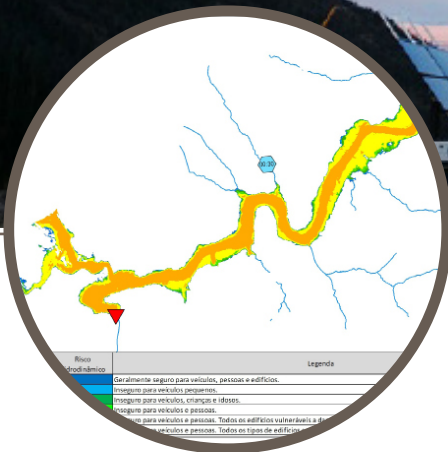


# Geotechnologies applied to emergency situations



Tetra Tech assists its customers to deal with safety and emergencies management, developing innovative solutions which employ geographic information and specialist systems to create platforms and environments to support decisions making processes.

## Geotechnologies

Over the past years, we have developed several applications for managing and viewing geoscience data. Through computer visualization tools, it is possible to evaluate investments, a variety of structures of the site and create possible scenarios, using technologies such as Virtual Reality and Augmented Virtual Reality.

- Development of customized solutions
- Analysis and management of spatial data
- Territorial mapping and planning
- Delivery of tools for data collection
- Management of environmental, geological, geotechnical and instrumentation data
- Dam safety management
- Specialized courses
- 3D modeling and simulation in immersive environments (Virtual Reality)

# Applied Geotechnology

## Prevention

- Risk identification and management
- Territorial management
- Alerts setting

## Occasion

- Emergency reaction
- Identification of nearby internal and external resource

## Control

- Continued reaction, Medium-term actions
- Damage assessment
- Scenarios simulation

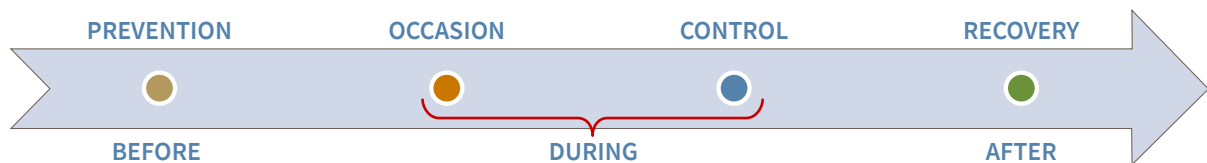
## Recovery

- Planning
- Simulations
- Comparative Analysis

**BEFORE - Prevention:** Geographic information is fundamental for the knowledge of the space in which we operate, allowing to identify potential risks, to develop management plans, monitor different phenomena, establish alert thresholds, allocate resources, simulate scenarios, carry out planning and future actions.

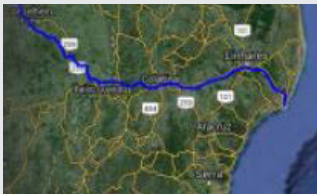
**DURING - Occasion and Control:** In emergency situations, the temporal aspect is a determining element, not only due to the consequences of the time of response, but also to understand that we all must be prepared before, during and after an event.

**AFTER - Recovery:** In this sense, having organized, accessible and geo-referenced information facilitates risks management, improves response time and assists specialists and managers in decision-making processes involving crisis situations, regardless of the nature of the emergency.



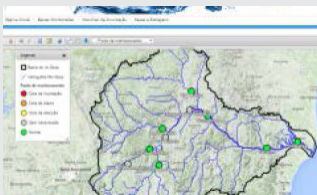
## Developed Projects

### Dam Failure - Mariana/MG



Tetra Tech developed a platform supported by GIS, Webmap, and Virtual Reality tools aiming to assist in the process of organizing, integrating and sharing information in the areas affected by the dam break. The platform supports field teams, recovery projects and studies, and it also helps involved professionals to understand the set of information and actions in a global perspective, improving the time of response and effectiveness of actions.

### Critical Event Alert System (CrEAS)



CrEAS is a hydrological alert system, developed for the Brazil Geological Survey (CPRM), under the Portuguese name of SACE (*Sistema de Alerta de Eventos Críticos*), in favor of prevention of emergency events, informing authorities and communities about the occurrence of floods and droughts in the monitored watercourses.

With the emergency confirmation, a series of alerts is triggered using email and text messages, according to a list of indicators and bulletins that can be accessed by the system (<http://www.cprm.gov.br/sace/>).

### Crisis Room - Vli



Designed to assist in the prevention, care and recovery of damage caused by accidents, the VLi Crisis Room is equipped with several technological resources, including an Emergency Support System and a Virtual Reality environment.

This system uses georeferenced information to enable VLi's specialists to trigger both internal and external resources and guide field teams in crisis situations.

The Virtual Reality environment provides a three-dimensional view of the entire railway network, providing professionals with a better understanding of the accident, without having to be physically on site.