13 Registration

13.1 Introduction

This International Standard specifies standardized instances of several SRM concepts. This International Standard allows new instances of some SRM concepts to be specified by registration. These new instances are termed *registered items*.

New instances of the following SRM concepts may be registered:

a) abstract coordinate systems (see 5.3),

b) reference datums (see 7.2),

c) similarity transformation templates (see 7.3.3),

d) object reference model templates (see 7.4.4),

e) object reference models (see 7.4.5),

f) reference transformations (see 7.4.5),

g) object binding rule sets (see 7.5),

h) spatial reference frame templates (see 8.5),

i) spatial reference frames (see 8.6),

j) spatial reference frame sets and their members (see 8.7),

k) designated spatial surfaces (see Clause 9), and

l) profiles (see Clause 12).

References for new instances of the above SRM concepts may also be registered separately (see 13.2.5).

New items are registered using the established procedures of the registration authority for this International Standard[30]. These procedures require the submitter to supply all information for a new SRM registered item. Registration shall be according to the procedures in ISO/IEC 9973 (see [ISO/IEC 9973]). Registration shall not be used to modify any existing standardized or SRM registered item (see Annex G for details concerning how standardized and registered items may be deprecated).

ISO/IEC 9973 allows for previously registered items to be added to this International Standard, when amended. When previously registered SRM concept instances are added to this International Standard, all abbreviations used (in labels, description text, etc.) in those instances that are not already included in Table 3.3 and/or Table F.1 shall be added, as appropriate. Additionally, all associated references (see 13.2.5) not already included in Clause 2 or the Bibliography shall be added, as appropriate.

Other International Standards that normatively reference this International Standard, implementations of those standards, and implementations of this International Standard shall not use any SRM registered item codes in the value ranges reserved for registration or future standardization by this International Standard with any meaning other than the one defined in this International Standard or in the International Register of Items.

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[30] At the time this International Standard was published, the registration authority was the ISO/IEC Registration Authority for Items. Contact information for the ISO-designated Registration Authority for Items registered under the ISO/IEC 9973 procedures is available at the ISO Maintenance agencies and registration authorities web site: http://www.iso.org/iso/standards_development/maintenance_agencies.htm.

This clause specifies the rules and guidelines that shall be followed in preparing registration proposals. Registration proposals include required information for new SRM registered items, as well as accompanying administrative information (see Annex H). The guidelines in 13.2 shall apply to all SRM registered items. The additional guidelines in 13.3 shall apply only to the indicated sets of SRM registered items.

13.2 Specification elements for SRM registered items

13.2.1 Introduction

The specification of each SRM registered item shall include the following elements:

a) label: a unique, compact, character string that is used to denote the registered item,

b) code: a unique integer[31] that is used to denote the registered item, and

c) other concept-dependent information as required in this International Standard.

Other concept-dependent information may include the following elements:

a) a description, and

b) references.

The SRFS members do not require labels in the case of some SRFSs. See 8.7.1.

13.2.2 Label

The *label* element of an SRM registered item specification shall be a compact and human-readable designator that is used to denote that registered item. Labels in this International Standard may include the name or names for the registered item.

Each label in this International Standard shall:

a) uniquely denote a specific instance within the set of instances of a given SRM concept,

b) be a succinct expression of the concept instance that it denotes,

c) be represented as a character string, and

d) be human readable.

For presentation purposes only, a long label may be displayed on more than one line by using a hyphen (-) to separate the label before an underscore (_) character.

EXAMPLE 1 The label LOCOCENTRIC_SURFACE_EUCLIDEAN may be displayed for presentation purposes as:
LOCOCENTRIC_SURFACE -
_EUCLIDEAN.

If two concept instances differ only in the dimension of an associated position-space or the dimension of an associated object-space, then the characters “_1D”, “_2D”, or “_3D”, as appropriate, shall be appended to the label as a means of differentiating such concept instances.

The labels of standardized SRM concept instances in this International Standard were created by applying the following guidelines. Labels for proposed SRM registered items shall be created according to these guidelines:

[31] Uniqueness is only within each set of SRM concepts, for example: RDs or ORMs.

a) A label shall be provided for each registered SRM concept instance.

b) Labels shall be character strings.

c) Labels shall contain only uppercase characters (A-Z) and digits (0-9) with the exception of the radix delimiter symbol "r" and the underscore character (_).

d) Labels shall begin with an uppercase alphabetic character (A-Z).

e) Labels shall not contain spaces.

f) Labels may be a single word or abbreviation (see 3.2 and Annex F), or may be composed of a series of components, each of which is a word or an abbreviation.

g) The underscore (_) character shall be used to concatenate the components of a label.

h) Labels should be as short as possible while capturing a common use descriptive word or phrase representative of the registered SRM concept instance.

i) The length of a label shall not exceed sixty-three (63) characters.

The components of a registered SRM concept instance label shall be chosen according to the following guidelines:

a) Components of labels shall not be used with a different meaning from how that component is used in this International Standard or in previously registered SRM concept instances.

b) When abbreviating, if a word or phrase to be abbreviated appears in Annex F or Table 3.3, the given abbreviation for that word or phrase shall be used.

c) When abbreviating, if a word or phrase to be abbreviated does not appear in Annex F or Table 3.3, the proposed abbreviation should, if possible, be consistent with those specified in Annex F and Table 3.3.

Recognized abbreviations for words or phrases, may be used as components of a label based on the following guidelines:

a) Each abbreviation shall uniquely represent a single word or phrase.

b) If a word or phrase is abbreviated in one label, it is not required to be abbreviated in other labels.

c) Jargon shall not be used.

d) An abbreviation in a label shall not be, by itself, a word with a different meaning than that of the word/phrase that it replaces.

EXAMPLE 2 The abbreviation DATUM should not be used for the phrase "Dartmouth Arc Transit Universal Meridian" as this would violate guideline (d).

13.2.3 Code

The *code* element of an SRM registered item specification shall be a compact designator that is used to uniquely identify that registered item. Codes are assigned by the registration authority for this International Standard when a registration proposal is accepted. Therefore, codes are not included in registration proposals.

Each code in this International Standard shall:

a) uniquely denote a specific instance within the set of instances of a given SRM concept,

b) be represented as an integer, and

c) be assigned sequentially in increasing order within the set of instances of a given SRM concept, beginning at 1.

There is a one-to-one relationship between labels and codes in the same set of SRM concept instances. Therefore, a label and a code may be used interchangeably to denote the same concept instance. The set of members of a single SRFS shall be considered as a separate and distinct set from the set of members of a different SRFS.

Application program interfaces and exchange formats often utilize codes. Applications using such codes shall be capable of distinguishing 2^{31}-1 different codes. Negative codes are not permitted in this International Standard, but they may be used in a non-conforming implementation for experimentation. The code value zero is reserved for use in the API (see Clause 11).

All codes for SRM standardized concept instances that are not assigned in this International Standard are reserved for future standardization or for registration. Codes shall be assigned by the registration authority for this International Standard according to these rules:

a) Nothing shall be assumed about the relationship among standardized or registered SRM concept instances from the numerical relationships of their corresponding codes. In particular, the numerical sequencing of codes does not impose any sequential ordering to the standardized or registered SRM concept instances denoted by those codes.

b) Integers are used to represent codes even though only positive integer values shall ever be assigned in either this International Standard or through registration. This allows negative integer values to be used experimentally in applications, even though such use of negative integer values is not in conformance to this International Standard.

c) The registration authority for this International Standard shall assign codes in increasing order beginning at the first available integer value, and skipping no integer values, within the set of codes for each SRM concept.

d) The registration authority for this International Standard shall coordinate the assignment of codes with future revisions of this International Standard to ensure that no code shall be assigned more than once in the same scope by either standardization or registration.

13.2.4 Description

The contents of the *description* element of an SRM registered item specification shall be a precise statement of the nature, properties, scope, or essential qualities of the concept instance.

The descriptions of standardized SRM concept instances in this International Standard were created by applying the following guidelines. Descriptions for proposed SRM registered items shall be created according to these guidelines:

a) A description shall be provided for each SRM concept instance. This description shall contain at least one word, number, expression or formula.

b) Descriptions shall be clear and concise, containing only the content necessary to summarize the concept instance.

c) Jargon shall not be used.

d) When abbreviating, if a word or phrase to be abbreviated appears in Table 3.3, the given abbreviation for that word or phrase shall be used.

e) When abbreviating, if a word or phrase to be abbreviated does not appear in Table 3.3, the proposed abbreviation should, if possible, be consistent with those specified in Table 3.3.

13.2.5 References

13.2.5.1 Introduction

Two types of references are recognized in International Standards. The first type of reference is a normative reference [ISOD2]. Identified provisions of a normative reference are incorporated by reference and "become"

part of the subject standard. Normative references play a key role in ensuring the consistency of the body of International Standards by allowing work done by others to be reused without modification. The second type of reference is an informative reference [ISOD2]. Identified provisions of an informative reference are cited as being the source of, related to, or providing additional information about text in the subject standard, but the identified provisions of the document are not themselves directly incorporated into the subject standard.

13.2.5.2 Citation format

Each citation consists of an identifier and an optional location enclosed in square brackets ([ ]) with the identifier listed first, followed by a comma, followed by the location. The *identifier* specifies the cited document and shall appear in either Clause 2 or the Bibliography. The *location* specifies the portion of the document that is cited. Whenever possible, the location shall be specified in accordance with the requirements in [ISOD2]. When a cited document lacks a subclause structure, the location may be specified in a convenient and natural format depending on the organization of the cited document.

EXAMPLE [83502T, App. A-1, "HO"] and [RIIC06, Table 4, "Saturn"].

13.3 Guidelines for specific SRM concepts

13.3.1 Guidelines for registration of abstract CSs

Abstract CSs shall be registered according to the following additional guidelines:

a) The function type shall be either “generating function” or “map projection”.

b) The CS descriptor shall be one of: 3D linear, 3D curvilinear, surface linear, surface curvilinear, map projection, 2D linear, 2D curvilinear, 1D linear, 1D curvilinear, or surface (map projection) and 3D (augmented map projection).

c) The CS properties shall be either “none” or a list of one or more properties of the CS chosen from the following: orthogonal, not orthogonal, orthonormal, not orthonormal, conformal, or not conformal. Conformal and not conformal only apply to map projections.

d) The CS parameters and constraints, if any, shall specify the parameters of the CS and constraints on how those parameters interrelate.

e) The coordinate symbols and common names shall specify these symbols and terms as used in the specification of coordinates in the CS. Thus in the case of the geodetic CS, “λ : longitude in radians, φ : latitude in radians, and h : ellipsoidal height”.

f) The domain of the CS generating function or mapping equations shall be specified in terms of the coordinate symbols and other CS parameters.

g) The CS generating function or mapping equations shall be specified in terms of the coordinate symbols and other CS parameters. In the case of an oblate ellipsoid, common parameters and functions from Table 5.6 shall be used if possible.

h) The domain of the inverse of the CS generating function or mapping equations shall be specified in terms of the coordinate symbols and other CS parameters.

i) The inverse of the CS generating function or mapping equations shall be specified in terms of the coordinate symbols and other CS parameters. In the case of an oblate ellipsoid common parameters and functions from Table 5.6 shall be used.

j) If the CS is a map projection, the COM function shall be specified in terms of the coordinate symbols, other CS parameters, and or functions from Table 5.6.

k) If the CS is a map projection, the point distortion function(s) shall be specified in terms of the coordinate symbols, other CS parameters, and or functions from Table 5.6.

l) Supplementary geometric figures may be provided that explain the roles of the CS parameters and illustrate the CS.

m) Additional, non-normative information concerning the CS may be supplied in the form of notes.

EXAMPLE 1 Guideline d:

CS parameters: "a: major semi-axis length, and b: minor semi-axis length" and
CS parameter constraints: "$a > b$".

EXAMPLE 2 Guidelines f and h: "$-\pi/2 < \varphi < \pi/2$, $-\pi \le \lambda < \pi$, and $-b < h$".

EXAMPLE 3 Guideline m note: "The generating function is the composition of the generating function for azimuthal spherical with the 3D localization operator."

13.3.2 Guidelines for registration of STTs

STTs shall be registered according to the following additional guidelines:

a) The dimension shall be specified as either "2D" or "3D".

b) The STT parameters and constraints, if any, shall specify the parameters of the STT and constraints on how those parameters interrelate. STT parameter symbols shall be listed in a specified order with optional names and/or descriptions and units of measure (or unitless).

c) The STT formulation and inverse formulation shall be specified in terms of the STT parameters and the source and target positions.

d) Additional, non-normative information concerning the STT may be supplied in the form of notes.

EXAMPLE 1: Guideline b:

STT parameters:

Δx : the x-component of the origin displacement in metres.
Δy : the y-component of the origin displacement in metres.
Δz : the z-component of the origin displacement in metres.

ω_1 : x-axis rotation in radians.

ω_2 : y-axis rotation in radians.

ω_3 : z-axis rotation in radians.

Δs : scale difference from unity (unitless).

Constraints:

1) ω_1, ω_2 and, ω_3 are small rotations (magnitude less than 2×10^{-4} radians) in the position vector rotation convention.

2) Δs is a small adjustment of scale ($|\Delta s| < 10^{-5}$).

EXAMPLE 2: Guideline c:

STT formulation:

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_{\mathrm{T}} = \begin{pmatrix} \Delta x \\ \Delta y \\ \Delta z \end{pmatrix} + (1+\Delta s)\begin{pmatrix} 1 & -\omega_3 & \omega_2 \\ \omega_3 & 1 & -\omega_1 \\ -\omega_2 & \omega_1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix}_{\mathrm{S}}$$

EXAMPLE 3: Guideline d:

Notes:

1) This transformation widely used in geodesy with rotation angle values specified in arc second or milliarcsecond (mas) units.

13.3.3 Guidelines for registration of RDs

RDs shall be registered according to the following additional guidelines:

a) The name of the physical object, if any, shall be specified.

b) If the RD is not based on an ellipsoid, the analytic formulation of the RD in position-space shall be specified.

c) If the RD is based on an ellipsoid, the parameter values shall be specified as follows:

1) For an RD based on an oblate ellipsoid: major semi-axis, a, and flattening, f.

2) An RD based on a sphere shall be specified as an oblate ellipsoid RD with major semi-axis equal to the sphere radius and the flattening equal to zero.

3) For an RD based on a prolate ellipsoid: minor semi-axis, a, and major semi-axis, b.

4) For an RD based on a tri-axial ellipsoid: semi-axis, a, semi-axis, b, and semi-axis, c.

d) RD parameters shall be specified by value or by reference (see 13.2.5).

1) If by value, the value(s) shall be specified and followed by a error estimate expressed in one of the following forms:

i) error estimate: unknown

ii) error estimate: assumed precise

iii) error estimate (1σ): <parameter name>:<error value>

iv) error interval: <parameter name> ± <error value>

2) If by reference, this element shall contain a citation(s) for the value(s) and error estimate(s) using the terminology found in the reference. These terms shall be enclosed in brackets ({ }). Any parameter value that is not specified in the citation(s) shall be specified as in the “by value” case.

e) The date the RD parameters were specified or published shall be specified.

EXAMPLE 1 Guideline b: “ $\boldsymbol{F}(t) = t(0,0,1)$ ”.

EXAMPLE 2 Guideline c.1: "a = 6 377 563,396" and "f = 1/299,324 964 6".
Guideline c.2: Sphere of radius 6 371 229" specified as "a = 6 371 229" and "f = 0".
Guideline c.3: "a = 4 564" and "b = 4 608".
Guideline c.4: "a = 581 100", "b = 577 900", and "c = 577 700".

EXAMPLE 3 Guideline d.1.iii: "error estimate (1σ): a : 1 250, f^{-1} : 0,25 ".

13.3.4 Guidelines for registration of ORMTs

ORMTs shall be registered according to the following additional guidelines:

a) A list of RDs in the set shall be specified.

b) The binding constraints shall specify the relationship(s) in object-space between two or more geometric constructions corresponding to RD bindings. These binding constraints shall be constructed so that any realization of the ORMT shall be an ORM.

c) Additional, non-normative information concerning the RD may be supplied in the form of notes.

EXAMPLE 1 Guideline a: "RD 1. The oblate ellipsoid RD with major semi-axis a and minor semi-axis b", and "RD 2. Z_AXIS_3D".

EXAMPLE 2 Guideline b: "The constructed directed line bound to RD 2 shall contain the centre of the constructed oblate ellipsoid bound to RD 1".

EXAMPLE 3 Guideline c: "The constructed directed line bound to RD 2 passing through the origin of the normal embedding uniquely determines the z-axis of the normal embedding".

13.3.5 Guidelines for registration of ORMs

ORMs shall be registered according to the following additional guidelines:

a) The published name shall be specified.

b) The label of the reference ORM for the spatial object shall be specified. If no standard or registered ORM exists for the spatial object, then the spatial object name and an optional description shall be specified, and the spatial object type shall be identified as either abstract or physical.

c) If the ORM is dynamic, or a time-fixed (object-fixed) instance of a dynamic ORM, the label of the OBRS shall be specified.

d) If the ORM is object-fixed and the spatial object is a physical object, the date that the ORM component RDs were bound in object-space shall be specified. This case includes time-fixed instances of dynamic ORMs for a physical object.

e) If the ORM is object-fixed and the spatial object is the Earth, and if Greenwich, UK is not contained in the x-positive xz-half-plane of the normal embedding, then the significant location contained in the x-positive xz-half-plane of the normal embedding shall be specified.

f) Any required binding constraints on the component RDs shall be specified.

g) Optional binding notes may be specified.

h) The approximate subset of object-space to which the model applies expressed as either a spatial extent or the description as specified in the reference shall be specified.

i) The label of the ORMT for this ORM shall be specified.

j) If the specified ORMT is ORMT SPHERE, or OBLATE_ELLIPSOID, or PROLATE_ELLIPSOID, the label of the ellipsoidal ORM component RD shall be specified.

k) If the ORM is object-fixed, one or more reference transformation shall be specified (see 13.3.6).

EXAMPLE Guideline i: ORMT TRI_PLANE.

13.3.6 Guidelines for registration of RTs

RTs shall be registered according to the following additional guidelines:

a) The STT parameter values shall be specified by value or by reference as follows:

1) If by value, the values of the STT parameters specifying the reference transformation $\boldsymbol{H}_{\mathbf{SR}}$ (see Table 10.1) shall be specified. These values may be followed by a measurement/modelling error estimate expressed in one of the following forms:

i) assumed precise

ii) σ<standard error>

iii) ±<tolerance>

iv) no error information following a parameter value indicates that the error estimate is unknown or unobtainable

2) If by reference, a citation(s) for the values of the STT parameters specifying the reference transformation $\boldsymbol{H}_{\mathbf{SR}}$ and the associated error estimates shall be specified. Terms appearing in the references that are cited for a value shall be enclosed in brackets ({ }). Any parameter value that is not specified in the citation(s) shall be specified as in the "by value" case.

3) A dynamic $\boldsymbol{H}_{\mathbf{SR}}(t)$ transformation may specify parameter values as functions of time.

4) To avoid loss of precision, axis rotations angles (if applicable to the STT) may be expressed in arc seconds (") and, in cases of a large rotation, in arc degrees (°).

b) The date the RT was specified or published shall be specified.

EXAMPLE Guideline a.1.iii: error estimate (1σ): Δx : 25, Δy : 25, Δz : 25 .

13.3.7 Guidelines for registration of OBRSs

OBRSs shall be registered according to the following additional guidelines:

a) A descriptive name shall be specified.

b) A set of spatial objects for which the binding rules apply shall be specified.

c) The binding restrictions shall be specified.

13.3.8 Guidelines for registration of SRFTs

SRFTs shall be registered according to the following additional guidelines:

a) A short name as published or as commonly known and an optional description shall be specified.

b) The object or object type shall be specified as one or more of: abstract, physical, the Earth, planet, satellite, and the Sun; and, optionally, additional restrictions.

c) The ORM constraint shall specify criteria for allowable ORMs.

d) The label of a standard or registered CS of compatible type shall be specified.

e) The CS coordinate names and/or symbols shall be specified as follows:

1) The k^{th}-coordinate names and/or symbols shall be expressed in terms of those of the CS.

2) The designation of the vertical coordinate, if applicable, shall be expressed in terms of the CS.

f) The SRFT parameters shall be specified as follows:

1) If no CS, RD, and/or SRF parameters are required, this shall be expressed as “none”.

2) CS and RD parameters, if any.

3) SRF parameters that are not specified by a CS parameter binding rule in (g).

g) The CS parameter binding rules shall be specified as follows:

1) If no CS, RD, and/or SRF binding rules are required, this shall be expressed as “none”.

2) CS and RD parameter binding rules, if any.

3) CS and SRF parameter binding rules, if any.

h) The coordinate valid region shall specify an optional restriction of the domain of the CS to a valid region. If a valid region is specified, optionally, an extended valid region may also be specified. If both are unspecified, then there are no additional constraints on coordinate validity beyond those of the CS.

i) The API base SRF class shall be specified as one of BaseSRF2D, BaseSRF3D, BaseSRFwithTangentPlaneSurface, BaseSRFwithEllipsoidalHeight, or BaseSRFMapProjection.

j) The API SRF class name shall be specified.

k) If SRFT parameters are specified in (f), then an API SRF parameter structure shall be specified. If possible, an existing data type that is already defined in Clause 11 of this International Standard shall be referenced. Otherwise, this element shall include the definition of the required parameter structure, along with any other necessary supporting data types that are not already specified in this International Standard or in a registered SRFT.

l) The API coordinate structure shall be specified. If possible, an existing coordinate structure that is already defined in 11.9.7 of this International Standard shall be referenced. Otherwise, this element shall include the definition of the required coordinate structure, along with any other necessary supporting data types that are not already specified in this International Standard or in a registered SRFT.

m) Additional, non-normative information such as a description of the SRF structure, modelled region, intended use, and/or application domain may be supplied in the form of notes.

EXAMPLE 1 Guideline c: “Shall be derived from: ORMT OBLATE_ELLIPSOID or ORMT SPHERE.”

EXAMPLE 2 Guideline d: CS “EUCLIDEAN_3D”.

EXAMPLE 3 Guideline e.1: “The same as the CS.” or “u: x (x), and v: y (y)”.

EXAMPLE 4 Guideline e.2: “Ellipsoidal height is the vertical coordinate.” or “w: height (h) is the vertical coordinate”.

EXAMPLE 5 Guideline f.2: “λ_{origin}: longitude of origin ($-\pi < \lambda_{origin} \leq \pi$)”.

EXAMPLE 6 Guideline f.3: “u_F: false easting ($u_F \geq 0$)”.

EXAMPLE 7 Guideline g.2: “CS parameters match RD values: Major semi-axis a, and eccentricity ε”.

EXAMPLE 8 Guideline m: “When the object is the Earth, this SRF is referred to as a geocentric SRF.”

13.3.9 Guidelines for registration of SRFs

SRFs shall be registered according to the following additional guidelines:

a) A short name as published or as commonly known and an optional description shall be specified.

b) The label of the applicable SRF template shall be specified.

c) The label of the applicable ORM shall be specified.

d) The coordinate valid region shall specify an optional restriction of the domain of the CS to a valid region. If a valid region is specified, optionally an extended valid region may also be specified. If both are unspecified, then there are no additional constraints on coordinate validity beyond those of the CS.

e) The parameter values shall specify values for all SRF template parameters by value or reference. If by reference, a citation(s) shall be specified for the parameter values.

f) Additional, non-normative information such as a description of the SRF structure, modelled region, intended use, and/or application domain may be supplied in the form of notes.

EXAMPLE 1 Guideline b: "SRFT TRANSVERSE_MERCATOR".

EXAMPLE 2 Guideline c: "ORM OSGB_1936"

EXAMPLE 3 Guideline d: "Valid region description: Great Britain."

EXAMPLE 4 Guideline e: by value example:
"longitude of origin: λ_{origin} = -8°
latitude of origin: φ_{origin} = 53° 30′
central scale: k_0 = 0,999 820
false easting: u_F = 600 000 m
false northing: v_F = 750 000 m"

13.3.10 Guidelines for registration of SRF sets and their members

SRF sets shall be registered according to the following additional guidelines:

a) The name as published or as commonly known shall be specified and an optional description may be specified.

b) The label of the applicable SRF template shall be specified.

c) The ORM constraints shall be specified as follows:

   1) If a unique ORM is applicable, its label shall be specified.

   2) If more than a single ORM is applicable, the criteria for allowable ORMs shall be specified.

d) The coordinate valid region shall be specified as follows:

   1) An optional restriction of the domain of the CS to a valid region may be specified.

   2) If a valid region is specified, optionally an extended valid region may also be specified.

   3) If both are unspecified, then there are no additional constraints on coordinate validity beyond those of the CS. This is indicated by the phrase "No additional restrictions".

e) The SRF set membership shall be specified as either:

   1) The set of explicit members, by individual listing and registration, or

2) An algorithm implicitly generating all set members, including for each: an optional label, a short name (description), coordinate valid region, and parameter values, and notes. If any member is labelled, all members shall be labelled.

f) Additional, non-normative information such as a description of the SRF structure, modelled region, intended use, and/or application domain may be supplied in the form of notes.

EXAMPLE 1 Guideline b: "SRFT TRANSVERSE_MERCATOR".

EXAMPLE 2 Guideline c.1: ORM "N_AM_1983".

EXAMPLE 3 Guideline c.2: "A global model ERM such as ORM WGS_1984".

EXAMPLE 4 Guideline d.1:
" Valid region specification:
$0^o \le \varphi < 84^o$ "

EXAMPLE 5 Guideline d.2:
" Extended valid region specification:
$-0{,}5^o \le \varphi < 84{,}5^o$ "

EXAMPLE 6 Guideline e.2: See the specification of SRFS GTRS_GLOBAL_COORDINATE_SYSTEM.

EXAMPLE 7 Guideline f: "A set of two localized SRFs where only one SRF is used for each county in the state and no overlap is allowed."

SRF set members shall be registered according to the following additional guidelines:

a) The label of the SRFS member shall be specified if all SRFS members are specified.

b) A short name for the member shall be specified.

c) The coordinate valid region shall be specified as follows:

1) An optional restriction of the domain of the SRF set to a valid region may be specified.

2) If a valid region is specified, optionally an extended valid region may also be specified.

3) If both are unspecified, then there are no additional constraints on coordinate validity beyond those of the SRF set as a whole. This is indicated by the phrase "No additional restrictions".

d) The parameter values shall specify values for all SRF parameters by value or reference. If by reference, a citation(s) shall be specified for the parameter values.

e) Additional, non-normative information such as a description of the SRF structure, modelled region, intended use, and/or application domain may be supplied in the form of notes.

These specifications shall be explicit for all members, or they shall be implicit by algorithmic specification for all members.

EXAMPLE 8 Guideline a: SRFS "UNIVERSAL_TRANSVERSE_MERCATOR".

EXAMPLE 9 Guideline b: "Central zone."

EXAMPLE 10 Guideline c.1:
" Valid region specification:
$-180^o \le \lambda < -174^o$
$0^o \le \varphi < 84^o$ "

EXAMPLE 11 Guideline c.2:
" Extended valid region specification:
179,5º ≤ λ < -173,5º
-0,5º ≤ φ < 84,5º "

EXAMPLE 12 Guideline d: specification by value:
" longitude of origin: λ_{origin} = -177º
latitude of origin: φ_{origin} = 0º
central scale: k_0 = 0,999 6
False easting: u_F = -500 000 m.
False northing: v_F = 0 m."

13.3.11 Guidelines for registration of DSSs

DSSs shall be registered according to the following additional guidelines:

a) The description shall include the name as published or as commonly known.

b) Whether the DSS is of global or local extent relative to the relevant spatial object shall be specified.

c) Additional, non-normative information concerning the DSS may be supplied in the form of notes.

d) Whether or not the DSS has a DSS model, and, if so, a reference to that DSS model shall be specified.

EXAMPLE 1 Guideline a: "WGS 84 EGM 96 geoid".

EXAMPLE 2 Guideline d: "The geopotential surface defined by the WGS 84 EGM 96 Earth gravity model (EGM) that is closely associated with the mean ocean surface."

13.3.12 Guidelines for registration of profiles

Profiles shall be registered according to the following additional guidelines:

a) A non-empty subset of the standardized and registered ORMs shall be specified, such that each ORM in the set shall be applicable to at least one SRFT in the SRFT profile set in guideline (b). The RTs associated with each ORM in the set shall also be specified.

b) A non-empty subset of standardized and registered SRFTs shall be specified, such that for each SRFT in the set, there is at least one ORM in the ORM profile set specified in guideline (a) that is applicable to that SRFT.

c) A subset of the standardized and registered SRFs shall be specified, including only SRFs derived from SRFTs in the SRFT profile set specified in guideline (b), and specifying an ORM in the ORM profile set specified in guideline (a).

d) A subset of the standardized and registered SRFSs shall be specified, including only SRFSs derived from SRFTs in the SRFT profile set specified in guideline (b), and such that at least one ORM specified in the ORM profile set specified in guideline (a) satisfies the ORM constraint of the SRFS.

e) A subset of the standard and registered DSSs shall be specified.

f) The SRFT accuracy shall be specified for each of the SRFTs in the SRTS profile set specified in guideline (b), as follows:

1) The label of the SRFT profile set member shall be specified. Multiple SRFT labels may be grouped together.

2) The error bounds for the SRFT shall be specified as follows:

i) The positional error bound, in metres, shall be specified.

ii) The directional error bound, in radians, shall be specified.

iii) The ratio error bound shall be specified.

iv) Error bounds for one or more subsets of the ORM profile set in guideline (a) may also be specified.

3) The accuracy domain template shall be specified in terms of constraints on the parameters of the SRFT(s) specified in (1) above.

EXAMPLE 1 Guideline a: {ORM WGS_1984}.

EXAMPLE 2 Guideline b: {SRFT CELESTIODETIC}.

EXAMPLE 3 Guideline c: {SRF GEODETIC_WGS_1984}.

EXAMPLE 4 Guideline d: {none}.

EXAMPLE 5 Guideline e: {DSS EGM96_GEOID}.

EXAMPLE 6 Guideline f1: SRFT CELESTIODETIC.

EXAMPLE 7 Guideline f 2: ε_P = 0,001m, ε_D = 0,000 1, ε_R =0,000 1. Oblate ellipsoid ORMs restricted to ellipsoid RDs with $a \leq 6\,400\,000$ and $f \leq 1/150$.

EXAMPLE 8 Guideline f 3: –50 000, $0 \leq h \leq +1\,000\,000$.

