DIN EN 16603-60-21:2018-11 (E)

Space engineering - Gyros terminology and performance specification; English version EN 16603-60-21:2018

Table of contents

European Foreword 5

Introduction 6

1 Scope 7

2 Normative references 8

3 Terms, definitions and abbreviated terms 9

3.1 Terms from other standards 9

3.2 Terms specific to the present standard 9

3.3 Abbreviated terms 15

4 Functional requirements 16

4.1 Overview 16

4.2 Operating modes 16

4.2.1 Operating modes Functional requirements 16

4.2.2 Operating modes Verification requirement 17

4.3 Start-up 17

4.3.1 Start-up Functional requirements 17

4.3.2 Start-up Verification requirements 17

4.4 Warm-up 18

4.4.1 Warm-up Functional requirements 18

4.4.2 Warm-up Verification requirements 18

4.5 Time and frequency, datation and synchronisation 18

4.5.1 Time and frequency Functional requirements 18

4.5.2 Time and frequency Verification requirements 19

4.6 Alignment and scale factor 19

4.6.1 Alignment and scale factor Functional requirements 19

4.6.2 Alignment and scale factor Verification requirements 20

4.7 Commandability and observability 20

4.7.1 Commandability and observability Functional requirements 20

4.7.2 Commandability and observability Verification requirements 20

4.8 Failure diagnosis 20

4.8.1 Failure diagnosis Functional requirements 20
4.8.2 Failure diagnosis Verification requirements 21
4.9 Measurement mode 21
4.9.1 Measurement mode Functional requirements 21
4.9.2 Measurement mode Verification requirements 21
4.10 Auxiliary modes 21
4.10.1 Auxiliary modes Functional requirements 21
4.10.2 Auxiliary modes Verification requirements 22
4.11 Anti-aliasing filter 22
4.11.1 Anti-aliasing Functional requirements 22
4.11.2 Anti-aliasing Verification requirements 22
4.12 Stimulation 22
4.12.1 Stimulation Functional requirements 22
4.12.2 Stimulation Verification requirement 22
4.13 Lifetime and duty cycle 23
4.13.1 Lifetime and duty cycle Functional requirements 23
4.13.2 Lifetime and duty cycle Verification requirement 23

5 Performance requirements 24

5.1 Use of the statistical ensemble 24
5.1.1 Overview 24
5.1.2 Provisions 24
5.2 Performance Verification requirements 25
5.3 General Performance requirements 25
5.4 General performance metrics 26
5.4.1 Overview and definition 26
5.4.2 Bias 27
5.4.3 Noise 32
5.4.4 Scale factor error 35
5.4.5 Misalignment 38
5.4.6 Measurement datation and latency 41
5.4.7 Start-up performances 42
5.4.8 Warm-up phase performances 43
5.4.9 Measured output bandwidth 43
5.4.10 Anti-aliasing filter 43
5.4.11 Data quantization 44
5.4.12 Failure detection efficiency 44
5.4.13 Stimulation 45

5.5 Functional and performance mathematical model....45

Annex A (normative) Functional and performance mathematical model (FMM) description - DRD....48

Annex B (informative) Example of data sheet....50

Bibliography....52

Figures

Figure 3-1: example alignment reference frame....10
Figure 3-2: mechanical reference frame (MRF)....14
Figure 4-1: Example of Start-up and Warm-up phases....18
Figure 5-1: Examples of Bias evaluation from test or simulation data....27
Figure 5-2: Switch-on bias repeatability computation....31
Figure 5-3: Bias stability computation....32
Figure 5-4: Monolateral PSD and Allan Variance....34
Figure 5-5: Example of Functional Mathematical Model Architecture....47