Astronomy Work Experience

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Introduction

This poster has been produced as a product of work experience at NTU. It represents some of the many projects worked on during the past two to three years, including our experience gathered during field work with AIRO CAM as well as other subjects such as the movement of our sun and 3D imaging. All the results below have been produced by work experience students.

AIRO CAM

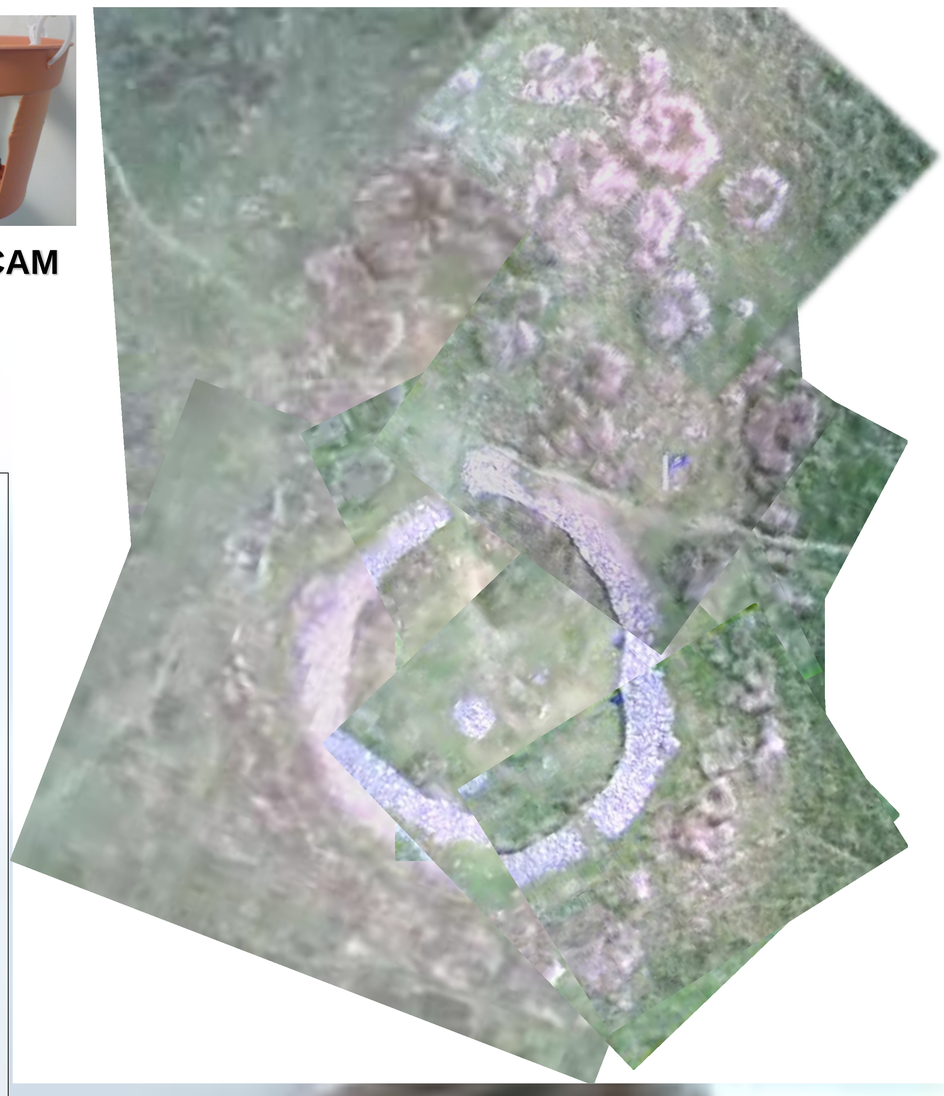


Fig.1- This image shows a picture taken by the AIRO CAM whilst flying over Barbrook II at a height of 40m. Barbrook II is an ancient stone circle just north of Baslow.

AIRO CAM

AIRO CAM is a device that enabled us to take good quality pictures, compared to that of Google images, of a site by allowing a camera to fly over archaeological sites and take aerial photographs, as shown in Fig.1. You can calculate the volume of a balloon by measuring the amount of water displaced if a balloon is placed in a bath of water. The volume of water displaced is equal to the volume of the balloon. To measure how much weight it would take to balance a helium balloon you attach blue tack to the string attached to the balloon until you have the right amount of weight so that the balloon can balance To deploy the balloon in a safe and efficient way we needed to give the line enough slack so that when the balloons took off with the wind it could move freely without the line becoming tense which would result in a decrease in height and could lead to the balloon being damaged. Improvements to the AIRO CAM unit are based around stopping helium escaping. To stop this happening we made sure that when reeling the unit back in, we made sure that the unit was kept away from anything sharp.

3D Imaging

In this project we surveyed the standing stone at Gardom's edge, which was discovered by work experience students to be a seasonal sun dial, in order to create a 3D image of the standing monument. To take a 3D image you need to have more than two reference points of the object that you are trying to image and you then need to set up these points on the horizontal plane. To do this you need to set up the water level as shown in Fig. 3. You now need to measure some points on the object and to get a 3D computer model, you need to take points from all sides. Then convert them into Google Sketchup, where you arrange them in a triangular manner leaving you with your final product.

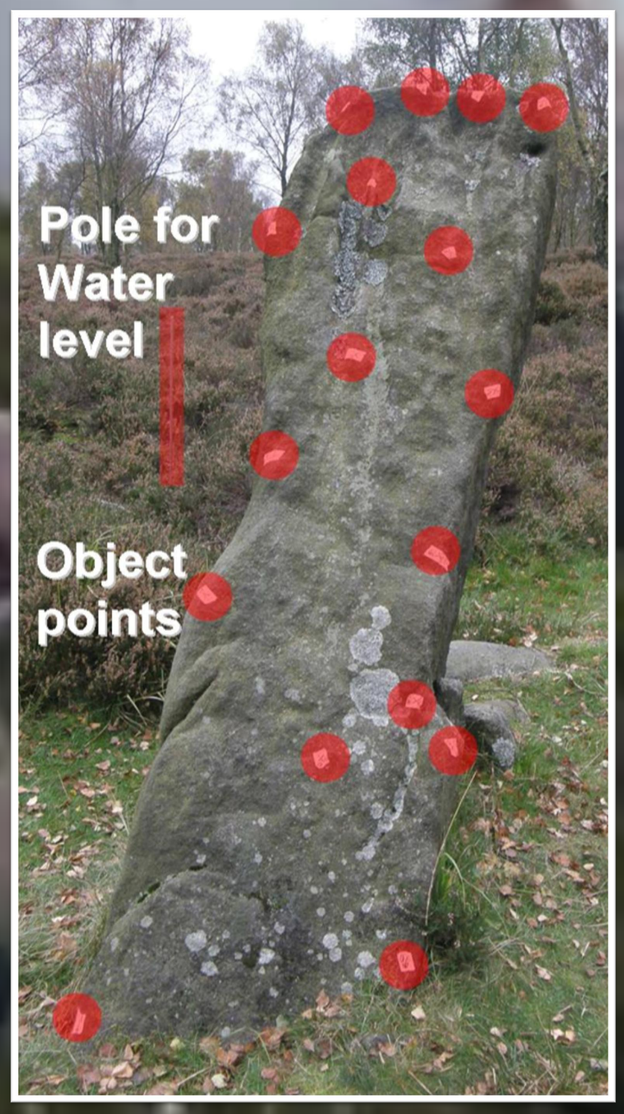
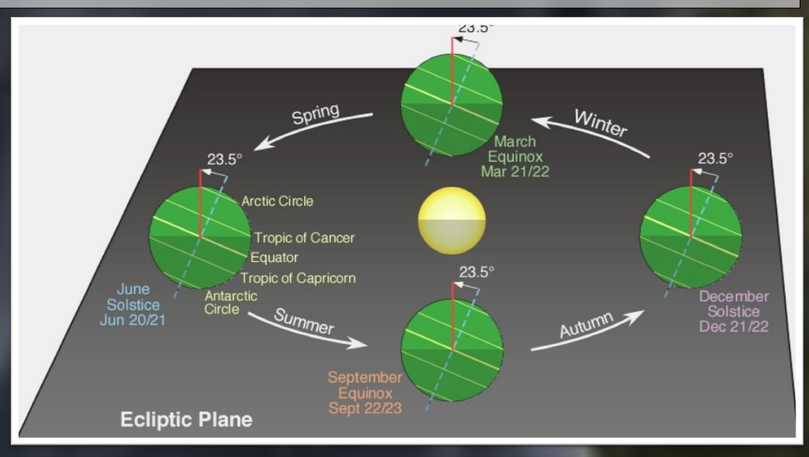


Fig. 3 -
This image shows the ancient standing stone at Gardom's edge, close to the site of Barbrook II.

Movement of the Sun

The axis of the Earth is tilted as shown in Figure 2. This means during certain times of the year, the sun's position in the sky will change. The sun rises and sets further away in the north and south during summer. This contributes to longer days since the arc is higher and stretches further meaning that the sun is in the sky for a longer period of time. The southern hemisphere is quite the opposite; the arc is shorter at this time of year and the sun is lower in the sky, meaning that they have shorter days. Shadows can be used as a way of measuring the time, due to their length and orientation when the sun's position in the sky changes. When the sun is low in the sky the shadows are more elongated and vice versa. This can be due to a different time of day or year, allowing ancient civilisation to tell the time, using a sundial as shown in fig.3.

Fig. 2 –
This shows how different seasons are created through different positions of the Earth.



Experiences

The work placement here at NTU offers a lot in terms of practical field work, mainly our in depth work with the AIRO CAM unit, and we took data back to the university and analysed and evaluated our results. It offered us many opportunities for individual work and developed the number of skills that are needed for a working environment. Independence and confidence in a work place are essential; we both better achieved this as a result of this work experience and the chance to have been part of this project has been a thoroughly welcomed experience.