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From EPSG 2462 to EPSG 6870: The evolution of coordinate systems in Albania and the importance of KRGJSH 2010 for National Geospace

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Abstract:

The evolution of coordinate reference systems in Albania reflects a profound technical, institutional, and strategic transformation, marking the transition from a locally derived legacy system (EPSG:2462 – Albanian 1987 / Gauss–Krüger zone 4) to a modern, harmonized geospatial framework aligned with European and global standards (EPSG:6870 – ETRS89 / Albania TM 2010). The former system, based on the Krasovsky 1940 ellipsoid, served national cartography, geodesy, and infrastructure development for several decades; however, it exhibited notable limitations related to GNSS compatibility, planimetric distortions, and restricted interoperability with international geospatial datasets.

The establishment of the Albanian Geodetic Reference Framework 2010 (KRGJSH2010) and the adoption of EPSG:6870—built upon the GRS80 ellipsoid and the ETRS89 datum—represent a fundamental modernization of the national geodetic infrastructure. This transformation enables higher positional accuracy, improved institutional interoperability, compliance with the European Spatial Data Infrastructure (ESDI), and seamless integration into continental geodetic networks.

This study presents a comparative analysis of the technical parameters of both systems, including Transverse Mercator projection characteristics, false origins, scale factors, and their effects on planimetric coordinates. It further examines the institutional guidelines issued by ASIG for the operationalization of the new system, the challenges associated with transforming historical datasets, and the practical implications for GIS applications, digital cartography, urban planning, land administration, environmental monitoring, and engineering design. The findings indicate that the adoption of EPSG:6870 substantially reduces positional discrepancies, strengthens spatial integrity, and standardizes geospatial workflows across Albania, thereby supporting the development of a robust and interoperable national geospatial infrastructure.

The study recommends enhancing professional capacities for geodetic transformations, ensuring controlled and well-documented migration of legacy datasets, investing in the National Spatial Data Infrastructure (NSDI), and promoting the adoption of international geospatial standards. Ultimately, the transition to EPSG:6870 constitutes a strategic advancement for Albania, significantly improving the quality, accuracy, and interoperability of geospatial information while aligning the country with contemporary European best practices in geodesy and cartography.