



Training the 8-Balls: Psychological Readiness Preparation for the 2013 US Astronaut Class

A photograph of a space shuttle in orbit, viewed from a distance. The shuttle is illuminated by the sun, creating a bright glow. The Earth's horizon is visible in the background, showing a blue and white atmosphere against the black of space.

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Behavioral Health and Performance

NASA-Johnson Space Center

Wyle

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The Wyle logo, consisting of the word "wyle" in a bold, blue, lowercase sans-serif font.

Class of 2013 – The 8-Balls





From ASCAN to Astronaut

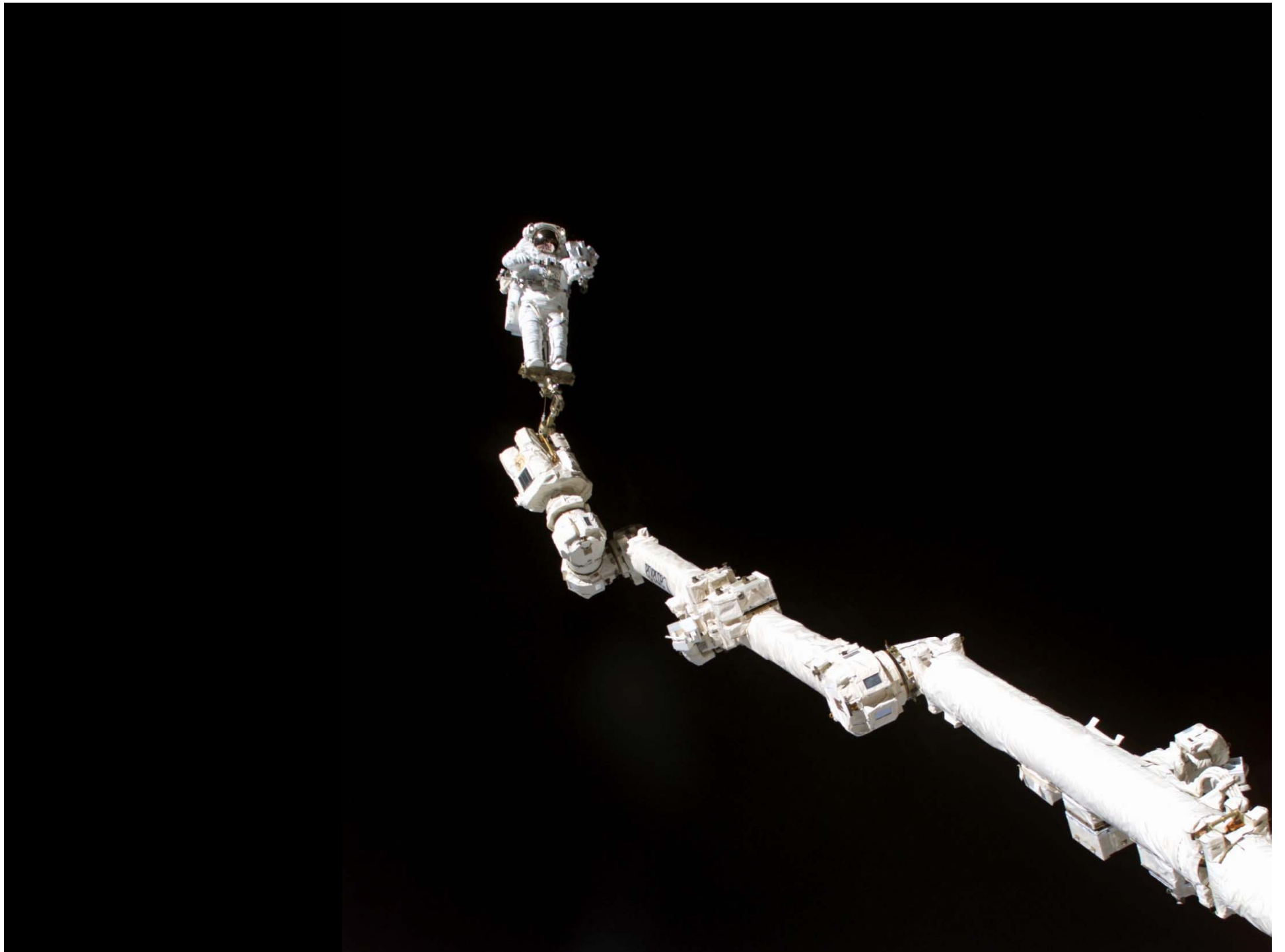


Photos: Original 7 – Mercury Astronauts

Why do astronauts
need psychological
readiness training?

After all, didn't we
select for the "right
stuff"?







Goals of Psychological Readiness Training

Psychological readiness training isn't just about psychosocial adaptation and resilience.

It's also about performance and mission safety.



Photo: EVA (space walk) oops



Goals of Psychological Training

Psychological training isn't just about psychosocial support and resilience

It's also about performance and mission safety.

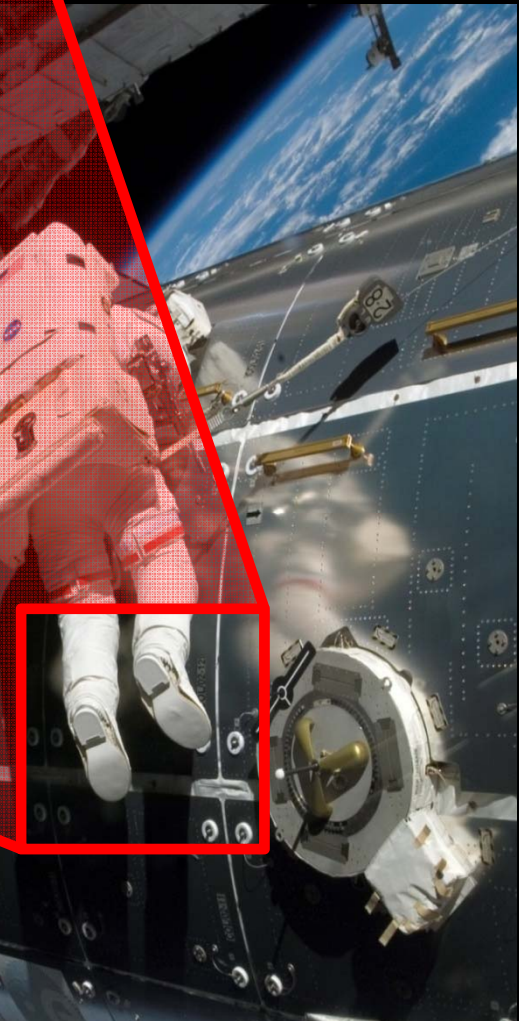


Photo: EVA (space walk) oops



Behavioral Health Training Flow

- Two points at which we are more involved in their training

ASCAN

Assigned



Photos: Left—Class of 2009 including Japanese and Canadian ASCANs; Right—Clay Anderson



Behavioral Health ASCAN Training

- Behavioral Health and Performance Group Overview
- Stress management
- Conflict management
- Cross-cultural
- Expeditionary workshop
- NOLS field training
- Space flight resource management



Photo: Opening a CCP (Crew Care Package)



Behavioral Health ASCAN Training

- **Stress management**
- **Conflict management**
- **Cross-cultural**
- **Expeditionary workshop**
- **NOLS field training**
- **Space flight resource management**

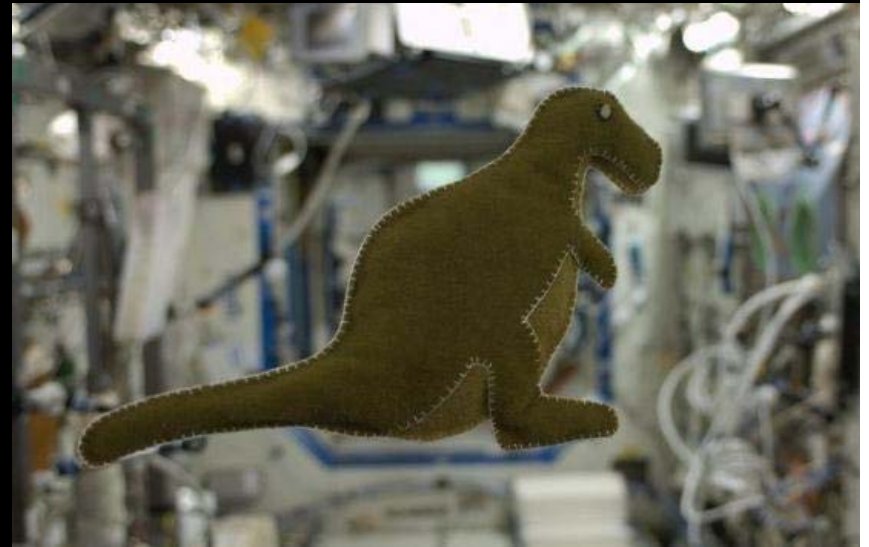


Photo: Karen Nyburg made a dinosaur for her son from scraps she found around the ISS



Behavioral Health ASCAN Training

- Stress management
- **Conflict management**
- Cross-cultural
- Expeditionary workshop
- NOLS field training
- Space flight resource management

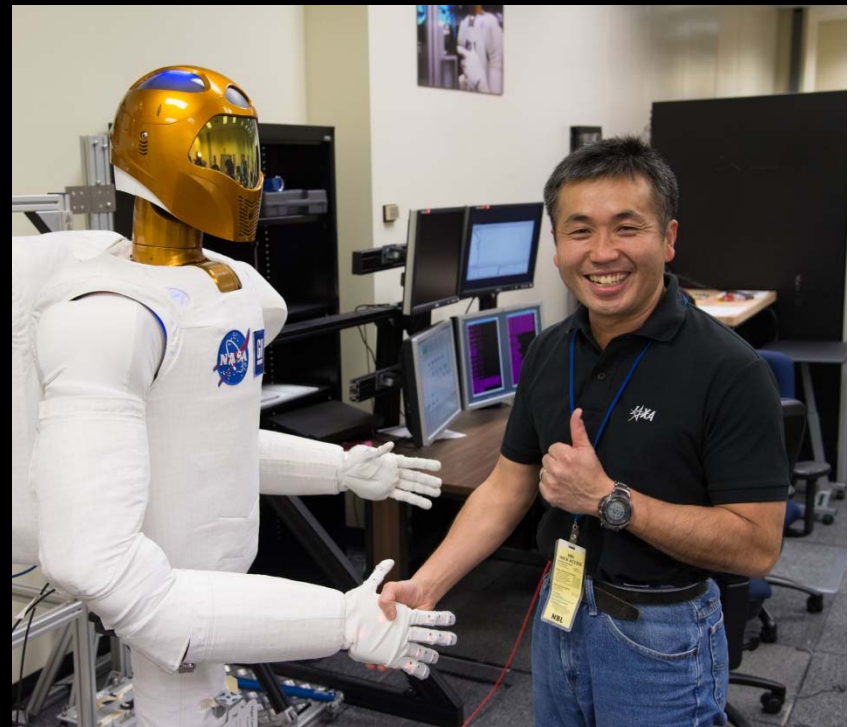


Photo: Expedition 38/39 JAXA astronaut Koichi Wakata making friends with Robonaut.



Behavioral Health ASCAN Training

- Stress management
- Conflict management
- **Cross-cultural**
- Expeditionary workshop
- NOLS field training
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Photo: Five space agencies represented on the ISS.



Behavioral Health ASCAN Training

- Stress management
- Conflict management
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Photo: Peggy Whitson



Behavioral Health ASCAN Training

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- Conflict management
- Cross-cultural
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- **NOLS field training**
- Space flight resource management



Photo: Astronauts training in Wyoming in 2006 formed a table by digging out snow



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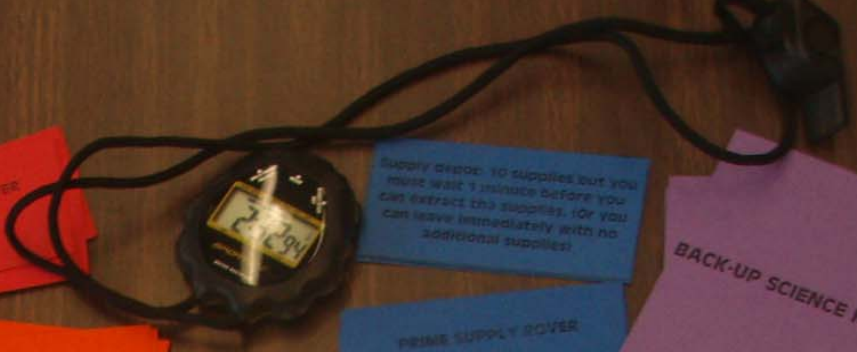


Photo: Crewmembers of NEEMO 15 (Shannon Walker & David Saint-Jacques) test procedures and tools developed for human exploration of near-Earth Asteroids.

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Supply depot: 10 supplies but you must wait 7 minutes before you can extract the supplies. (Or you can leave immediately with no additional supplies)

PRIME SUPPLY ROVER



Supply depot: 10 supplies but you must wait 7 minutes before you can extract the supplies. (Or you can leave immediately with no additional supplies)

PRIME SUPPLY ROVER

BACK-UP SCIENCE ROVER

PRIME SUPPLY ROVER

MOON BASE V3
BASIC
7/6/10





SFRM Moon Base Feedback

- Each student monitored and coached by SFRM instructor
- Individual feedback
Feedback based on SFRM BARS
- Narrative summary of feedback provided to ASCAN and to ASCAN Review Board



Photo: The training room used for Moon Base is modeled after the FCR-1, the Flight Control Room used for Station operations

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Thanks

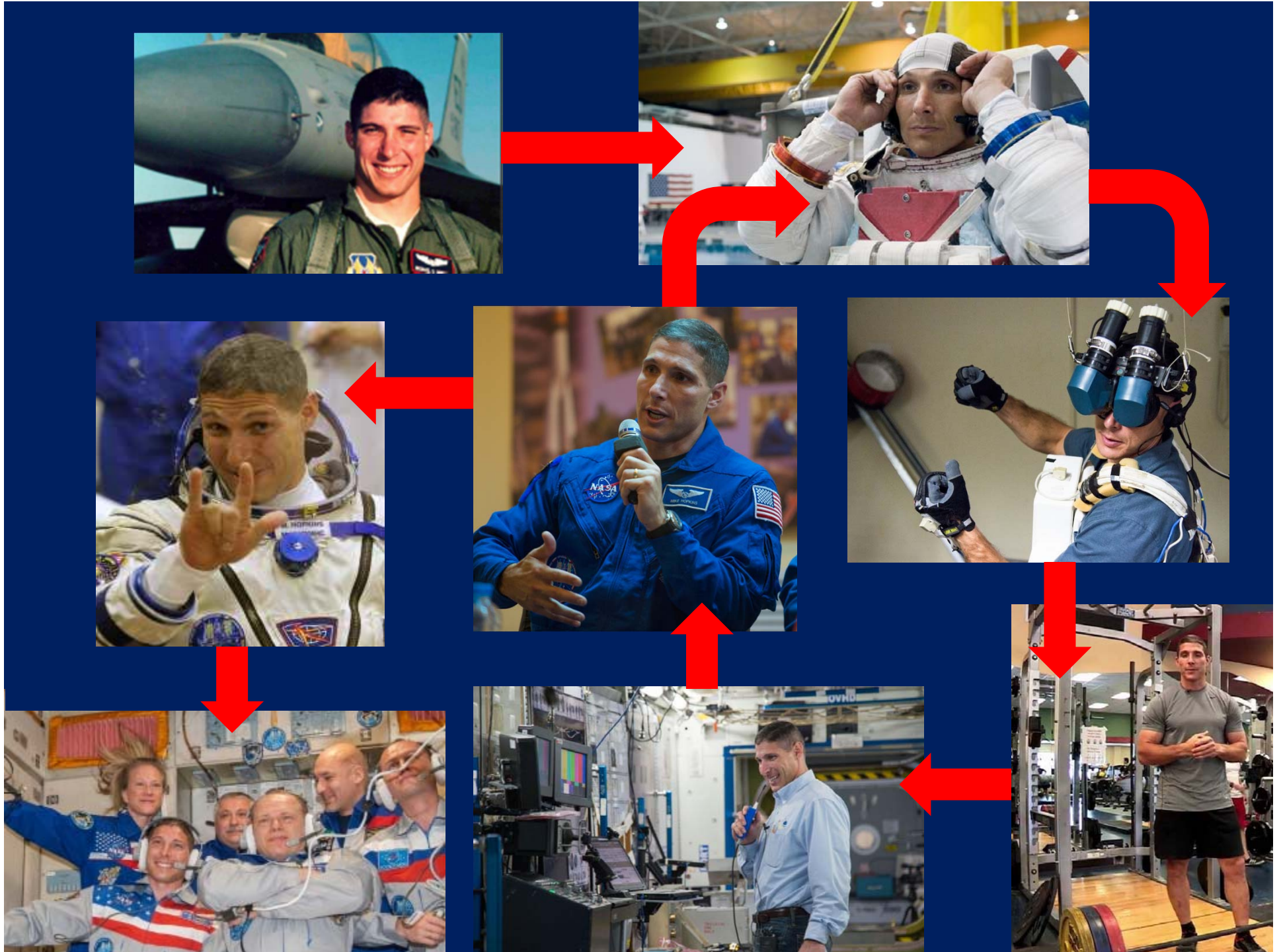
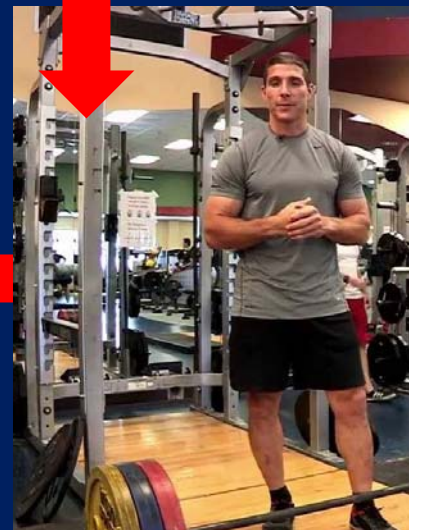


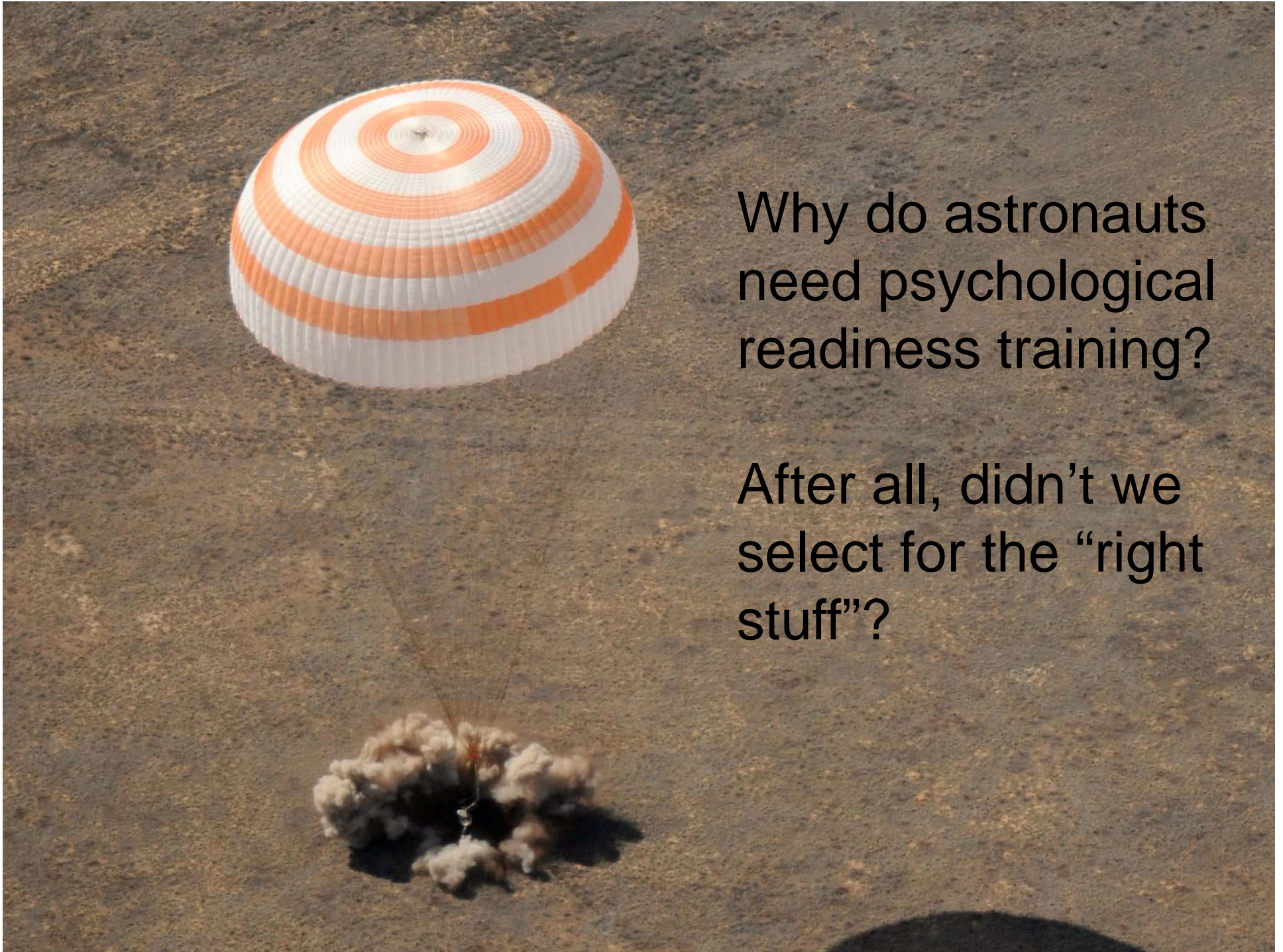
•Photo: Tracy Caldwell in the cupola looking at home, a favorite activity of every astronaut.

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Back up slides





Why do astronauts need psychological readiness training?

After all, didn't we select for the "right stuff"?







SFRM Training Flow Overview

- Stand-alone classes taught by SFRM experts
- Technical classes incorporating SFRM
- Technical sims with SFRM incorporated
- Low fidelity simulations
- T-38
- Expeditionary workshop
- Field experience—NOLS



Photo: Super Guppy swallowing a T-38.



SFRM Behavior Elements

The goal of the SFRM program is to reduce human errors in Space Flight Operations.

Situation Awareness:

The capability to identify, process, and comprehend the critical information regarding what is happening with the team and situation with regards to mission success. Simply put, *sensing what is going on around you (including identifying disconfirming info and predicting effects.)*

Conflict management:

The ways individuals and teams identify and manage differences in opinion, perception, technical knowledge, personality, etc. to complete a task or mission.

Leadership:

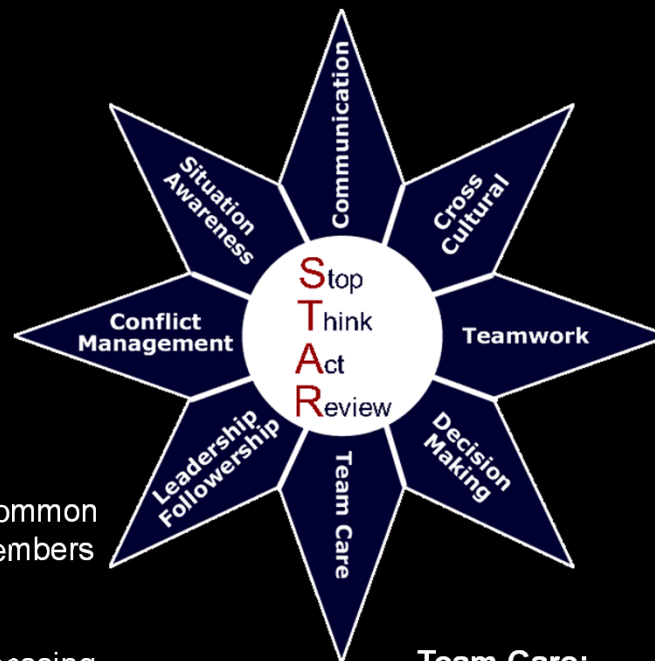
Directing a team or individual toward a common goal, developing and motivating team members as appropriate to tasks.

Followership:

Following the leaders direction, while assessing individual and team behavior elements and providing input to best support the leader to reach the common goal.

Communications:

To express oneself in such a way that one is readily and clearly understood. This is accomplished by active listening and allowing for non-verbal actions.



Cross-Cultural:

Considering the effects of various cultures (nationalities, professions, heritage) on the workplace and peoples actions.

Teamwork:

How individuals cooperate with each other to achieve a shared goal, including accepting accountability and responsibility for actions.

Decision Making:

The cognitive process leading to selecting a course of action, including an assessment of options and risks.

Team Care:

How healthy the person or team is on a psychological level. This can be influenced by various personal factors such as: stress, fatigue, boredom, training, sickness, etc.



Lesson Learned

Developing & Implementing Good Role Plays

- Ask for real examples
- Pilot the role play
- Provide context and increase realism
- Give some direction
- Debrief/After Action Review



Photo: The card game happened before every shuttle flight and was a ritual handed down by NASA astronauts - though none seem to know the origin of the game.



Lesson Learned

Balancing Instruction & Practice

- Instruction viewed as necessary but is it?
- Practice is optional or is it?
- How to minimize instruction
 - Determine how much instruction is required
 - Before class reading material
 - Pre-test
 - Survey via email or at beginning of class
 - Other methods?

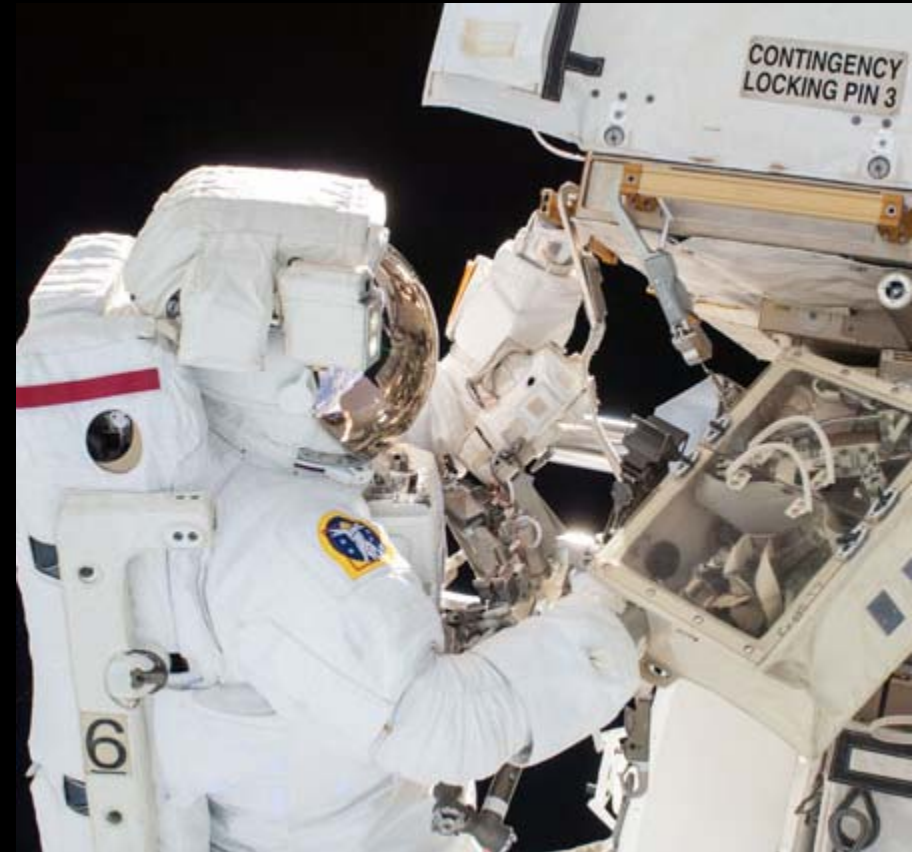


Photo: Rick Mastracchio on second spacewalk with Mike Hopkins to change out a faulty water pump on the exterior of the ISS.



Behavioral Health Training for Assigned Astronauts

- Psychological Factors
- Practical Planning for Long-Duration Missions
- Inflight Resource Planning
- Behavioral Medicine for Crew Medical Officer

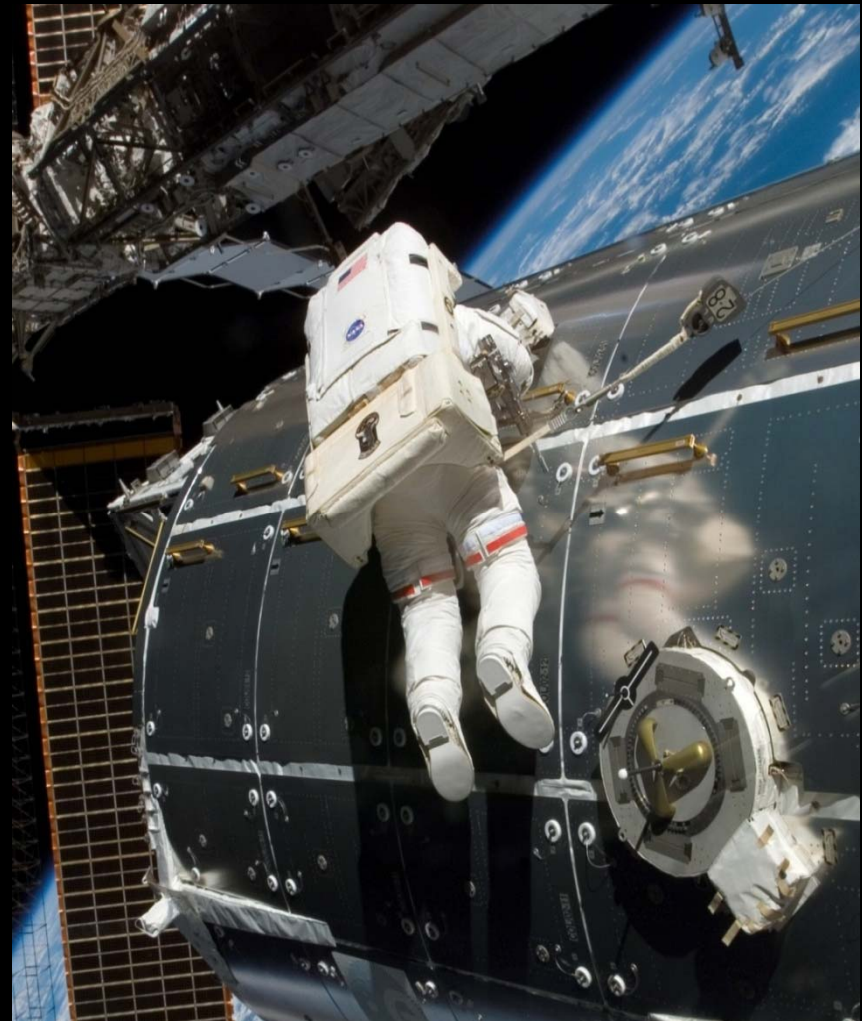


Photo: EVA (space walk) oops



Behavioral Training for Astronauts

- Psychological
- Practical Planning for Long-Duration Missions
- Inflight Rescheduling and Planning
- Behavioral Medicine for Crew Medical Officer

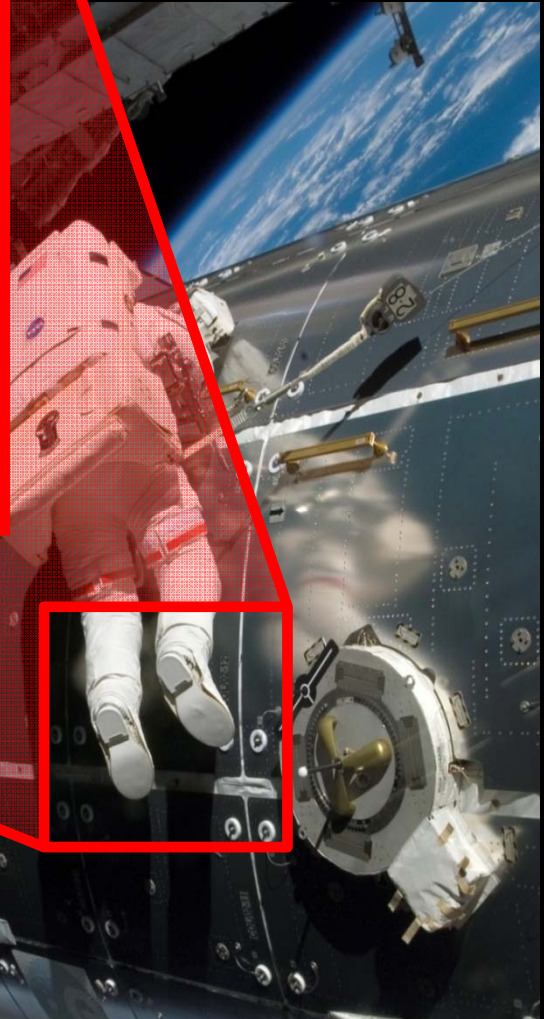


Photo: EVA (space walk) oops



Lesson Learned

Incorporate Veterans into Newbies' Training

- Newbies want to hear veterans talk of their experiences
- Newbies want to connect with veterans and sharing experiences help veterans connect with newbies.
- Learning others' "war" stories adds an added depth that simulation training lacks.
- Sharing experiences with newbies is a valuable way to bolster transfer of knowledge.

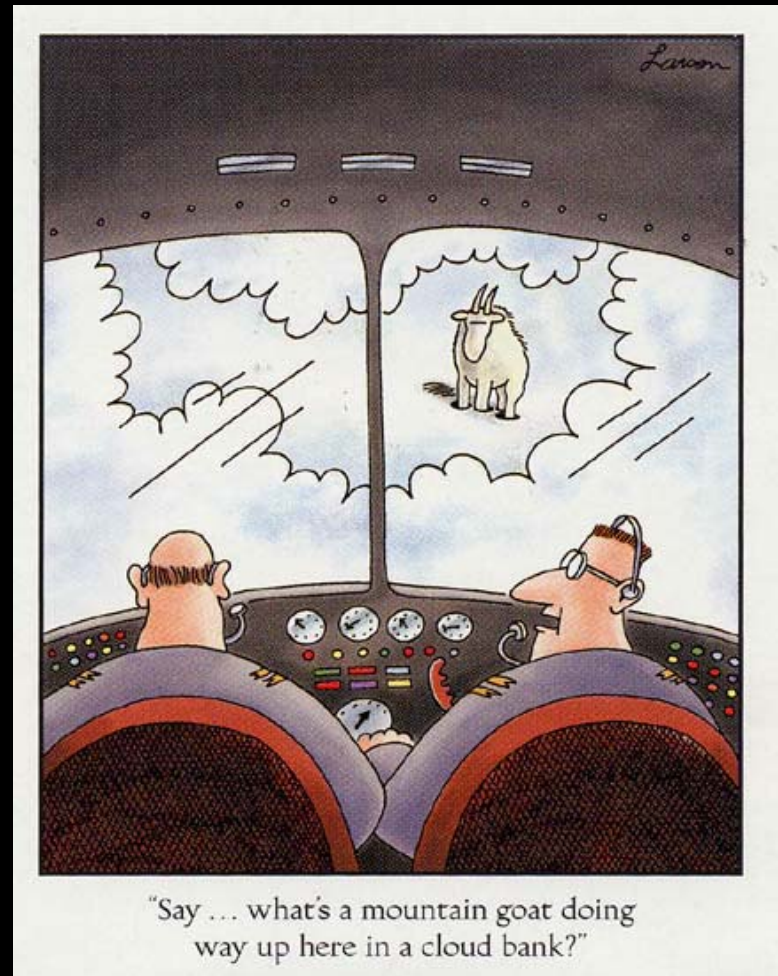


Photo: C. J. Sturckow, commander of space shuttle mission STS-128, talks about his 2009 flight.



S.T.A.R.

- **Stop** and focus
- **Think** about the situation at hand
- **Act** on the chosen option
- **Review** the process and outcome





Lesson Learned

Value of Low Fidelity Simulations

- Low fidelity sims have their place.
- It doesn't have to be high tech or on a mobile device to have high face validity and be well received.
- Low fidelity sims can be valuable tools for teaching skills.
 - Can be flexible, easily adaptable
 - Practice skills in a safe environment
- Use as part of a tiered training system to guide them into incorporating soft skills (SFRM skills) into real world job situations
 - Improving soft skills aids technical performance



Photo: JAXA astronaut Koichi Wakata teaches Sesame Street kids the basics, “A” is for astronaut.



Lesson Learned

Focus In and Repeat

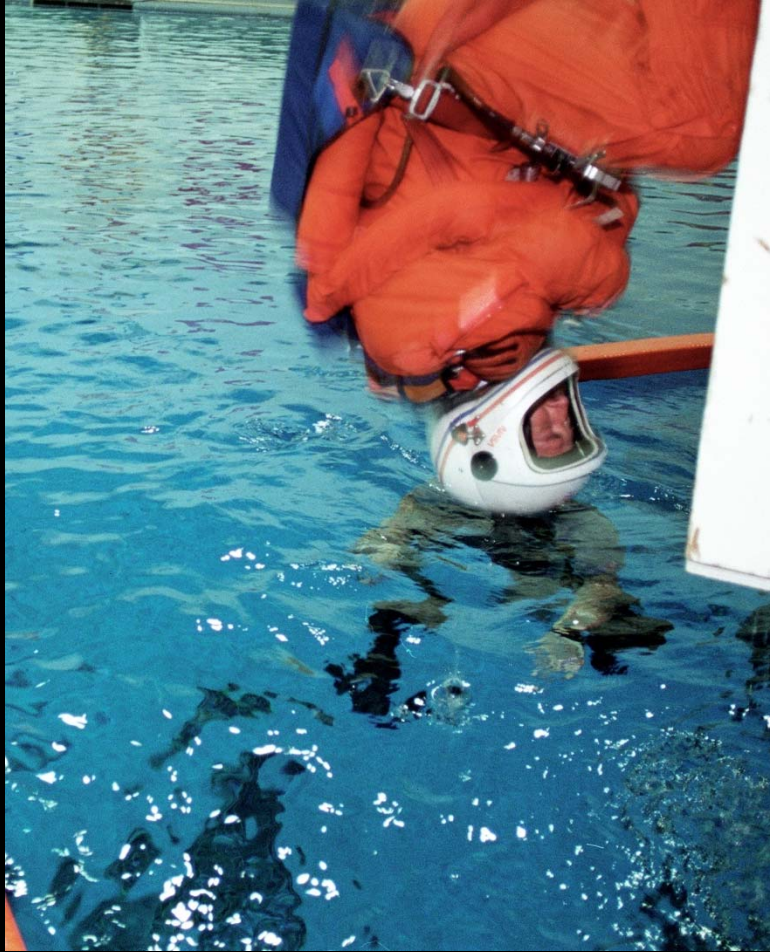
- Identify the 3 or so most critical lessons, skills, etc.
- Select people based on those factors
- Overtly teach them the 3 or so lessons
- Incorporate those factors into every aspect of a training flow
- Train for those factors repeatedly over time.



Photo: Reflection in Skipochka's visor shows a reflection of himself in the reflection of fellow cosmonaut Yurchikhin's visor.



Back to ASCAN Psychological Readiness Training Flow



Photos: Bailout training in the Neutral Buoyancy Lab. Left--a blurry Scott Horowitz falls helmet first. Right--Pilot Rick Husband and Mission Specialist Daniel T. Barry in floatation devices.



Behavioral Health Training for Assigned Astronauts

- Psychological Factors
- Practical Planning for Long-Duration Missions
- Inflight Resource Planning
- Behavioral Medicine for Crew Medical Officer



Photo: Astronauts Ron Garan and Mike Fossum order pizza and ask about the “30 minutes or it’s free” delivery guarantee

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Behavioral Health Training for Assigned Astronauts

- Psychological Factors
- Practical Planning for Long-Duration Missions
- Inflight Resource Planning
- Behavioral Medicine for Crew Medical Officer



Photo: Video is one way to keep in touch with family and friends.



Behavioral Health Training for Assigned Astronauts

- Psychological Factors
- Practical Planning for Long-Duration Missions
- **Inflight Resource Planning**
- Behavioral Medicine for Crew Medical Officer



Photo: Ellen Ochoa, current JSC Center Director, playing a flute she took on the shuttle. Several instruments stay on the ISS such as the guitar Canadian astronaut Chris Hadfield played in his rendition of Space Oddity (Major Tom) by David Bowie.





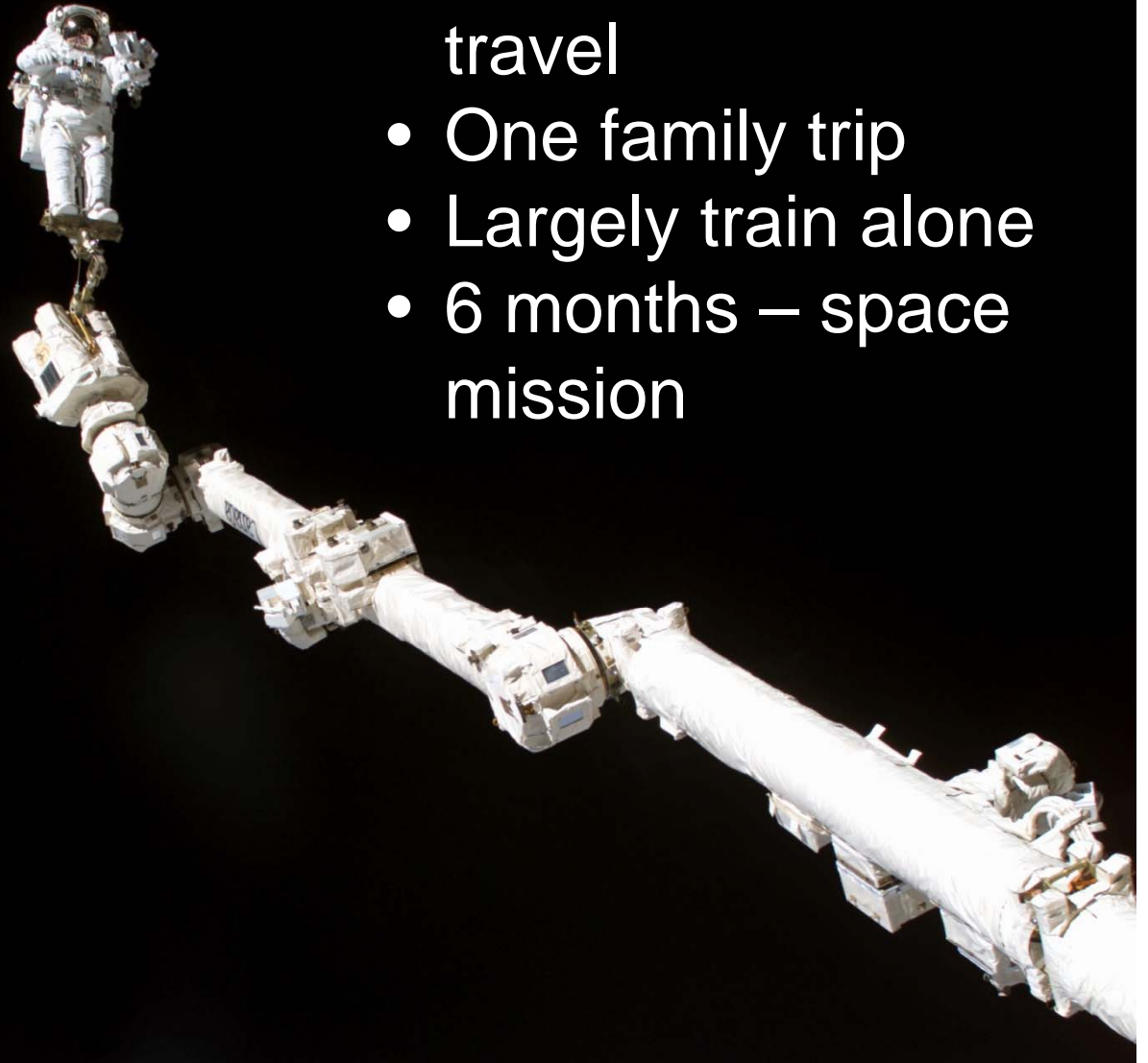
Behavioral Health Training for Assigned Astronauts

- Psychological Factors
- Practical Planning for Long-Duration Missions
- Inflight Resource Planning
- Behavioral Medicine for Crew Medical Officer



Photo: ESA astronaut Alexander Gerst practices a medical procedure.

- 2 ½ years
- 50% international travel
- One family trip
- Largely train alone
- 6 months – space mission





SFRM Training Flow

Low Fidelity Simulation—Moon Base

- **Non-technical, low fidelity tabletop simulation**
- **Players practice**
 - **planning, implementing, and debriefing SFRM skills as a team, and**
 - **self-correction techniques.**
- **4-5 students, 1 acts as mission control**
- **Students are physically separated and use walkie-talkies to communicate**
- **Planning session prior to playing the game**
- **Facilitated debrief follows the game**
- **Game is played twice in one day**
- **Scenarios can be tailored to meet needs of student or team**



SFRM Training Flow

Low Fidelity Simulation—Moon Base

- **Primary game objective—To have each crewmember travel to moon base and back and then launch successfully within the mission window**
- **3 Versions of the game with increasing complexity and difficulty**
 - **Version 1—Basic; meet primary objective**
 - **Version 2—Intermediate; adds unexpected emergency and risk management scenarios**
 - **Version 3—Advanced; adds assigned mission roles and individual as well as team objectives**



SFRM Training Flow

Low Fidelity Simulation—Moon Base

- **Each student monitored and coached by SFRM instructor**
- **Individual feedback given at end of day**
- **Feedback based on SFRM Behaviorally Anchored Rating Scales**
- **2 SFRM skill strengths**
- **2 goals for improving weakest SFRM skills**
- **Narrative summary of this feedback discussion provided to ASCAN and to ASCAN Review Board (and International Partners for international ASCANs)**