Fiscal Year:	FY 2010	**Task Last Updated:**	FY 11/15/2010
PI Name:	Huber, Marcus Ph.D.		
Project Title:	Automated Behavior and Cohesion Assessment Tools		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **BHP**:Behavioral Health & Performance (archival in 2017)		
Human Research Program Risks:	(1) **Team**:Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	48108-1639	**Congressional District:**	15
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	SBIR Phase II
Start Date:	06/18/2010	**End Date:**	06/17/2012
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	NNX10CB01C		
Performance Goal No.:			
Performance Goal Text:			
	An important consideration of long duration space flight operations is interpersonal dynamics that effect crew cohesion and performance. Flight surgeons have stated the need for unobtrusive monitoring to help detect if crews are having difficulties with coping with long duration spaceflight environments. The long-term goal of this project is to develop a set of applied technologies that can monitor crew health and cohesiveness in an unobtrusive manner and identify potential abnormalities for feedback to astronauts and flight surgeons for further investigation. The new Constellation vehicles will have thousands of procedures represented in XML, which facilitates automatic translation. Our approach is to determine nominal performance metrics during training and then compare that against data acquired during actual missions. Deviations between the nominal and current performance can be flagged for additional attention. Since crew members can perform upwards of hundreds of procedures a week, there will be substantial data with which to assess crew behavior and performance. Social interactions are also a significant factor in		

Task Description:	team cohesion and performance and we plan to establish, and then compare against, social norms using Sociometric Badges and communications (spoken and text) analysis. During Phase I research, we determined those objectives measures that are acquirable in an unobtrusive manner directly and via tractable processing and have a high likelihood of providing flight surgeons with the information they can use to best assess crew cohesion, performance, and mental state. In Phase II, we will develop and then evolve a prototype ABCAT system by iterating through a cycle of gathering test data in experiments, evaluating its effectiveness with feedback from project personnel and NASA flight surgeons, and refining or redesigning aspects of the system to improve performance. POTENTIAL NASA COMMERCIAL APPLICATIONS: This technology could be applied to all current and future NASA missions. While it is being developed for application to long duration space flight operations, the techniques are amenable to application in shorter duration flight operations as well, such as related to the International Space Station and Space Shuttle. This is particularly true with respect to behavioral and psychological health (whereas crew cohesiveness is anticipated to be less of an issue as duration decreases). This technology could also be applied to NASA's Aerospace activities. For example, it could be used to measure stress on air traffic controllers. Adaption to commercial airlines, in which the standardized procedures and repetitive nature of their execution within the close confines of an aircraft facilitates the modeling and establishment of norms for the behavior for individual crew.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The military has teams of individuals working in high stress environments over long durations. Examples include submarine crews, aircraft carriers, embedded special operations forces and pilots flying unmanned air vehicles for hours on end. Therefore we expect this same technology to transfer to military applications. A variety of commercial activities also have similar characteristics to NASA missions. As mentioned, air traffic controllers work in high-stress environment where small mistakes can be costly. Likewise, teams of operators control nuclear power plants, petrochemical plants, oil refineries, etc. They often perform standard operating procedures and need to be monitored closely for degraded performance. Even in situations in which lives or property are not at risk, monitoring and detecting problems with individual and team performance is useful for managers interested in achieving peak performance. Further possibilities include competitive sports teams, particularly professional sports teams with their highly paid teams, where team cohesiveness and particularly team performance are significant concerns.
Task Progress:	New project for FY2010. Reporting not required for this SBIR Phase 2 project.
Bibliography Type:	Description: (Last Updated:)