Adaptive Problem Solving and Mitigation

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NEEMO Overview

LSB (life support buoy)
NEEMO Overview

MCC interior
Methods of Communication/Information Transmission

- Voice Comm
- VCOM
- Voxer

Playbook
- Mission Log
- Timeline

ML Videos and Photos

Video (one-way, no audio)

Daily Plan Review
Daily Planning Conf.
Procedures
Crew Notes
Methods of Communication/ Information Transmission
Types of unexpected problem solving seen on the NEEMO 22 Mission
Case Study 1 - Payload Complex Experiment (RAPSAP)
Case Study 2 - Payload Hardware Troubleshooting (miniDNA)
Case Study 3 - Weather Related EVA Replan
Types of unexpected troubleshooting

Complex Payload Setup/Teardown
Payload Hardware Technical Issues
Weather Related EVA Replan
Mitigation Techniques
Mitigation Techniques

Case Study 1 - Payload Complex Experiment (RAPSAP)
Mitigation Techniques

Case Study 2 - Payload Hardware Troubleshooting (miniDNA)
Mitigation Techniques

Case Study 3 - Weather Related EVA Replan
How this can relate back to guidelines for automation
What Machine Learning Can Do
(Brynjolfsson and Mitchell)
<table>
<thead>
<tr>
<th>Case Study</th>
<th>SML Score</th>
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<tr>
<td>Case Study 1 - Payload Complex Experiment (RAPSAP)</td>
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<td>Case Study 2 - Payload Hardware Troubleshooting (miniDNA)</td>
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<tr>
<td>Case Study 3 - Weather Related EVA Replan</td>
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On a scale from 1.0 to 5.0, where 1.0 is least suitable and 5.0 is most suitable for machine learning (Brynjolfsson and Mitchell)
How this can relate back to guidelines for automation

Automation would have been able to assist in some of the troubleshooting seen on the mission

Human autonomy teaming needed for other tasks

Large open ended solutions such as the EVA replan are difficult to automate with an optimal solution for a mission
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