

A refined definition of the International Terrestrial Reference System.

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Background

- ITRS and IERS
 - Initially defined by IERS in 1988
 - IERS determines its primary realization: ITRF
 - IERS publishes standards/conventions which describe ITRS and ITRF
- IAU recent activities
 - IAU 2000 resolutions
 - IAU nomenclature
- IUGG resolution (Perugia 2007)
 - Formal recognition of ITRS
 - Consistent with IAU recommendations
- IAG SC 1-2 Global Reference Frames
 - Terminology
 - New definition in progress



Terrestrial Reference Systems (TRS)

- Defined as co-moving with the Earth in its diurnal motion in space
- Three points of view:
 - Astronomical : study of roto-translational motion of the Earth in space (Earth rotation, transformation celestial/terrestrial systems...)
 - Geophysical:reference for models of Earth system components (solid Earth, ocean, atmosphere..)
 - Metrological :reference for positioning objects in the vicinity of the Earth: mapping, navigation...

Necessity to refine the definition of ITRS

- Geophysical requirements:
 - Motion of the geocenter
 - Sea level investigations
 - POD for satellite altimetry
 - Vertical motion at tide gauges
 - Time evolution of its orientation (NNR, hot spots...)
- Astronomical requirements:
 - Rigorous definition within the currently accepted relativistic background model for the Solar system (IAU)
 - Transformation wrt BCRS
 - Consistency with time scales
- Metrological aspects
 - Tridimensional definition
 - Consistent with TT

Items for upgrade

- Dimension of ITRS*
- Scale of ITRS*
- Origin of ITRS*
- Orientation of ITRS
- Relativistic physical model

Dimension of ITRS

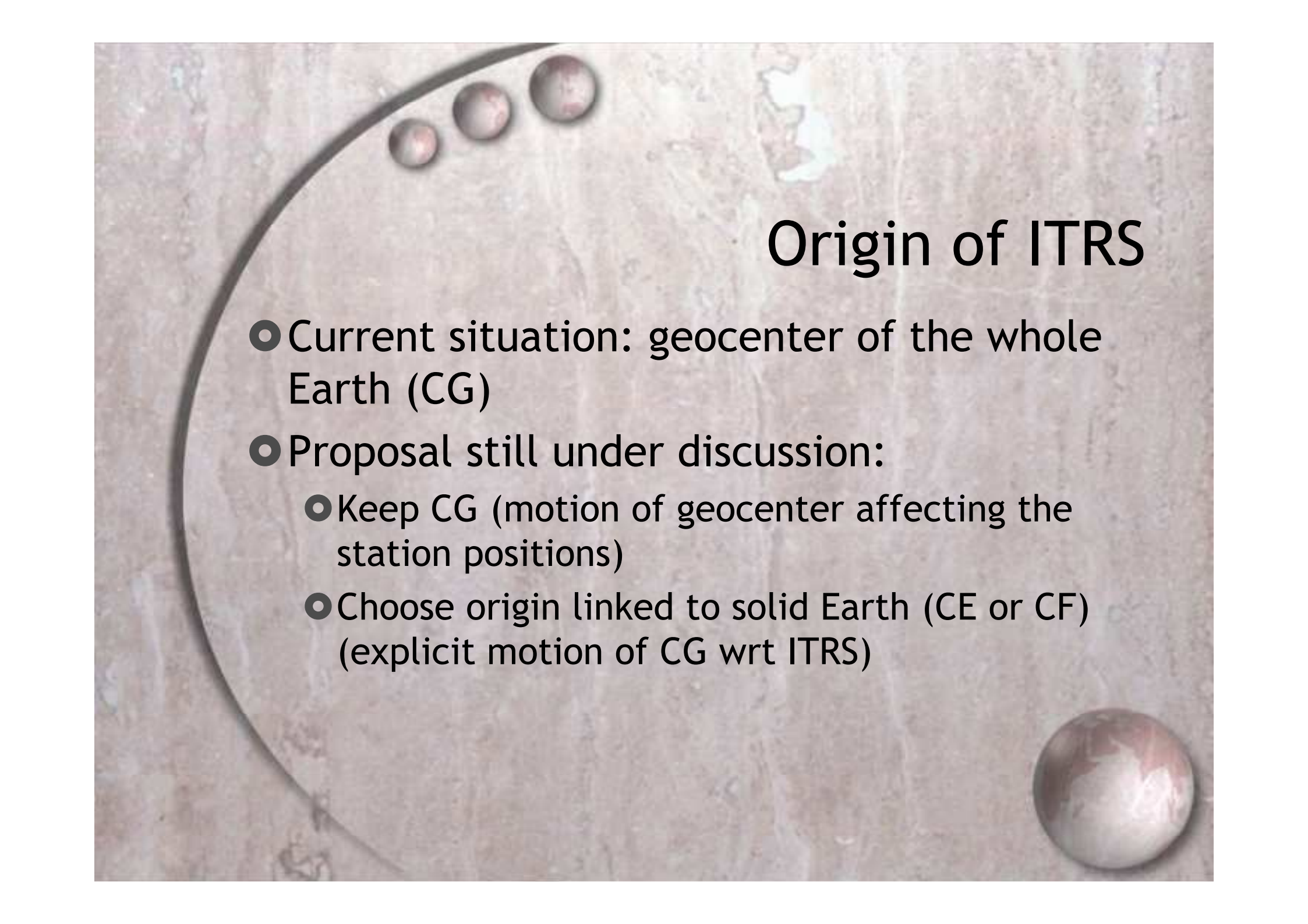
- Current situation: inconsistent
 - IUGG resolution: 4d (specific GTRS)
 - IAG WG:3d recommended
- Proposal : 3d

The background of the slide features a large, semi-transparent globe centered on the left side. A thick, black arc curves from the top left towards the bottom left. In the upper left quadrant, three small, semi-transparent globe icons are arranged in a slight curve. In the bottom right corner, a single, larger semi-transparent globe icon is positioned. The overall background has a light, textured, off-white appearance.

Scale of ITRS

- Current situation: consistent with TCG

- Proposal: consistent with TT



Origin of ITRS

- Current situation: geocenter of the whole Earth (CG)
- Proposal still under discussion:
 - Keep CG (motion of geocenter affecting the station positions)
 - Choose origin linked to solid Earth (CE or CF) (explicit motion of CG wrt ITRS)

Conclusions

- New definition with dimension, scale and origin
 - New IUGG resolution
 - Inclusion into IERS conventions (next ed)
- Further works, in particular on
 - Orientation
 - Relativistic modeling