

ISO 16615:2025-07 (E)

Space systems - Stable operation requirements for spacecraft attitude and orbit control system

Contents

| | Page |
|---|----------|
| Foreword..... | v |
| Introduction..... | vi |
| 1 Scope..... | 1 |
| 2 Normative references..... | 1 |
| 3 Terms and definitions..... | 1 |
| 4 Stable operation general principles..... | 2 |
| 4.1 General..... | 2 |
| 4.2 Classification of stable operation levels..... | 2 |
| 4.2.1 General..... | 2 |
| 4.2.2 Continuous operational service..... | 2 |
| 4.2.3 Degraded performance operation..... | 3 |
| 4.2.4 Emergency transitional operation..... | 3 |
| 4.3 Factors affecting stable operation..... | 3 |
| 4.3.1 General..... | 3 |
| 4.3.2 Anomalies from known sources..... | 3 |
| 4.3.3 Anomalies from unknown sources..... | 3 |
| 4.4 Capability building for stable operation..... | 3 |
| 4.5 Ground-based optimization and operational maintenance..... | 4 |
| 5 Data validity assessment requirements..... | 4 |
| 5.1 Basic principles of data validity judgement..... | 4 |
| 5.2 Data validity assessment process..... | 5 |
| 5.2.1 General..... | 5 |
| 5.2.2 Status flag assessment..... | 5 |
| 5.2.3 Data validity range assessment..... | 5 |
| 5.2.4 Data continuity assessment..... | 5 |
| 5.2.5 Data dynamism assessment..... | 5 |
| 5.2.6 Data consistency assessment..... | 6 |
| 6 Anomaly detection requirements..... | 6 |
| 6.1 Classification of anomaly levels..... | 6 |
| 6.1.1 General..... | 6 |
| 6.1.2 Component-level anomaly detection..... | 6 |
| 6.1.3 System-level anomaly detection..... | 6 |
| 6.2 Component-level anomaly detection..... | 6 |
| 6.3 System-level anomaly detection..... | 7 |
| 7 Software or hardware fault handling requirements..... | 7 |
| 7.1 Fault classification..... | 7 |
| 7.1.1 General..... | 7 |
| 7.1.2 Software faults..... | 7 |
| 7.1.3 Hardware faults..... | 7 |
| 7.2 Software fault handling requirements..... | 7 |
| 7.3 Hardware fault handling requirements..... | 7 |
| 8 Safety boundary check requirements..... | 8 |
| 8.1 Principles of safety boundary checks..... | 8 |
| 8.2 Requirements for safety boundary checks of spacecraft structure or mechanism..... | 8 |
| 8.3 Requirements for safety boundary checks of spacecraft energy..... | 8 |
| 8.4 Requirements for safety boundary checks of spacecraft propellant..... | 8 |

| | | |
|-----------|---|-----------|
| 9 | Requirements for emergency survival modes in the spacecraft's AOCS | 9 |
| 9.1 | Classification of emergency survival modes | 9 |
| 9.1.1 | General | 9 |
| 9.1.2 | Sun-oriented safety mode | 9 |
| 9.1.3 | Stop-control safety mode | 9 |
| 9.2 | Requirements for sun-oriented safety mode handling | 9 |
| 9.3 | Requirements for stop-control safety mode handling..... | 9 |
| 10 | Cybersecurity requirements for AOCS | 10 |
| 10.1 | General..... | 10 |
| 10.2 | Encryption of telemetry data | 10 |
| 10.3 | Access control for ground systems..... | 10 |
| 10.4 | Anomaly detection for cybersecurity breaches..... | 10 |
| 10.5 | Fault handling in the event of a cyber-attack..... | 10 |
| 10.6 | Regular security updates and testing..... | 10 |
| | Bibliography | 11 |