

## LUMINAIRE INTELLIGENT TRACKING (LIT)

### BACKGROUND

The purpose of applying lighting to any vehicle is to allow for situational awareness for the crew, however, adaptive lighting applied to the external body of a vehicle would increase crew visibility, decrease vehicle power usage, and enable crew autonomy during EVA operations. Adaptive lighting integrates a high-definition (HD) micro-LED matrix, laser spot beam and camera(s) to provide pixel-level digital control of the system. Computer vision extracts surface information to improve the precision & accuracy of the lighting system and will act as a glare-free, hands-free supplemental lighting source while crew is traversing the lunar terrain or performing EVA tasks. This vehicle exterior adaptive lighting system has a wide-range of applicability for lunar surface operations, but its main purpose is to keep the crew safe and aware of their surroundings



Automotive headlamp comparison

### PROBLEM/DESCRIPTION

While we may have an idea the natural lighting conditions present on the far side of the moon, we do not have the experience or integrated lighting architecture to traverse safely in the shadowed regions. Adaptive lighting can close the architecture gap and mitigate operations and performance risks for Artemis missions. LED matrix technology has been used in roadway lighting and vehicle headlights to provide navigational guidance, pedestrian/object detection and minimize glare for oncoming drivers. In an EVA application, this technology will detect crewmembers during surface exploration, act as a spotlight to increase crew's situational awareness, and enhance our exploration capabilities with a modular lighting solution applicable to all vehicles supporting an EVA.

### DELIVERABLES:

- Prototype CAD models, schematics, & software
- Quantifiable evidence of performance and power conservation capabilities compared to conventional lighting systems

Time and funding permitting deliverables:

- VR simulation environment utilizing adaptive lighting concept
- Prototype demonstration

#### DESIGN TEAM PROFILE

<b>NASA MENTOR:</b>	Ricco Aceves
<b>LEVEL:</b>	SO/JR/SR
<b>MAJOR / DISCIPLINES:</b>	EE/CE/ME/Engineering Physics/Physics
<b>TEAMS:</b>	Mentor may accept more than one team
<b>DURATION:</b>	Two-Semester Project

