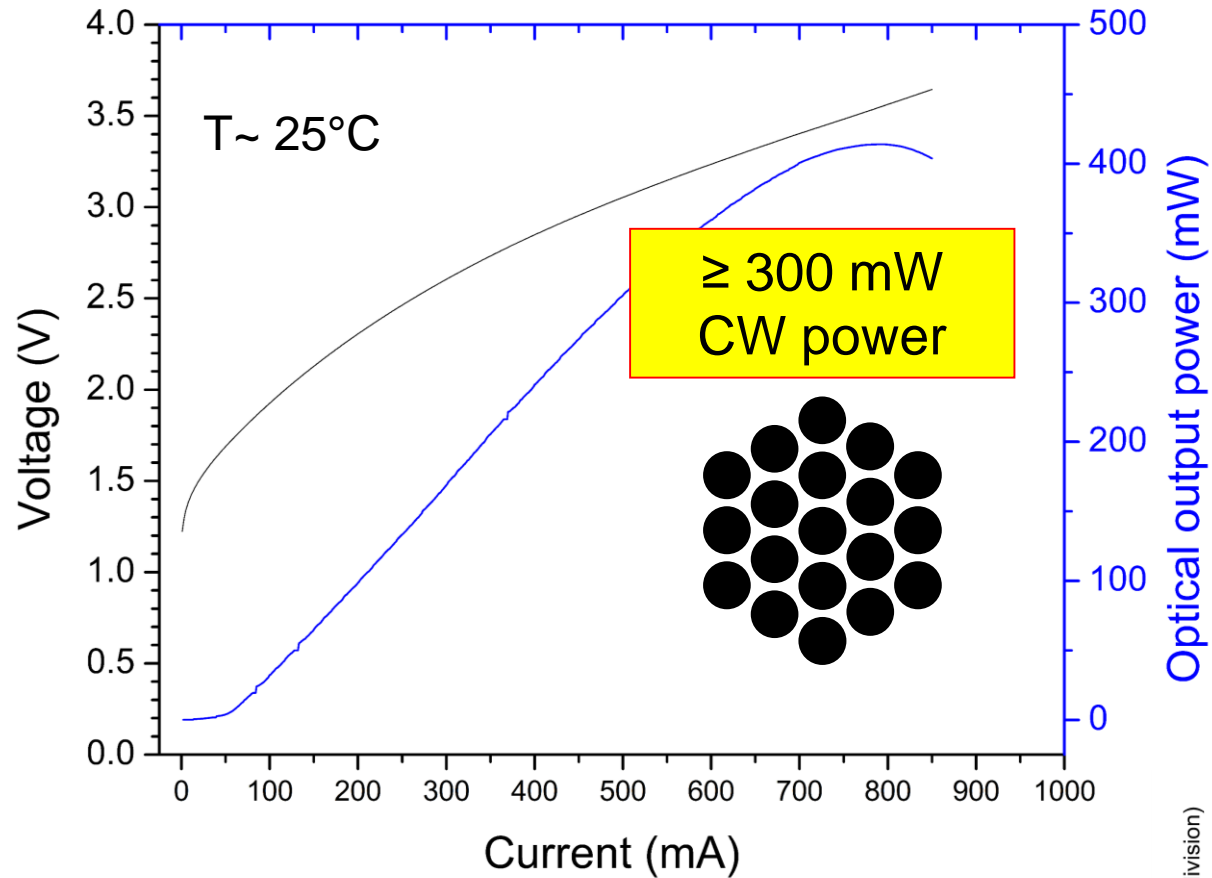
## 10G Demonstration system

- System Operating at 10 Gbps single channel, full duplex
  - Linking college buildings at 105 m
- In progress – developing and deploying a “Smart City” Mesh Network demonstration system in ABQ

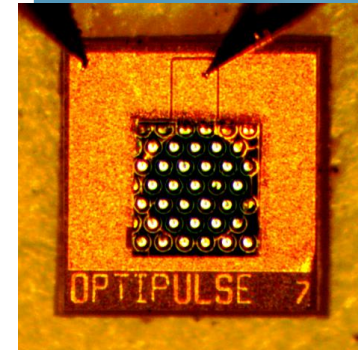
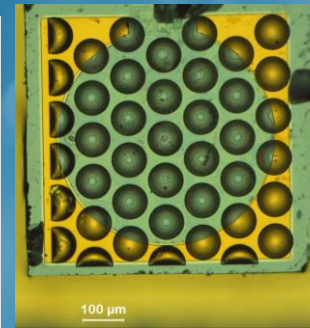




## Example 19-element VCSEL array

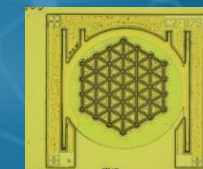
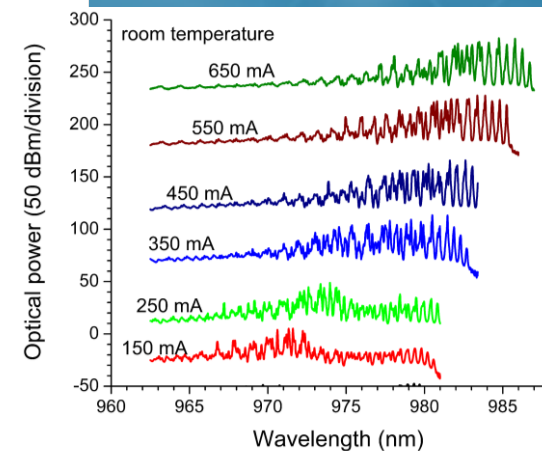
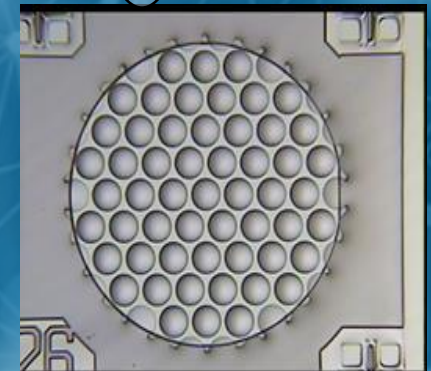
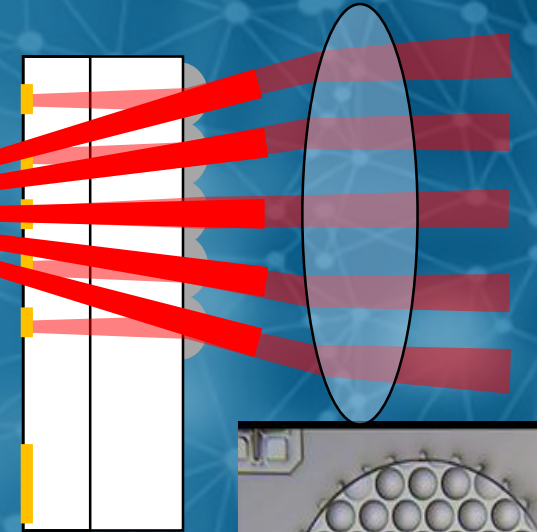


**Scale up the optical output power by increasing the number of VCSEL elements**



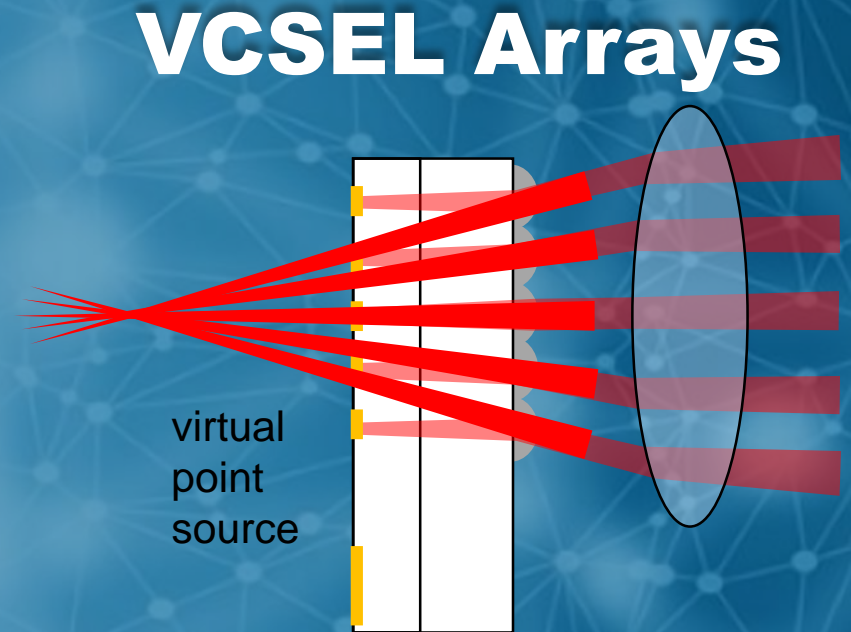
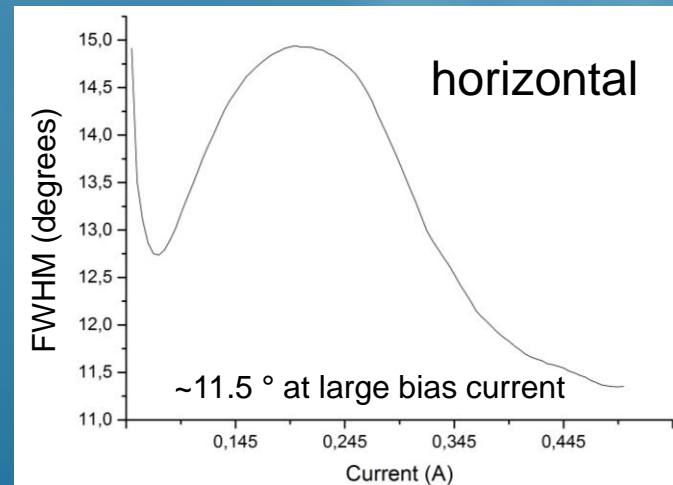
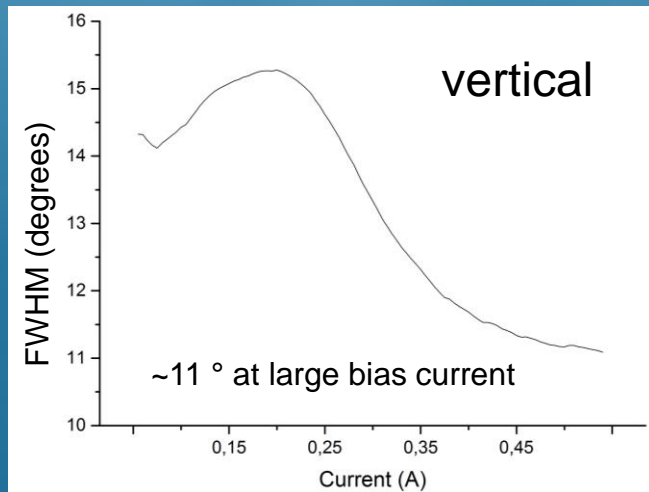
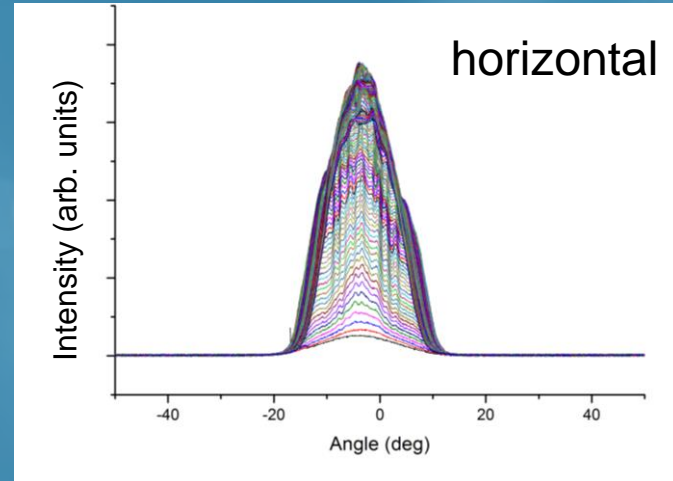
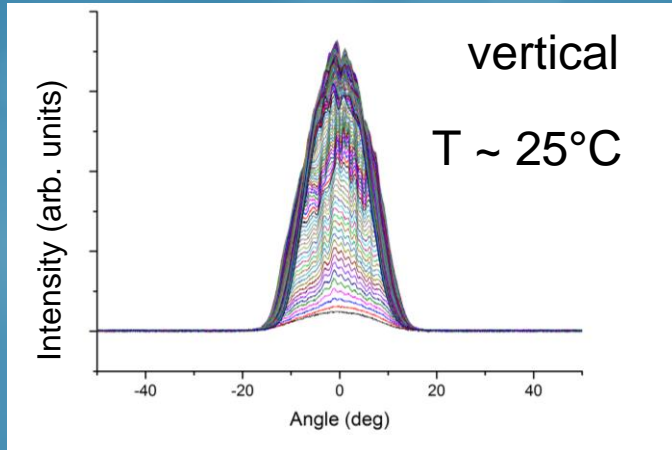
## VCSEL Arrays

virtual point source



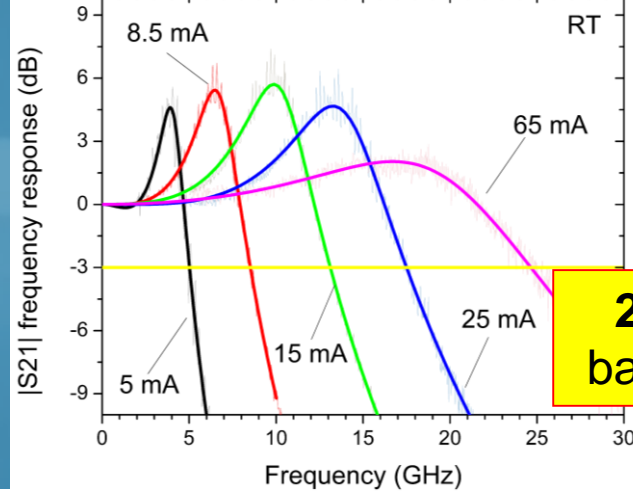
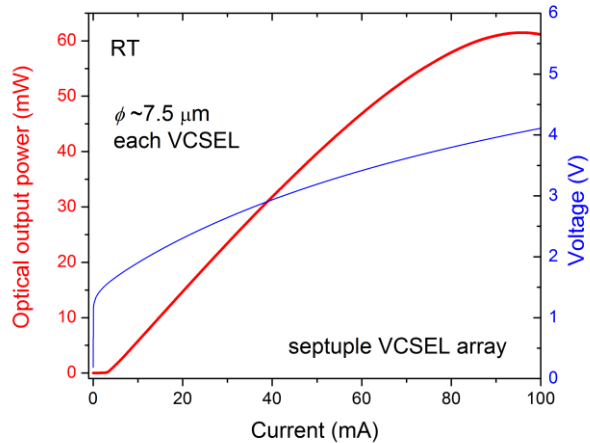


## 11 degrees beam via a patented surface lensing scheme

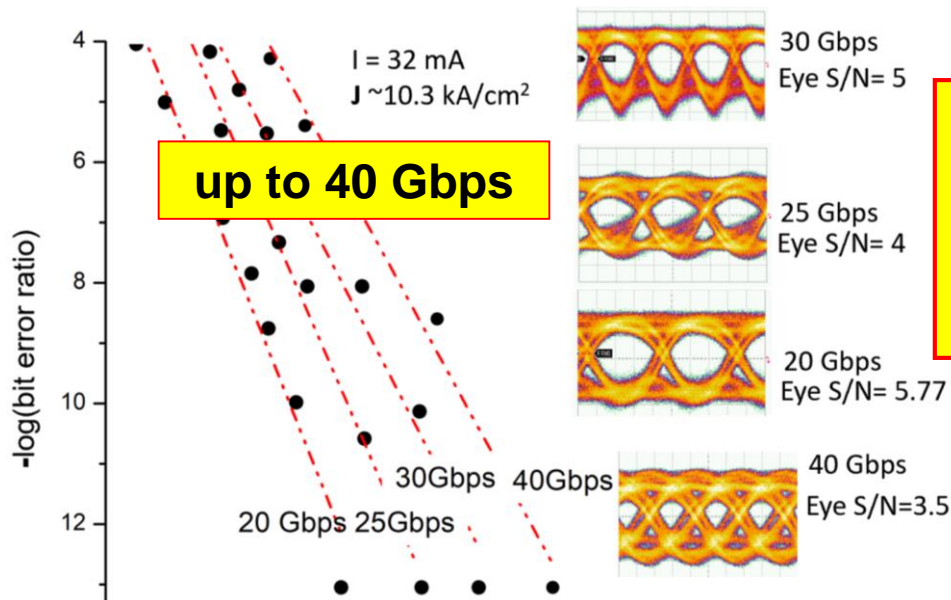
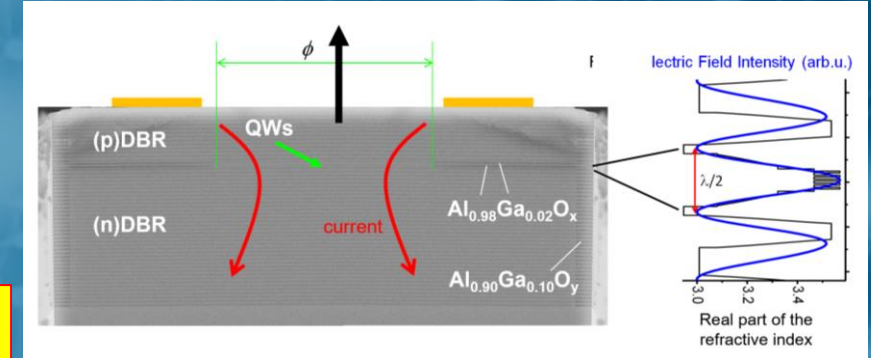




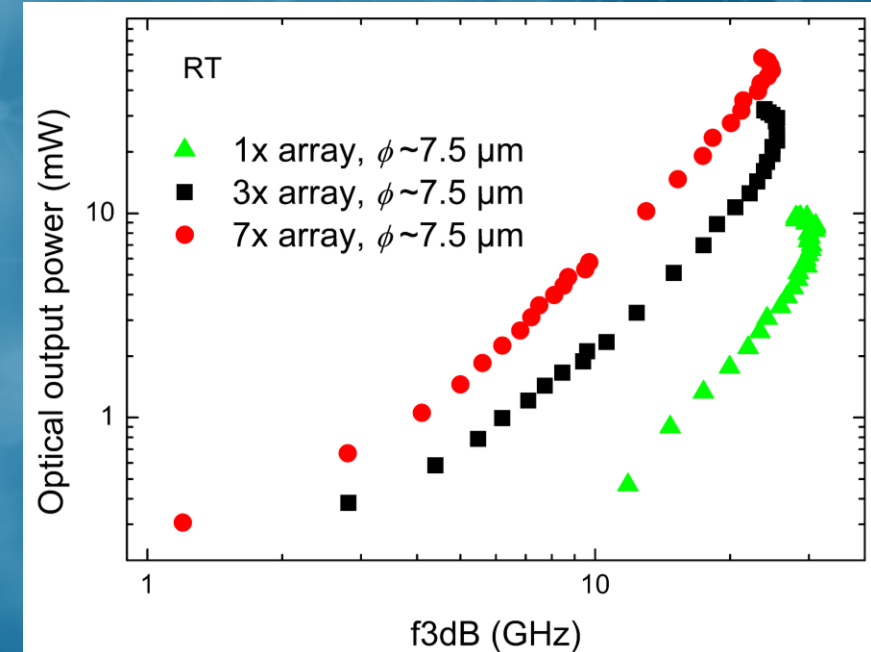
# Next generation VCSEL Arrays



**25 GHz  
bandwidth**

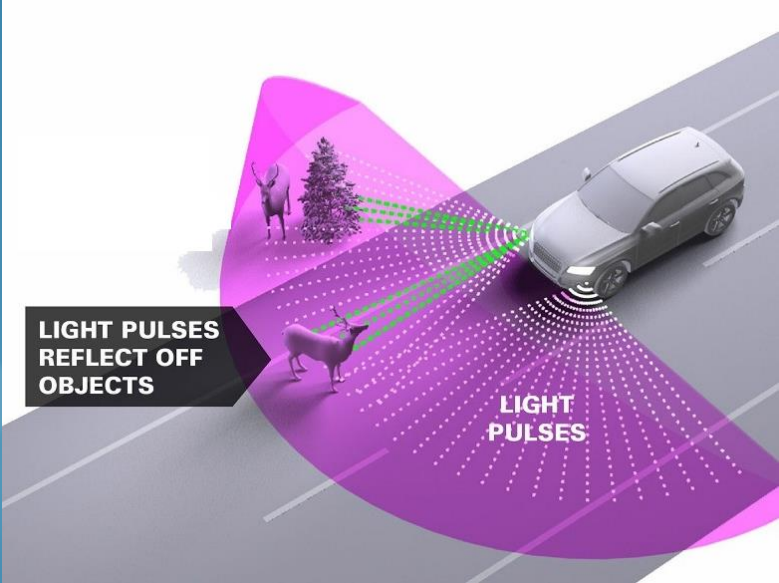


**25 GHz bandwidths  
and 40 Gbps “error  
free” data  
transmission rates**

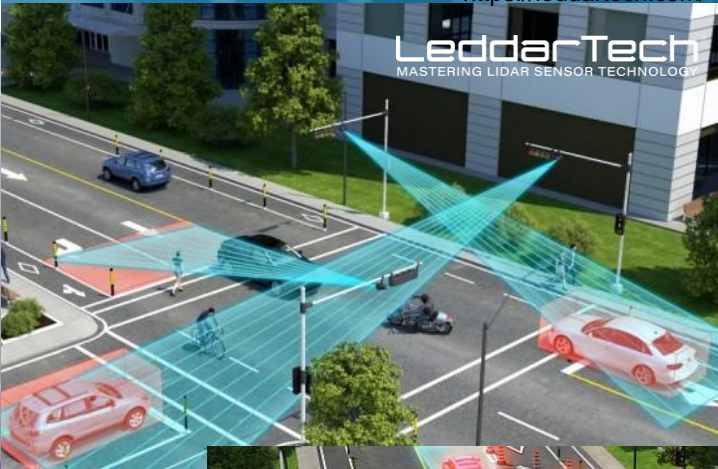




# Sensing and data transfer



<https://www.genxsecurity.com/single-post/2017/06/07/Groundbreaking-LiDAR-Security-Surveillance-Camera-Tech-by-Quanergy>

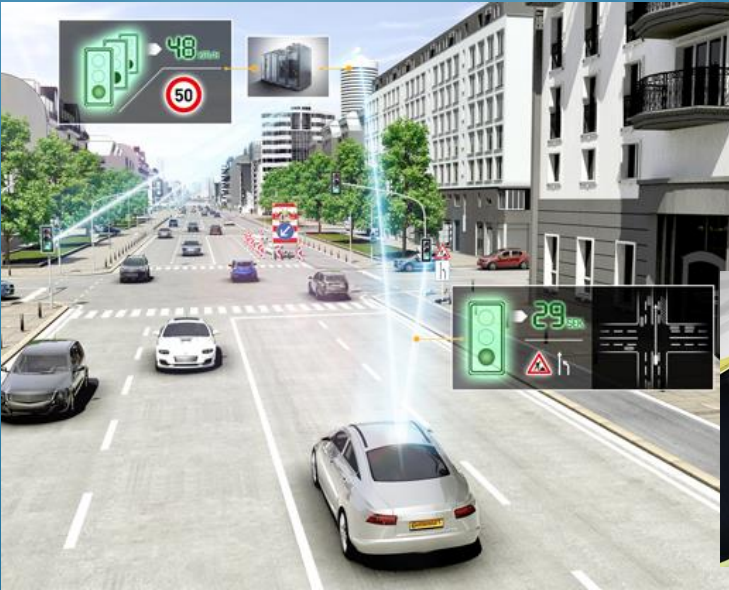


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# Operations, partnerships

- **We perform epitaxial design, packaging design, and systems design**
- **Foundry epitaxial growth, wafer processing, and assembly**
- **Our core array technology may be applied in a plethora of applications**
- **Any and all optical communication and sensing applications are in play**



# Thank you for your attention



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**Mathis Shinnick** | CEO | M 646-710-0939 | [mshinnick@optiPulse.com](mailto:mshinnick@optiPulse.com)

**Dr. Jim Lott** | CTO (acting)



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