

# Protecting lives and livelihoods

High-speed research network CAREN is helping Central Asian and EU geoscientists work together to mitigate the effects of earthquakes

Central Asia is under constant threat from its vulnerability to earthquakes. The region sits on the junction of two tectonic plates that have been colliding for millions of years, building mountains and causing earthquakes. CAREN – the Central Asia Research and Education Network – underpins international scientific efforts in the region to protect lives and to safeguard economic growth from the consequences.

### *Protecting against devastation*

Earthquakes can cause great damage. And so can the events they trigger: landslides, mudflows and floods. And they destroy infrastructure – roads, railways, communications – often making rescue difficult in this mountainous region.

The cities of Central Asia have a particularly dreadful history of damage and death caused by earthquakes and the secondary events they trigger. A few examples\* show the gravity of the problem: in 1948 there were 176,000 reported deaths in the Ashgabat earthquake. In 1887, 1889 and again in 1911, the city of Almaty was almost flattened. As recently as 2008 a magnitude 6.6 quake hit the south-east of Kyrgyzstan, killing 74 people and almost completely destroying an entire village.

Earthquakes and the destructive forces they unleash cannot be prevented. But international scientific research can help reduce their impact. For example, monitoring gives seismologists and civil authorities a clearer understanding of the specific vulnerabilities in an area, allowing them to devise effective risk management strategies. These same systems also help build a picture of the post-disaster damage to property and infrastructure, so that rescuers can get to the right places with the right equipment.

The business end of this capacity consists of sensors and geographical information systems located in seismically active areas. Valuable though this capacity is, its usefulness is multiplied by the links provided by CAREN and its European counterpart GÉANT to geoscientists in Central Asia and Europe.

Source: Central Asia and Caucasus Disaster Risk Management Initiative - [www.unisdr.org/files/11641\\_CentralAsiaCaucasusDRManagementInit.pdf](http://www.unisdr.org/files/11641_CentralAsiaCaucasusDRManagementInit.pdf)



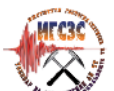
**The challenge:** help Central Asian countries mitigate the effects of earthquakes and the devastating events they trigger.

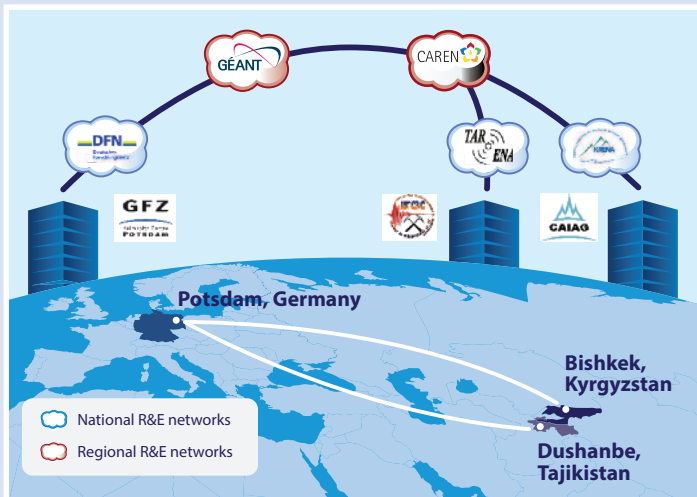
**The solution:** data from an array of real-time and sensor-based systems can be shared among geophysical research institutes across the world using the high-speed CAREN research network – linked to the Europe-wide GÉANT network.

**Key benefits:** the right people have access to the right information and are in a position to make informed and timely decisions about how to handle the effects of seismic events. At the same time, better information is helping build the local capacity to prepare for and respond to these natural disasters.

### *Shared information leads to expert solutions*

Fundamental to the success of this effort to mitigate the effects of earthquakes is the ability to transmit large volumes of data speedily and accurately across national boundaries – so that other scientists can share the work and the insights. CAREN and GÉANT together ensure that the best people working in the field are actively involved.





The route of data between Central Asian geoscience institutes and GFZ via dedicated national and regional research and education internet networks.

### Collaboration improves outcomes

The German Research Centre for Geosciences – GFZ – is one of the leading centres in the field. GFZ collaborates with colleague establishments in Central Asia, such as the Central Asian Institute of Applied Geosciences (CAIAG) in Kyrgyzstan and the Tajikistan Institute of Geology, Earthquake Engineering and Seismology (IGEES) in Dushanbe.

“Science is unlikely ever to prevent earthquakes. But that doesn’t mean we are helpless. Nowadays computer screens can make the damage visible and we can work out the best rescue routes. And the science is helping us understand the causes and assisting us to prepare for the inevitable. To turn all this data into useful information, we need collaboration between geoscientists across Central Asia and Europe that means we need the speed and security CAREN offers.”

*Associate Professor, Dr Ansor Niezov  
Head of Laboratory for Geodynamics and Regional Geology,  
Institute of Geology, Earthquake Engineering and Seismology of  
the Academy of Sciences, Republic of Tajikistan (IGEES AS RT)*

Here are just some of GFZ’s key projects, all reliant on the data collection and transfer across national boundaries that CAREN supports:

#### CAREMON

providing monitoring in critical locations across Central Asia. CAREN can support this first attempt at a cross-border data network – enabling scientists to access real-time seismic data, improving hazard assessment and providing effective risk management.

#### ACROSS

implementing a Central Asia network to detect and report strong earthquakes in real time. It enables rapid assessment of areas with the greatest losses – including unpassable roads – and traces optimum access routes to ensure speedy response.

#### SENSUM

providing tools that build up a detailed picture of the physical make-up of an area – everything from buildings to roads. It quantifies risk from seismic events in ‘data-poor’ areas – in turn feeding into disaster management and mitigation. SENSUM tools combine satellite images with local ground-based sensor data.

### CAREN – looking to the future

CAREN can do a lot more than support the exchange of vital realtime information:

- build the capacity of Central Asian scientists and civil protection authorities
- support to e-learning and virtual workshops, and ensure that awareness building begins with school-age children
- provide region-wide access to an authoritative centralised database of practical solutions and earthquake related material.

### CAREN: a modern Silk Road

For many centuries, the Silk Road was the long-distance route through which Asia and Europe traded and communicated. Today, CAREN is upgrading this ancient trade route to a high-speed internet highway, connecting researchers and educationalists throughout the region. Launched in 2009, CAREN – now in its third phase – currently interconnects R&E communities in Kyrgyzstan and Tajikistan, with plans to re-connect Kazakhstan and Turkmenistan. Uzbekistan is a candidate for future inclusion. Links to other continental networks, such as GÉANT, give CAREN worldwide reach, allowing seamless co-operation between scientists, academics and students in Central Asia, Europe and the rest of the world.

Until August 2019, CAREN3 is co-funded with €10M by the European Union through the European Commission’s Directorate-General for Development and Cooperation, with extra funding being provided by participating countries.

#### For more information:

CAREN: <https://caren.geant.org>

GÉANT: [www.geant.org](http://www.geant.org)

KRENA/AKNET: <http://krena.kg>

TARENA: [www.tarena.tj](http://www.tarena.tj)

CAIAG: [www.caiag.kg](http://www.caiag.kg)

GFZ: [www.gfz-potsdam.de](http://www.gfz-potsdam.de)

SENSUM: [www.sensum-project.eu](http://www.sensum-project.eu)

EU: <http://ec.europa.eu/europeaid/>



EU-funded project