UI/UX Committee Overview and MBSE Use Case Development Demo

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User Experience-Use Interface (UX-UI) Standards Committee
MOSA-IF-S-003 UX-UI Standard

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Agenda

- Motivation for UX-UI Standard
- Use Case Process
- SATOPS Use Cases
  - Use Case Example
- UX-UI Standard Product Roadmap

Motivation for Developing UX-UI Standard

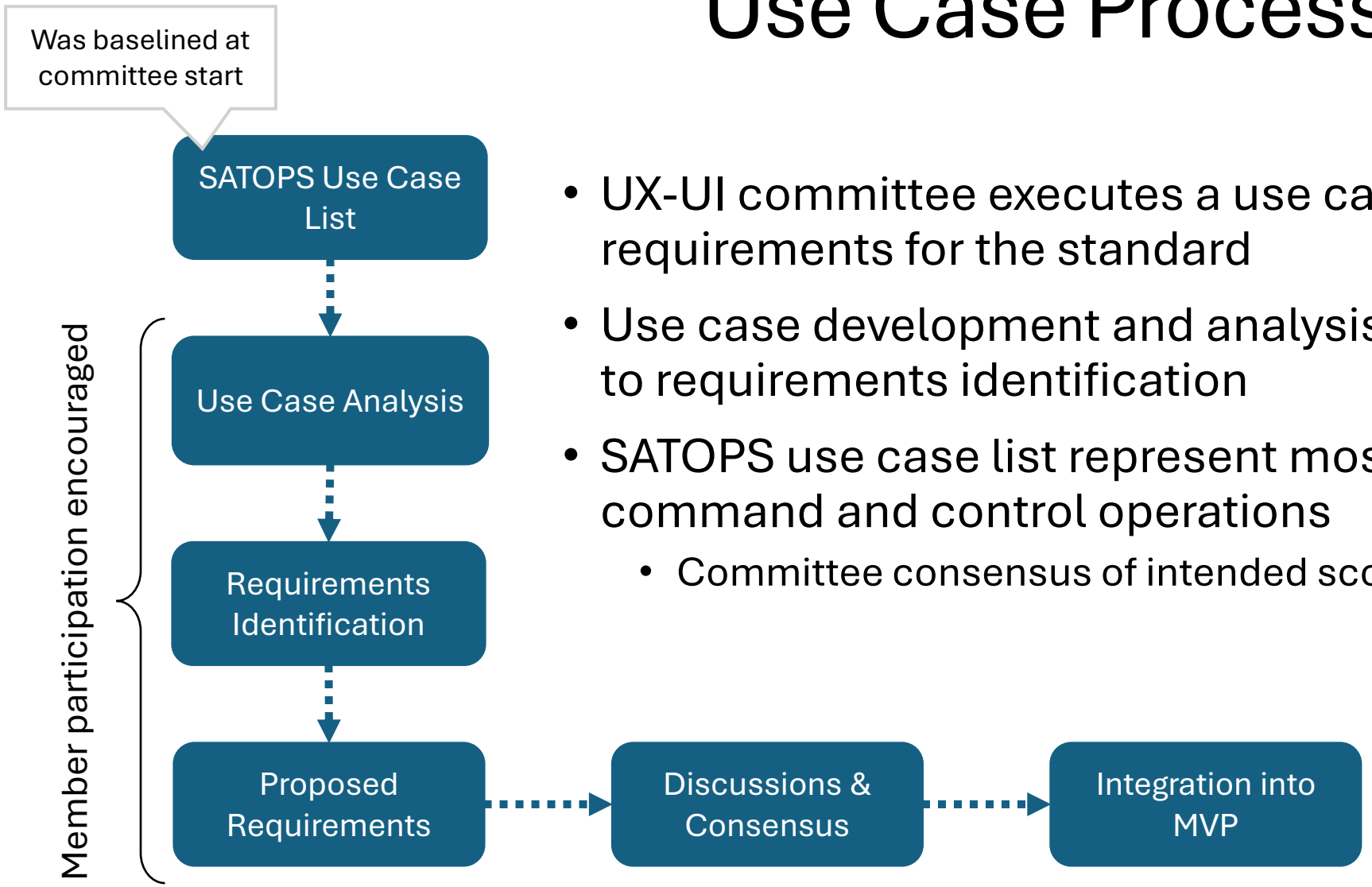
Problem

- Current standards do not meet needs for USSF operations and need update
- USSF operations community consistently requests “common”/modernized systems for improved effective and efficient operations
- Current satellite operations systems are disparate and have little commonality in operations between systems
- Initial Qualification Training pipelines are relatively long (~4-12 months or more) and require extensive retraining to operate different systems

Goal

- Set of standards to achieve modernized, effective/efficient operations and common look-and-feel screens to reduce acquisition development & ops training timelines

Use Case Process



- UX-UI committee executes a use case process to develop requirements for the standard
- Use case development and analysis is a textbook approach to requirements identification
- SATOPS use case list represent most common satellite command and control operations
  - Committee consensus of intended scope of UX-UI standard

SATOPS Use Case List

Satellite Operations	Executive Functions	Administrative Functions	Maneuver
1- Satellite Contact	10- Schedule Contact	21- Login/Accept Control	29- Delta V
2- State of Health	11- Schedule Review/Update	22- Logout/Transfer Control	30- RPO
3- Alarm/Anomaly Response	12- Telemetry Playback	23- Profile/Preference Saving	**Launch/Disposal Operations**
4- Satellite Commanding	13A- Report Generation: Crew Logging	24- Contact Systems Administrator	31- Launch
5- Telemetry Download	13B- Report Generation: System Report	25- Command Approval	32- Deployment
6- Telemetry Viewing	14- Report Receipt	26- Command Verification	33- Early/On-Orbit Checkout
7- Safe Vehicle	15- Report Status/Update	27- Authorization	34- Disposal
8- Signal Processing/Monitoring	16- Contact Engineering	28- Secure Chat/Email/Message Box	**General Use Cases**
9- Monitor Data: Alarms, Alerts, Msgs, Events	17- Contact Commander / Mission Director		35- Test
	18- Modeling & Sim Interface/Exercise		36- Training
	19- COMSEC Key Change / Management		37- Security
	20- Constellation Operations		38- Alt/Back-up Ops
			39- COTS Applications/Maps
			40- Automation

- Blue = MVP1 / MVP1A
- Green = MVP 2
- Black = MVP 3

Use Case Example: Satellite State of Health Check

Conduct a Satellite State of Health Check

Purpose

This use case describes a sequence of actions to execute a typical State of Health Check for a satellite system. The use case describes a State of Health Check as part of the larger Satellite Contact activity (documented in the Satellite Contact Use Case) and as part of the User Experience/User Interface (UX/UI) use case model. The State of Health Check use case provides background, overview, and clarifying information for associated UX/UI requirements for satellite contact operations.

Use Case Description

1. Brief Description

This Use Case describes how an Operator conducts a State of Health Check activity to a satellite. The ground system is presumed to be connected to a space vehicle (SV) to perform a planned satellite State of Health Check. A satellite contact will typically be accomplished for satellite operations "commanding" of the SV and receiving of associated telemetry to the satellite operations ground system. This use case provides basic and generic information for a typical state of health. Satellite state of health check specifics will vary by system, but the general high-level methodology is similar between systems. Alternate flows occur when anomalous conditions occur during the operation.

2. Assumptions and Constraints

- Ability to connect to antenna: The satellite operations system must be able to connect directly to an antenna or to an intermediary system that connects to an antenna (e.g. satellite operations system connected to a ground terminal that then connects to the antenna).
- Ability to perform satellite operations: The system described in the use case is presumed to primarily perform satellite operations. The system may include ability to perform bus and payload operations. The system may also include ability to perform orbital analysis, launch operations, mission planning, etc., but the primary function of the system is satellite operations.
- Commanding by Ground Segment is by batch processing: the Operator configures a sequence of commands for transmission then the Ground Segment steps through command sequence in time. Operator can configure batch processing to pause at certain points. The Ground Segment will pause or terminate the command sequence if anomalous conditions appear in telemetry.

3. Preconditions

- Ground segment is operating normally.
- SV is operating normally.
- Operator or other positions as needed (engineer, orbital analyst, etc.) are logged into ground segment software in appropriate user role.
- Operator or other position (scheduler, engineer, orbital analyst, etc.) have scheduled contact activity (state of health, tracking, etc.)
- Operator or other position (scheduler, engineer, orbital analyst, etc.) have scheduled ground asset (e.g. antenna)

4. Postconditions

4.1 From Basic Flow of Events

- Telemetry indicates SV completed the satellite contact activity as commanded.
- SV is operating normally.
- Ground segment is operating normally.
- Communications link between Ground Segment and SV is operating normally.
- Operational state for SV is Mission Capable.

4.2 From Alternate Flow of Events 1

- Telemetry indicates SV did not complete command sequence.
- Telemetry indicates SV may or may not be operating normally.
- Communications link between Ground Segment and SV is operating normally.
- Anomaly investigation initiated.
- Operational state for SV is downgraded to Partially Mission capable.

4.3 From Alternate Flow of Events 2

- Telemetry indicates SV did not complete command sequence.
- Telemetry indicates SV has entered "Safe Hold" mode.
- Communications link between Ground Segment and may or may not be operating normally.
- Emergency anomaly investigation team called in.
- Operational State for SV is downgraded to Non-mission capable.

4.4 From Alternate Flow of Events 3

- Telemetry indicates SV completed the satellite contact activity as commanded.
- SV is operating normally.
- Ground segment is operating normally.
- Communications link between Ground Segment and SV is operating normally.
- Operational state for SV is Mission Capable.

5. Use-Case Diagrams

Insert diagram here (as needed)

6. Flow of Events

6.1 Basic Flow of Events

1. State of Health activity initiated.
2. Telemetry configured to receive telemetry points for
3. Connection to antenna complete.
4. Connection to antenna verified.
5. Satellite contact activity conducted (state of health, tracking, etc.).
6. Review/Verification of telemetry complete and/or activity completed.
7. Disconnect from antenna complete.
8. Disconnect from antenna verified.
9. Post-pass activities complete (logging actions, report, etc.).

6.2 Alternative Flow of Events

6.2.1 Alternate Flow 1: Command upload not executed by the SV

Exit the use case with stated post-conditions.

6.2.2 Alternate Flow 2: SV is in Safe Hold Mode

Exit the use case with stated post-conditions.

6.2.3 Alternate Flow 3: Satellite Contact with dedicated antenna asset (e.g. antenna is constantly connected to satellite operations ground system).

1. Pre-pass activities conducted.
2. Satellite contact activity conducted (state of health, tracking, etc.).
3. Review/Verification of telemetry complete and/or activity completed.
4. Post-pass activities complete (logging actions, report, etc.).

UX-UI Standard Product Roadmap

MVP	Contents	Status
MVP1	Requirements set from first batch of SATOPS use cases. Informative content includes short glossary and sample use case.	Released as MOSA-IF-S003-1 (25 Nov 2024).
MVP1A	Same scope as MVP1. Addresses critical comments made from SERB approval-for-use review.	Released as MOSA-IF-S003-1A (12 June 2025) and supersedes MOSA-IF-S003-1.
MVP2	Requirements set from second batch of SATOPS use cases. Informative content includes more extensive glossary, system architecture to support use case analysis, and sample use case.	Committee approved and completing MOSA approval.
MVP3	Requirement set from final batch of SATOPS Use Cases.	In development
MVP4	Guidebook to accompany MVP1A and MVP2. Content is informative only - no normative content will be included. Topics in preliminary content draft: Human-Systems Integration (HSI) Policy; Human Readiness Levels; Levels of Verification/Validation; HSI in Agile Examples; Definition of Done	Development started. On hold while MVP3 is developed.

MBSE Support for MOSA-IF-S-003

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Modular Open Systems Approach (MOSA) Alliance Webinar
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Overview

- Aerospace is using digital engineering to guide development of MOSA-IF-S-003, "MOSA User Experience/User Interface Standard"
- Key Content
  - Use Cases - as documented via the Use Case Template
  - Requirements
  - Actors (Systems, Individuals, Organizations)
  - Glossary
- Motivation
  - Simplify integration of MOSA-IF-S-003 in digital engineering environments
  - Archival Authoritative Source of Truth (ASoT) of standards development
  - For UX-UI Committee: requirements and metadata self-consistency and gap checks (within a Volume, across Volumes)
- Our brief demo will walk through how content is captured then traced within the architecture model

Snapshot of Digital Engineering Content