UK Meteor Radar project Recording Notes

These notes provide some commented manual observations made during the first recording of the full bandwidth data from all the (5) operational receivers in the UK Meteor Radar project on 1st March 2025. More than 24 hours of recordings will be available from the project web site in due course.

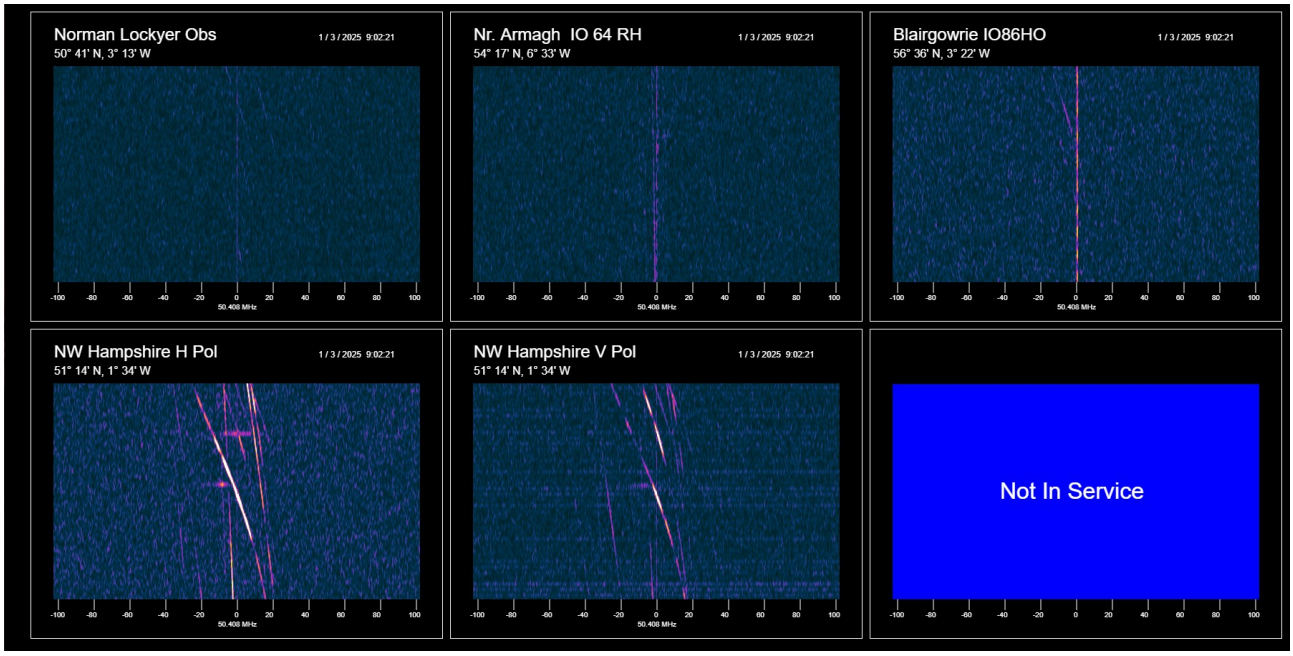
These observations have been made by taking screenshots of the live stream at https://ukmeteorbeacon.org/beaconclient / while recording is in progress. They are intended to provide a guide to interpreting the recorded data. We hope that others will use these data to develop automated capture and classification of meteor echoes .

The recorded data contains precision timing information and a greater bandwidth and dynamic range than can be displayed on the live stream. A first task in using the recorded data is to decode the timing data so that observations can be correlated with the manually captured screenshots.

As these first recordings are being made at a relatively quiet time for meteors most of the echoes are likely to be from small meteoroids no bigger than grains of sand and therefore the echoes are faint and short lived. Once automated recognition and capture is available we hope to capture and analyse larger events and explore the possibility of triangulating the meteor's location and trajectory using bi-static Doppler radar techniques..

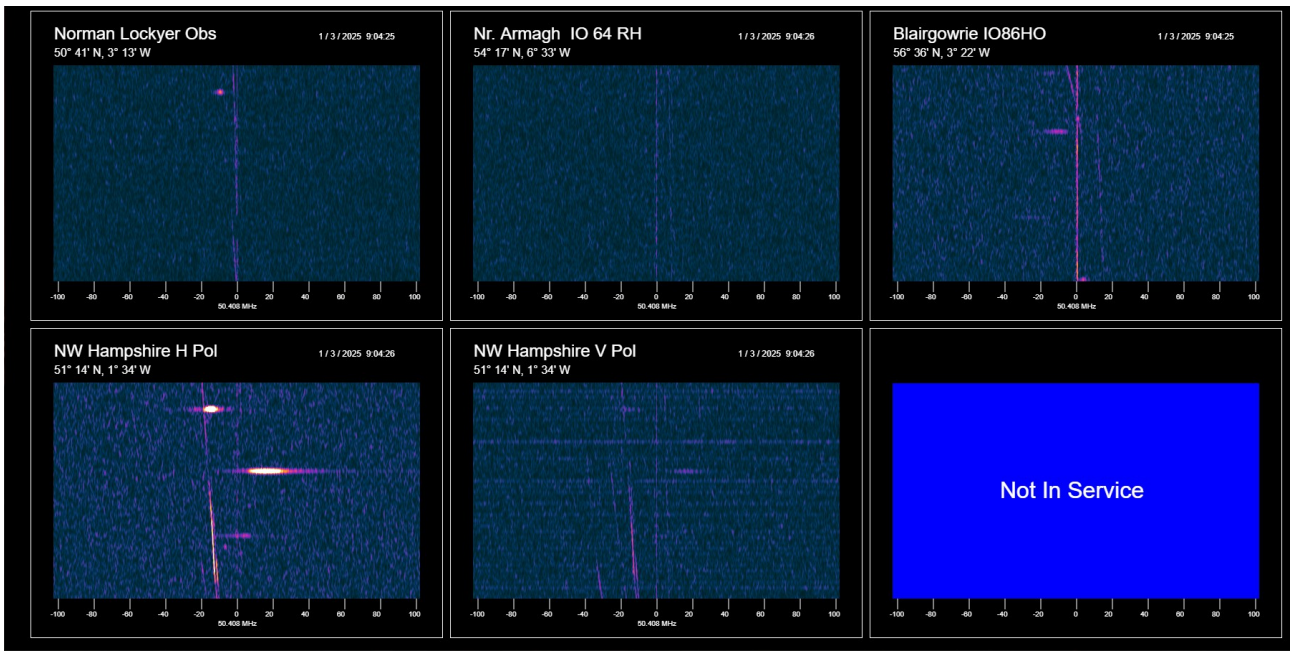
On the live stream, the receivers are numbered 1 to 3 top row left to right and 4 to 6 bottom row left to right. Receivers 4 and 5 are co-sited. Receiver 4 uses Horizontal polarisation while receiver 5 uses Vertical polarisation. Receiver 6 is not yet in service.

Recording Starts at 09:00 1st Mar 2025

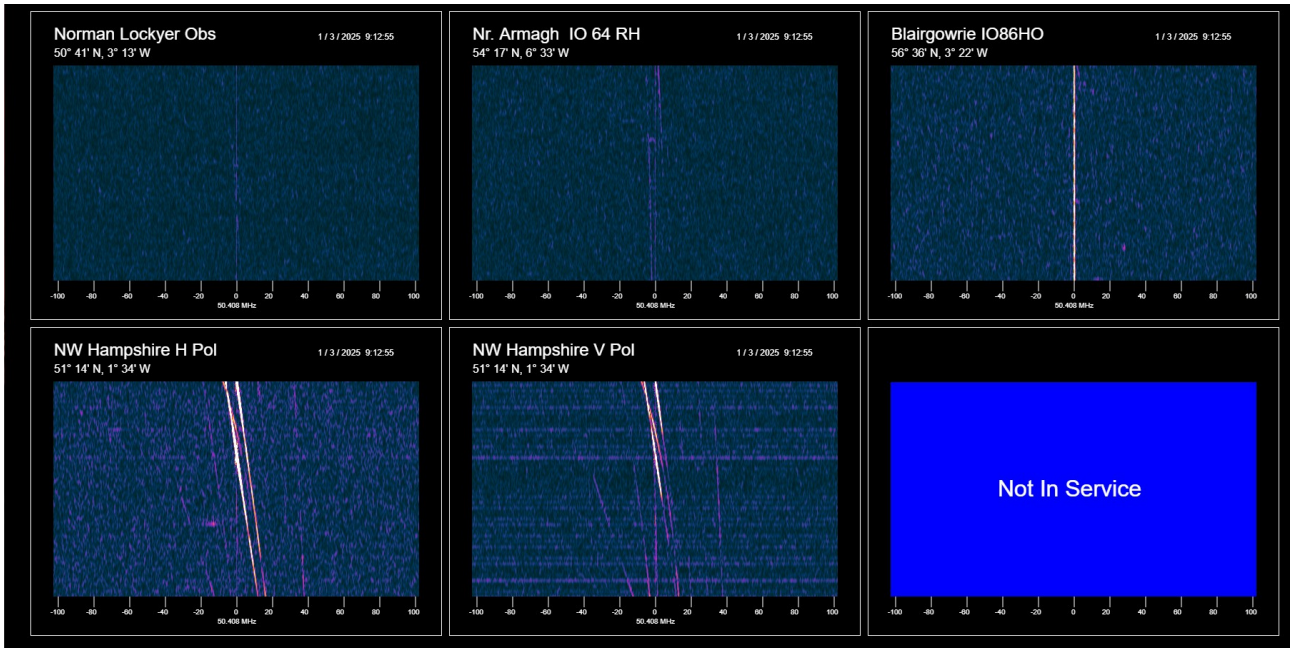


09:03:01 Some direct signal on 1 ,2, 3 and aircraft on 3, 4, 5. Faint Head echoes on 3.

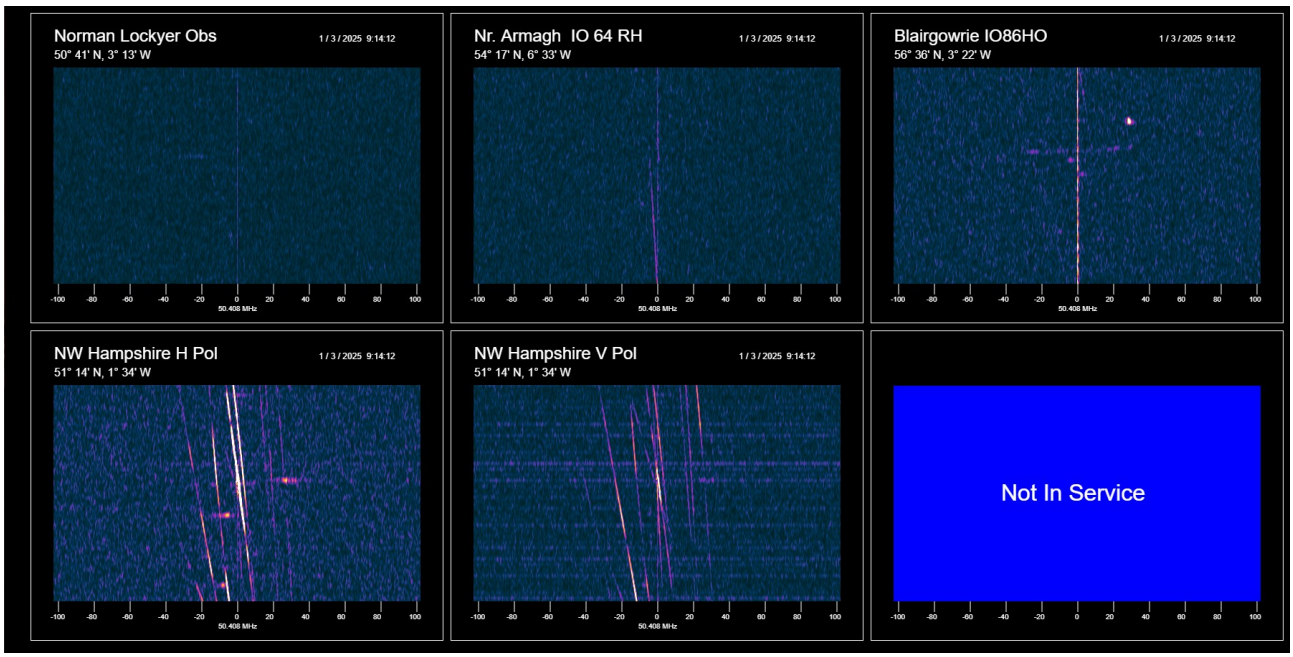
Note that when correlating these screenshots with the recorded data that the times are approximate. The vertical scale of the waterfall lasts about one minute.



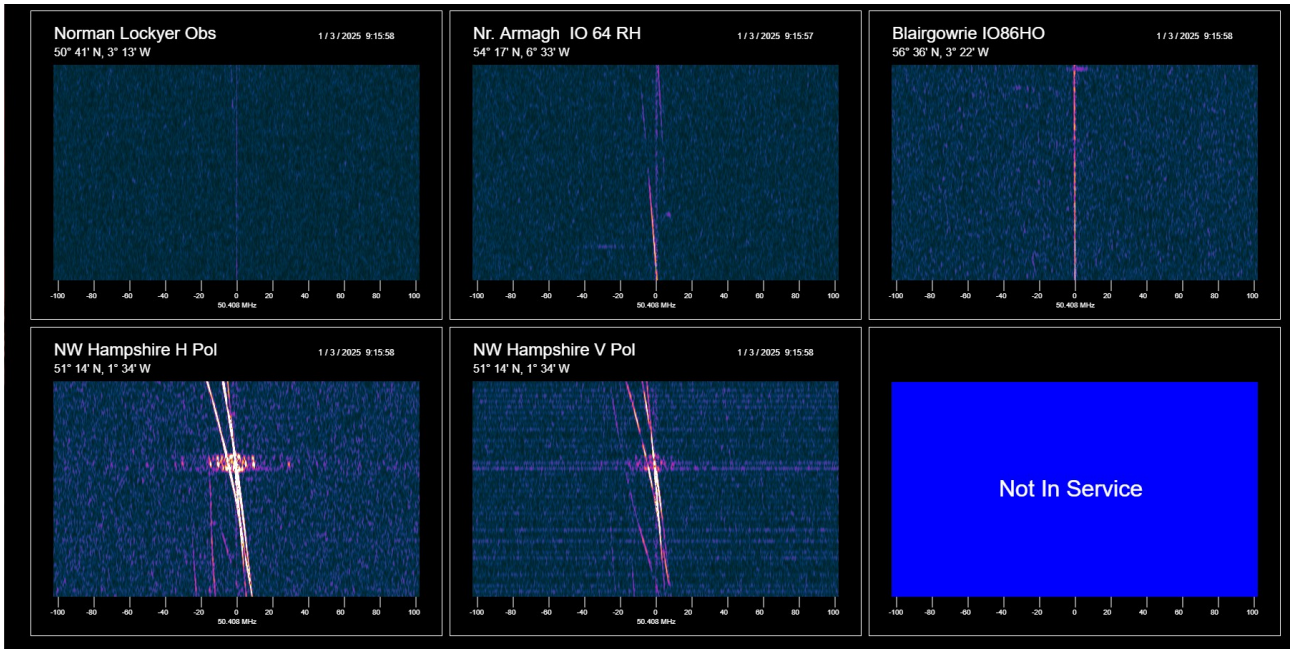
09:04:39 Rx 1 faint head echo , The first echoes are at the bottom of the screen latest, most recent at the top. RX 3 sees 3 head echoes the last (top) one is seen by RX1. RX 3 sees two head echoes.



09:13:09 Aircraft, strong on RX 4 and 5 direct signal strong on RX3

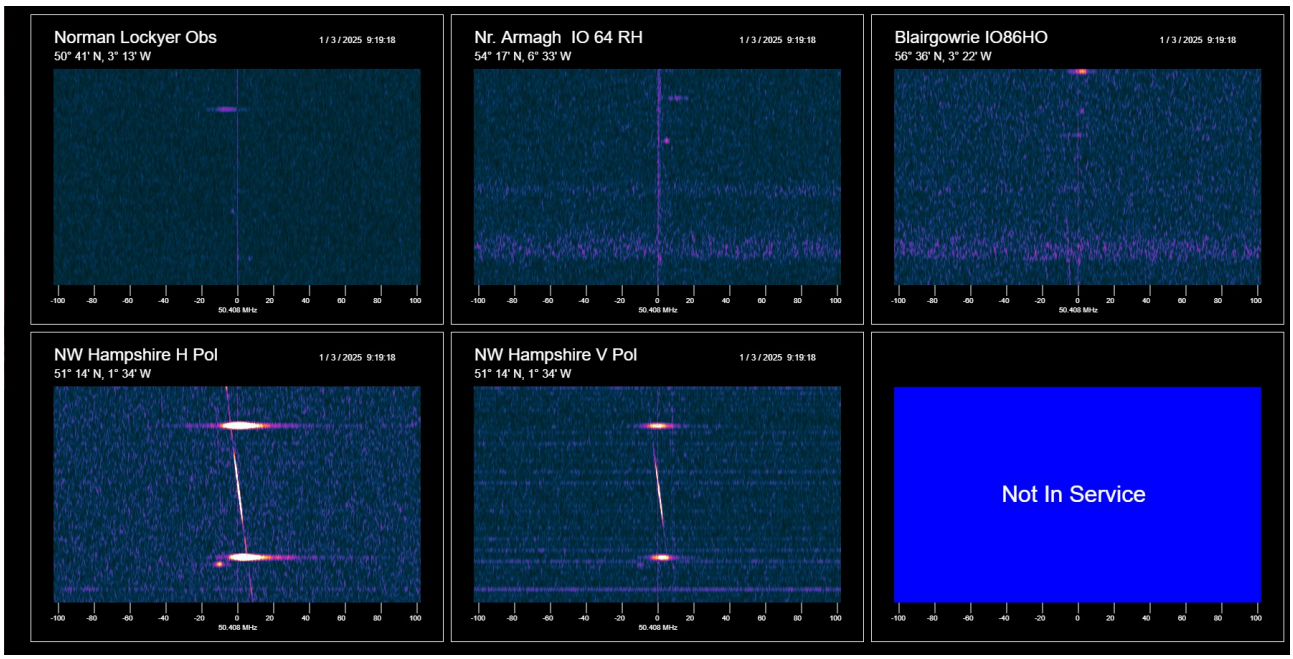


09:13:09 strong direct signal on RX 3 and aircraft on RX 3 and 4 some faint head echoes on RX 3 and 4. Slightly worrying echo on RX 3. Slopes the wrong way .. possible interference. Bright blip on RX 3. Note the Doppler shift.

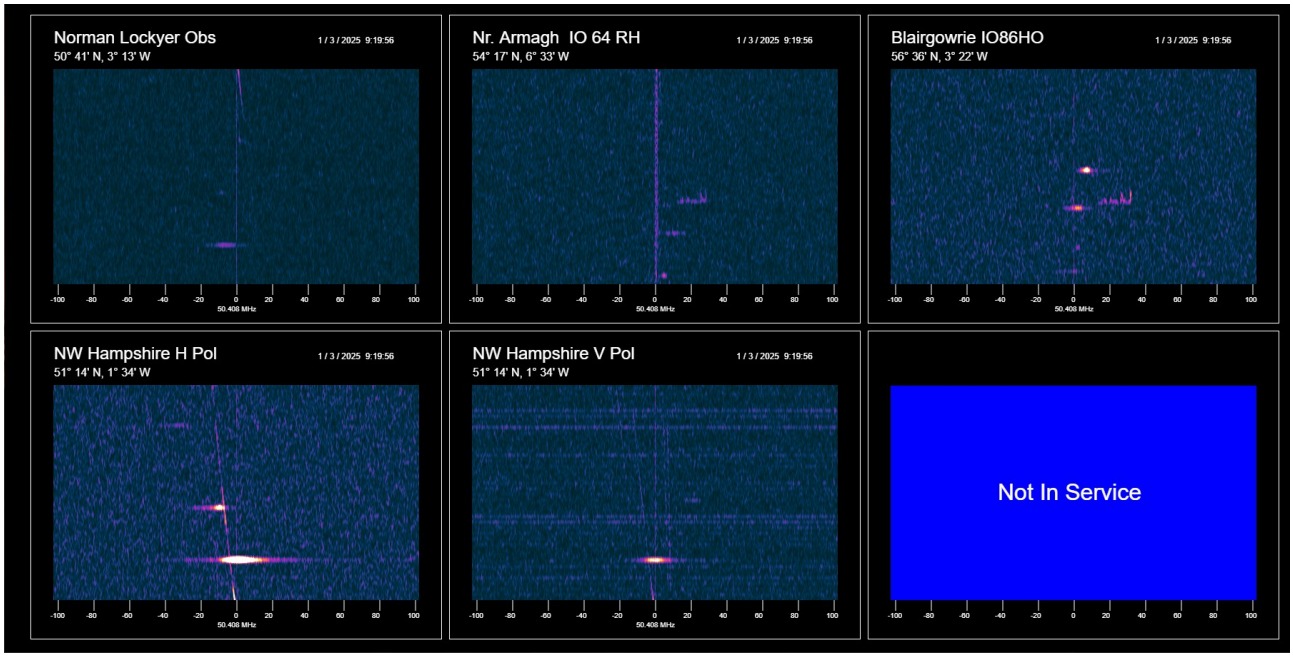


09:16:21 Strong aircraft echoes with keying interference on RX4 and faint on RX5.

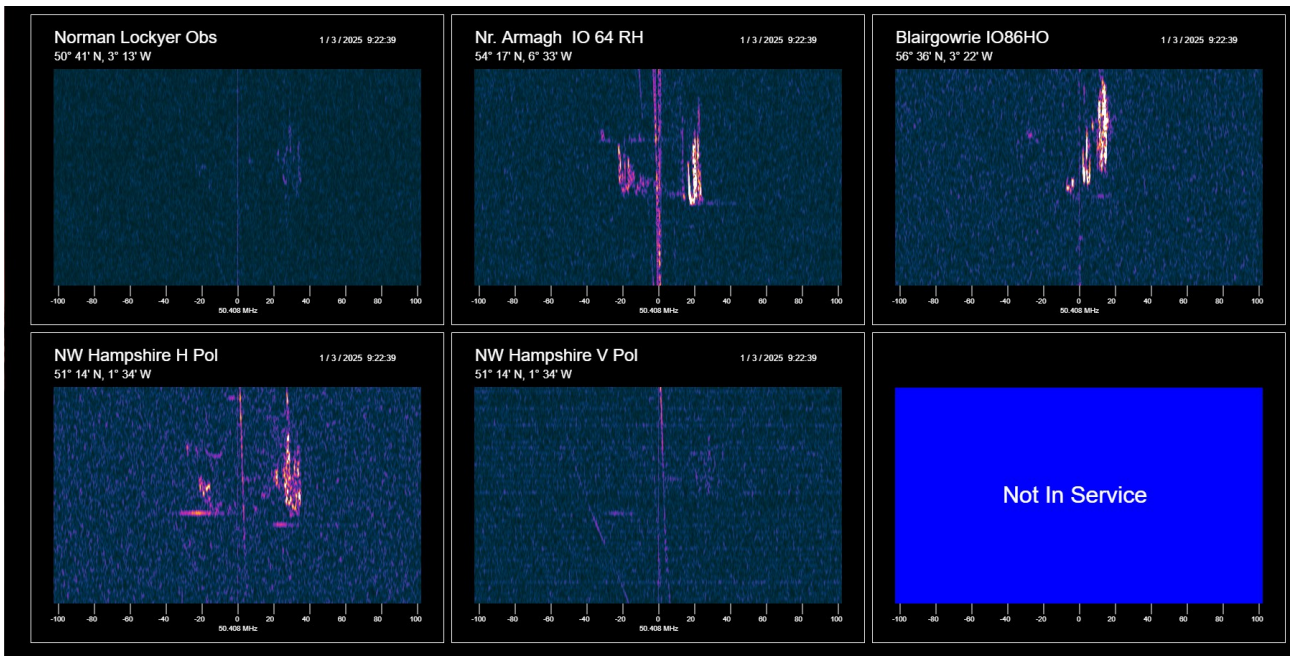
Keying interference (key clicks) occurs when the beacon sends it's call sign in morese code (A1A) so that other users of the beacon can identify it.



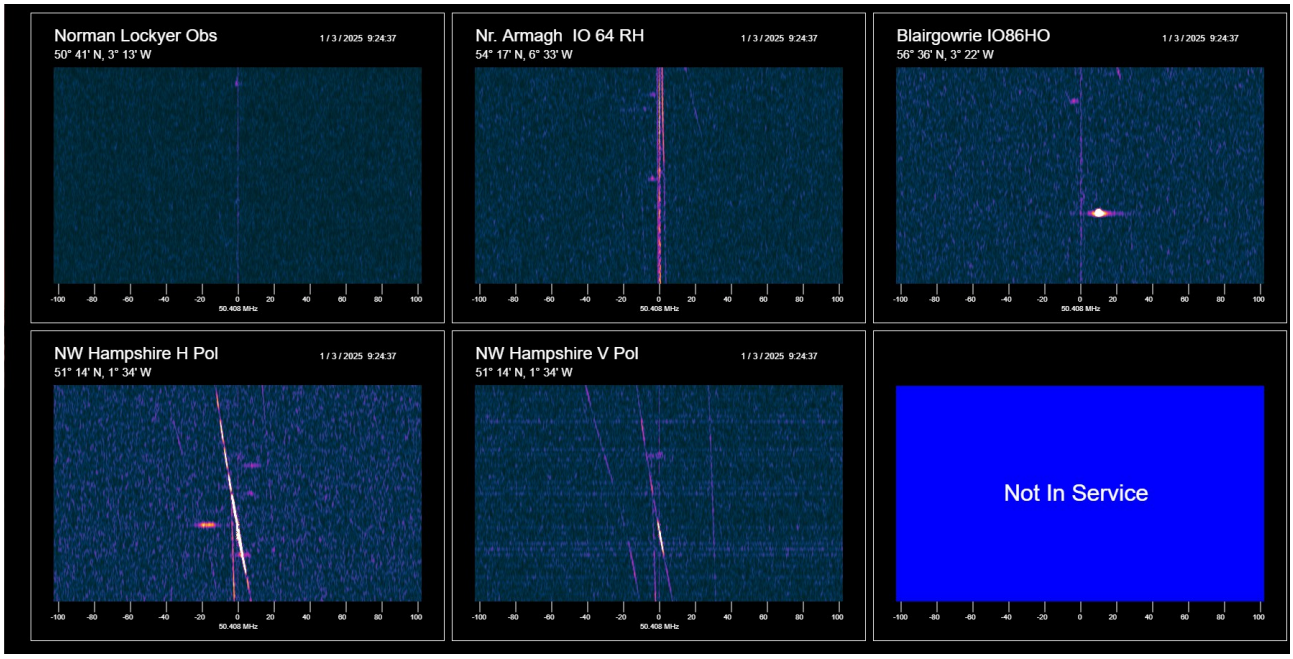
09:19:35 Last, top echo seen by RX 1 , RX 2 , RX 3 and RX 4. Note the different Doppler shifts.



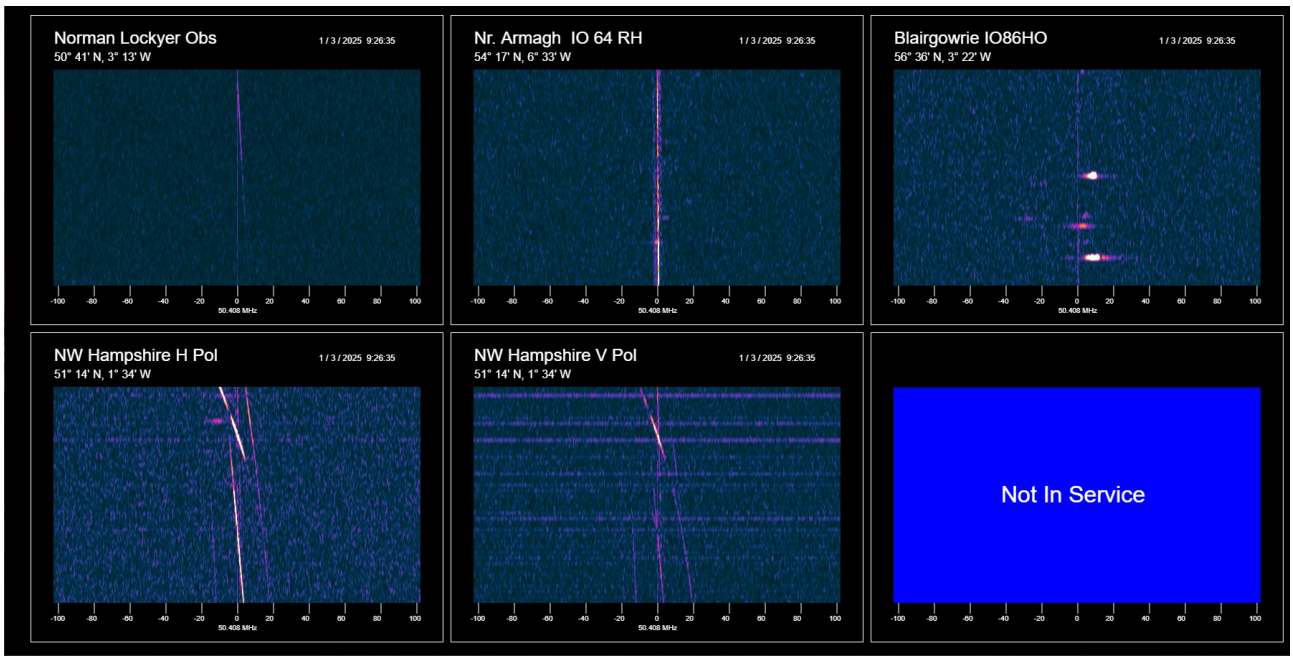
09:20:15 First (bottom) echo seen by RX1, RX2 ,RX4 and RX 5 another seen by RX2 and RX3 with a faint multi tail / exotic echo.



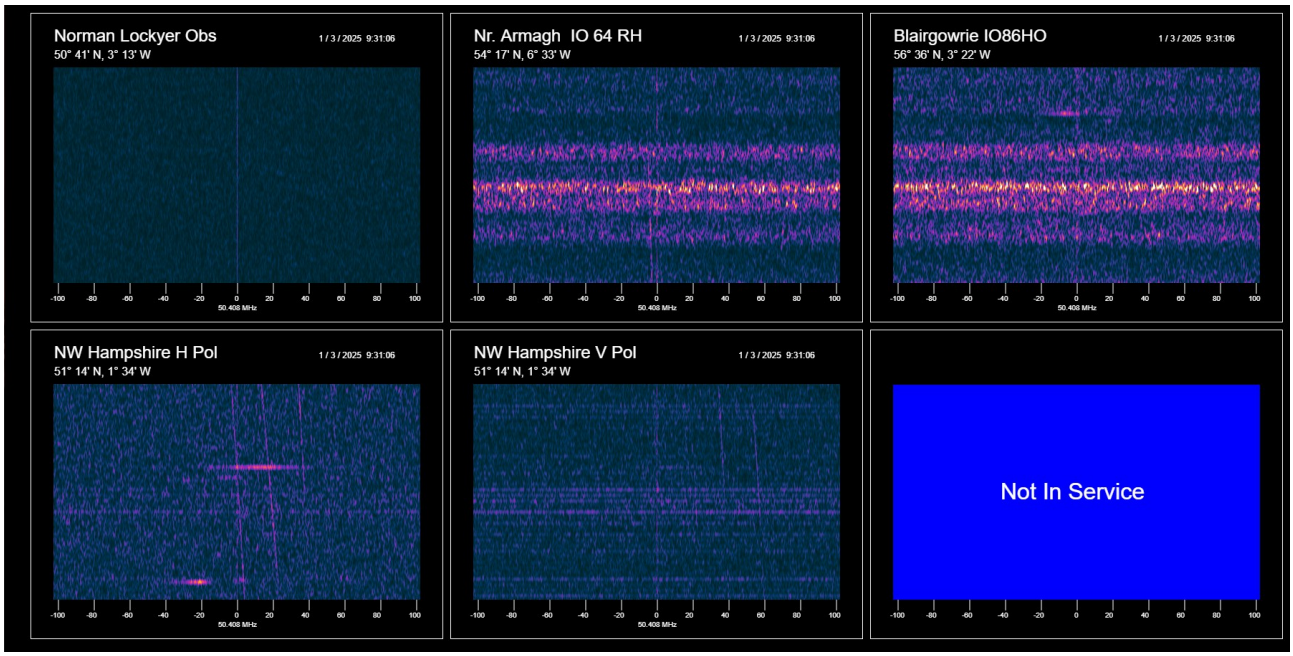
09:23:03 Exotic echo seen by RX1 faint , RX2 , RX3 , RX 4 Head echoes on RX3.



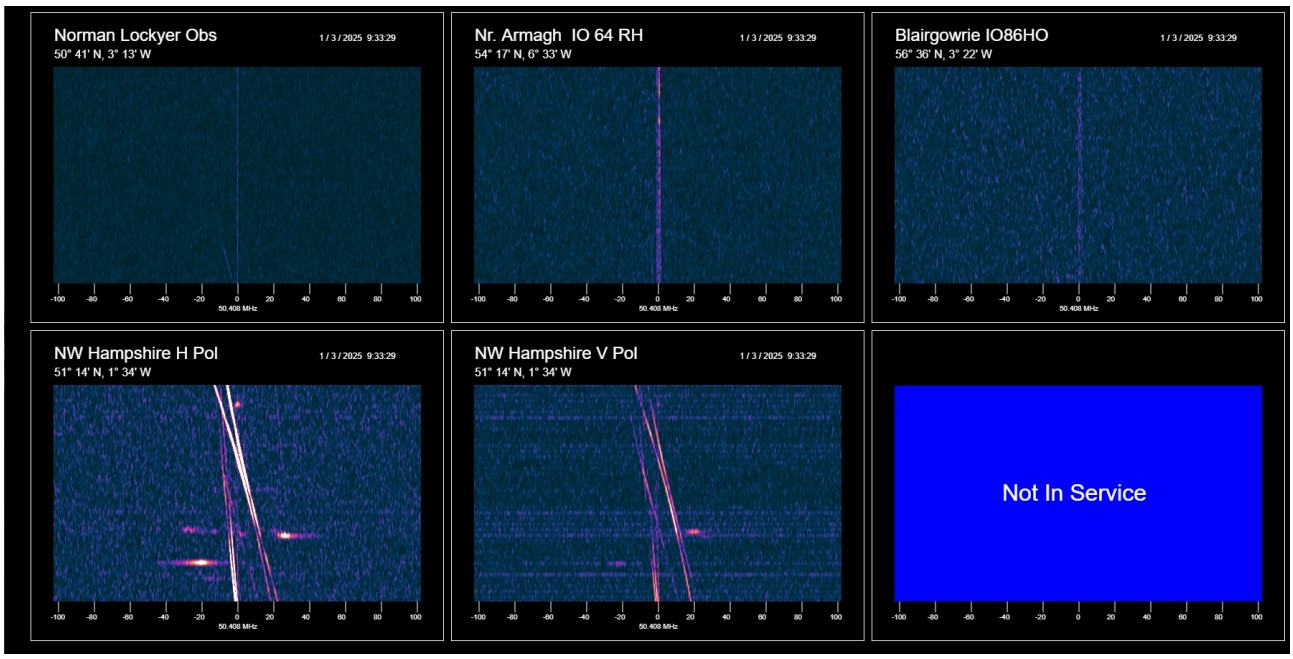
09:24:52 Head echo on RX3 and RX 4 note different Doppler.



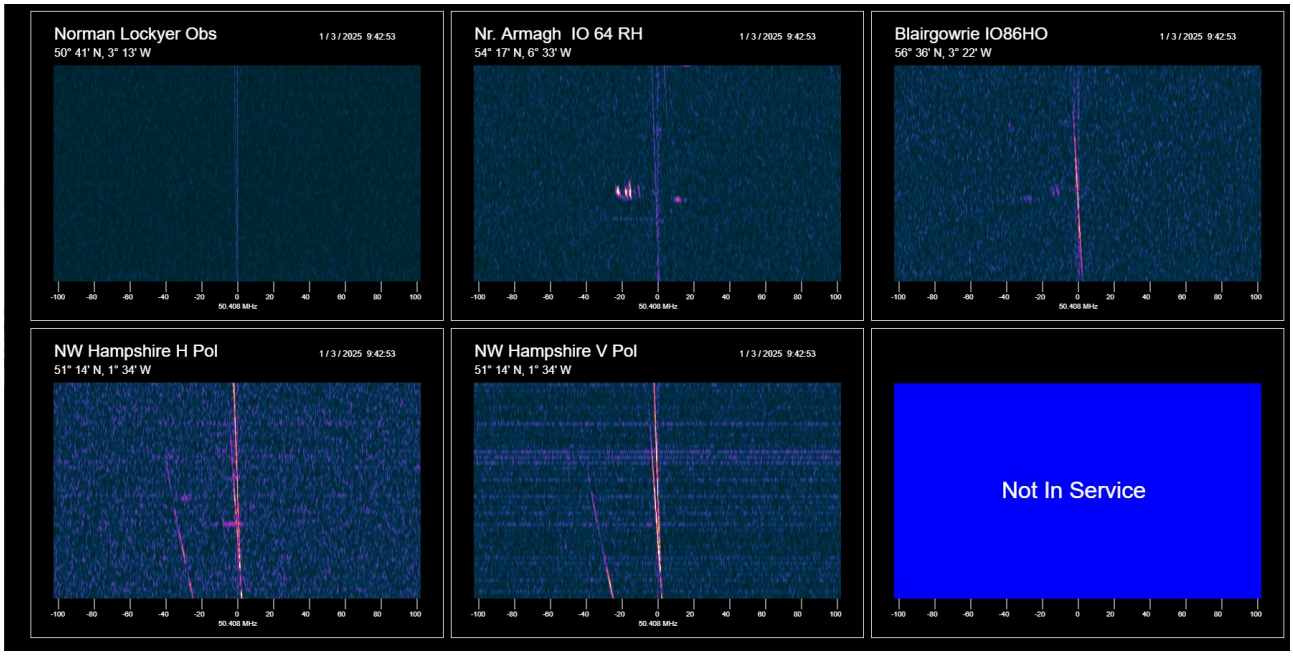
09:26:50 three echoes seen on RX 3 only direct signal on RX2 and aircraft on RX3 and 4.



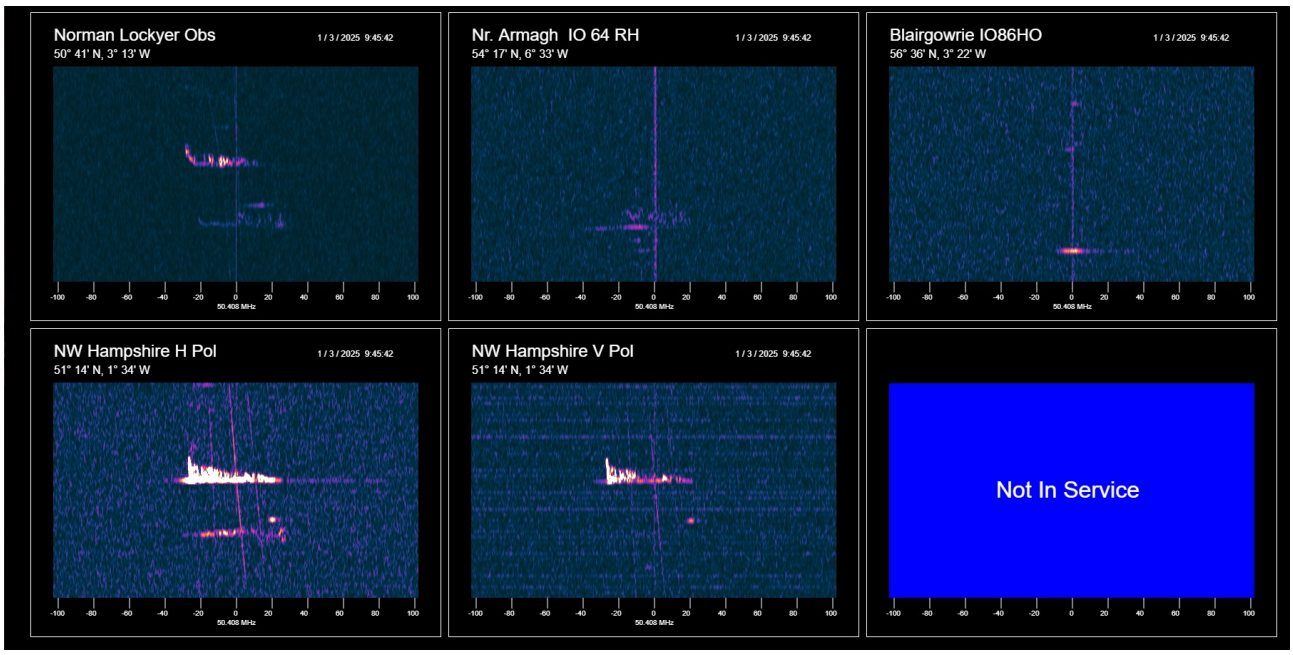
09:31:36 Burst interference at RX2 and RX3 Head echoes on RX 4.



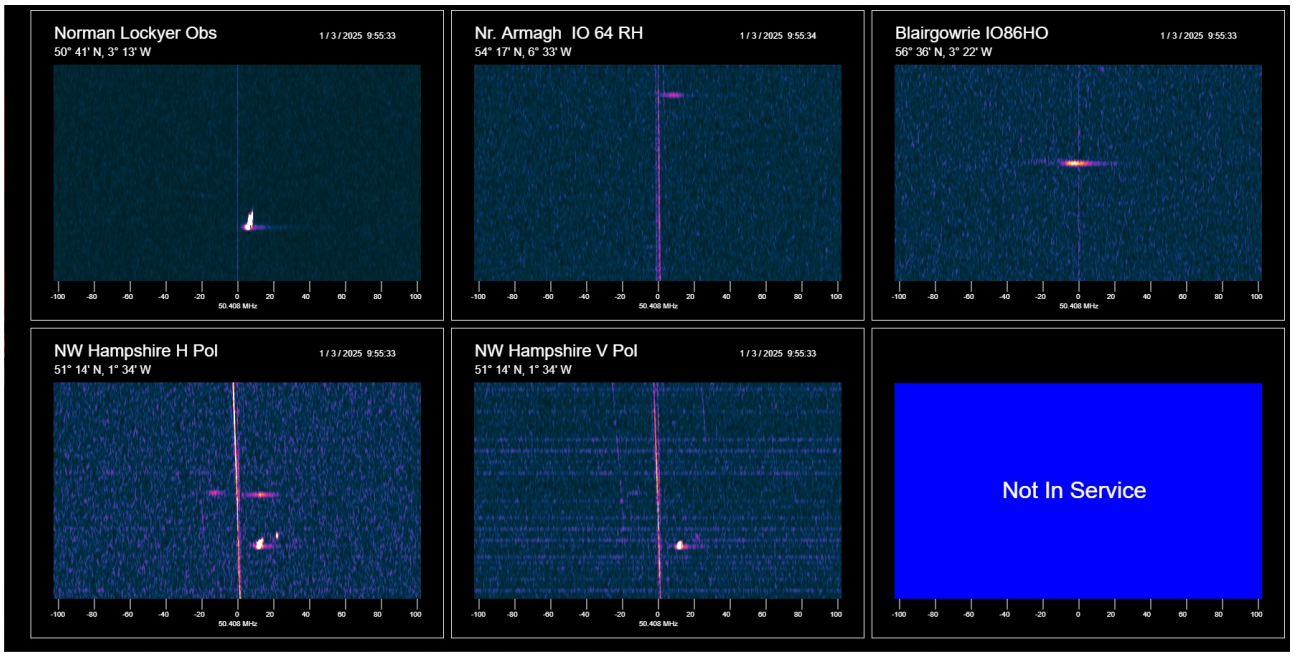
09:33:44 Some head echoes on RX 4 and RX 5 plus aircraft. Direct signal on RX1 & RX3.



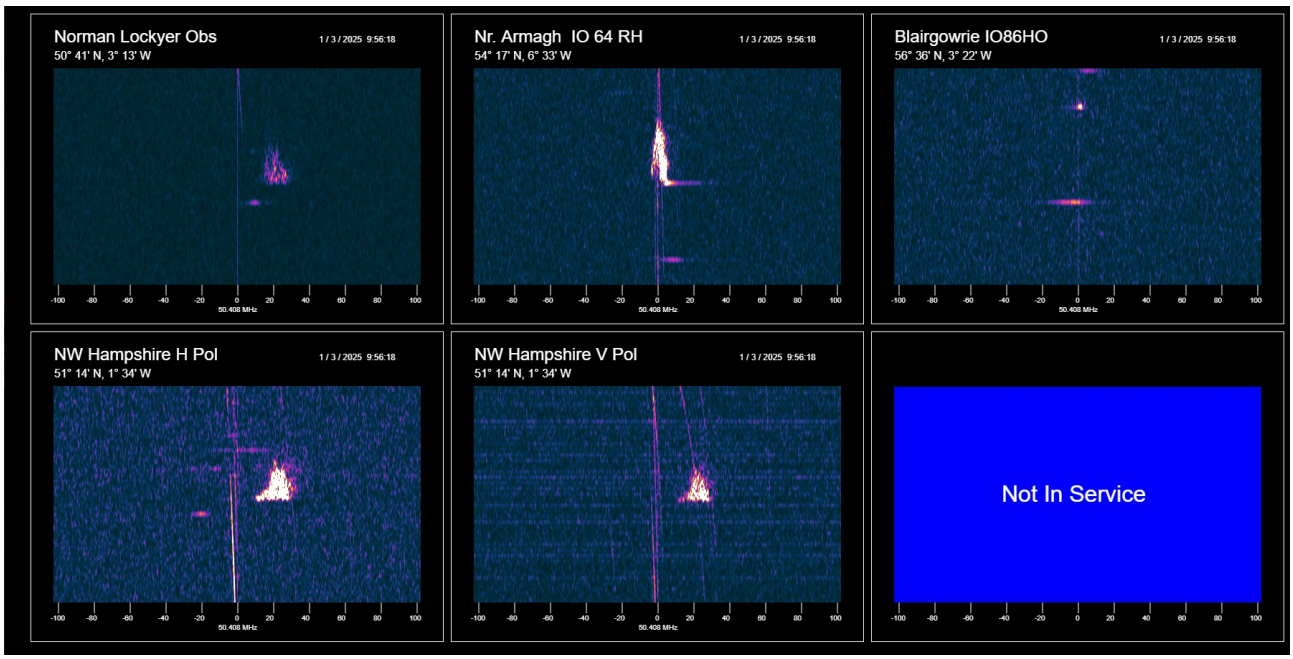
09:43:07 RX 2 faint multiple tail echo RX 5 some low level interference.



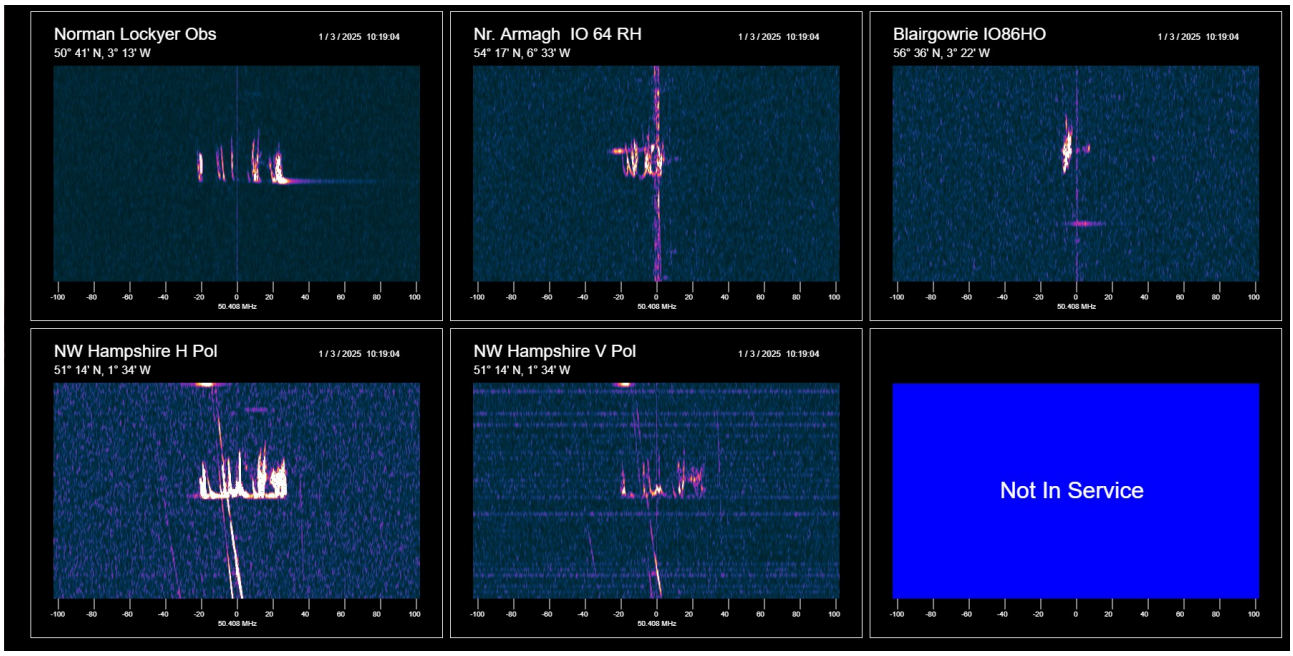
09:46:06 Interesting head echo with tail echo spread over a wide range of frequency due to Doppler shifts. Would be very interesting to establish the direction of slope of these echoes ! This could be done from the raw data but is not clear from the live stream.



09:55:54 A typical selection of small echoes with some direct sinal and some aircraft. The first, bottom echo has a small tail seen by RX1 and RX3 and 4.



09:56:34 A mix of head and tail echoes seen by various receivers.



10:19:20 Multiple tail echoes .