



Erick Mena and Randy Hale standing with scanner in front of Scott's Discovery Hut

SCANNING SCOTT'S DISCOVERY HUT

Discovery Hut was built in 1902 and is located at Hut Point near McMurdo Sound on Ross Island, Antarctica. The hut was designated a Historic Site of Monument (HSM 18) following a meeting at the Antarctic Treaty Consultative Meeting by New Zealand and the United Kingdom. Erick Mena and Randy Hale

of Merrick & Co. got the opportunity to visit Discovery Hut and also collect high definition LiDAR of both the outside and inside of the Hut.

The Discovery Hut was designed by Professor Gregory who was appointed as leader of the scientific staff to construct the hut. He designed it before the hut was sent to Antarctica. The hut

was prefabricated by James Moore of Sydney. It was sent to Antarctica by ship and assembled there. The hut was built on site by Robert Falcon Scott during the Discovery Expedition of 1901–1904. The hut was to be used as quarters and storage for Scott and his crew during their expedition. The Discovery Crew took all the gear, including the stove

BY JAMIE YOUNG



Crew arrives in Airforce plane in Antarctica.
Provided by Erick Mena –Merrick & Co.

prior to departing from the Discovery expedition but did leave a large amount of stores behind and some of these stores are apparent in the scans.

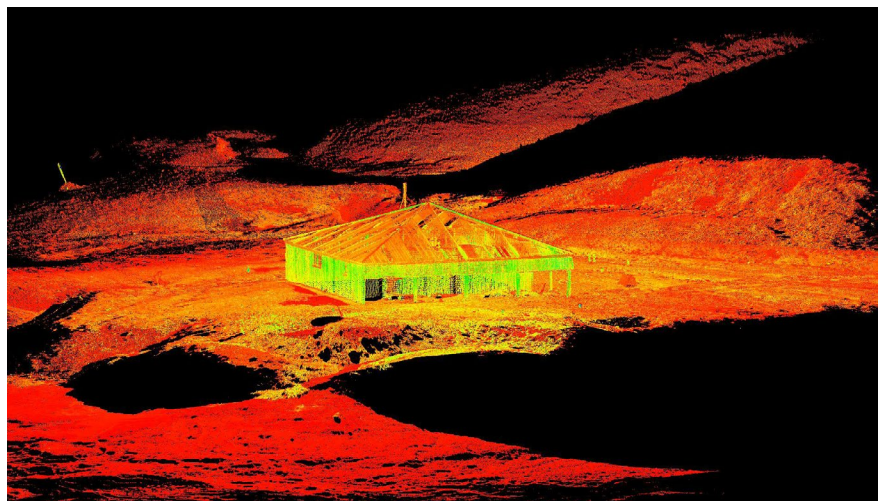
The hut walls were constructed of wood with a thin layer of felt between two layers of wood and it became quickly apparent that the hut would not be warm enough for the discovery crew to stay there so the crew took up quarters on their ship for the balance of the 1901–1904 expedition. The hut was used as a storage facility. The location of the door to the hut was positioned to the south, such that it would be covered up with snow whenever there was a blizzard and when the British Antarctic Expedition of 1907–1909 arrived they found the door of the hut blown off and the entrance covered in snow so they entered the hut from one of the lee windows and used that as their entry and exit point. The hut was used by Shackleton's crew in the spring (September and October 1908) as a storage location for equipment, food and oil that they would take to try and reach the South Pole. Shackleton's crew made a living area built with provisions left at the hut but decided to sleep

in tents because they thought it was warmer in the tents. The hut continually was used as a location to store supplies and the supplies were transported to Shackleton's Cape Royds Hut.

After making it within 100 miles of the South Pole the crew barely made it back. On the night of March 3, 1909 after being gone for 128 days they arrived, Shackleton desperate for help, attempted to burn the nearby Magnetic

Hut in hopes that the ship would see him and his crew, but he could not get it to light. He finally was able to light a flare and the ship came to them in a blizzard. Before leaving the hut they covered the window up with wood in the storm and darkness.

During the British Antarctic Expedition of 1910 to 1913, members of the Terra Nova Expedition coming from Cape Evans in 1911, they found the



Calibrated exterior scan of Scott's Discovery Hut performed by Erick Mena and Randy Hale of Merrick & Co.
Provided by Erick Mena

Discovery Hut full of snow and ice. They removed all the snow and ice and found supplies left over from 1903. The hut was cleaned out and used until 1912 as a staging point for the expedition when heading south to the South Pole.

During the ill-fated Imperial Trans-Antarctic expedition of 1914 to 1917, the hut was again cleared of ice and snow and used to store supplies. This expedition was headed by Aeneas Mackintosh and his confidence was lost during this expedition as a result of several bad events and loss of life. The expedition's entire dog team was lost during the return to Hut Point between January–March 1915 and the men were all frost bitten and exhausted. The ice conditions in McMurdo Sound did not provide a return so the team was stranded until June 1st, 1915. The party relied on fresh seal meat and blubber fuel to survive.

Several of the team were again stranded at hut point beginning in September 1915. In March 1916, three members of the crew collapsed and were unable to walk. Three other men still on their feet but two weak to carry the other men. One man volunteered to stay with the stranded men, while two others went back. One of the men died and was buried in the ice. The two other men reached Hayward and returned for the other men. By March 16th, the crew reached the hut, the five surviving members slowly recovered their strength with a diet of seal meat. The ice was too thin again to risk a final trip to Cape Evans. On May 8th, two members risked the journey to Cape Evans and were never seen again. The rest of the party made the trip to Cape Evans on July 15th. The use of seal blubber to heat the hut resulted in considerable staining of the interior walls and contents of the hut.



Rendering of scanned data as intensity of preserved seal.

Provided by Erick Mena of Merrick & Co.

The Discovery Hut largely remained untouched after 1917, until 1956 when United States expeditioners dug it out of snow and ice. It was in remarkable shape and included many artifacts from the previous expeditions. Some of the artifacts were taken as souvenirs at this time and later, but it remained as it was in 1917. The Hut experiences considerable bacterial decay even in the freezing temperatures and the seal meat preserved at Discovery Hut is described as quite rancid. There is also concern that

the fabric of the hut is being affected by fungal decay.

The Discovery Hut was scanned with a Zoller+Frohlich Imager 5010 3D Laser Scanner. This is an eye safe (laser class 1) scanner with a range of 187 meters (613.5 feet). It is resistant against dust and water and can operate at temperatures between -10 to +45 degrees Celsius (14 to 113 Degree Fahrenheit) but that maybe conservative. The scan for the Discovery Hut was done in temperatures close or below the lower end of the operating



Calibrated scan rendering of some artifacts inside Scott's Discovery Hut.

Provided by Erick Mena of Merrick & Co.



Scan rendering of another part of the inside of the Hut, Note the targets at the end of the hall on the stool and one in the window.

Provided by Erick Mena of Merrick & Co.

temperature. The 5010 laser scanner collects more than 1 million pixels/second (1.016 million) at maximum measurement rate and has a Field-of-view of 320 degrees x 360 degrees.

The beam divergence is < 0.3 mrad (full angle) with a minimum distance of 0.3 meter. Range Noise is Black is 14%, grey 37% and white 80%. The vertical field-of-view is 320 degrees and the horizontal field-of-view is 360 degrees. The vertical resolution is 0.0004 degree and the horizontal resolution of 0.0002 degree. The vertical and horizontal accuracy is 0.007 degree RMS and the

rotation speed of the sensor is 3000 rpm maximum. Obviously, this being a laser it operates in all conditions including bright sun light to pitch darkness.

The targets used for the scanning are Leica black and white targets and can be seen in some of the images used in this article. The targets are used to tie together the scans and calibrate the data. The target locations also provided locations for georeferencing the data to real world coordinates. There was a total of 8 targets being used and the targets where moved around for each scan and it was required to have at least 4 targets

in each scan. Also, it was required to have at least 2 targets as the same from scan to scan so the scans can be tied together. The targets are surveyed in using a total station. The total station used for this job was a Leica 1800 total station. The number of scan stations required to scan the outside of the Discovery Hut was 4 and the number of scan stations of the inside of the hut was also 4. This would then indicate that there would be a minimum of 16 targets in each set of scans with 8 in each being duplicate to tie the scans together. After getting all the equipment to the hut by ATV and dragging the rest of the way, it took roughly 4 hours to scan both the inside and outside of the hut. The total project started at about 6:00pm in the evening after receiving permission to scan the hut and was completed just after 10:00 pm.

Scott's Discovery Hut is a very important part of the history for early exploration of Antarctica. The pre-fabrication of hut and installation of the hut showed how unfamiliar the early explorers of Antarctica were with the environment of this part of the world. It proved to be very ineffective for its intended use but it served as an important part of Antarctica history. This was a distinct opportunity to be able to visit it and be able to provide useful information about the hut by providing a detailed scan of its structure. ¹



Scan rendering of the exterior of Scott's Discovery Hut.

Provided by Erick Mena of Merrick & Co.

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