LGC: CERN’s geodetic network adjustment software goes open-source

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SUMMARY

LGC (Logiciel General de Compensation) is a geodetic adjustment software package developed at CERN to compute position estimates and related statistics from surveying observations. Since the mid-1980s, it has been a key tool for precise geodetic computation in a wide range of applications - from simple levelling computations to advanced sensor-based position monitoring systems. LGC has evolved into a mature and reliable computation engine, continually maintained and improved by the CERN Geodetic Metrology Group.

In late 2025, the first open-source version of LGC was released. For the CERN Geodetic Metrology Group, this marks an important step towards a more sustainable and collaborative way of developing software. The goal is to move beyond internal use and share the tool with external users, from academia, industry and other research institutions. It also reflects the larger efforts of CERN, supported by the CERN Open Source Program Office (OSPO), to promote responsible open-source practices and ensure due diligence in software dissemination. The LGC project has directly benefited from the OSPO’s guidance throughout this transition process.

The move to open-source involved several organizational and technical challenges, including modernizing legacy code, preparing open documentation, defining licensing and governance structures, and migrating the codebase to public repositories. In parallel, the development team conducted outreach activities by supporting external institutes and sharing knowledge within the accelerator surveying community. Although the community around LGC is currently modest, the growing interest from external parties highlights the clear potential for future collaborations, joint developments, and the exploration of diverse use cases for the tool.

In this paper, we report on the open-source transition of LGC and share the practical lessons learned

during the process. In addition, we aim to encourage further exchange around sustainable, transparent, and open software practices within the geospatial community.