International Standard 1151/6

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Terms and symbols for flight dynamics — Part 6 : Aircraft geometry

Termes et symboles de la mécanique du vol — Partie 6 : Géométrie de l'avion

Second edition — 1982-02-15

UDC 629.7.015 : 001.4 : 003.62

Ref. No. ISO 1151/6-1982 (E)

Descriptors : aircraft industry, aircraft, geometric characteristics, symbols, definitions.

Price based on 26 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1151/6 was developed by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the member bodies in December 1979.

It has been approved by the member bodies of the following countries:

Austria	France	South Africa, Rep. of
Belgium	Germany, F.R.	Spain
Brazil	Italy	United Kingdom
Canada	Mexico	USA
Chile	Netherlands	USSR
China	Poland	
Czechoslovakia	Romania	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 1151/6-1977).

Printed in Switzerland

International Standard ISO 1151, *Terms and symbols for flight dynamics*, comprises, at present, six parts :

ISO 1151/1, *Terms and symbols for flight dynamics — Part 1 : Aircraft motion relative to the air.*

ISO 1151/2, *Terms and symbols for flight dynamics — Part 2 : Motions of the aircraft and the atmosphere relative to the Earth.*

ISO 1151/3, *Terms and symbols for flight dynamics — Part 3 : Derivatives of forces, moments and their coefficients.*

ISO 1151/4, *Terms and symbols for flight dynamics — Part 4 : Parameters used in the study of aircraft stability and control.*

ISO 1151/5, *Terms and symbols for flight dynamics — Part 5 : Quantities used in measurements.*

ISO 1151/6, *Terms and symbols for flight dynamics — Part 6 : Aircraft geometry.*

This International Standard is intended to introduce the main concepts, to include the more important terms used in theoretical and experimental studies and, as far as possible, to give corresponding symbols.

In this International Standard, the term "aircraft" denotes a vehicle intended for atmosphere or space flight. Usually, it has an essentially port and starboard symmetry with respect to a plane. That plane is determined by the geometric characteristics of the aircraft. In that plane, two orthogonal directions are defined : force-and-aft and dorsal-ventral. The transverse direction on the perpendicular to that plane follows.

When there is more than one plane of symmetry, or when there is none, it is necessary to introduce a reference plane. In the former case, the reference plane is one of the planes of symmetry. In the latter case, the reference plane is arbitrary. In all cases, it is necessary to specify the choice made.

Angles of rotation, angular velocities and moments about any axis are positive clockwise when viewed in the positive direction of that axis.

All the axis systems used are three-dimensional, orthogonal and right-handed, which implies that a positive rotation through $\pi/2$ around the x-axis brings the y-axis into the position previously occupied by the z-axis.

Numbering of sections and clauses

With the aim of easing the indication of references from a section or a clause, a decimal numbering system has been adopted such that the first figure is the number of the part of the International Standard considered.

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Terms and symbols for flight dynamics — Part 6 : Aircraft geometry

6.0 Introduction

6.0.1 This International Standard defines certain notions used for the geometric description of an aircraft for the purpose of flight dynamic studies[1].

It does not give all the definitions that permit the detailed description of the shape of the aircraft.

6.0.2 The aircraft is considered to be made up of various components. These components are in practice grouped in sub-sets forming the "main parts" of the aircraft.

A main part consists of a basic component and usually some other components that are either fixed or movable. The positions of movable components with respect to the basic component can be varied during flight.

Examples

Main parts / Components	Fuselage	Wing	Tailplane	...
Basic components	Cabin	Centre section	Fixed surface	...
Fixed components	Tail cone	Fixed portions	—	...
Movable components	Droop nose Landing gear doors	Variable sweep portions Flaps Ailerons Slats	Pitch motivator Tab	...

Moreover, the position of a main part with respect to another main part can be varied in flight. Examples : The rotation of the tailplane with respect to the fuselage, the rotation of the engine nacelles of a vertical take-off and landing aircraft with respect to the wing.

The breakdown of the aircraft into main parts and components depends on the problem studied. For example, a high-lift system composed of several flaps can be considered as a single component if the law of relative motion of the various flaps is defined (for example, during the study of approach at different deflections); in that case, the position of the component is defined by a single parameter which is the position of the high-lift system control. On the other hand, under other circumstances, each flap must be considered as a component (for example, during a wind-tunnel study aimed at defining the law of relative motion of the various flaps).

6.0.3 The basic component is used to define the relative positions of the other components composing the main part to which it belongs by means of reference axis systems within each component (6.1.9). The basic component is equally used to define the relative position of the main part to which it belongs with respect to the other main parts by means of reference axis systems within each main part (6.1.13).

To define the position of each main part with respect to the aircraft, it is necessary to define an axis system $x_R y_R z_R$, called the aircraft reference axis system (6.1.4).

That axis system need not be the body axis system (1.1.5) the axes of which are chosen from flight dynamic considerations. Usually, the axes of the aircraft reference axis system are coincident with the axes of the fuselage axis system.

1) The definitions introduced in this International Standard have been worded to maintain consistency with other fields (study of structures, manufacturing, etc.) in which it may also be necessary to introduce further concepts.