NASA SBIR 2015 Phase I Solicitation

H12.02 Unobtrusive Workload Measurement

Lead Center: JSC

Participating Center(s): ARC

Task design and associated hardware and software impose cognitive and physical demands on an operator and thus, drive the workload associated with a task. This solicitation is looking for technologies and methods to measure, assess, and predict astronaut workload unobtrusively, and to extend these technologies to measuring and predicting astronaut workload during long duration operations. Unobtrusive measures would be ones that do not require operators to specifically interact with a technology or provide inputs, and would not interrupt an operatorâ€™s work.Â

Astronauts on long-duration missions will potentially have long periods of low workload and short bursts of high workload combined with reduced workload capacity that needs to be taken into account for system and mission design. Both high task demand and reduced workload capacity at any phase of a flight may lead to performance errors, which could potentially compromise mission objectives, and consequently the mission.Â

Astronauts, mission planners, and system designers require the capability to assess and predict when astronauts will be at a reduced capacity resulting from either work underload or from work overload. An unobtrusive workload tool could be used during development to ensure a system produces acceptable workload, or in real-time, to drive schedule modifications or to adapt interfaces based on the current workload the astronaut is experiencing. Unobtrusive objective measures such as video, voice, thermal infrared imaging or eye tracking methods may be more appropriate when measuring long duration workload, so long as the technologyâ€™s credibility is ensured.Â

Phase I of this SBIR is to complete a review of the current state of the art in automatically, unobtrusively measuring and tracking workload and informing astronaut of such workload levels in scenarios that are applicable to long duration missions. This Phase I effort will identify suitable unobtrusive measurement technologies and the parameters that need to be included in a candidate workload algorithm and subsequently generate the algorithm. NASA has already supported the development of wrist and arm-worn devices, therefore any unobtrusive wearables proposed should consider alternative concepts and/or new implementations of existing wearable technologies. Phase II of this SBIR is to take the current state of the art and recommendations from the Phase I effort to develop an unobtrusive workload measurement tool prototype, and test and validate the tool.Â