All award winners must submit a summary report at the end of their Phase I and any subsequent Phase II project. The summary report is unclassified, non-sensitive and non-proprietary and should not exceed 700 words. A photo is required. It is intended for public viewing on the Army SBIR/STTR Small Business area. This summary report is in addition to the required final technical report and should require minimal work because most of this information is required in the final technical report. By submitting this report, I give permission to PM, Army SBIR to publicly post this report.

Government Contract Number: W911QX23P0022

Description and Anticipated Benefit (Max 700 Words):

Warfighters have access to a wider breadth of information than ever before. This enhanced information and sensing environment supports (1) decision making in multidomain battlespaces; (2) intelligent systems that can adapt based on a Warfighter's cognitive state to enhance their performance; and (3) systems that assess a Warfighter's limits, and train them to exceed them. Data are a key component of supporting the Warfighter of the future, however technical limitations prevent this future from leaving a laboratory.

To provide Warfighters with these capabilities currently requires (1) a comprehensive suite of sensors to collect information from the Warfighter; (2) high accuracy sensors to bolster machine decision making; and (3) focused human-machine interfaces to communicate with Warfighters. However, high-fidelity sensors can limit the range of motion for users and impose physical constraints on them; using a multi-sensor array can restrict a user's motion and disrupt their workflow; and improper alerting and intervention can harm operational goals.

To enable Warfighters to thrive in complex multi-domain battlespaces, we designed COSMO. COSMO is a cognitive modeling framework that mitigates many of the issues that prevent technology that leverages cognitive and physiological information from seeing operational deployment. COSMO uses an ensemble approach to modeling that enables modelers to quickly add and remove cognitive and physiological sensors to support the optimal sensor configuration for their use-case and operating environment. Furthermore, COSMO employs a gross-to-fine conversion model that enhances the resolution of highly portable low-fidelity sensors (such as a smart watch), enabling a significant increase in accuracy when using data that might otherwise be too noisy and unreliable for use. These sub-systems are combined with COSMO's built-in human-in-the-loop functionality, which enhances the transparency of decision systems, ensuring that the Warfighter is always at the forefront of critical decision-making.

In summary, the COSMO framework will enable cognitive systems that were previously limited to highly controlled laboratories, to be used within operational environments by enhancing their flexibility, accuracy, and ability to work with Warfighters to make better decisions.

Additional Comments (Max 500 words):

Photograph Caption (Max 200 words):

Cognitive models integrated with the COSMO framework will be able to enhance the resolution of portable cognitive and physiological sensors, enabling smarter decisions at a smaller size.

Photograph (send in JPEG file format)