

Approaches to Time-Dependent Transformations Between Reference Frames in Practice

Richard Stanaway (Australia)

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SUMMARY

Alignment between GNSS positioning reference frames and spatial data reference frames require careful and robust application of geodetic transformations which are necessarily time-dependent. Positions of ground-fixed features within GNSS frames are kinematic in nature due to global plate motions and other geodynamic effects such as seismic deformation and glacial isostatic adjustment. Conversely, dense, high resolution spatial data such as imagery and point clouds are not intrinsically kinematic at the time of acquisition. Misalignment of this data with global reference frames such as those used by GNSS is inevitable unless a rigorous time-dependent transformation accommodating the complexity of global deformation is applied. Spatial data defined by different epochs of a kinematic frame require time-dependent transformations within GIS in order to align the data correctly for the purpose of combination, visualisation and precision analysis. This presentation summarises progress in the development of time-dependent transformation strategies that can be implemented in practice between geodetic reference frames in complex deformation environments. The approaches described in the presentation can support geodetic applications including positioning, surveying and spatial data management.

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