The Future of Ground Marks for Geomatics: Stability and Utility

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Key words: Capacity building; Cost management; Deformation measurement; Land management; Positioning; Reference systems; Spatial planning; Standards; benchmarks; benchmark stability; benchmark utility

SUMMARY

The near ubiquity of GNSS positioning often brings into question the need for ground marks. Can ground marks be replaced with 'marks in the sky,' as some have suggested? In this paper, the authors argue that ground marks remain a critical part of our geospatial infrastructure and that applications from geodetic to cadastral still need good quality ground marks.

Having high quality ground marks is a key point. Stability and survivability are the highest priority. Using a 25-year monitoring study in Australia as a foundation, the stability of different types of marks is examined, together with a basic cost-benefit analysis. Survivability for marks is greatly helped by type and placement, and the authors draw on many years of experience in placing and recovering marks, as well as not recovering them, as a basis for survivability guidelines.

To invest in ground marks means that a return is expected, which is based on the marks' utility. The utility of ground marks can be increased, in current times and the near future, by a number of steps that broaden the way that marks can be included in a wider range of survey work, especially airborne drones. These steps and applications are enumerated. Included in this discussion is the question of maintenance and its funding, as well as the need to educate the public about spatial information infrastructure.

The weakest component of GNSS positioning is vertical location, which is essential for applications involving the movement of water, especially when part of the flow is under gravity. Stable ground marks can provide critical control for these applications in ways that may be difficult for GNSS. Direct gravimetry, rather than leveling, when combined with GNSS observations, may be a more efficient way to provide high quality locations in the field, compared to traditional differential leveling.