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| <b>Fiscal Year:</b>                               | FY 2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Task Last Updated:</b> FY 10/17/2017 |                                                                                                      |
| <b>PI Name:</b>                                   | Dinges, David F. Ph.D.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                                                                                                      |
| <b>Project Title:</b>                             | NSCOR for Evaluating Risk Factors and Biomarkers for Adaptation and Resilience to Spaceflight: Emotional Valence and Social Processes in ICC/ICE Environments                                                                                                                                                                                                                                                                                                                                                             |                                         |                                                                                                      |
| <b>Division Name:</b>                             | Human Research                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |                                                                                                      |
| <b>Program/Discipline:</b>                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                                                                                      |
| <b>Program/Discipline--Element/Subdiscipline:</b> | HUMAN RESEARCH--Behavior and performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |                                                                                                      |
| <b>Joint Agency Name:</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>TechPort:</b>                        | No                                                                                                   |
| <b>Human Research Program Elements:</b>           | (1) <b>HFBP</b> : Human Factors & Behavioral Performance (IRP Rev H)                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                                                                      |
| <b>Human Research Program Risks:</b>              | (1) <b>BMed</b> : Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders<br>(2) <b>Team</b> : Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team                                                                                                                                                                                                                                            |                                         |                                                                                                      |
| <b>Space Biology Element:</b>                     | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                                                                      |
| <b>Space Biology Cross-Element Discipline:</b>    | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                                                                      |
| <b>Space Biology Special Category:</b>            | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                                                                      |
| <b>PI Email:</b>                                  | <a href="mailto:dinges@pennmedicine.upenn.edu">dinges@pennmedicine.upenn.edu</a>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Fax:</b>                             | FY                                                                                                   |
| <b>PI Organization Type:</b>                      | UNIVERSITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Phone:</b>                           | 215-898-9949                                                                                         |
| <b>Organization Name:</b>                         | University of Pennsylvania                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                                                                                      |
| <b>PI Address 1:</b>                              | Department of Psychiatry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |                                                                                                      |
| <b>PI Address 2:</b>                              | 423 Service Dr., 1013 Blockley Hall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |                                                                                                      |
| <b>PI Web Page:</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                                                                                      |
| <b>City:</b>                                      | Philadelphia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>State:</b>                           | PA                                                                                                   |
| <b>Zip Code:</b>                                  | 19104-4209                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Congressional District:</b>          | 2                                                                                                    |
| <b>Comments:</b>                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                                                                                      |
| <b>Project Type:</b>                              | GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Solicitation / Funding Source:</b>   | 2016-2017 HERO NNJ16ZSA001N-Crew Health (FLAGSHIP, OMNIBUS). Appendix A-Omnibus, Appendix B-Flagship |
| <b>Start Date:</b>                                | 09/05/2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>End Date:</b>                        | 09/04/2021                                                                                           |
| <b>No. of Post Docs:</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>No. of PhD Degrees:</b>              |                                                                                                      |
| <b>No. of PhD Candidates:</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>No. of Master' Degrees:</b>          |                                                                                                      |
| <b>No. of Master's Candidates:</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>No. of Bachelor's Degrees:</b>       |                                                                                                      |
| <b>No. of Bachelor's Candidates:</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Monitoring Center:</b>               | NASA JSC                                                                                             |
| <b>Contact Monitor:</b>                           | Williams, Thomas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Contact Phone:</b>                   | 281-483-8773                                                                                         |
| <b>Contact Email:</b>                             | <a href="mailto:thomas.j.will1@nasa.gov">thomas.j.will1@nasa.gov</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                                                                      |
| <b>Flight Program:</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                                                                                      |
| <b>Flight Assignment:</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                                                                                      |
| <b>Key Personnel Changes/Previous PI:</b>         | Basner, Mathias M.D., Ph.D. ( University of Pennsylvania )<br>Bilker, Warren Ph.D. ( University of Pennsylvania )<br>Chouker, Alexander M.D. ( University of Munich )<br>Elliott, Mark Ph.D. ( University of Pennsylvania )<br>Feiveson, Alan Ph.D. ( NASA Johnson Space Center )<br>Flanagan, Shawn Ph.D. ( University of Pittsburgh )<br>Gehrman, Philp Ph.D. ( University of Pennsylvania )<br>Gunga, Hanns-Christian M.D. ( Charite - Universitätsmedizin Berlin )<br>Gur, Ruben Ph.D. ( University of Pennsylvania ) |                                         |                                                                                                      |

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| <b>COI Name (Institution):</b>              | Kuehn, Simone Ph.D. ( University Clinic Hamburg-Eppendorf )<br>Landon, Lauren Ph.D. ( Wyle/NASA Johnson Space Center )<br>McGuire, Sarah Ph.D. ( University of Pennsylvania )<br>Nindl, Bradley Ph.D. ( University of Pittsburgh )<br>Roalf, David Ph.D. ( University of Pennsylvania )<br>Schneiderman, Jason Ph.D. ( Wyle/NASA Johnson Space Center )<br>Stahn, Alexander Ph.D. ( University of Pennsylvania )<br>Vessey, William Ph.D. ( Wyle/NASA Johnson Space Center )<br>Hensch, Takao Ph.D. ( Boston Children's Hospital )<br>Williams, Tom Ph.D. ( Wyle/NASA Johnson Space Center )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Grant/Contract No.:</b>                  | 80NSSC17K0644                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Performance Goal No.:</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Performance Goal Text:</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Task Description:</b>                    | NASA's vision for successful long-duration exploration missions (LDEM) depends on optimizing human performance, adaptability, and resiliency to reduce individual and crew behavioral risks. To date, the major emphasis in optimizing astronauts for their tolerance to prolonged spaceflight has involved human health and performance countermeasures as well as technologies and tools to ensure safety during exploration. However, considerable evidence suggests that there are individual differences among astronauts in their vulnerabilities to the various stressors of spaceflight. The goal of the proposed NSCOR (NASA Specialized Center of Research) is to obtain novel information that will help identify individuals who are resilient to the stressors of prolonged human spaceflight, thereby ensuring successful completion of exploration missions and the preservation of astronaut health over the life of the astronaut. This NSCOR project leverages the NIMH (National Institute of Mental Health) Research Domain Criteria (RDoC) heuristic framework to conduct experimental studies to identify biological domains (molecular, circuitry, physiology) and behavioral domains that relate to individual adaptation and resiliency (as well as behavioral vulnerability) in spaceflight-relevant confined and extreme environments (ICC and ICE). The NSCOR focuses specifically on differences among astronauts in their tolerance of and adaptability to simulated conditions of prolonged spaceflight that impact behavioral health and performance. The NSCOR will provide novel information on the extent to which behavioral and biological factors can be identified that predict astronauts who can maintain positive mood, proactive social processes, a high level of performance and personal well-being, while coping with confinement, meaningless work, limited social support, and living in the extreme environmental conditions of space. By utilizing the RDoC framework, three different human confinement analogs and an animal model, the NSCOR will generate data converging on biomarkers of neurobehavioral and neurobiological resilience to the spaceflight conditions. Such a discovery will help in selecting astronauts most likely to maintain human health and performance during long-duration exploration missions. |
| <b>Rationale for HRP Directed Research:</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Research Impact/Earth Benefits:</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Task Progress:</b>                       | New project for FY2017.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Bibliography Type:</b>                   | Description: (Last Updated: 04/24/2024)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |