

Sarez Lake monitoring and Early Warning System (EWS)



Within the framework of the **Lake Sarez Risk Mitigation Project (LSRMP)**, CAE and its local partner are responsible for an update of the current monitoring and Early Warning System (EWS), established between 2003 and 2006, as it is approaching the end of its design life. The project, financed by the Asian Development Bank (ADB), will help the **Committee of Emergency Situation and Civil Defense of the Republic of Tajikistan** in managing the risk associated with Usoi dam and Sarez Lake in Pamir region. The **new monitoring and EWS** is expected to protect communities downstream of the dam, where **5 million people** living in 4 different countries (Tajikistan, Afghanistan, Turkmenistan and Uzbekistan) may be affected by the potential outburst of Sarez Lake.

Summary

Location: Sarez Lake, Tajikistan

Conclusion: 2021

Focus: Meteorological and hydrogeological risk

Challenges:

- Implement the new monitoring and Early Warning System (EWS) for Sarez Lake

CAE solutions:

- 3 Strong Motion Accelerometer
- Automatic monitoring stations
- Early Warning Communication System with 30 sirens
- 1 Drone for remote site monitoring
- Ancillary measuring Equipment
- 2 Data centers
- Services: project design, installation and commissioning, testing & training, etc.

FEATURES

The contract scope includes the **supply, installation, and commissioning of the monitoring and EWS** that will enable real time and reliable monitoring of Sarez Lake's right and left banks, as well as upstream and downstream rivers for data gathering, EWS activation and communications with control centres.

The approach to the early warning and monitoring system was based on **triggering effects** and the concatenation of possible triggering events for the Usoi Dam and the Sarez Lake, respectively. The triggering events to be monitored in the contract:

- Right bank and left bank slides;
- Earthquakes;
- Sarez Lake level;
- Community EWS;
- EWS System, Communications and Data Centre (SCADA);
- Communication centres at Sarez Lake and at Dushanbe.

Sarez lake sites, located at the altitude between **2.600 and 3.000 m a.s.l.**, are **only accessible with helicopter or by a 24-km walk**. It represented a challenging task for CAE in managing the logistics, installation and operation. Due to the lack of the electricity network and mobile communication network in most of the sites, the monitoring stations and EWS communication are powered completely by **solar panels and rechargeable batteries**, with data transmission via **Eumetsat satellite transmitter**.



COMPOSITION

The new Sarez Lake monitoring and EWS include GPS units, strong motion accelerometers, submersible pressure sensors, drone, radios, satellite phones, automatic weather station, hydrological stations, hydrometric stations, and others.

In particular:

- n.3 Strong Motion Accelerometers (SMA);
- n.4 GPS receivers;
- Automatic stations: n.1 weather station, n.1 hydrometric station and n.2 hydrological stations;
- EWS Communication System composed of n.30 manually-triggered sirens;
- n.2 data centers equipped with hardware and CAE software suite;
- n.1 Drone for remote monitoring;
- n.1 ADCP, n. 1 salt dilution technique equipment and 2 Surveyors Levels : for Discharge measurements and direct water level readings;

In addition to the supply of the specialized equipment, CAE provided a **full range of services** such as **project design**, system integration, equipment **installation and commissioning**, transport, testing as well as classroom and on-site **technical training**, etc.

The completion of the project, which is considered of **strategic importance** for the country of Tajikistan, once again confirmed CAE's preparedness at the forefront in the mitigation of natural risks.

