U.S. Army Corps of Engineers Supports an Arctic Mission

By Dr. JoAnne Castagna

Up north near the Arctic Circle is Greenland, a province of Denmark. Greenland is the world's largest island, slightly three times larger than Texas. It sits 900 miles south of the North Pole, between northeastern Canada and Europe. More than 80 percent of the sparsely populated island is covered with flat, sloping ice caps and small glaciers. In the northwestern corner of Greenland, in a coastal valley nestled between two mountains and surrounded by miles of icebergs and glaciers, is Thule Air Base, the northernmost U.S. military installation. *Thule* (pronounced "Two Lee") is Latin for "northernmost part of the inhabitable world." The air base is home to hundreds of personnel, including active duty Air Force members, U.S. contractors, and Danish and Greenlandic personnel.

In this remote area of the world, you will also find personnel from the U.S. Army Corps of Engineers® (USACE). They volunteer to stay at the base, for months at a time, to supervise new construction and renovation projects that keep the installation fully operational and mission-ready. Some USACE projects have included an aircraft runway and taxiway, new living quarters, a firefighting training facility and, most recently, a new medical center.

Earlier this winter, Thule Air Base unveiled its new state-of-the-art structure—a single-story, 1,900-square-meter medical center. The medical center was built by a Denmark-based firm under a design/build contract and supervised and quality assured by the USACE New York District. The previous medical center, which was built 50 years ago, was becoming too expensive to operate and was located far from the current housing facilities of the main base population. Besides saving the U.S. Air Force money on costly utility services, the base personnel—as well as residents of local West Greenland communities—benefit from the services of the new facility. Some of the new services the medical center provides are outpatient and inpatient care, surgical services, and mortuary facilities. An additional service is digital X-rays that supply a quicker product to doctors and have lower radiation dosages and no adverse effects on the environment.

Thule Air Base, Greenland, the northernmost U.S. military installation.

Overseas projects, like the new medical center at Thule Air Base, can prove to be very challenging, but also rewarding. For USACE personnel, working on overseas projects allows them to experience different cultures, visit various parts of the world and, most importantly, broaden their construction skills and experiences. The construction of the new medical center was a project that did just that.

The severe weather at Thule Air Base can create a lot of logistical challenges and result in construction that is very

Photo courtesy Resident Office, USACE

The new medical center at Thule Air Base

unique and fast-paced. There is a limited exterior construction season because Thule is above the Arctic Circle. There are 24 hours of sunlight from June to August and 24 hours of darkness from November to February. During the summer season, high temperatures are in the mid-50s. It was during these warmer months that the USACE team was able to receive its construction materials because the island is locked in by ice the other 9 months of the year. But in the summer, Greenland's frozen shipping lanes can be broken up to allow supply ships in. During the winter, the weather is too severe to work outdoors, so construction of the medical center took place during the summer and fall months between May 2003 and October 2004.

Due to the harsh arctic environment, the medical center had to be constructed differently than a typical building. Two-thirds of the northern portion of Greenland, where Thule Air Base is located, is covered by 6 to12 feet of permafrost—permanently frozen ground at variable depths below the earth's surface. Most structures in Thule, including the medical center, are elevated because of the presence of permafrost. Buildings must be constructed off the ground or have air corridors separating the buildings from the ground, because the heat from inside the buildings can melt the permafrost, causing the buildings to sink. Materials used to build the new elevated facility included preinsulated metal panels for the underside of the flooring, walls, and roof; composite gypsum; and a metal decking system for the interior floors.

Construction on the medical center was performed in collaboration with teams from various agencies, to include engineers from both the USACE New York and Europe Districts. The on-site manager for the new medical center, who was from the USACE New York District, was familiar with the working conditions at Thule Air Base, because he has worked on various construction projects at the base, both as a military officer and civilian employee, for the last 20 years. Because of the strong working relationship between all the agencies, they were able to resolve issues that arose due to the many challenges Thule's limited logistics, severe weather, unique construction activities, and short construction season brought to the project. The collaboration between the agencies produced a great finished product that both Thule Air Base and the engineers involved are proud of. Completing a project under severe climatic conditions in such a remote area of the world is a dream come true.

Photo courtesy Resident Office, USACE

Preparing and insulating the medical center's foundation

For additional information about Thule Air Base, visit its Web site at <*www.thule.af.mil*>; for information on the USACE military construction program, contact the author at <*joanne.castagna @usace.army.mil*>.

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