CONRAD OBSERVATORY
CTBTO TEST FACILITY OPENING — FACT SHEET

Sound is carried in the air by waves most of which are audible. Infrasound consists of low frequency waves below the ability of the human ear to hear. Such waves can have natural causes, such as exploding volcanoes, earthquakes, meteors, storms and auroras. Their sources can also be man-made, such as nuclear tests, mining, large chemical explosions, and from aircraft and rocket launches.

The disturbances created are known as Infrasonic waves and cause changes in the atmospheric pressure, measurable by micro barometers. Because they can carry over long distances without losing strength, infrasound monitoring of infrasonic waves is an important means of detecting nuclear explosions.

Krakatoa

The first recording of naturally occurring infrasound was in the aftermath of the eruption of the Krakatoa volcano in Indonesia in 1883. Infrasonic waves from this eruption travelled around the world and were detected thousands of miles away.

Infrasound technology was used to monitor nuclear explosions in the late 1940s. Its use declined after the introduction of the Partial Test Ban Treaty (PTBT) in 1963. The PTBT banned atmospheric, outer space, and underwater nuclear explosions but did not prohibit underground testing and had no verification mechanism. At the time the Comprehensive Nuclear-Test- Ban Treaty (CTBT) was signed in 1996 and infrasound technology was selected as one of the methods for monitoring compliance, only a few infrasound facilities were in use worldwide.

Renewed Interest

Infrasound monitoring has resulted in "growing interest in the technology among scientists," said Patrick Grenard, Chief of the International Monitoring System (IMS) Engineering and Development Section at the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). The IMS, which is being established by the CTBTO around the globe in order to detect and locate nuclear explosions, employs infrasound together with three other verification technologies – seismic, radionuclide and hydroacoustic monitoring.

At present, 42 infrasound stations around the world send data in near real time to the International Data Centre (IDC) in Vienna.

Cooperation between the CTBTO and the Austrian Institute for Meteorology and Geodynamics (ZAMG), which owns the Conrad Observatory, is part of the CTBTO's development of its ties with scientists and advancement of science to help it further refine its verification techniques and increase the precision with which nuclear explosions can be detected and assessed.

Austrian Support

For the last 10 years, the Government of Austria has made the Conrad Observatory available to the CTBTO to conduct seismic measuring experiments and training activities. The Observatory, about 50 km southwest of Vienna, is an ideal location for testing the CTBTO's verification technologies. The Observatory is a research and development centre for seismology and the gravitational and geomagnetic fields.
The CTBTO has invested more than 400,000 Euros in the Observatory to support infrasound measuring experiments over the past two years.

Infrasound detection works best where local wind noise is minimized by trees or shrubs. Yet not all sites are sufficiently sheltered. A task for the new facility will be to test wind noise reduction systems.

Seismology, the study of waves generated by earthquakes, or other natural and man-made events and the most used technology in the CTBTO's monitoring system to detect nuclear explosions, is also integrated into the new test facility.

Testing infrasound and seismic detection capabilities together – known as wave technologies – will assist CTBTO engineers in their task of developing innovative means to optimize the performance of stations in the global monitoring system. The facility will also be used for training purposes.

There are more than 250 certified IMS facilities operating worldwide that provide data to the CTBTO's International Data Centre (IDC) in Vienna.When the network of 337 facilities is complete it will include 60 infrasound stations and 170 seismic stations.