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14. ABSTRACT This thesis addresses the development of a new micro-scale interrupter mechanism for a safe and arm device used in modern weapon systems. The interrupter mechanism often consists of a physical barrier that prevents an initial source of energy, in an explosive train, from being transferred to subsequent charges. In general, when the physical barrier is removed, the weapon is considered armed, and the charge is allowed to propagate. Several issues facing current safe and arm devices systems are the shrinking industrial base for manufacturing these devices and the desire for modern safe and arm devices to be compatible with next generation weapon systems that are generally decreasing in size and increasing in complexity. The solution proposed here is to design, fabricate, and test a conceptual interrupter mechanism using Microelectromechanical Systems (MEMS) components. These components have inherent benefits over current devices, such as smaller feature sizes and lower part counts, which have the capability to improve performance and reliability. After an extensive review of existing micro-scale safe and arm devices currently being developed, a preliminary design was fabricated in a polysilicon surface micromachining process. The operating principle of this conceptual interrupter mechanism is to have MEMS actuators slide four overlapping plates away from each other to create an aperture, thus providing an unimpeded path for an initiating energy source to propagate. Operation of the fabricated MEMS interrupter mechanism was successfully demonstrated with an approximate aperture area of 1024 μm^2 being created.					
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