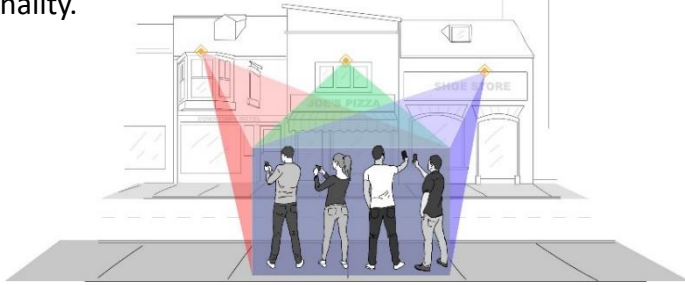


Augmented-Reality Optical Narrowcasting (ARON)

SureFire, LLC, Fountain Valley, CA



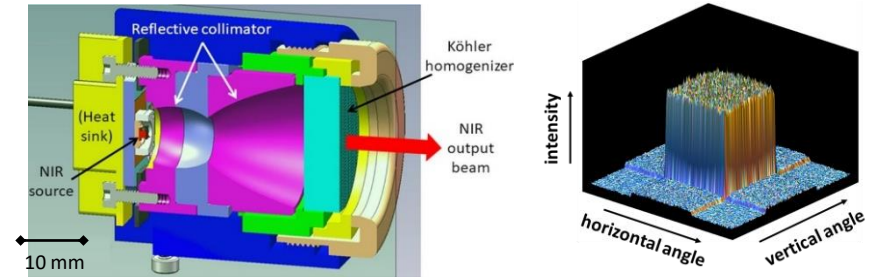
Optical narrowcasting: A novel free-space communications system that transmits information locally using beams of light with tailored directionality.



ARON provides:

- Alternate localized communications channel for mobile devices, vehicles, and fixed locations.
- Communication independent of existing cellular or internet networks.
- Many-to-many communications topology.
- Exciting “through-the-lens” augmented reality (AR) experience.

ARON technology demonstrator: optical transmitter

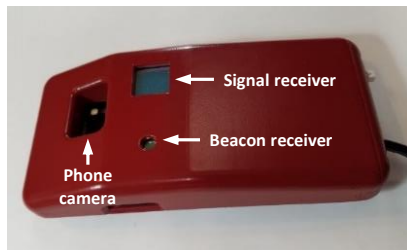


Transmitter design

Uniform square output beam

- Miniaturized nonimaging optical design.
- Transmits 810-890 nm near-infrared (NIR) beam, using 4 W of electrical power.
- Multiple transmitters operating in proximity do not jam each other.
- Square beams from multiple units can be tiled for tailored angular coverage.
- Optical signal data rate of >1 Mbit/s, permitting HD video transmission.
- Demonstrated 200-m range in broad daylight, scalable to much longer ranges.

ARON technology demonstrator: optical receiver



- Beacon receiver detects beacon sent by transmitter and then decodes identifying information.
- ARON app overlays AR icon and identifying text on the live video imagery on phone's display screen.
- Signal data from transmitter is then received and displayed.
- Currently the optical receiver is incorporated in a phone case.

Summary

ARON is a free-space optical communications channel that:

- Is free to use; unregulated and uncensored spectrum.
- Can be adapted for integration into next-generation smartphones and vehicles and be capable of >100 Mbit/s using Adaptive Communications Focal Plane Array with angular channel multiplexing.
- Is virtually immune to obstructions to line of sight, when operated in photonic cross-fire mode.
- Does not require Wi-Fi, cellular, or any other RF communications channels.
- Allows for many-to-many communications.
- Is 300x more energy efficient than Wi-Fi; can be powered by small solar panel.
- Provides a secure communication channel.
- Provides an AR capability without the need for geolocation.
- Can be adapted to provide advanced Li-Fi receiver capability.
- Protected by a 21-patent portfolio.

For further information, visit SureFire's ARON website:

aronsurefire.com