MANAGING PROTECTION MEASURES USING A MOBILE ASSESSMENT APP

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ABSTRACT: We present a new, digital approach for producing reports on the repair-status of natural hazard protection measures through multiple field-based team members, each using a mobile device with the FeldApp app. All collected data is made available through a WebGIS protection measure management system, where repair-status reports can be produced on demand. This web-based management system itself also provides a historical record of all defects and repairs.

KEYWORDS: Protection Measures, Assessment, Management, Data, App.

1. INTRODUCTION

Reporting workflows for tracking the repair-status of protection measures predominantly use paper-based implementations. Even where these workflows require predefined forms for gathering data, the use of paper in this process may lead to inconsistency between field-staff; mistakes in the translation of field-notes into a digital form; and wasted time in the report compilation process.

We present a new, digital approach for producing reports on the repair-status of protection structures using multiple field-based team members. This approach makes use of multiple mobile devices in the field using the FeldApp mobile app, combined with a custom WebGIS system for editing field entries and producing a report.

2. FIELD ASSESSMENT

2.1 Selection of protection measures

The FeldApp app is a mobile GIS which uses a combination of maps, images and lists to allow easy identification and selection of individual protection measures of any size and in any location (even on vertical rock-walls). Predominantly, the user locates and selects the protection measure of interest from a map interface (Figure 1) however, if the terrain is steep or the protection measures are closer together than the map-scale can show, the protection measures can be displayed in and selected from an image (photograph or plan) (Figure 2). Search fields, GPS localisation and lists of protection measures may be used to further simplify the selection of a specific structure.

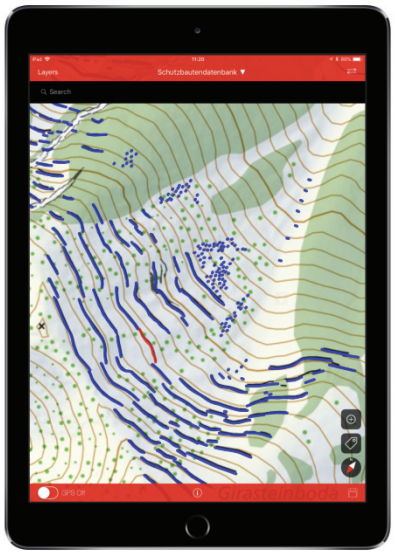

Figure 1: The primary method of object selection is provided via the map interface. One structure is shown here in red to indicate that a problem has been encountered.

Figure 2: In steep terrain, the objects may be localised on a photograph or plan. Here the objects are colour-coded according to (red) problem encountered, (green) no problem encountered and (blue) no assessment yet recorded.

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2.2 *Recording repair-status*

The repair-status of an object may be recorded using an assessment form. Forms are used in order to structure the data, significantly improving the consistency of assessments across multiple users and objects and hence improving the quality of the output.

The FeldApp system can easily be configured to replicate any local assessment form and has been tested using the successful KUfl system [AWN et al 2018]. Where possible, these forms are adapted to take advantage of digital data entry and tablet-based sensors, e.g. using dropdown menus (Figure 3) and sketching on top of photographs taken with the device (Figure 4). The use of these digital adaptations allows more standardised and enhanced data output compared to a paper-based system and, with practice, can require less time.

The repair-status of individual protection measures is shown in both mobile and web-based interfaces using a colour-coded system (Figures 1 and 2), allowing the team to easily identify where assessments still need to be carried out, as well as where problems have been identified and their severity. This colour-coding is also used to indicate where repair-status assessments need to be repeated after a specified return period has expired.

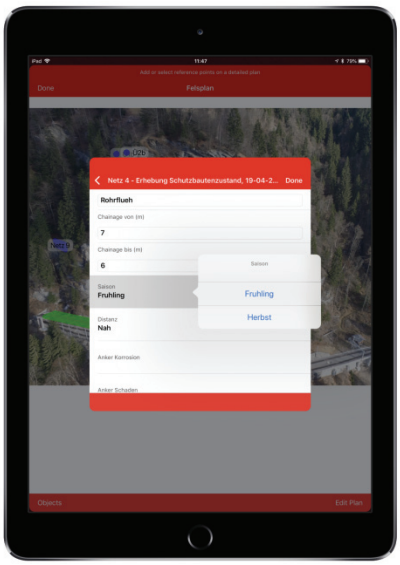

Figure 3: The field data collection process is simplified and standardised using dropdown menus where possible.

Figure 4: Data collection is enhanced using the integrated camera in the tablet and FeldApp's drawing capabilities.

The mobile devices may work offline and be used to gather information using multiple devices simultaneously before submitting the findings to the server. The data gathered can be accessed by the natural hazards management team via a web-based visualisation system (WebGIS).

3. WEBGIS REPORTING SYSTEM

The value of digital data collection is immediately clear when viewing the collected data from the WebGIS interface (Figure 5). All of the collected data is immediately available for the user to browse in an interface similar to that in the mobile application, providing an overview of the protection measures still to be assessed, as well as indicating where problems have been identified. This can be used directly as a reporting tool, or all of this data can be compiled on demand into pre-defined tables or text structures within a Microsoft Word/Excel report template or PDF document, should static documentation be required. This skips not only the digitalisation process, but also a large part of the reporting process.

The result is not only a detailed status report, but also an electronic system containing the full repair-status history of each protection measure, geographically referenced. This history can contain all the observations, repair schedules and repair assessments required for a fully traceable record. All this information can be re-synchronised to the mobile devices so that the whole data history is available when making repair-status assessments.

The mobile and web applications are part of a wider data collection capability under construction by GEOTEST, and are used intensively in multiple projects. Additional capabilities, developed for other usecases, are therefore available according to requirements, e.g. a geographically organised document browser, sensor-based measurement plots, plots of measurements manually entered via the mobile app, webcams or user defined map layers (Figure 6).

For more information see:
http://feldapp.geotest.ch

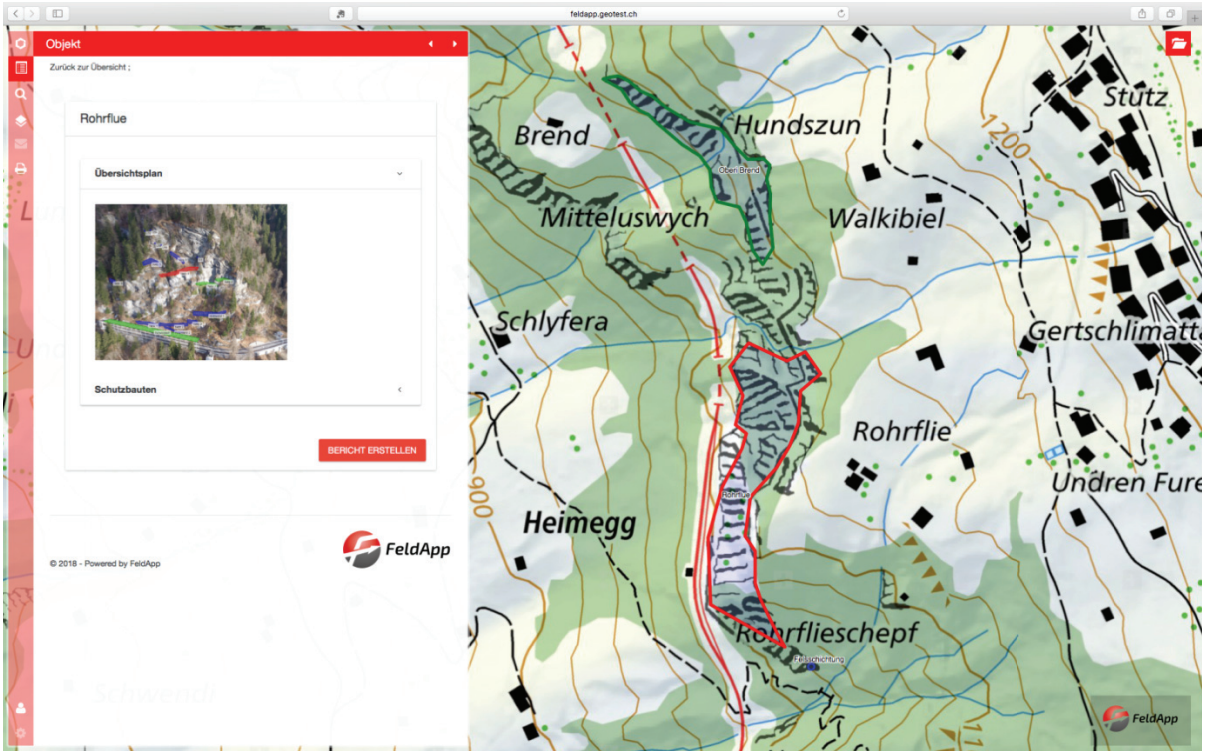

Figure 5: The WebGIS system provides all of the collected data in an interface similar to that in the mobile application.

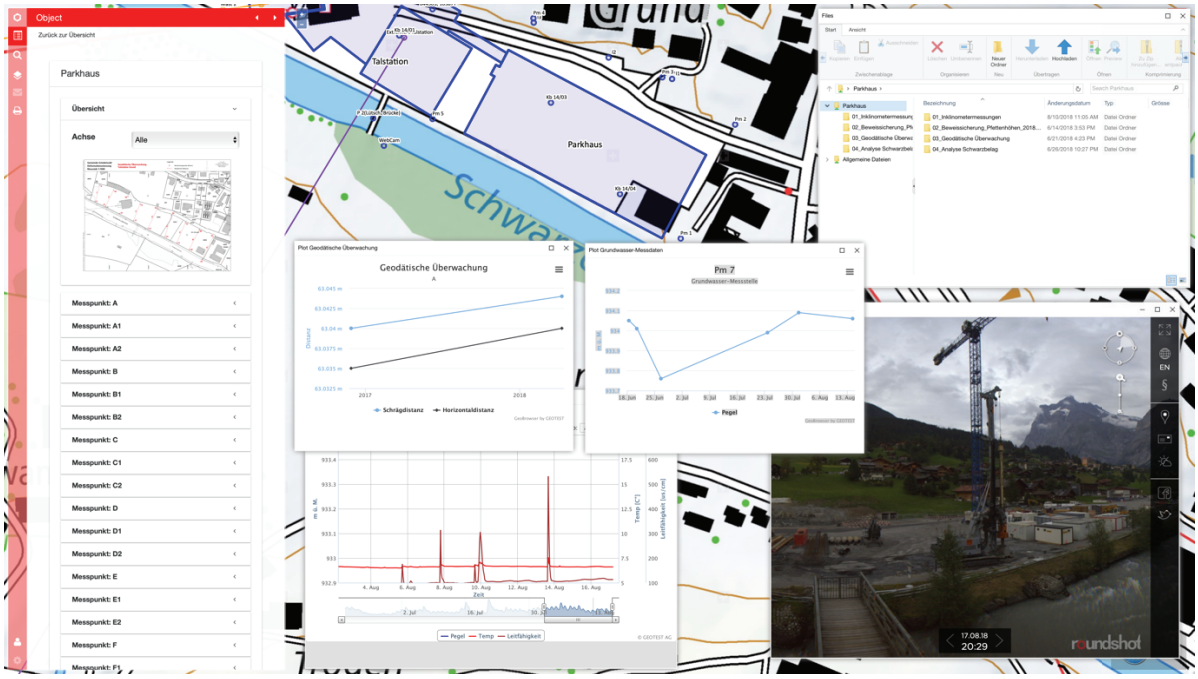

Figure 6: The mobile and web applications are part of a wider data collection capability; hence, many functions not covered by the remit of this usecase are also available.

REFERENCES

Amt für Wald und Naturgefahren, Graubünden; Amt für Wald, Kanton Bern; Dienststelle für Wald, Flüssbau und Landschaft, Kanton Wallis 2018: Handbuch Schutzbautenkontrolle, Version 4, February 2018, online publication: https://www.naturgefahren.sites.be.ch/naturgefahren_sites/de/index/schutzmassnahmen/schutzmassnahmen/schutzbauten/schutzbautenmanagement.assetref/dam/documents/VOL/Naturgefahren/de/Handbuch_Schutzbautenkontrolle_BE.pdf