



Behavioral Health and Performance Operations at the NASA Johnson Space Center

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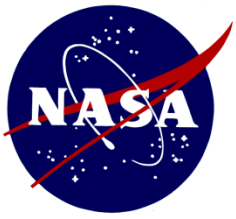


Disclosure Information

88th Annual Scientific Meeting

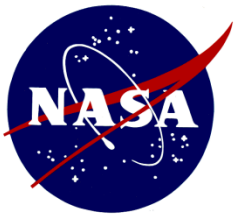
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JSC's Behavioral Health and Performance Operations Group (BHP)

- BHP Operations is a component of the JSC Space Medicine Operations Division
 - ISS mission psychological/behavioral health support (primary mission)
 - Astronaut applicant psychological and psychiatric screening
 - Clinical evaluation and care of astronauts and their dependents
 - Occupational mental health evaluation of NASA divers, pilots and flight controllers
 - Consultants to the NASA Human Research Program
 - Consultants to NASA flight surgeons, ISS crew surgeons, the Astronaut Office, and JSC management
 - Consultants to the JSC Employee Assistance Program Office



BHP Operations

- JSC's BHP Operations Group was founded in the mid 1990's with the purpose of providing services and support to Shuttle-Mir Program astronauts
- The need for behavioral health/psychological services during spaceflight was first noted by the Russians during Salyut 6 and 7 due to behavioral health decrement in cosmonauts on long duration missions



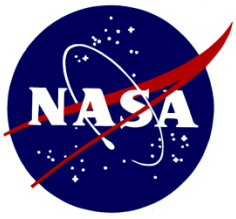
BHP Operations Primary Mission

- The JSC BHP Operations Group is focused on ensuring that ISS crew members are psychologically prepared for the rigors of long duration spaceflight
- BHP operations provides individualized behavioral health and psychological support services directly to ISS crew members and their families before, during and after each ISS mission
- Our goal is a safe, productive, and enjoyable spaceflight experience—hopefully a peak life event



BHP Operations

- Multifaceted, career spanning, behavioral health program for active astronauts and their dependents
 - Astronaut candidate (ASCAN) selection
 - ASCAN training participation
 - Annual BHP evaluations
 - Preflight BHP training and evaluations
 - Inflight BHP evaluations
 - Inflight neurocognitive assessments
 - Postflight BHP evaluations
 - Elective BHP services



Astronaut Candidate Selection

- **Extensive medical/psychiatric screening for all final candidates:**
 - Comprehensive history and physical examination by NASA flight surgeon
 - Neurologic, ENT, orthopedic, and optometric exams
 - Audiology assessment
 - 5 days of continuous ECG monitoring
 - Cardiac stress testing with VO2 max
 - Echocardiogram
 - Cardiac EBCT (calcium score)
 - Carotid Doppler
 - Thyroid ultrasound
 - Pulmonary function tests
 - Dexascan
 - CXR
 - Abdominal and renal ultrasound
 - GYN exam for females including mammogram and pelvic ultrasound
 - Extensive lab work
 - **Psychiatric/psychological examination (3.5 hours)**
 - **Psychological testing (6 hours)**
 - **Observed individual and group performance activities**



BHP Selection Goals

- Two primary goals are clinical screening and suitability assessment
- Clinical screening conclusions are provided to the Aerospace Medical Board (AMB)
- Suitability assessment conclusions are provided to the Astronaut Selection Board (ASB)
- BHP does not select or reject astronaut candidates but only provides information to the AMB and ASB for those bodies to consider



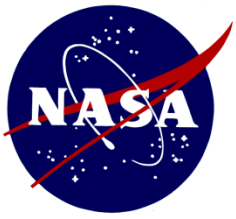
BHP Astronaut Selection Select-In Suitability Proficiencies 2009 and 2013

- Family Issues and ability to cope with prolonged family separations
- Ability to perform under stressful conditions
- Group living skills
- Teamwork skills
- Self-Regulation
- Motivation
- Judgment and Decision Making
- Conscientiousness
- Communication Skills
- Leadership Skills



BHP ASCAN Training Involvement

- **Cross Cultural Skills Training**
- **Stress Management**
 - Preparation for new role, what to expect, changes in lifestyle, common stressors, and Astronaut code of conduct
- **Conflict Management**
 - Related to expeditionary, but happens early on and focused more on conflicts at work and home and strategies for addressing conflict
 - Short and long-term conflict mitigation strategies
- **Expeditionary Skills Training**
 - Self-Care, Team Care, Teamwork and Group Living, Communication, and Leadership/Followership
 - Classroom and operational training to train and practice Expeditionary skills and debrief method
 - Non-technical skills for long-duration spaceflight
- **Space Flight Resource Management**
 - Strategies for effective Supporting Behavior, Communication Delivery, Information Exchange, and Leadership/Followership
 - Planning, Forecasting, and Decision-Making



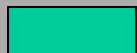
Annual Astronaut BHP Evaluation

1. Summary of current NASA career status
2. Professional training and workload
3. Sleep and fatigue
4. Peer and management relationships
5. Social and family life
6. Greatest professional and personal challenges
7. Primary goals for the coming year
8. Brief MSE & Conclusions
9. Aeromedical concerns identified?
 - No
 - Yes-discuss case with flight surgeon



ISS Pre/Postflight Operational Psychology and Behavioral Medicine Activities

Activity	Duration	Preflight	Postflight
Psychological Factors I	1.5 hours	L-12 months	
Behavioral Medicine Assessment	1.0 hours	L-12 months	
In-flight Resource Planning I	1.5 hours	L- 11months	
Behavioral Medicine Training for crew Medical Officers (CMO training)	1.5 hours	L- 18 months	
Behavioral Medicine Assessment	1.0 hours	L- 6 months	
Psychological Factors II	1.0 hours	L-6 months	
In-flight Resource Planning II	1.5 hours	L-2 months	
Behavioral Medicine Assessment	1.0 hours	L-2 months	
Behavioral Medicine Assessment	1.0 hour		R+3 R+14, R+30-45 days
Operational Psychology Debrief	1.0 hour		R+3, R+10 days

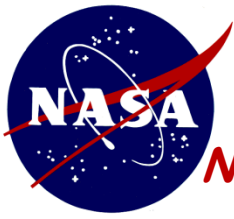


Behavioral Health Support Training



ISS Preflight Assessments (L-365/180/60)

- Principle pre-flight evaluation topics:
 - Training issues including perception of mission readiness
 - Training workload and fatigue levels
 - Family or personal relationship issues
 - Crew-crew training interactions, familiarity and concerns
 - NASA management issues or concerns
 - Mood and anxiety
 - Mission goals, desires, challenges and risks
 - Post mission rehabilitation or family concerns
 - Aeromedical concerns identified?
 - No—inform crew surgeon of nominal contact
 - Yes—Discuss with crew surgeon and formulate plan



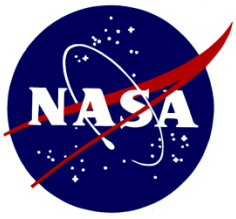
Neurocognitive Assessment with WinSCAT (Space Flight Cognitive Assessment Tool for Windows)

WinSCAT is a brief neurocognitive test that provides a baseline level of cognition. This baseline can be used following a neurological injury on the ISS to judge severity and gage recovery



Neurocognitive Assessment with WinSCAT

Activity	Duration	Preflight	In Flight	Postflight
Training	60 minutes	L-120 days		
Neurocognitive Assessment Baseline (MAT)	60 minutes	L-100 days		
	45 minutes	L-90 days		
	30 minutes	L-60, L-30, L-7 days		
Routine Monitoring	30 minutes		Every 30 days	
Postflight	30 minutes			R+14*, R+30 days * If clinically indicated



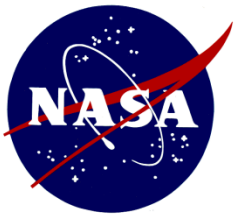
Private Psychological Conference (PPC's)

- The Russians developed the PPC as a standard psychological countermeasure beginning with Salyut 6 and continued to use them on Salyut 7 and Mir
- NASA began using PPC's during Shuttle-Mir in 1995
- Performed every two weeks during ISS expeditions (all crew members)
- Private video conference between the ISS astronaut and the NASA psychiatrist or psychologist that ordinarily takes place on the weekend
- Typically lasts 15-20 minutes depending on subject matter discussed and mission phase
- Contents are non-recorded private and confidential medical events



ISS Private Psychological Conferences (PPC's)

- The following topics are covered each PPC and these reflect the main clinical/operational concerns:
 - Sleep (duration and quality) and sleep shift issues
 - Fatigue level
 - Workload and pace of work
 - Individual and crew morale
 - Crew relationships
 - Crew-ground relationships
 - Mood and Cognition
 - Family and personal relationships
 - Environment and habitability issues, including food
 - Operational psychology issues or requests
 - Preparation for important tasks, such as EVA's
 - Mission impact noted?
 - No—inform crew surgeon of nominal contact
 - Yes—discuss case with crew surgeon to formulate plan



ISS Postflight Assessment

R+3; R+14; R+30-45

- Mission in retrospect—level of personal satisfaction
- Greatest challenges, frustrations, joys during the mission
- Retrospect review of fatigue level prior to critical events such as EVA's
- Family reintegration issues
- Postflight mood, anxiety and cognition
- What worked and didn't work from a BHP standpoint?
- What BHP services need improvement or change?
- What are short and long-term career plans?
- Aeromedical concerns identified?
 - No—inform crew surgeon of nominal contact
 - Yes—discuss with crew surgeon and formulate plan



Elective BHP Services

- Available to all active astronauts, management astronauts, and astronaut dependents
- Self referral
- Flight surgeon or Crew Surgeon referral
- Management referral
- Employee Assistance Program (EAP) referral
 - If any aeromedical concerns are present, the case is discussed with flight/crew surgeon



Summary

- The Behavioral Health and Performance Operations Group is a comprehensive resource for astronauts and their dependents that spans from selection to retirement
- Annual, preflight, inflight, postflight and elective BHP evaluations act as way points throughout an astronaut's career, ensuring a proactive focus on the behavioral aspects of aeromedical flight duty certification akin to regular Adaptability Rating for Military Aviation determinations.