

## **MOOC Press Release**

Since mid-September, unidentified drones have been wreaking havoc in Britain's skies, causing increasing worry among citizens and authorities alike. The most recent incident occurred in Wiltshire, with drones observed flying dangerously close to several British Army bases, intensifying the already serious concerns.

The Government has voiced its increasing unease about the situation, expressing concern over the disruptive activities describing them as “increasingly reckless”. Drones operating in restricted areas pose a serious safety risk. Flying both low and at high altitudes, these rogue drones have not only raised questions of security but also disrupted air-traffic in the areas affected.

In an encouraging development, an anonymous source revealed that the military made significant progress recently by successfully intercepting a signal from one of the unidentified drones. This could potentially be the breakthrough needed to uncover the origin and identity of the perpetrators.

In response to the mounting public pressure, the Government has assured citizens that they are dedicated to resolving the situation. A spokesperson stated, "We understand the public's concern, and we're committed to uncovering the truth behind these incidents and holding those responsible to account."

The Government has stated its intent to prosecute those found guilty of these disruptions. In the face of uncertainty and public worry, these drone incidents have become a pressing matter for Britain. As investigations continue, a spokesperson stated that the Government remain resolute in their determination to restore security to Britain's skies.

## **DSTL Analyst's Brief [Code First Girls MOOC exercise]**

### **Situation**

A transmission was received 8 Oct 23 by a radio amateur in the vicinity of Salisbury Plain in England, it is assumed that this was transmitted by one of the recent unknown Uncrewed Aerial Vehicles (UAV) that have been spotted across the UK in recent weeks. The recording was handed to the Dstl who cleaned the signal up using standard noise reduction techniques.

The contents of the signal are unknown currently. It has been supplied as a binary file for analysis. The recording took approximately 90 seconds.

Previous signals have been known to contain pictures and data. Also often found are preamble or synchronisation words, these tend to be short repeating patterns of numbers. It is not known if the UAV are the work of amateurs or professionals and what their intentions are.

### **Task**

1. Extract as many video frames as possible
2. Extract protocol elements such as synchronisation words
3. Define the protocol
4. Extract the data as a JSON.
5. Bonus - visualise the data in some way for briefing to the Dstl. [JSON to GPX, or even a straight viewer in Python]
6. Bonus – construct a video from the video frames in real-time
7. Share any insights gained from the data, brief back to Dstl any conclusions.  
This task will also be judged on technical output as well as approach and insights from the data.

### **Related Analysis**

Previous interceptions have found signals with frame stills such as PNG, GIF, JPEG or JBIG2. Data streams that contain video interleaved with data usually use MJPEG streams, although initial analysis suggests that this is unlikely considering the length and size of the recording.

Understanding the concept of file signatures is crucial in identifying any embedded images within the binary data. File signatures are unique sets of bytes that denote specific file formats. Recognising these signatures enables us to pinpoint and extract potential picture files, if present within the binary stream.

Some picture files are fixed in size, such as bitmaps. Compressed formats like JPEG are a variable size since large featureless areas compress into a smaller file size.

Radio and electronic engineers have stated that protocols often include synchronisation words or preamble, to signal to the receiver when specific segments of data are about to be received. If identified, these will repeat in the message. The purpose of these words is to synchronise the receiver to the message ahead of processing. In summary, we believe there is data, video frames and synchronisation messages within the binary we have supplied you for analysis.

Initial triage of the data suggests the capture is comprised of fully usable data, but the radio operator reported that the signal dropped off toward the end so there may be errors in the data.