



Maths as others see it

A hot air balloon journey

NARRATOR (FRANCESCA HUNT)

Hot-air balloons of all shapes and sizes are used for many purposes, not just for pleasure flights.

A balloon was used to film part of a video band you saw earlier in the course, where you worked with a map of an area of the Peak District near Mam Tor.

Aerial views were filmed to compare with the map contours.

Some shots also showed the three walkers following the ridge between Mam Tor and Hollins Cross.

The use of a balloon also allowed us to look at how balloons are navigated, a topic which depends upon wind speeds and bearings, and that's a story in itself.

As with any flight, the operation required a detailed pre-flight planning meeting.

JAMES IRELAND

... I got this morning from Birmingham Weather Centre ...

NARRATOR

James Ireland was the balloon's pilot, and Barbara Bailey was responsible for the recovery vehicle. Also at the meeting was Judy Ekins from the Open University and the three walkers – Mike Underhill, Elisabeth Evershed and Chris Dillon.

JAMES IRELAND

Essentially what we're trying to achieve is that your walkers are setting off at Mam Tor down here ...

JUDY EKINS

Yes.

JAMES IRELAND

... and following the ridge line up to Lose Hill.

JUDY EKINS

That's right, yeah.

JAMES IRELAND

And this is the bit we're hoping to get on film with the hot-air balloon.

JUDY EKINS

Yes.

JAMES IRELAND

We're going to have to set off from down here, given the wind direction, which is a south-westerly.

JUDY EKINS

That means it's coming from the south-west.

JAMES IRELAND

That's right. We'll be travelling in a north-easterly direction on the surface, and we've got a westerly at ...

NARRATOR

The predicted wind from the ground up to about 2000 feet was at a bearing of oh-two-five degrees with a speed of around eight kilometres per hour.

Above 2000 feet, the forecast suggested the wind would be stronger and change direction. So, by choosing a take-off site which you'll find on your map just below a spot called Windy Knoll, at grid reference one-two-two eight-two-five, the balloon should pass over the route of the walk.

If the conditions are right it doesn't take long to prepare a balloon for take off.

This balloon has a volume of about 90000 cubic feet, and there's sufficient fuel to carry three or four people on a flight lasting about an hour and a half.

The wind speed meant that the balloon would travel at about eight kilometres per hour and take about 15 minutes to cover the distance to Mam Tor.

MIKE UNDERHILL

Wish that I was flying in one of those. Don't you?

ELISABETH EVERSLED

Yeah.

NARRATOR

The take-off was highly visible, and that was the cue for the walkers to set off, so that they'd be filmed as they walked along the ridge.

The timing worked out, and Elisabeth, Chris and Mike were filmed striding along the path between Mam Tor and Hollins Cross.

But once that shot was complete and goodbyes were said, the balloon turned its attention to filming what it could of the rest of the ridge, before looking for a landing site.

That's set you behind the scenes, to explain how the aerial shots were achieved.

The problem with travelling on a bearing of oh-two-five degrees was that the balloon would quickly reach the moors of the Peak District to the north-east of Edale.

So our pilot, James, looked for a landing site the recovery vehicle could reach before the balloon reached the moors, as there wasn't enough fuel to fly right across the moors.

The balloon did manage to land in a suitable area near a road, just within your map of the area. It's shown in this shot taken from above Ladybower reservoir.

But how was this shot was taken?

In actual fact two balloons were used, so that we could film as much of the walk as possible and see the progress of the first balloon from the air.

But as the second balloon was filming the first balloon landing, it had to stay in the air longer. Once past Ladybower reservoir, it would be over the moors.

And this terrain is an inhospitable place to land and hope to be easily recovered, so the pilot, Chris Davies, had a real problem.

CHRIS DAVIS

The planning meeting was based upon a met forecast that told us that we would fly to the north-east, with the possibility of going well to the east if we flew higher.

But unfortunately we haven't found the wind direction that was forecast, and we're having to fly on across the moors.

The position I've just marked on the map is the reference I got from the GPS here, which is a very useful tool, flying over open moorland like this, because it saves the trouble of taking bearings from landmarks to decide precisely where we are.

NARRATOR

By taking readings of the balloon's position at different times following take off at 9.40, Chris had been able to compare his fuel consumption with his rate of progress.

And then, by taking into account how long the fuel would last, he was able to confidently continue on.

Without this information, he would have to have seriously considered an emergency landing as close as possible to a road near Ladybower reservoir.

But, instead, his balloon was able to safely land north of the moors, after a two-hour flight.