Second to none

by Katherine Lehmuller and Marco Mozzon

K2, the second tallest mountain on Earth after Mount Everest, is in many aspects, second to none. It is without a doubt the most dangerous and difficult mountain to climb of the fourteen peaks reaching over 8,000 metres (26,250 feet). Consistently steep with exposed sides dropping sharply off in all directions, the K2 closely resembles a dangerously jagged pyramid and is prone to frequent and severe storms of merciless duration. The Italian Duke of Abruzzi was the first mountaineer to unsuccessfully attempt climbing K2's southeast ridge route, and from this time forward, the route was known as the Abruzzi Spur. How very appropriate then that the first to successfully reach the top of K2 in 1954 was an Italian team led by Ardito Desio and succeeded by climbing the Abruzzi Spur. This devoted explorer, geologist and climber inspired many generations of Italian mountaineers and founded the non-profit Italian association EvK2CNR, known widely today for promoting scientific and technological research in mountain areas.

"K2, 60 Years Later", named in honour of the first successful ascent of the K2 and for the strong mountaineer history between Italians and Pakistanis, set out to measure the K2 sixty years after Desio's team reached the top. Supported by the Pakistani Gilgit-Baltistan regional government and EvK2CNR, the Pakasti-Italian team decided that working in such an extreme environment meant that only a device designed and proven to exceed the most rugged industrial standards could be chosen. The team decided on using Leica Geosystems instruments.

Leica Geosystems offered the expedition the use of their latest GPS receiver, the Leica Viva GS14, made for the most demanding environments. This was an opportunity for Leica Geosystems to further prove the endurance of the Leica Viva GS14 in extreme temperatures and weather conditions and also to test the device's compact and lightweight portability. Three Italians from the EvK2CNR association, the world renown climber, Marcello Alborghetti, Maurizio Gallo, responsible for the project's technical matters and Giorgio Poretti, responsible for the expedition's scientific support and coordination, were first presented with the Leica Geosystems antennae and GX1230+ receiver in Italy before bringing it to Pakistan. Giorgio Poretti, professor at the University of Trieste, organised the part of the expedition dealing with GNSS measurements, directed the progress of the Leica Viva GS14, together with Pakistani researchers Aamir Asghar from University of Azad Jammu and Kashmir and Hameed Fahad from the University of Poonch (Rawalkot).

Carrying the receiver up the mountain and performing measurements at each of the five different K2 campsites and on the K2 summit, was accomplished by Pakistan's Rehmat Ullah Baigh and Italy's Michele Cucchi, who would set up the receiver at each stop, allowing it to remain for approximately 20 minutes to collect the latitude, longitude and altitude of each point from the available satellites.

One Leica GX1230+ reference receivers were permanently positioned by Maurizio Gallo at the Gilkey Puchot Memorial, a kind of shrine dedicated to climbers who died on K2, located close to the K2 Base Camp, and a second GX1230+ in Skardu, a final desti-

nation city for climbers to stop at before heading up the mountains. Here computer informatics expert, Fida Hassain from Central Karakorum National Park, helped install and process the transmitted data along with colleagues Asghar and Poretti. This coordinated network of two permanent GNSS stations allowed data from the summit to be processed with excellent precision and is still in operation today.

After returning the instruments to Italy and Leica Geosystems, the data was downloaded from the receivers and analysed. The results showed that after using GNSS technology, the height of the K2 was reduced from its previous altitude of 8,610.34 metre (28,248.03 feet) to 8,609.02 metre (28,244.75 feet), making the K2 1.5 metres (3,3 feet) shorter than previously believed.

Yet the biggest surprise was at K2's Camp Four on the Abruzzi Spur, where expeditions on this route begin their final ascent to the summit. Previous measurements stated that the route began at 7,900 metre (25,920 feet). Now data collected by the Leica GS14 proves that the route starts at 7,747.029 metre (25,416.667 feet), making the climb 150 metre (492 feet) longer than previously recorded. This is a huge and challenging difference for climbers of the K2, who at this point are struggling for weeks with the weakening effects of altitude sickness and the stress of staying focused.

The team has plans to climb Mount Everest in the near future, where a Leica Geosystems reference station is located, very close to the EVK2CNR's Pyramid International Laboratory at the Nepali side of Mount Evert and hope for another successful and challenging collaboration between EvK2CNR and Leica Geosystems.

About the authors:
Katherine Lehmuller received her Bachelor of Fine Arts from Tufts University, NY, and works as a copywriter for Leica Geosystems AG, Heerbrugg, Switzerland.
katherine.lehmuller@leica-geosystems.com
Marco Mozzon received his Bachelor of Geology with Geophysics Specialisation from University of Milano Earth Science department "Ardito Desio", and works as SmartNet EMEA service manager for Leica Geosystems Italy.
marco.mozzon@leica-geosystems.com

K2, 60 Years Later

The Italians have a long climbing history together with Pakistan, especially between the Italian EvK2CNR association and the regional Pakistani government of Gilgit-Baltistan. Dating back sixty years, the two have enjoyed worked together many times, most importantly on three historic expeditions: for the first successful ascent of the K2 led by Ardito Desio in 1954; fifty years later in 2004, to measure the K2 (a expedition's efforts to bring the GNSS receiver to the top failed when a climber fell) and finally, sixty years later, in 2014 with the expedition "K2, 60 Years Later", collected the most accurate measurements ever made of the K2 by using GNSS technology.