

3 Terms, definitions, symbols, and abbreviations

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 Gravity includes rotational effects; however, such rotational effects are not included in this model.

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 perpendicular 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.

NOTE 3 The north side of the invariable plane of the solar system is the side facing in the direction of Polaris.

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, and/or orientations expressed in one spatial reference frame in terms of a different spatial reference frame; or mathematical function for distance or other geometric quantities within a single spatial reference frame

3.2 Notation, symbols and abbreviations

In this International Standard, dates that are included in an element of a concept instance specification shall conform to the notation and formats of [ISO 8601](#).

[Table 3.1](#) lists mathematical notation conventions commonly used in this document.

Table 3.1 — Mathematical notation

Style	Use	Examples
lower case, bold, italic	points, vectors	\mathbf{x}, \mathbf{p}
lower case, italic	variables, scalars, scalar-valued functions, axes of a linear coordinate system	$a, b, f, x\text{-axis}$
upper case, bold, italic	vector-valued functions, matrices	$\mathbf{F}, \mathbf{G}, \mathbf{M}$
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 symbols commonly 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)
$SO(3)$	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)

Symbol	Definition
λ	geodetic or planetodetic longitude
θ	spherical latitude or depression/elevation angle or cylindrical angle or (polar) angle
ρ	radius or range
ξ	height
$R_n(\theta)$	rotation about the axis n through angle θ in the position vector rotation convention
$\Omega_n(\theta)$	rotation about the axis n through angle θ in the coordinate frame rotation convention
R_{ST}	orientation of target SRF with respect to source SRF in the position vector rotation convention

A shortened form of a word or phrase is commonly referred to as 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 and record data type element names 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	Word or phrase
1D	one- <u>D</u> imensional
2D	two- <u>D</u> imensional
3D	three- <u>D</u> imensional
AFWA	<u>A</u> ir <u>F</u> orce <u>W</u> eather <u>A</u> gency
API	<u>A</u> pplication <u>P</u> rogram <u>I</u> nterface
CAD/CAM	<u>C</u> omputer- <u>A</u> ided <u>D</u> esign/ <u>C</u> omputer- <u>A</u> ided <u>M</u> anufacturing
CFR	<u>C</u> oordinate <u>E</u> frame <u>R</u> otation
CH1903	<u>C</u> H <u>1903</u> ("CH" is the ISO 3166-1:1997 country code for Switzerland)
CS	<u>C</u> oordinate <u>S</u> ystem
COAMPS	<u>C</u> oupled <u>O</u> cean/ <u>A</u> tmospheric <u>M</u> esoscale <u>P</u> rediction <u>S</u> ystem
COM	<u>C</u> onvergence <u>o</u> f the <u>M</u> eridian
D73	<u>D</u> atum <u>1973</u>
DSS	<u>D</u> esignated <u>S</u> patial <u>S</u> urface
DHDN	<u>D</u> eutschen <u>H</u> aupt <u>d</u> reiecks <u>n</u> etzes
E	<u>E</u> ast
ERM	<u>E</u> arth <u>R</u> eference <u>M</u> odel

Abbreviation	Word or phrase
ETRF	<u>E</u> uropean <u>T</u> errestrial <u>R</u> eference <u>F</u> rame
ETRS89	<u>E</u> uropean <u>T</u> errestrial <u>R</u> eference <u>S</u> ystem 19 <u>8</u> 9
GDA	<u>G</u> eocentric <u>D</u> atum of <u>A</u> ustralia
GGRS	<u>G</u> reek <u>G</u> eodetic <u>R</u> eference <u>S</u> ystem
GRS	<u>G</u> eodetic <u>R</u> eference <u>S</u> ystem
GTRS	<u>G</u> eo <u>T</u> ile <u>R</u> eference <u>S</u> ystem
IAG	<u>I</u> nternational <u>A</u> ssociation of <u>G</u> eodesy
IEC	<u>I</u> nternational <u>E</u> lectrotechnical <u>C</u> ommission
IGN	<u>I</u> nstitut <u>G</u> éographique <u>N</u> ational (France)
ISO	<u>I</u> nternational <u>O</u> rganization for <u>S</u> tandardization
JTC	<u>J</u> oint <u>T</u> echnical <u>C</u> ommittee
KKJ	<u>K</u> artasto <u>k</u> oordinaattija <u>r</u> jestelma
MGI	<u>M</u> ilitärgeographisches <u>I</u> nstitut
MM5	<u>M</u> esoscale (weather) <u>M</u> odel <u>5</u>
MODTRAN	<u>M</u> oderate resolution <u>T</u> ransmittance (atmospheric radiation transfer)
MP	<u>M</u> ap <u>P</u> rojection
N	<u>N</u> orth
NGO	<u>N</u> orges <u>G</u> eografiske <u>O</u> ppmåling
NOGAPS	<u>N</u> avy <u>O</u> perational <u>G</u> lobal <u>A</u> tmospheric <u>P</u> rediction <u>S</u> ystem (United States)
NT	unknown
NTF	<u>N</u> ouvelle <u>T</u> riangulation <u>F</u> rançais (France)
OBRS	<u>O</u> bject <u>B</u> inding <u>R</u> ule <u>S</u> et
ORM	<u>O</u> bject <u>R</u> eference <u>M</u> odel
ORMT	<u>O</u> bject <u>R</u> eference <u>M</u> odel <u>T</u> emplate
PVR	<u>P</u> osition <u>V</u> ector <u>R</u> otation
RD	<u>R</u> eference <u>D</u> atum
RT	<u>R</u> eference <u>T</u> ransformation
RT90	<u>R</u> ikets <u>T</u> riangelnät 1990
S	<u>S</u> outh
S-JTSK	<u>S</u> ystem - <u>J</u> ednotné <u>T</u> rigonometrické <u>S</u> íti <u>K</u> atastrální (Czechoslovakia)
SI	<u>S</u> ystème <u>I</u> nternational d'unités (International System of Units)
SIRGAS	<u>S</u> istema de <u>R</u> erencia <u>G</u> eocéntrico para las <u>A</u> méricas (The Americas)
SRF	<u>S</u> patial <u>R</u> eference <u>F</u> rame
SRFT	<u>S</u> patial <u>R</u> eference <u>F</u> rame <u>T</u> emplate
SRM	<u>S</u> patial <u>R</u> eference <u>M</u> odel

Abbreviation	Word or phrase
SSM	<u>S</u> RF <u>S</u> et <u>M</u> ember
STT	<u>S</u> imilarity <u>T</u> ransformation <u>T</u> emplate
TAI	<u>T</u> emps <u>A</u> tomique <u>I</u> nternational (International Atomic Time)
UK	<u>U</u> nited <u>K</u> ingdom
US	<u>U</u> nited <u>S</u> tates
UTC	<u>C</u> oordinated <u>U</u> niversal <u>T</u> ime
W	<u>W</u> est
WGS	<u>W</u> orld <u>G</u> eodetic <u>S</u> ystem

<http://standards.iso.org/ittf/PubliclyAvailableStandards/>