

# 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

<b>9</b>	<b>Requirements for emergency survival modes in the spacecraft's AOCS</b> .....	<b>9</b>
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
<b>10</b>	<b>Cybersecurity requirements for AOCS</b> .....	<b>10</b>
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
	<b>Bibliography</b> .....	<b>11</b>