

**Hochschule Karlsruhe
Technik und Wirtschaft**

UNIVERSITY OF APPLIED SCIENCES

GOCA-Alarm



Alarming-Software for the Geo-Monitoring-System GOCA



www.goca.info



Geo-monitoring

With the worldwide use of newer and more efficient construction methods, the demand for geodetic supervision rises. In the past, buildings were constructed with the highest possible effort regarding safety and stability. Today, however, for the planning of constructions, new methods are introduced which are edging technical feasibility. These new methods require an increase of measurement accuracy and also a decrease of the epoch timespans, aiming to a continuous online geodetic monitoring of the building or construction. Otherwise, the security for man and building cannot be guaranteed.

Global climate changes, population growth and the successive expansion of general land-use area lead to a conflict between land use and prevention of natural hazards, such as slopes or thawing permafrost zones. This conflict can also be transferred to generally critical areas, like regions with volcano activities or earthquakes.

Geodetic geo-monitoring starts with the storage of original measurements and ends with their reporting, - or in case of emergency, with the alarming of responsible persons. Completely automated, it also reduces permanent costs.

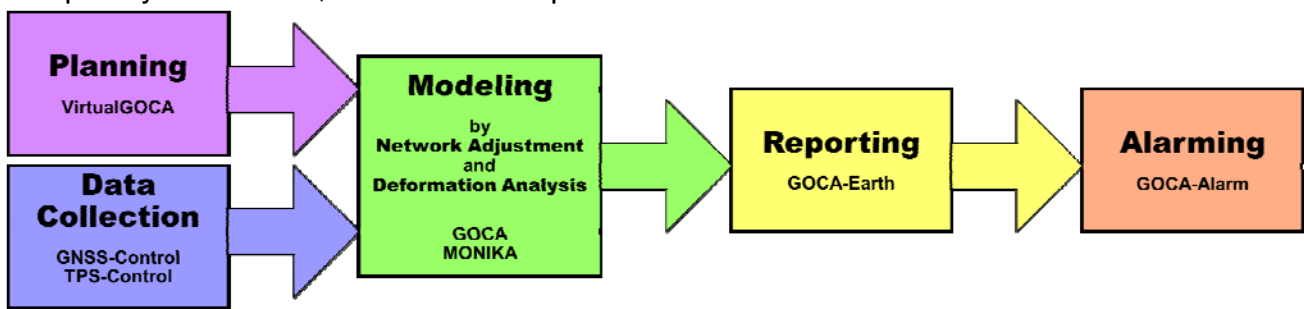


Figure 1: General scheme of an automatic geo-monitoring system

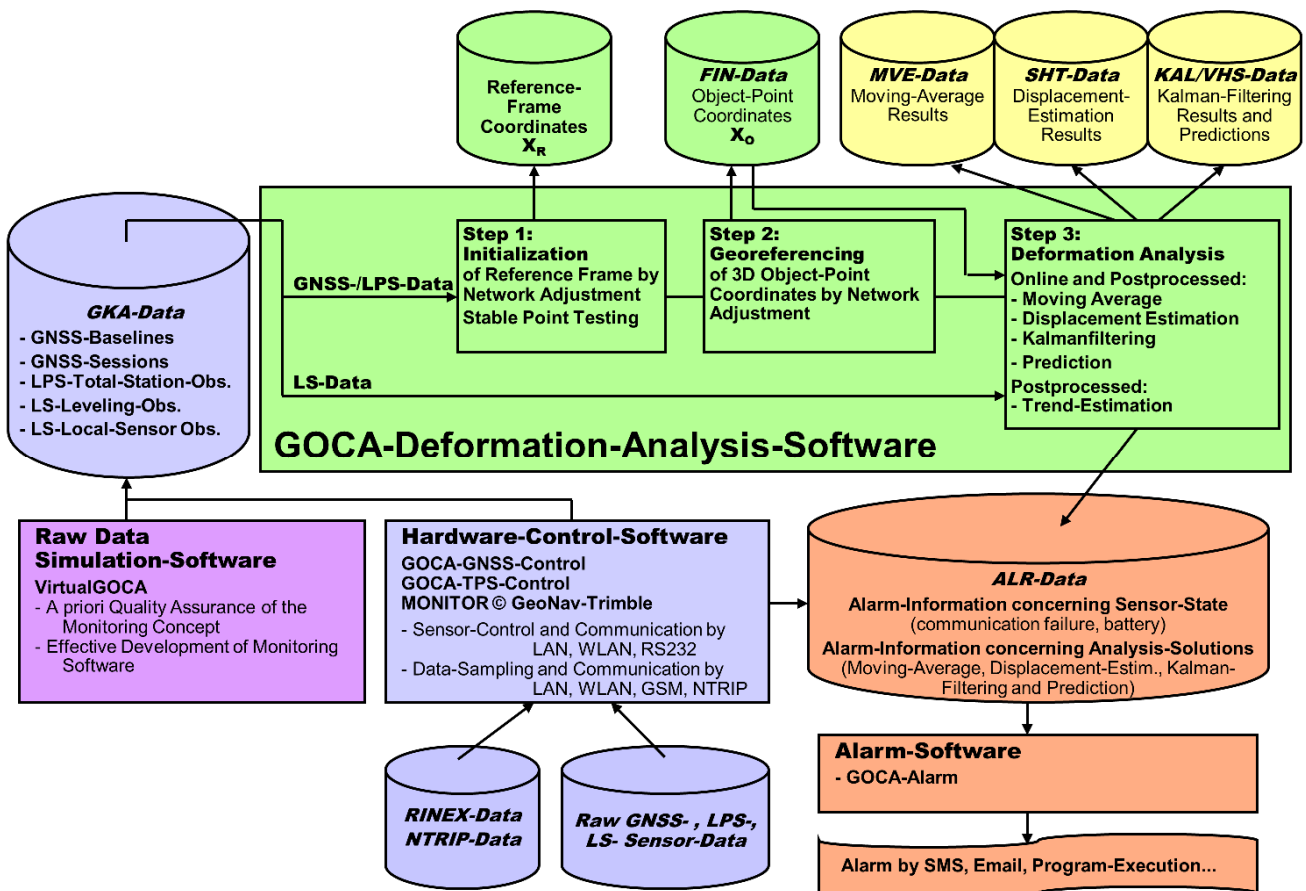


Figure 2: Scheme of a deformation analysis with GOCA

GOCA

The GOCA-system is a multi-sensory system with GNSS receivers, terrestrial total stations or local sensors that are installed inside the observed object itself or temporary attached to it. Its sensors can be freely configured and combined in a GOCA online monitoring project.

GOCA can serve as a rapid alert system for natural hazards (e. g. earthquakes or volcano activities, etc.) or it can supervise geo-technical constructions or buildings such as mines, dams or tunnels. All over the world, GOCA has been installed over 30 times.

The deformation analysis software GOCA performs measurement data processing and a deformation analysis in consecutive adjustments. After initializing the reference frame (step 1), the simultaneous adjustments follow. In step 2 the object points are geo-referenced and in step 3 Kalman filtering and displacement estimations are performed. If the values are critical, a warning is given. In- and output interfaces are opened for further developments (Fig. 2).

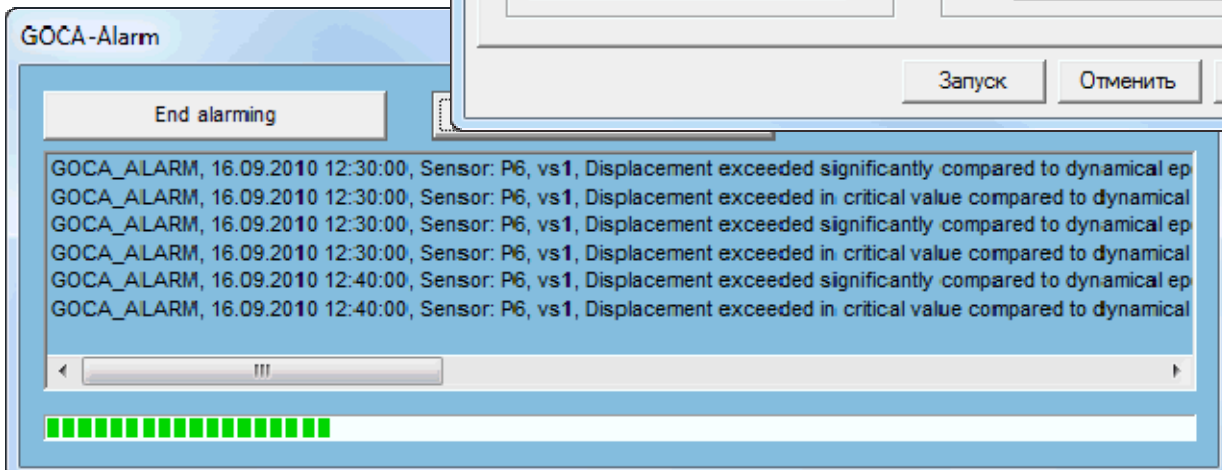
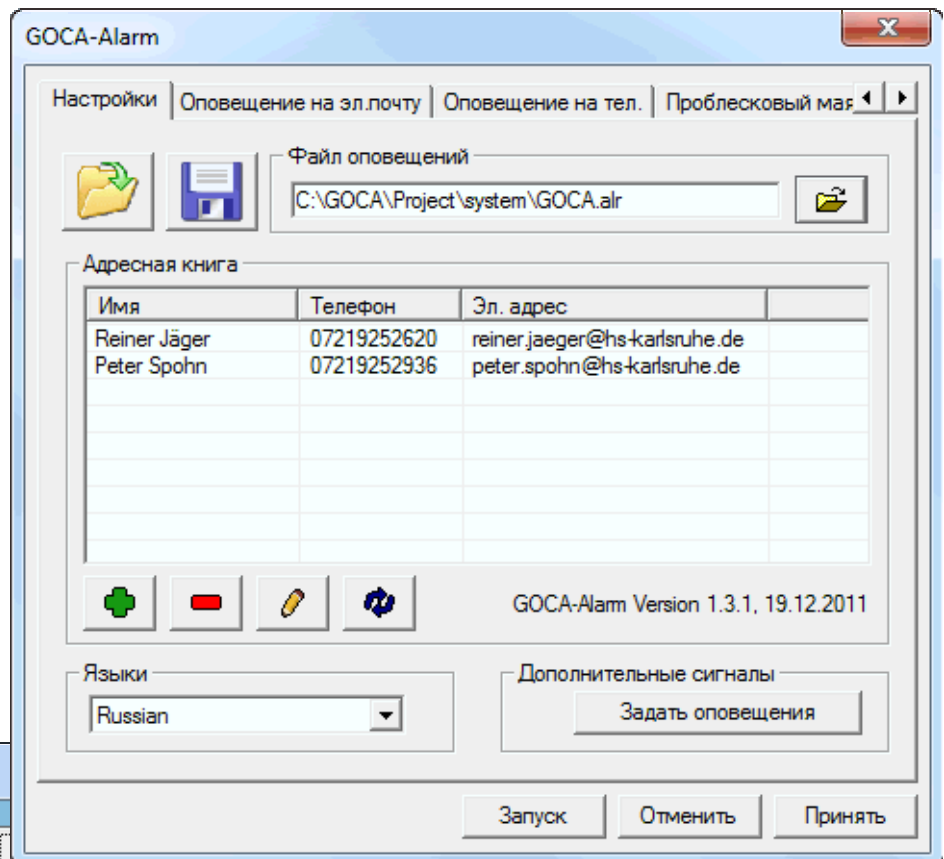
GOCA-Alarm

The GOCA-Alarm module is the fourth and final module of the geo-monitoring chain (see Fig.1) and completes the online GOCA system. GOCA-Alarm is an alarm-management-system. The software handles incoming alarm strings from GOCA or GOCA-TPS/GNSS-Control in an open interface file and translates them to real physical alerts. Besides signals and horns, specific persons can also be alert by SMS or email.

An Address-Book is included to GOCA-Alarm, which can save the contact data of multiple persons (see Fig. 3). Depending on the type of the alert (hardware-, software-, displacement-, kalman alert, etc.) different alerts can be activated or send to different persons.

Figure 3 right:
Example of a multilingual dialog

Figure 4 down:
GOCA-Alarm Online-Modus



For example, if there is a critical deformation, the construction supervisor can be informed. But if there are only problems with the power supply, only the local technician can be informed. That is to say, GOCA-Alarm gives you the possibility to switch the alerts to the person in charge. There are several possibilities for alerts:

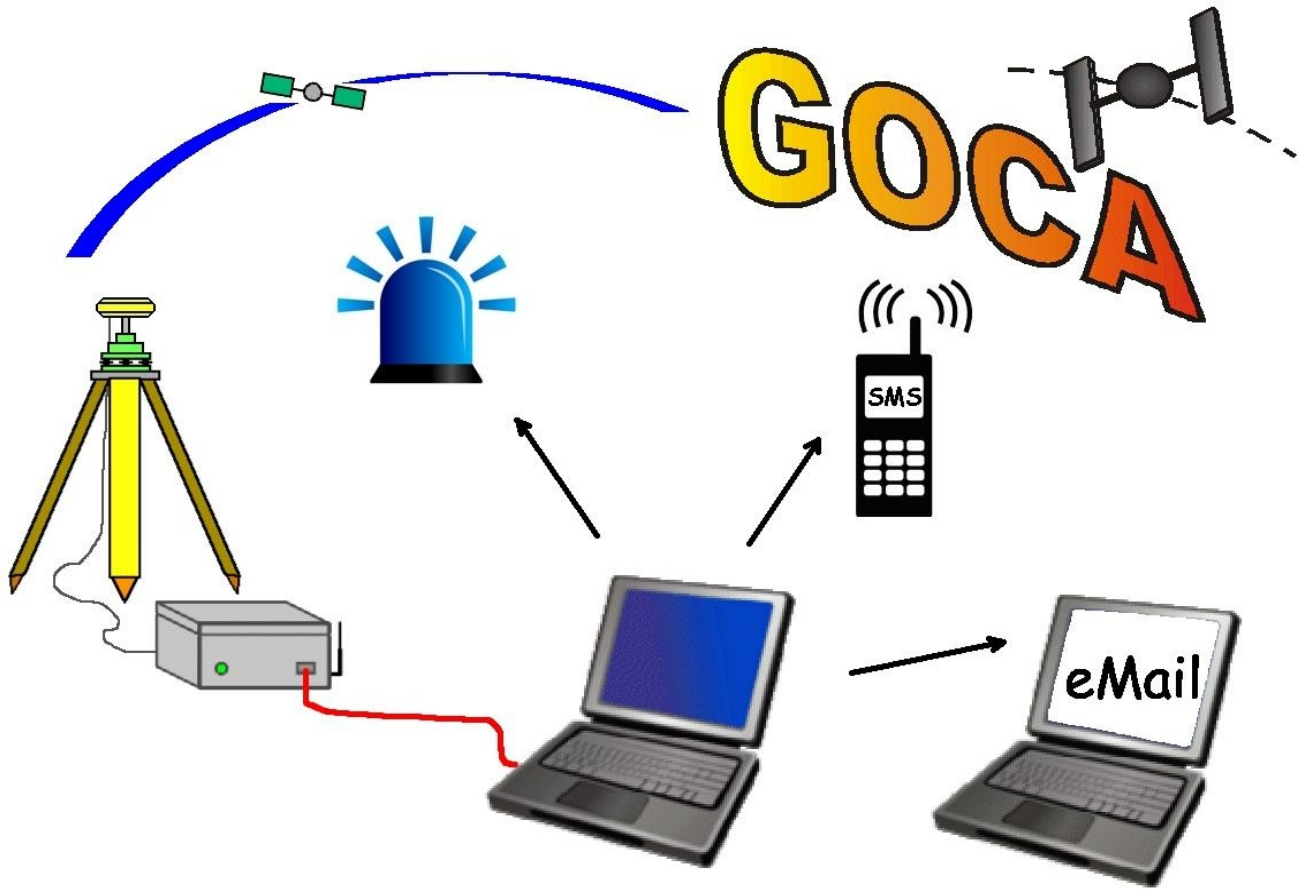


Figure 5: Alert-Chain and possibilities of alarming

The first possibility is to connect a relay or air gap switch at the COM port, which activate or deactivate an alert horn or an alert signal, to warn all people at the monitoring site immediately. The same also work for TCP/IP based devices. With an internet connection available, all alerts can also be send by SMS or email. Only an usual email or SMS account must be available during the set up.

GOCA-Alarm was developed to be used as an international software in different languages. Currently the German, English and Russian language is available.

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