

Met Office

Initial operational suitability tests of the Modem Robotsonde

Kevin Linklater

Synopsis

I was asked to evaluate the automatic radiosonde launching system made by Modem, called the Robotsonde. The evaluation was to look at the feasibility of the system for operational use within the Met Office, Upper Air & Remote Sensing Network, also considering use for international sites and other users within the Met Office. The evaluation was to encompass the installation, training, loading and operational use of the Robotsonde. The radiosondes used were the Modem M2K2DC which have been evaluated at the same site at various times before and after the Robotsonde evaluation period.

Description of the launcher

- The launcher is encased in a cabin.
- An external supply of helium and electricity is required.
- There are two access doors and two windows.
- The PC, processor unit and a few small consumables are kept in a small cabinet.
- The loading and launching tube area is visible from the PC area.
- There is heating and if required air conditioning is available.
- The carousel can hold six radiosondes.
- On the roof above the launching tube is a sliding door.
- All operations are commanded by the PC.

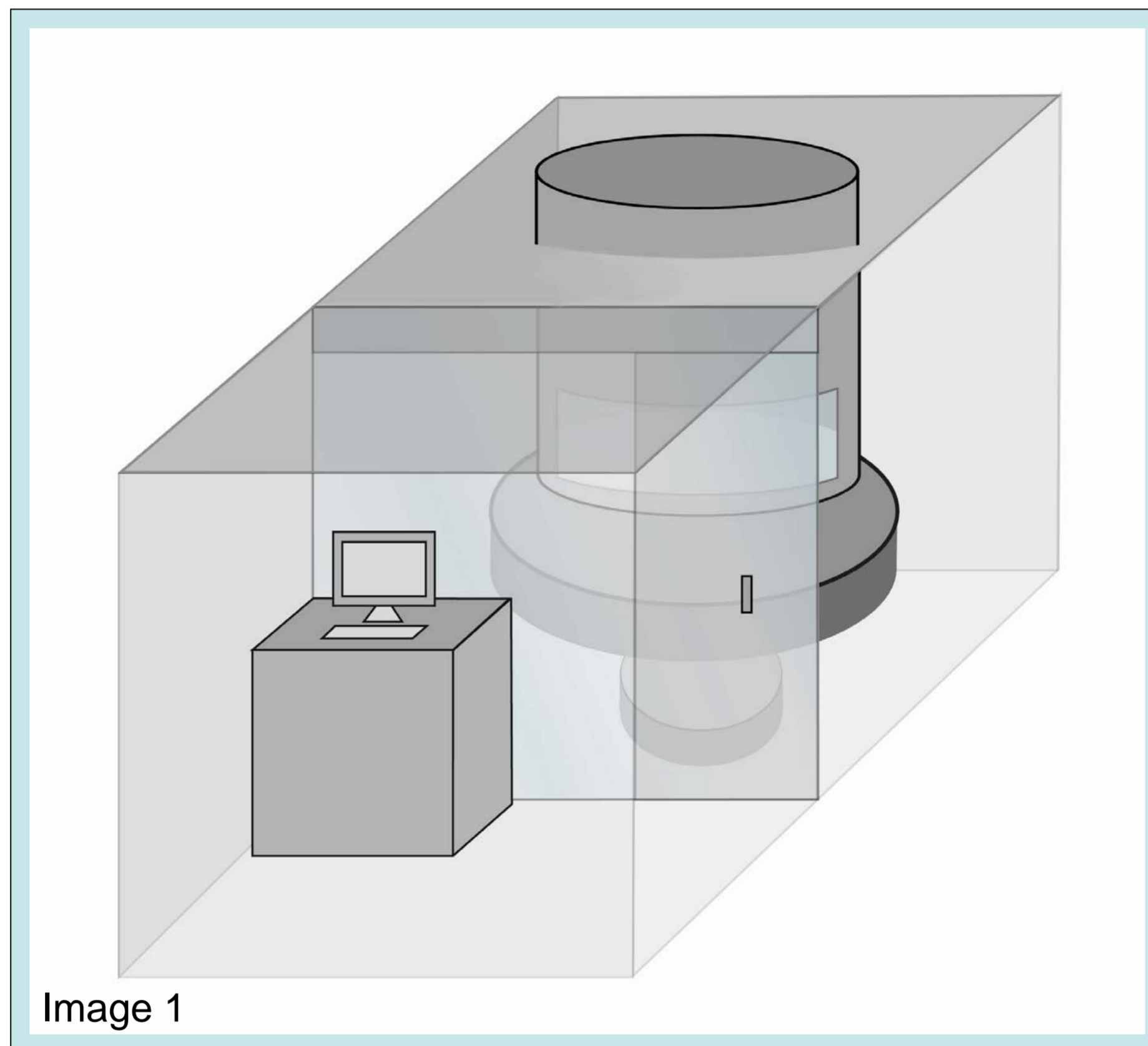


Image 1

Installation, training and loading

- The Robotsonde arrived on a flat bed lorry, was placed and made level on grass (Image 2).
- It took eight hours from arriving to being operational.
- Loading instructions were written (Image 4).
- The operators found the system easy to learn and use.
- The loading of the radiosonde onto the launcher module would in average take between five and ten minutes.



Image 2

In an operational environment

Balloons used: (Graph)

- Totex 350g with internal parachute.
- Totex 200g with an external parachute.
- Totex 800g and Totex 1200g with an external parachute (Image 3).

The graph illustrates the number of launches of each weight of balloon and the number of flights from these launches.

Met Office staff would load the carousel and observe the radiosonde preparation, balloon inflation and the radiosonde launch. The minor issues were taken care of with the software. **System failures** were seen where the GPS did not initialise, when encountered the software would start up a second sonde. Modem are now using a faster and improved GPS receiver which would assist in eliminating this issue. The **sonde failures** were normally low battery failures. The system would cease the sounding initialisation when the battery voltage came down to a critical level. The software would initialise a repeat if this was encountered. However, if the sonde is launched there is enough battery power to complete the sounding. There were more **sonde strikes** against the launching tube when using the 200g balloon. I believe this is due to the external parachute rig. The strongest wind with a clean launch was 28kt with a 350g (internal parachute).

Balloons used during evaluation

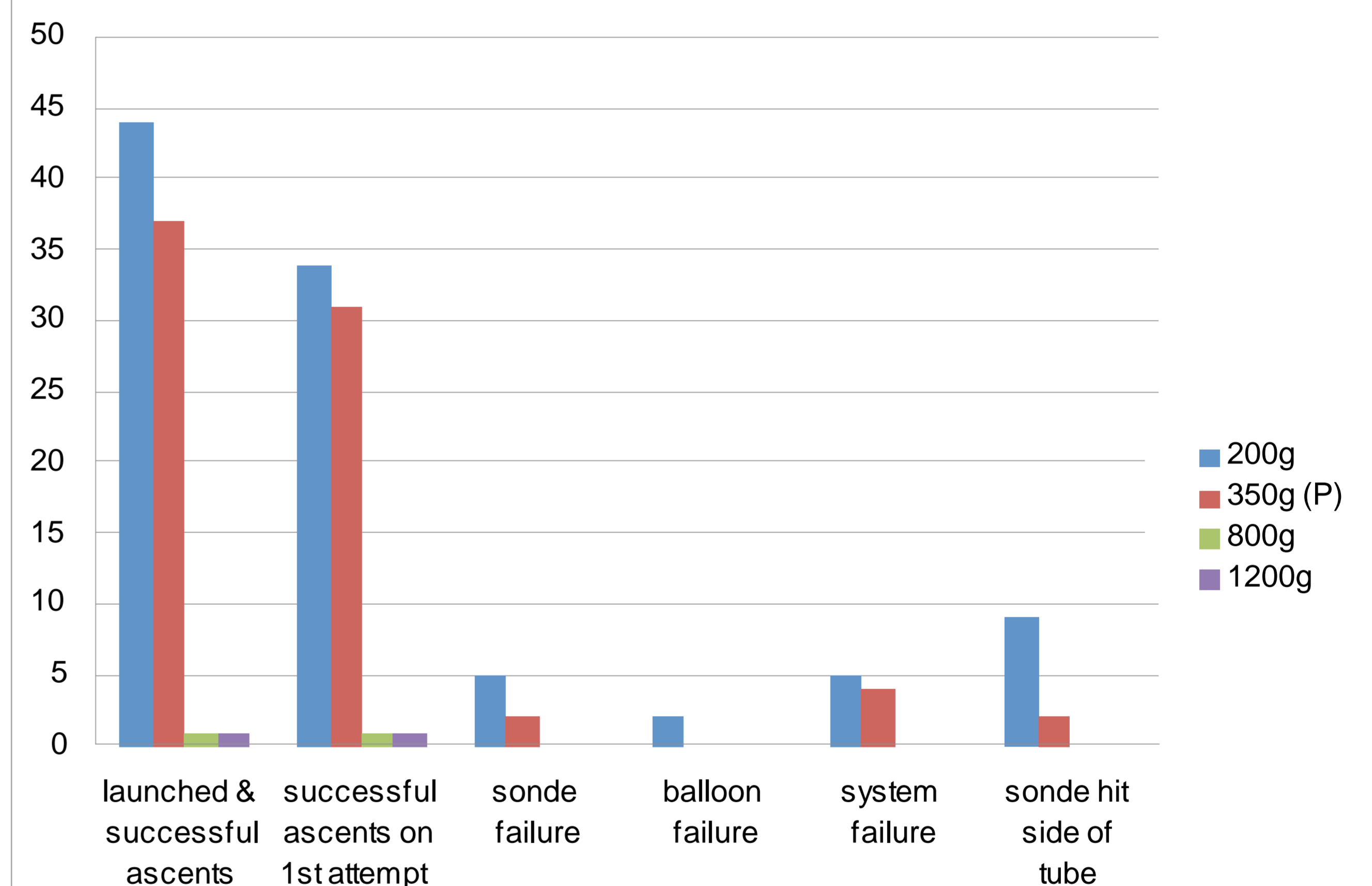


Image 3



Image 4

Summary and conclusions

- The Modem Robotsonde was used over three months and 85 radiosonde launches.
- The installation took eight hours from unloading to first ascent.
- Instructions were created for operational use.
- The operators found the Robotsonde easy to learn and operate.
- Each radiosonde took between five and ten minutes to load onto the module.
- There were a range of balloon sizes used.
- It was seen that there were less sonde strikes by using the internal parachute.
- There were minimal sonde and system failures.
- There is now a faster GPS receiver in the sondes.
- The six sonde system would be ideal if to be used instead of night shifts or outside of working hours.
- The system appeared to be easy to maintain with minimal parts that were easy accessible.