

# **THE INTERNATIONAL TERRESTRIAL REFERENCE SYSTEM (ITRS) AS A GLOBAL STANDARD**

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# OBJECTIVES OF THE PRESENTATION

- ✘ To give some background information related to ITRS for the ICG-4 meeting
- ✘ To contribute to the overall understanding by the various ICG members (GNSS providers, GNSS user communities, technical experts..)
- ✘ To provide specific input for the Task force on Geodetic references which may help to propose proper recommendations

# DOMAIN

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- ✘ Terrestrial Reference System as Earth-fixed Earth-centered geometric reference frame
  - + Its motion in inertial space is relevant for astronomy, celestial mechanics, astrodynamics
  - + It provides a unified frame to study the various components of the Earth system (solid Earth, oceans, atmosphere..)
  - + It provides a frame to define coordinate systems for geo-referencing and navigation
- ✘ Object of interest for numerous communities:
  - + Astronomy
  - + Astrodynamics
  - + Geodesy
  - + Earth sciences
  - + Geomatics, cartography
  - + Navigation (aircraft, marine, land...)
  - + Space techniques (satellites, space probes...)
  - + ...

## CONTEXT

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- ✘ IUGG/IAG activities since 1984: 25 years!
- ✘ Task force (AR-07-03) in the Global Earth Observation (GEO) organization, gathering 77 countries and 56 international organizations
- ✘ Recognition of ITRS under consideration by the General Conference on Weights and Measurements (CGPM) (see presentation by Wodek Lewandowski)
- ✘ Plan to publish an ISO standard about ITRS (see below)

# INTERNATIONAL TERRESTRIAL REFERENCE SYSTEM (ITRS)

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- ✘ Defined by the international geodetic scientific community: International Association of Geodesy (IAG)
- ✘ Since 1984 a series of constantly improved fundamental realizations of ITRS were achieved by a best effort of the international community (IERS) (see presentation by Zuheir Altamimi)
- ✘ Adopted by the astronomical (IAU) and Earth Science scientific communities (IUGG)
- ✘ Formally defined and recommended by IUGG (Resolution Perugia 2007)

# ISO STANDARD ON ITRS

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- ✘ Objectives: to establish an ISO standard
  - + Containing basic recommended terminology
  - + Providing a definition of ITRS in agreement with IUGG
  - + Describing the ways ITRS is realized
    - ✘ Primary realization by IERS (ITRF)
    - ✘ Specific realizations by GNSS providers
    - ✘ Regional and national realizations by geodetic and mapping agencies
- ✘ Procedure : to establish an ISO Project Committee for that purpose
  - + France is ready to fund the secretariate of this PC

# PC MEMBERSHIP

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- ✘ Country representatives, through their national standardization agency, which can settle its own national mirror committee to collect input from all interested organizations from the country
- ✘ Representatives of ISO Technical Committees (e.g. TC 20 on aerospace or TC211 on geographical information)
- ✘ Representatives from international organizations (IUGG, IAU, IAG, IERS, IGS, BIPM, ICAO, IMO, ICA,CEOS...)

# RECOMMENDED TERMINOLOGY

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- ✘ Terrestrial Reference System (TRS)
  - + Earth-fixed geometric frame (origin, orientation, scale)
- ✘ Terrestrial Reference Frame (TRF)
  - + Realization of a TRS by a set of physical objects with related coordinates. Usually a network of points on the surface of the Earth
- ✘ ITRS
- ✘ ITRF
  - + Primary realization of ITRS by a specific TRF produced by IERS
- ✘ Alignment of TRF to TRFo
  - + No significant transformation parameter between TRF and TRFo



# CONCLUSION

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- ✘ Need for approval of proposals (ITRS, terminology) by all ICG actors
- ✘ Participation to the ISO PC
  - + Support the proposal during its submission to ISO through the national standardization agencies
  - + Active participation to the ISO PC (if established by ISO)
- ✘ Need for a specific ICG recommendation?