

Three Paths to Europe's Next Reference Frame

From invisible infrastructure to strategic choice





BONN, GERMANY — Leaders from national and international geodetic institutions convened at the UN-GGCE.

Why reference frames are a leadership topic

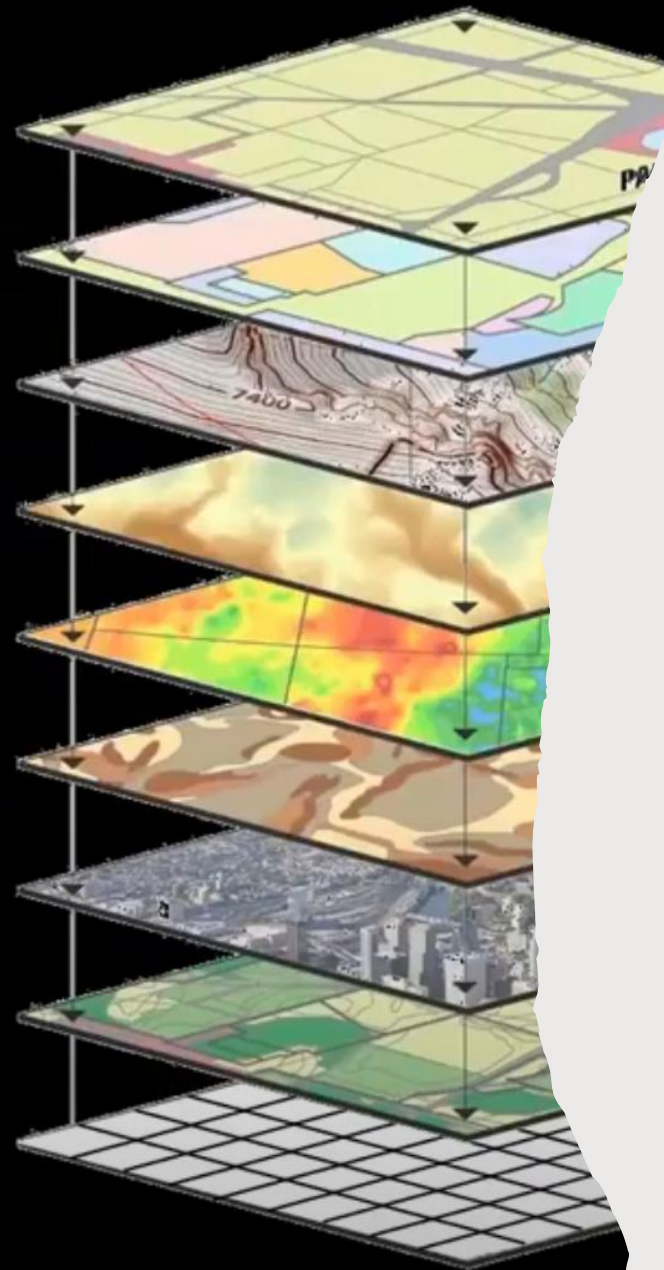
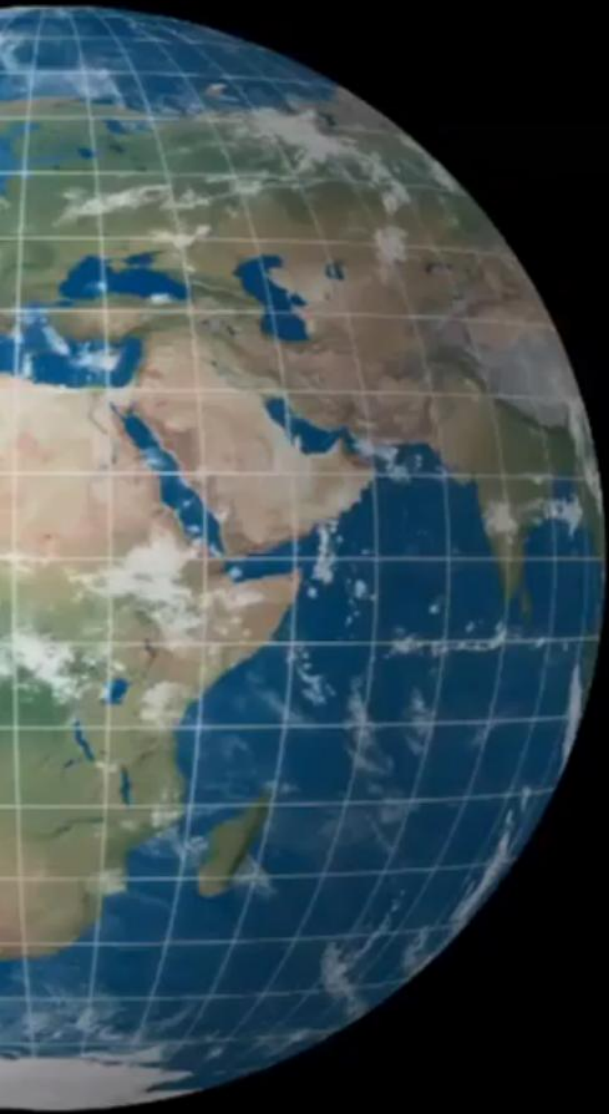
- The spatial language behind maps, apps, models and twins
- When they fail, users lose trust in **services**, not in the reference frame
- This is no longer just geodesy – it is digital infrastructure

Case: Rotterdam – Oslo
(Modi corridor)
**A leap towards SAE L4
automated driving in Europe**

One corridor – several “truths”

- Test drive with several high-accuracy GNSS services
- Same road, same time – slightly different positions
- Centimetres matter for lanes, safety and digital twin





COORDINATE REFERENCE

Fragmentation & governance gap

Fragmentation & a missing link

- EUREF and the UN-GGIM Europe GRF WG provides a strong technical backbone
- EU law (INSPIRE, etc.) embeds reference frames in regulation
- NMAs and EuroGeographics implement them in maps and data
- But users live across all of this and across borders
- We still lack a cross-disciplinary, leadership-level process that looks at the whole chain

Three possible paths for Europe

Path 1 – Business as usual

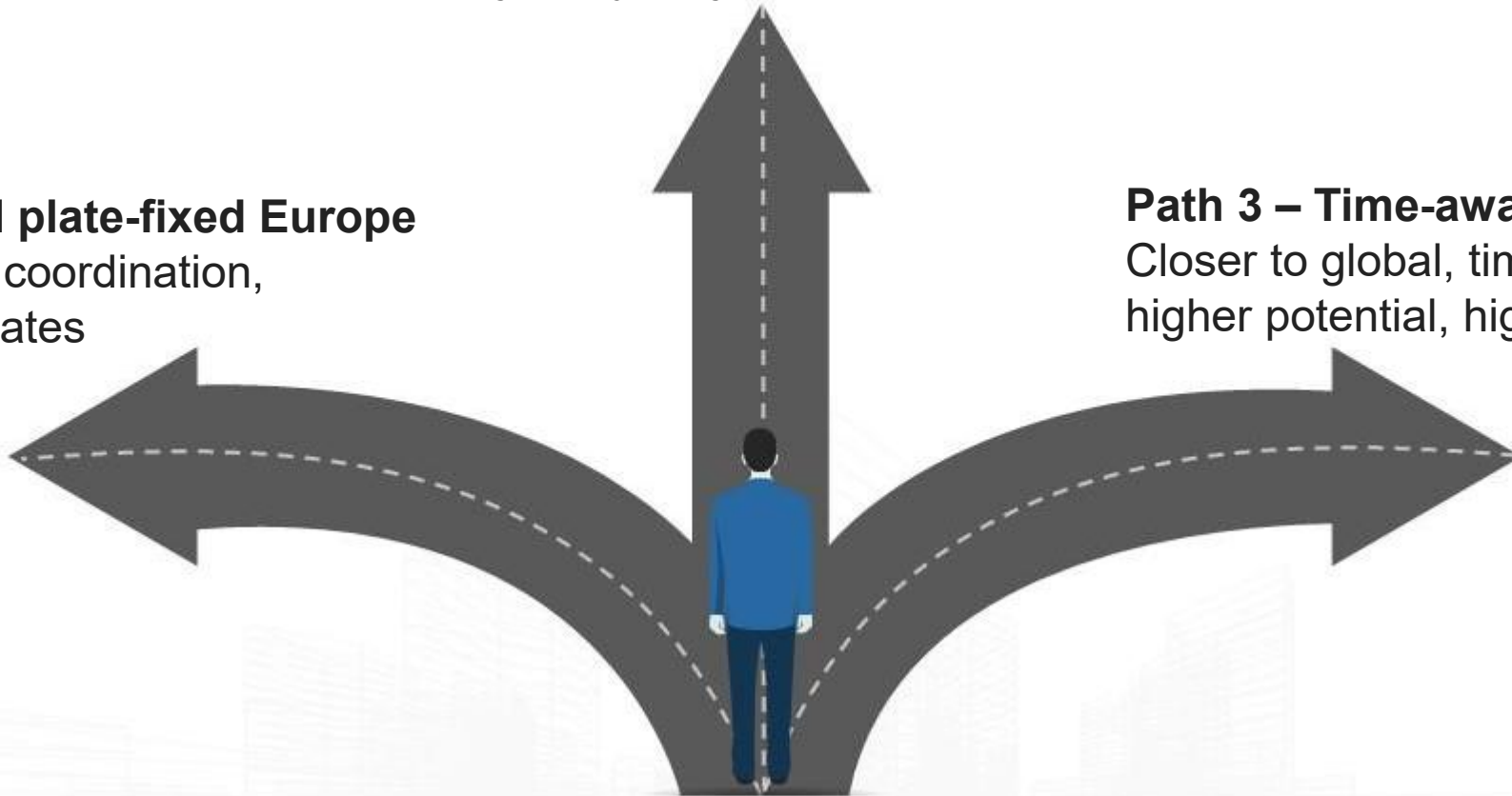
Static systems, national variants,
project-by-project fixes

Path 2 – Enhanced plate-fixed Europe

ETRS89 + stronger coordination,
documentation, updates

Path 3 – Time-aware Europe

Closer to global, time-dependent frames;
higher potential, higher demands



Objective:

A European reference frame strategy for the next 20–30 years

- Ensure trusted, interoperable positioning across borders and services
- Avoid hidden degradation in maps, data and digital twins due to mixed reference frames
- Provide a long-term, sustainable framework – also when GNSS is degraded or unavailable
- Support Europe's ambitions for transport, climate, security and digital twins
- Do this through a shared European process, building on existing structures



Next steps: A shared European discussion



- Europe faces strategic choices about future reference frames
- Choices affect transport, mapping, climate, resilience and digital twins
- No single community can handle this alone
- We need a **cross-disciplinary dialogue** involving
 - Geodesy
 - Mapping authorities
 - User sectors (transport, environment, emergency, etc.)
 - IT and platform providers
- Question for today:
What kind of forum do we need to explore these choices together?



Kartverket