Fiscal Year:	FY 2015	**Task Last Updated:**	FY 09/29/2015
PI Name:	Ryder, Valerie Ph.D.		
Project Title:	Effects of Acute Exposures to Carbon Dioxide upon Cognitive Function		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) **Bmed**:Risk of Adverse Behavioral Conditions and Psychiatric Disorders (2) **Sleep**:Risk of Performance Decrements and Adverse Health Outcomes Resulting from Sleep Loss, Circadian Desynchronization, and Work Overload (IRP Rev F)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	valerie.e.ryder@nasa.gov	**Fax:**	FY
PI Organization Type:	NASA CENTER	**Phone:**	281-483-4989
Organization Name:	NASA Johnson Space Center		
PI Address 1:	Toxicology MC: SK4		
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PI Web Page:			
City:	Houston	**State:**	TX
Zip Code:	77058-3607	**Congressional District:**	22
Comments:			
Project Type:	GROUND	**Solicitation:**	2014-15 HERO NNJ14ZSA001N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	07/01/2015	**End Date:**	06/30/2017
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
Contact Monitor:	Leveton, Lauren	**Contact Phone:**	
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Ploutz-Snyder, Robert Ph.D. (Universities Space Research Association, Columbia) Alexander, David M.D. (Co-PI: NASA Johnson Space Center) Lam, Chiu-Wing Ph.D. (Wyle Laboratories/NASA Johnson Space Center) Scully, Robert Ph.D. (Wyle Laboratories/NASA Johnson Space Center)		
Grant/Contract No.:	Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Evidence had been published that indicates that CO2 at concentrations below 2 mm Hg significantly impacted some cognitive functions that are associated with the ability to make complex decisions in conditions that are characterized by volatility, uncertainty, complexity, ambiguity, and delayed feedback – conditions that could be encountered by crews in off-nominal situations, or during the first missions beyond low Earth orbit. Our study will extend the original study by using measures of cognitive domains to determine if astronaut-like subjects are sensitive to concentrations of CO2 at or below limits currently controlled by flight rules. Human test subjects, selected based on similarities to the current astronaut cohort, will be exposed to 600, 1200, 2500, and 5000 ppm (0.5, 0.9, 1.9, and 3.8 mmHg) CO2 in a controlled facility. The concentration sequence will be randomized and unknown to study participants, and measures of cognitive function will be collected during exposures. Our use of cognitive measures in a well-controlled, ground-based study that is free of these potential confounding influences will establish a baseline terrestrial data set against which cognitive data collected in flight may be assessed. If confirmed, these findings would provide additional evidence that CO2 may need to be controlled at levels that are well below current spacecraft limits.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2015.
Bibliography Type:	Description: (Last Updated: 01/11/2021)