Project Title: Field Deployable OCT for Triage of Ocular Trauma  
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Background: Theatre injuries that threaten “life, limb, or eyesight” have severe long term consequences for the affected soldier, military/veteran health care organizations, and society as a whole, hence they need to be quickly identified and prioritized during triage. Unlike life and limb threatening pathologies, it is often difficult for non-specialist on-site personnel to properly diagnose and distinguish between the various pathologies that can affect eyesight. A symptom as apparently simple as blurry vision can be a result of pathologies ranging from the devastating (corneal ulcer, laceration) to the mundane (dry eye, need for glasses).  
Objective: The objective of the proposed research is to develop and demonstrate novel technologies for ruggedized, portable, optical coherence tomography (OCT) systems capable of: 1) performing state-of-the art OCT imaging in both anterior and posterior segments of the eye under field hospital conditions, 2) being operated by lightly trained personnel, 3) performing preliminary automated quality assurance of image data and screening for traumatic injury, and 4) supporting telemedicine capabilities including live image transfer/consultation and remote operation.  
Hypothesis: The proposed imaging system will bring new imaging capability into the theater by providing fast, non-invasive, 3-D imaging of both the anterior segment and the retina of the eye.  
Specific Aims: 1) Develop hardware technologies for convertible anterior/posterior segment swept source optical coherence tomography (SSOCT); 2) develop software technologies for field deployable SSOCT; 3) develop telemedicine ready and collaborative remote patient data consultation capabilities for field deployable SSOCT; and 4) conduct pilot tests of the component technologies and demonstration instrument in an emergency room environment.  
Study Design: This project includes development of new technologies which enable the four capabilities listed under the objective paragraph above, as well as construction and testing of a prototype demonstration instrument.  
Relevance: This project addresses the lack of deployable portable imaging systems and technologies for document and telemedicine. This may have a significant impact for triage of ocular trauma. The system may also be used as a diagnostic tool in small clinical offices.