

MEDB 7.4 Cognitive Assessment

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MEDB# and Title:	MEDB 7.4 Cognitive Assessment
Sponsor:	Space Medicine
Discipline:	Behavioral Health and Performance (BHP)
Category:	Medical Requirements (MR)
References:	ISS MORD Medical Evaluation Documents (MED) Volume B Section 7.4
Purpose/Objectives:	The main purpose of a cognitive assessment is to evaluate the impact of specific events including, but not limited to, head injury, decompression sickness with Central Nervous System involvement, atmosphere contamination, high CO2 levels, a change in normal behavior and any other indication of a reduced performance state. In order to maintain test proficiency and to obtain an in flight baseline, regular in flight assessments are required.
Measurement Parameters:	Functions to be assessed include, but are not limited to memory, attention, reasoning and spatial processing.
Deliverables:	Real-time data provided to the crew member (and flight surgeons as appropriate) to monitor, identify, or verify perceived changes in their own cognitive functions
Flight Duration:	Greater than or equal to 30 days
Number of Flights:	Every long duration expedition
Number and Type of Crew Members Required:	All ISS crewmembers (primary: pre-, in- and postflight ; backup: preflight only)
Other Flight Characteristics:	N/A

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3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	Familiarization with WinSCAT software. (3 training sessions) See notes.				
	Duration:	Schedule:	Flexibility:	Blood Voume:	Personnel Required:
	60 min	L-390 days	+/- 20 days	N/A	Crew member and BHP Specialist
	45 min	L-330 days	+/- 20 days		
30 min	L-270 days	+/- 20 days			
Schedule:					
Ground Support Requirements Hardware/Software	Preflight Hardware:		Preflight Software:		Test Location:
	Station Support Computer (SSC)		WinSCAT		U.S.
Training Facilities	Minimum Room Dimensions:		Number of Electrical Outlets:		Temperature Requirements:
	General Office or Conference Room, approximately 10' x 12'		2 (110V)		Normal room temperature
	Hot or Cold Running Water:		Privacy Requirements:		Other:
	N/A		Private room free from distractions		N/A
Constraints/Special Requirements:	N/A				
Launch Delay Requirements:	N/A				
Notes:	Data collected during training sessions may be incorporated into the overall preflight MAT baseline data that is uplinked to SSC prior to the crewmember's first WinSCAT session on orbit. Entries will be made in the EMR for each event showing completion of the MEDB requirement and stating if any aeromedical concerns were identified.				

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3.4 Preflight Activities

TABLE 3.4: PREFLIGHT ACTIVITIES

Preflight Activity	Description:	Crew member is requested to complete the WinSCAT software using the SSC flight-like laptop. The purpose of the MAT is to become familiar with each subtest and to establish a baseline level of performance for flight. (3 sessions)			
	Schedule:	Duration:	Schedule:	Flexibility:	Blood Volume:
		30 min	L- 210 days	+/- 20 days	N/A
		30 min	L- 150 days	+/- 20 days	
30 min	L- 90 days	+/- 10 days			
Personnel Required:		Crew member and BHP Specialist required for all MAT sessions.			
Ground Support Requirements Hardware/Software		Preflight Hardware:	Preflight Software:	Test Location:	
		Station Support Computer (SSC)	WinSCAT	U.S.	
Testing Facilities		Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:
		General Office or Conference Room, approximately 10' x 12'	2 (110V U.S.)	Normal room temperature	Normal lighting
		Hot or Cold Running Water:	Privacy Requirements:	Vibration/Acoustic Isolation:	Other:
		N/A	Private room free from distractions	N/A	N/A
Constraints/Special Requirements:		Crew members will be required to perform test in a quiet area, free of interruptions.			
Launch Delay Requirements:		N/A			
Notes:		MAT data must be copied to each crewmember's WinSCAT directory in order for the baseline information to be available on orbit. This will be achieved by uplinking files to the SSC via OCA prior to the first in-flight WinSCAT session. In the event this option is not possible, an electronic copy will be manifested as a late-stow item which the crewmember(s) can use to update the appropriate directory.			
Data Delivery		Data are crew member controlled. The crewmember is the designated recipient of the data and sharing this information is at his/her discretion. Entries will be made in the EMR for each event showing completion of the MEDB requirement and stating if any aeromedical concerns were identified.			

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3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES

In-Flight Activity	Description:	Crew member will complete the WinSCAT software on the SSC to monitor cognitive functions as the mission progresses and to maintain proficiency attained during preflight testing. The crew member will also complete the WinSCAT as medically indicated, such as following exposure to toxins, anoxic/hypoxic events, or physical injury. WinSCAT may also be taken at the crew member's option, such as before high risk activities (e.g., pre-EVA, pre-docking, etc.) or at any other time.				
	Schedule:	Duration:	Schedule:	Flexibility:	Blood Volume:	Personnel Required:
		WinSCAT 30 minutes	1/month and ACI	+/-2 days	N/A	Crew member
Procedures:	Procedures are contained within the Medical Operations procedures book. .					
Constraints / Special Requirements:	Beyond regular testing, if medically indicated, assessment is conducted at the discretion of the Crew Surgeon. If any WinSCAT session is flagged "red" then a subsequent session will be required within 24 hours. If the "red flag" is repeated during the second WinSCAT data will undergo further assessment by the Crew Surgeon and the BHP psychologist/psychiatrist and will become part of the flight medical record. Further distribution of the data is at crewmember's discretion.					
Photo / TV Requirements:	N/A					
Cold Storage Requirements:	N/A					
Mission Extension Requirements:	N/A					
Landing Wave-Off Requirements:	N/A					
Data Delivery	WinSCAT data will be downlinked within 3 days after the activity, and will be delivered to BHP within 48 hours after downlink.. The Crew Surgeon will receive feedback as needed from the BHP psychologist/psychiatrist, and possibly external neurocognitive experts. Entries will be made in the EMR for each event showing completion of the MEDB requirement and stating if any aeromedical concerns were identified. At the end of the mission, WinSCAT data will be erased from the SSC following confirmation that all data have been successfully downlinked.					

TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name
WinSCAT software on SSC
SSC

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3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity	Description:	Postflight assessment to examine return to baseline.				
	Schedule:	Duration:	Schedule:	Flexibility:	Blood Volume:	Personnel Required:
		30 min	R+30 days, and as indicated	As clinically indicated.	N/A	Crew member and BHP Specialist
Ground Support Requirements Hardware/Software	Postflight Hardware:	Postflight Software:		Test Location:		
	Station Support Computer	WinSCAT		U.S.		
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:		Temperature Requirements:	Special Lighting:	
	General Office or Conference Room, approximately 10' x 12'	2 (110V)		Normal room temperature	Normal lighting	
	Hot or Cold Running Water:	Privacy Requirements:		Vibration/Acoustic Isolation:		
	N/A	Private room free from distractions		N/A		
Constraints/Special Requirements:	N/A					
Notes:	N/A					
Data Delivery	Entries will be made in the EMR for each event showing completion of the MEDB requirement and stating if any aeromedical concerns were identified. After the flight, all data will become part of the BHP archive.					

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3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	BLOOD VOLUME	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training						
Cognitive Assessment Training (3 sessions)	60 minutes	L-390 days	+/- 20 days	N/A	Crew member & BHP Specialist	Data collected during training sessions may be incorporated into the overall preflight MAT baseline data that is uplinked to SSC prior to the crewmember's first WinSCAT session on orbit.
	45 minutes	L-330 days	+/- 20 days			
	30 minutes	L-270 days	+/- 20 days			
Preflight						
Cognitive Baseline (3 sessions)	30 minutes	L-210 days	+/- 20 days	N/A	Crew member & BHP Specialist required at all Baseline sessions	N/A
	30 minutes	L-150 days	+/- 20 days			
	30 minutes	L-90 days	+/- 10 days			
In-Flight						
Nominal: WinSCAT	30 minutes	Once/month	+/-2 days	N/A	Crew members	N/A
Contingency: (WinSCAT)	30 minutes	As medically indicated or at crew member's option	N/A	N/A	Crew members	As medically indicated or at discretion of the crew member, CDR, or CMO
Postflight						
Cognitive Assessment (WinSCAT)	30 minutes	R+30 days	As clinically indicated.	N/A	Crew member & BHP Specialist	Earlier than R+30 if clinically indicated