Department of Watershed Sciences
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Survey Instrument Recommendation for 2016

The progression of the CHaMP program is bringing about increased complexity and diversity in survey techniques and equipment. This document will provide a recommendation and information to support the recommendation for surveying instruments to meet the needs of the CHaMP program.

To utilize the full complement of CHaMP tools, manuals and training, the Topcon DS205, Magnet 2.5.1 is recommended. There are specific exports from this total station and software that are imported to the CHaMP GIS toolbar. The toolbar programming is designed to function with these specific data formats. These data formats allow the CHaMP toolbar to conduct error calculations of the data that is passed up the food chain to inform the geomorphic change detection software. The toolbar programming also conducts evaluations of survey methods employed in the field to provide feed back to the crew during GIS processing and this information can be analyzed at a later date by the CHaMP program development team.

The CHaMP toolbar will accept a points shapefile and breaklines in dxf or shapefile format from any source when said files are edited properly, but be aware that there are features in the toolbar that will not be utilized. At a minimum; the survey report will not be generated and the three dimensional (3D) point quality will not be calculated. The 3D point quality enhances the results of the geomorphic change detection.

Depending on the specific instrument and proprietary software associated with said instrument, it may be possible to calculate a point quality metric and make the necessary edits to shapefiles for input to the toolbar. As each instrument software provides point quality information described using an unspecific term for a common statistical calculation the provided information must be investigated and identified to properly develop a FIS. To utilize a point quality metric, a fuzzy inference system (FIS) should be developed, validated and incorporated into the geomorphic change detection at the cm.org level. This work flow will require advanced knowledge of GIS, the instrument manufacturers proprietary software, and knowledge of FIS and the ability to validate the FIS. This metric will not be equivalent to the 3D point quality calculated by the CHaMP toolbar.

End products derived from instruments other than those supported by Champ may be less robust and cost associated with processing data from other instruments will likely be larger.

At CHaMP camp we primarily train for the DS205. We also train using the Nikon Nivo 5c that remain in inventory, but this instrument will be phased out when future budgets provide the means. We currently cannot adjust the champ camp training for other TS models or rtkGPS.

CHaMP provides a full complement of tools, manuals and training designed to employ the Topcon DS205, Magnet 2.5.1.

UtahState University

Instrument Data Dichotomous Key

This dichotomas key is intended to provide an overview of the data work flow from the CHaMP suggested total station vs other total stations and rtkGPS.

Topcon DS 205

Magnet 2.5.1

Other
Total Station or rtkGPS

Manufacturers
Proprietary Software

Point Quality calculated.
Unvalidated Fuzzy
Inference System for GCD

Survey Report Unavailable

Point Quality NOT
calculated

Survey Report
Unavailable

Develop and validate
fuzzy inference system.

GIS editing

GIS editing

GIS editing

CHaMP Toolbar

CHaMP Toolbar

CHaMP Toolbar

cm.org

cm.org

cm.org

Valid GCD Results

Invalid GCD Results

Less Robust
Valid GCD Results