

Topic: N122-146

## SA Photonics

Novel CubeSat Payloads for Naval Space Missions

SkyLight is a cost-saving and performance-improving free space optical (FSO) communication system being developed for PEO Space. It has extremely low size, weight and power (SWaP) to allow its use on nanosatellites, namely the CubeSat platform. The device allows small (3U) satellites to communicate with the ground via infrared FSO techniques. SkyLight operates with high data speeds at high altitudes (LEO) through varying weather, allowing for significantly enhanced global communications. The company, which specializes in the development of advanced photonics systems to solve demanding problems for military and commercial customers, envisions its own small-scale production as well as teaming with well-known primes, as it has on past product developments.

### Technology Category Alignment:

Satellite Communications (SATCOM)

Networks and Communications

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**SYSCOM:** SPAWAR

**Contract:** N66001-14-C-5207

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N66001-14-C-5207](https://navystp.com/vtm/open_file?type=brochure&id=N66001-14-C-5207)

# Department of the Navy SBIR/STTR Transition Program

Statement A: Approved for public release, distribution is unlimited. (1 December 2016)

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## WHO

**SYSCOM:** SPAWAR

**Sponsoring Program:** Program Executive Office for Space Systems (PEO Space Systems)

**Transition Target:**

**TPOC:**  
843-218-2655

**Other transition opportunities:**

This free space optical (FSO) technology is not limited to Navy space applications. In addition to space programs with other Departments, SA Photonics is also pursuing uses with unmanned aerial vehicles (UAVs), littoral naval applications, and various ground communication systems.



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## WHAT

**Operational Need and Improvement:** Naval space missions, including narrowband communications (UHF Follow On, Mobile User Objective System), drastically need a reduction in the size, weight and power (SWaP) of payloads that have traditionally performed missions on much larger satellites. The SA Photonics FSO solution, entitled SkyLight, is capable of extremely high speed, reliable communication that is relatively unaffected by weather.

**Specifications Required:** The payload is to fit within the CubeSat standard (1U), within approximately 10x10x10 cm and have 1.33 kg or less mass, survive the low earth orbit (LEO) space environment for at least two years, and operate with significant power constraints, either very low duty cycle or very low instantaneous power.

**Technology Developed:** SkyLight is a very low SWaP FSO communication system that fits within the CubeSat system. The device allows small (3U) satellites to communicate with the ground via infrared FSO techniques. SkyLight is very small and light, as is needed on CubeSats, and operates at high data speeds through varying weather.

**Warfighter Value:** SA Photonics new SkyLight technology allows for significantly enhanced global communications. Thanks to its ability to operate at high altitudes (LEO), which have limited engagement times, there is a high chance of successful data communication on each pass. Additionally, SkyLight produces a robust and reliable signal wherein a single pass is sufficient to offload data, almost regardless of the weather. Furthermore, the extremely low SWaP will allow its use on nanosatellites, namely the CubeSat platform.

## WHEN

**Contract Number:** N66001-14-C-5207 **Ending on:** July 20, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System Design	Low	Completion of System Design	3	September 2014
SkyLight Fabrication	Low	Successful fabrication	4	May 2015
System IT complete	Med	Completion of laboratory brassboard	5	May 2016
Test flight	High	Successful communications test in LEO	6	January 2017

## HOW

**Projected Business Model:** SA Photonics intends to undergo initial production of the SkyLight system onsite. The company has a history of successful small-scale production for commercialized SBIR products. We envision teaming with a prime contractor for SkyLight product sales. We would look for the prime contractor to supply sales support, installation support, and maintenance support.

**Company Objectives:** The SkyLight system is positioned to be a cost-saving and performance-improving communication tool not just for U.S. Navy satellite communications, but military communications across the DoD. As a result, we are excited to present the product to a range of program offices at the FST, as well as a number of prime contractors, specifically those who work with satellite communications.

**Potential Commercial Applications:** Applications include the military space and UAV sectors, as well as commercial satellites. With commercial satellites, there is a market for free space optical links between them. The SWaP benefits are equally beneficial to the commercial market as the military. Additionally, the lower cost and simpler function of CubeSats combined with the improved performance of the SkyLight allow for the realization of unmet needs.

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