The infrared portion of the electromagnetic spectrum is very important for a variety of applications that relate to safety and homeland security. Chemical detectors that operate in the middle part of the infrared spectrum are much more sensitive than those that operate in the near infrared range. The mid-infrared is also a critical region for national defense in developing countermeasures that protect aircraft and ships from being destroyed by heat-seeking missiles. There are a number of important factors in developing these mid-infrared devices, including portability, power requirements, efficiency, and the quality of the emitted beam.

Semiconductors are excellent materials for such applications due to their compact nature. Many optical and electronic investigations are being pursued to improve the efficiency of these materials and devices--that is to maximize the light output while minimizing the power input. The goal of the proposed project is to acquire and use an infrared camera system that will enable imaging of the mid-infrared light emitted from semiconductor lasers. The shape and uniformity of this output light is a critical factor in moving from basic research to implementing these materials in practical devices. The PIs will use the equipment to acquire preliminary data from existing mid-infrared semiconductor lasers that will be incorporated into a proposal to a Department of Defense agency.