



Some potential **(ab)**uses of the upcoming **xDOMES** numbering scheme

Thomas Knudsen KDS, Brice Virly IGN, Thierry Gattacceca IGN

NKG General Assembly, Vilnius, Lithuania, 2026-09-14/17



Klimadatastyrelsen



DRAFT International Standard

ISO/DIS 19161-2

Geographic information — Geodetic references —

Part 2: Unique identification of geodetic ground stations

Information géographique — Références géodésiques —

Partie 2: Identification unique des stations géodésiques au sol

ICS: 35.240.70; 07.040

ISO/TC 211

Secretariat: **SIS**

Voting begins on:
2026-07-13

Voting terminates on:
2026-10-05



© Danish Standards Foundation

DRAFT
International

Geographic
reference
Part
II
of geodetic

ISO/DIS 19161-2

ISO/TC 211

Secretariat: **SIS**

Voting begins on:
2026-07-13

Voting terminates on:
2026-10-05

— Références géodésiques —
— Mécanisme des stations géodésiques au sol
ICS: 07.040

**A formalisation, and much needed revision
of the DOMES convention for geodetic
station identification**

DOMES?

- Directory **Of MERIT Sites**
- The 9-character gibberish in the **MARKER NUMBER** field of your RINEX file header: **10801M001**
- The **MERIT** campaign dates back to the early 1980's
- So DOMES pre-dates the 4-character **IGS Station ID**
- In general less human readable:
- VLNS _{vs.} **10801M001**



Anatomy of a DOMES id

10801M001

Country

Site

Type

Serial

Anatomy of a DOMES id

CCCCSSSTNNNN

Country

Site

Type

Serial

Primary problems

- Not a true (ISO) standard
- Country codes used are not ISO
- Too few sites possible (01-99)
 - › Currently solved in a hacky way, by inventing additional country codes for countries with more than 99 sites

Constraints

- Develop and ratify an ISO standard
- Use ISO country codes
- Extend the maximum possible number of sites in a country
- BUT keep the 9 character field width

Solution

- Develop and ratify an ISO standard: **RATIFICATION PENDING**
- Use ISO country codes: **DONE**
- Extend the maximum possible number of sites in a country: **DONE**
- BUT keep the 9 character field width: **DONE**

Anatomy of a DOMES id

CCCCSSSTNNNN

Country

Site

Type

Serial

Anatomy of an xDOMES id

CCCCSSSNNT

Country

Site

Serial

Type

Anatomy of a DOMES id

10801M001

Country

Site

Type

Serial

Anatomy of an xDOMES id

LTU00101M

Country

Site

Serial

Type

So 999 sites, each having 99 serial ids?

- Actually much more than that, if needed
- Only very few countries have more than 99 sites
- But that is enough to break the old data model
- Even fewer have more than 999 sites
- But that is still enough to break the new data model
- ...or rather: it would break, if we use base 10
- Incidentally, we use base 34...

Base 34? – Looks like 36 to me!

0123456789 ABCDEFGHIJKLMNOPQRSTUVWXYZ

Base 34!

0123456789 ABCDEFGH **I** JKLMN **O** PQRSTUVWXYZ

Plenty of sites and IDs

Sites: From 99 to $34 \times 34 \times 34$ = 39304

IDs/site: From 999 to 34×34 = 1156

5.2 Types of ground geodetic stations encompassed by this document

Table 1 — List of values for T

Technique/ type of point	Letter	Comment
Benchmarks (general)	A	Allows alternate adaptation of scheme to non-permanently instrumented stations (not belonging to a geodetic site)
Benchmarks (at a site)	B	Allows adaptation of scheme to non-permanently instrumented stations (belonging to a geodetic site)
Clocks (including atomic clocks and optical clocks)	C	
DORIS	D	DORIS
PRARE	E	Precise Range And Range-rate Equipment ^c
Absolute gravity point (permanent absolute gravimeter)	G	
Superconducting relative gravimeter	H	
InSAR	I	Interferometric Synthetic Aperture Radar
SLR	L	Satellite Laser Ranging
Marker	M	Keep the DOMES use of letter M
GNSS	P ^a	GNSS
VLBI (including their use in networks such as VLBA ^b , EVN ^d , EAVN ^e)	R	Very Long Baseline Interferometry
^a P refers to GNSS like in SINEX (Software Independent Exchange) format : P for Positioning in GPS.		

5.2 Types of ground geodetic stations encompassed by this document

Table 1 — List of values for T

Technique/ type of point	Letter	Comment
Benchmarks (general)	A	Allows alternate adaptation of scheme to non-permanently instrumented stations (not belonging to a geodetic site)
Benchmarks (at a site)	B	Allows adaptation of scheme to non-permanently instrumented stations (belonging to a geodetic site)
Clocks (including atomic clocks and optical clocks)	C	
DORIS	D	DORIS
PRARE	E	Precise Range And Range-rate Equipment ^c
Absolute gravity point (permanent absolute gravimeter)	G	
Superconducting relative gravimeter	H	
InSAR	I	Interferometric Synthetic Aperture Radar
SLR	L	Satellite Laser Ranging
Marker	M	Keep the DOMES use of letter M
GNSS	P ^a	GNSS
VLBI (including their use in networks such as VLBA ^b , EVN ^d , EAVN ^e)	R	Very Long Baseline Interferometry

^a P refers to GNSS like in SINEX (Software Independent Exchange) format : P for Positioning in GPS.

Type A – no site, 5 characters for ID

Total # of IDs: $34 \times 34 \times 34 \times 34 \times 34 = 45_435_424$

DNK000001A

Country

Serial

Type

First (ab)use: The Danish 5D net, IGS style names

5D: The integrated geodetic net, combining gravity, levelling and GNSS observations

Uses IGS style station IDs: HJAL, KOKI, DOMK, ROFF, etc.

Let's use xDOMES type A names, fixing the first character as 5, for 5D

Template

DNK50000A

Country

5D

IGS style

Type

HJAL

DNK5HJALA

Country

5D

IGS style

Type

KOKI – **OH NO!** No O and I in the base 34 alphabet

D N K 5 K 0 K 1 A

Country

5D

IGS style

Type

Second (ab)use: Traditional Danish County-Parish-Serial IDs

Abuse the B xDOMES type (3 characters for site, 2 for serial ID)

More than 34 historical counties $\Rightarrow$ 2 characters for county, 1 left for parish

Encode each pair in base 34:

89-08-00007: 2M-08-00007 $\Rightarrow$ DNK2M807B

89-08-00802: 2M-08-000PL $\Rightarrow$ DNK2M8PLB

Conclusion

New toys to abuse:

- xDOMES provides us with an improved, extended, and internationally unique, name space for geodetic benchmark identification.
- Incidentally, it also provides ample opportunities for **(ab)**use, by considering renovation of national naming schemes.

Don't try this at home 😊 since...

- The xDOMES standard is neither ratified by ISO, nor approved by IERS (yet!)

Links

- Temporary translation table from DOMEs to xDOMEs is available here to give some examples: <https://committee.iso.org/sites/tc211/home/standards-in-action/domes.html>
- 19161-2 ISO page: <https://www.iso.org/standard/89134.html>
- DOMEs request: <https://itrf.ign.fr/fr/network/domes/request>