3 Terms, definitions, symbols, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Symbols or abbreviations used as representations for the term are listed immediately following the term. After the definition, where necessary, an additional clarifying note may be provided. Terms defined in the body of this document are presented in italics at the point where they are defined. The Index provides a directory of those terms defined in the body of this International Standard.

3.1.1
Earth gravitational model
spherical harmonic expansion of the gravitational field potential

NOTE Rotational effects are not included in this model; gravity includes rotational effects.

3.1.2
ecliptic plane
plane defined by the orbit of a planet at a point in time

3.1.3
equatorial plane
plane through a designated centre of an object and normal to the rotational axis of the object

3.1.4
geodetic datum
datum describing the relationship of a coordinate system to the Earth
[ISO 19111]

NOTE In most cases, the geodetic datum includes an ellipsoid definition.

3.1.5
north pole
that pole of rotation that lies on the north side of the invariable plane of the solar system
[RIIC06]

NOTE 1 Some planets have retrograde rotation with respect to this definition.

NOTE 2 Map north (see 5.8.1) may be unrelated to this direction.

3.1.6
spatial object
physical or virtual object to which spatial information applies

3.1.7
spatial operation
mathematical function that re-expresses coordinates, directions, orientations and/or distances expressed in one spatial reference frame in terms of a different spatial reference frame or a mathematical function for distance or other geometric quantities within a single spatial reference frame

3.2 Notation, symbols and abbreviated terms

Table 3.1 lists the mathematical notation conventions used in this document.

Table 3.1 — Mathematical notation

Style	Use	Examples
lower case, bold, italic	points, vectors	$\boldsymbol{x}$, $\boldsymbol{p}$
lower case, italic	variables, scalars, scalar-valued functions, axes of a linear coordinate system	a, b, f, x-axis
upper case, bold, italic	vector-valued functions, matrices	$\boldsymbol{F}$, $\boldsymbol{G}$, $\boldsymbol{M}$
upper case, italic	sets	S, T

Upper case italic letter symbols are also used for scalar-valued functions that are customarily capitalized.

EXAMPLE R_N in Table 5.6.

Table 3.2 lists the symbols used in this document.

Table 3.2 — Symbols

Symbol	Definition
a	major semi-axis length of an oblate ellipsoid
b	minor semi-axis length of an oblate ellipsoid
f	flattening (see Table 5.6)
h	ellipsoidal height
h_e	elevation
k_0	central scale
R_M	radius of curvature in the meridian (see Table 5.6)
R_N	radius of curvature in the prime vertical (see Table 5.6)
$\mathbf{R}^n$	vector space of n-tuples
$S(\varphi)$	meridional distance to equator (see Table 5.6)
$\mathrm{SO}(3)$	special orthogonal group of degree 3
α	azimuth
ε	(first) eccentricity (see Table 5.6)
ε'	second eccentricity (see Table 5.6)
φ	geodetic latitude
γ	convergence of the meridian
Λ_c	longitudinal centring (see Table 5.6)
λ	geodetic or planetodetic longitude
θ	spherical latitude or depression/elevation angle or cylindrical angle or (polar) angle
ρ	radius or range

Symbol	Definition
ξ	height
$\boldsymbol{R}_n(\theta)$	rotation about the axis $\boldsymbol{n}$ through angle θ in the position vector rotation convention
$\boldsymbol{\Omega}_n(\theta)$	rotation about the axis $\boldsymbol{n}$ through angle θ in the coordinate frame rotation convention
$\boldsymbol{R}_{ST}$	orientation of SRF_T with respect to SRF_S in the position vector rotation convention

A shortened form of a word or phrase is commonly called an abbreviation, an acronym, or an initialism. In this International Standard, all of these are collectively termed abbreviations. Table 3.3 lists the abbreviations used in this document, with two exceptions. Abbreviations used in the API (Clause 11) in the formation of enumerant names and record element names of non-object types are listed in Table 11.1. Abbreviations used in the construction of labels (see 13.2.2) are listed in Table F.1.

In the specification of an abbreviation, the letters in the word or phrase used to form the abbreviation are underlined.

Table 3.3 — Abbreviations

Abbreviation	Abbreviated term
1D	one-Dimensional
2D	two-Dimensional
3D	three-Dimensional
AFWA	Air Force Weather Agency
API	Application Program Interface
CAD/CAM	Computer-Aided Design/Computer-Aided Manufacturing
CFR	Coordinate Frame Rotation
CS	Coordinate System
COAMPS	Coupled Ocean/Atmospheric Mesoscale Prediction System
COM	Convergence of the Meridian
DSS	Designated Spatial Surface
E	East
ERM	Earth Reference Model
ETRS	European Terrestrial Reference System
GDA	Geocentric Datum of Australia
GRS	Geodetic Reference System
GTRS	Geo Tile Reference System
IAG	International Association of Geodesy
IEC	International Electrotechnical Commission
IGN	Institut Géographique National (France)

Abbreviation	Abbreviated term
ISO	International Organization for Standardization
JTC	Joint Technical Committee
MM5	Mesoscale (weather) Model 5
MODTRAN	Moderate resolution Transmittance (atmospheric radiation transfer)
MP	Map Projection
N	North
NOGAPS	Navy Operational Global Atmospheric Prediction System (United States)
NTF	Nouvelle Triangulation Français (France)
OBRS	Object Binding Rule Set
ORM	Object Reference Model
ORMT	Object Reference Model Template
PVR	Position Vector Rotation
RD	Reference Datum
RT	Reference Transformation
S	South
S-JTSK	System - Jednotné Trigonometrické Síti Katastrální (Czechoslovakia)
SI	Système International d'unités (International System of Units)
SIRGAS	Sistema de Referencia Geocéntrico para América del Sur
SRF	Spatial Reference Frame
SRFS	Spatial Reference Frame Set
SRFT	Spatial Reference Frame Template
SRM	Spatial Reference Model
SSM	SRF Set Member
STT	Similarity Transformation Template
TAI	Temps Atomique International (International Atomic Time)
UK	United Kingdom
US	United States
UTC	Coordinated Universal Time
W	West
WGS	World Geodetic System