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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 14410.1-2008

Replacing GB/T 14410.1-1993

**Flight mechanics -- Concepts, quantities and symbols -- Part 1:
Axis systems and motion state variables**

飞行力学 概念、量和符号 第1部分：坐标轴系和运动状态变量
(English Translation)

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Foreword

GB/T 14410 "Flight mechanics - Concepts, quantities and symbols" is divided into nine sections.

- Part 1. Axis systems and motion state variables;
- Part 2. Forces, moments, their coefficients and derivative;
- Part 3. aircraft stability and control;
- Part 4. flight performance;
- Part 5. flight measurement;
- Part 6. Aircraft geometry;
- Part 7. Flight points and flight envelope;
- Part 8. dynamic characteristics of the aircraft;
- Part 9. atmospheric disturbance model.

This section GB/T 14410 Part 1.

The partial modification of the use of ISO 1151-1. 1988 "Flight dynamics - Concepts, quantities and symbols aircraft relative to the air motion" and ISO 1151-2. 1987 "Flight dynamics - Concepts, quantities and symbols aircraft and the atmosphere relative to the Earth's movement." And ISO 1151-1.

The main difference is 1988.

- a) increase the "track axis system with respect to the angle of the body axis system, cockpit steering device and displacement" and other terms;
- b) an increase in Appendix B Shaft transformation matrix;
- c) Appendix A to adjust when considering earth rotation and spherical coordinates shafting and supplementary angles.

And ISO 1151-2. 1987 is the main difference will be fully incorporated into the terms of ISO 1151-1. 1988 in the relevant provisions and adjust each Section order.

This Part replaces GB/T 14410.1-1993 "Flight mechanics - Concepts, quantities and symbols - Part 1. Axis systems and motion state variable the amount".

Section compared with the GB/T 14410.1-1993 The main changes are as follows.

- a) increase the "3.4.11 inertia matrix", "3.4.12 inertia inverse matrix", "3.9 energy-related amount", and "Appendix C flight the main part of the mechanics of the category";
- b) Delete the original specification 3.3.1.2 airspeed, flight speed 3.3.1.1 normalized incorporated provisions;
- c) The "dimensionless" unified changed to "dimension", the "Sonic" unified changed to "speed of sound", the speed of sound symbol "Rao" unified changed to "Ba";
- d) modify the terms and definitions have a number of references to other clauses marked;
- e) increasing the dimension of the unit, and indicated in the symbol bar;
- f) an increase in the English index.

Appendix A to this part of normative appendix, Appendix B and Appendix C are informative appendix.

This part is proposed by the China Aviation Industry Corporation.

This part of the jurisdiction of the China Aviation Industry Corporation.

This section is drafted. Beijing University of Aeronautics and Astronautics, China Aviation Technology Institute Comprehensive, China Aviation Industry Research Institute of air power, in State Aviation Industry Development Research Center.

1 Scope

This section provides a description of Axis systems and aircraft motion movement state variables basic terminology and symbols.

This section applies to fixed-wing aircraft, other aircraft can use the reference.

The aircraft will be considered as part of a rigid body.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this section, however, encourage the parties to this part of the research agreement Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 14410.2-2008 Flight mechanics - Concepts, quantities and symbols - Part 2. Forces, moments, their coefficients and derivatives GB/T 14410.6-2008 Flight mechanics - Concepts, quantities and symbols - Part 6. Aircraft geometry GB/T 14410.7-2008 Flight mechanics - Concepts, quantities and symbols - Part 7. Flight points and flight envelope

3 Terms, definitions and symbols

The following terms, definitions and symbols apply to this section.

For spherical and can not ignore the case of the rotation of the earth's axis system, see Appendix A.

The following definitions are three-dimensional orthogonal coordinate axis system shafting, and follow the right hand rule, for flat ground situation. This shaft between Relationship is shown in Figure 1, the conversion matrix see Appendix B.

Category flight mechanics major part in Appendix C.

No terms are defined or explained symbols and units 3.1.1 Terrestrial fixed axis system earth-fixed axis system Origin and three axes are relative to stationary ground Moving axis system.

$O x_0 y_0 z_0$,

Acronym S_0

3.1.2

Terrestrial fixed vertical axis system normal earth-fixed axis system Terrestrial fixed axis system (3.1.1), one of its z' axis Vertically downwards.

$O x_0' y_0' z_0'$,

Acronym S_g'

3.1.3

Aircraft ground implicated vertical axis system aircraft-carried normal earth axis system Origin is usually fixed to the center of gravity of the aircraft, each axis G direction are the same axis system with $x_0' y_0' z_0'$.

Note: Under the condition does not cause confusion can be referred to the vertical Ground axis system.

$O x_0 g y_0 g z_0 g$,

Acronym S_g

3.1.4

Body axis system

bodyaxissystem

Fixed on the plane axis system, its origin is usually Located in the center of gravity of the aircraft, three axes by the 3.1.4.1 ~ 3.1.4.3 definitions.

X0 y O z,

Acronym Sb