department 13

Phoenix Group®

MESMER® Site Report

Due to the sensitivity of our current Mesmer installations, this is a generic report for a fictional site using statistics based on actual data captured.

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Executive Summary

This is a generic report detailing Unmanned Aerial System (UAS) activity within detection range of an emplaced Mesmer system at an undisclosed location – Site X. The numbers contained within this report are based on live data that has been obtained by a permanent installation of Mesmer at a site of critical infrastructure. It details the number of detections and drone types that were operating in the vicinity of the emplaced system during a one-week period. The report contains data from the detections taken during the period, as well as data correlated over the entire deployment of the system to date. Since the last report, the Mesmer system has had no downtime and has been remotely monitored daily for activity by customer staff. All data collected is from live tracks and does not include any test data for this reporting period.

Drone Detection Overview - Key Statistics: Weekly Detections

42	26	17	25	1
Number of Detections	Number of Different Drones	Number of Uplink Detected	Number of Downlink Detected	Number of Mitigations

- 23 – Most Detections in a day (Saturday)
- 0 – Least Detections in a day (Wednesday/Friday)
- 5 – Most Detections/Identifications for a Drone – (081001DE)
- 15 – Most UAS Detected of the same type (Lightbridge Controller)
- 4-5pm – Most likely time for UAS to be active (8 Detections)

Drone Detection Overview - Key Statistics: Total Detections (Year to Date)

328	150	101	227	7
Number of Detections	Number of Different Drones	Number of Uplink Detected	Number of Downlink Detected	Number of Mitigations

- 28 – Most Detections in a day
- 0 – Least Detections in a day
- 23 – Most Detections/Identifications for a Drone
- 178 – Most UAS Detected of the same type (MAVIC/SPARK Drone)
- 4-5pm – Most likely time for UAS to be active (88 Detections)
- 1 – Most Mitigations in a day

Notable Events:

- 300th Detection occurred
- 150th Drone Detected

Introduction

This is a weekly report detailing the Unmanned Aerial System (UAS) activity within detection range of an emplaced Mesmer system at an undisclosed location. This report will detail the number of detections and drones that were operating around the Mesmer system. This report contains all detections and data analysis for the reporting period from 20th – 26th April.

Likely Launch Points

The below table and map show the Likely Launch Points identified by MESMER Operator.

Location	Area	Description
1	**West Beach**	Located North-West of the facility | Likely to capture footage over water and beach area | May encroach on western part of facility | Advise degree of caution
2	**East Beach**	Located East of the facility | Likely to capture footage over the ocean | May encroach over the East of the facility | Advise degree of caution.
3	**Cleared Hill**	Located South-West of the facility | Likely launch point for viewing facility | Approach from South West | Advise escalated degree of caution.
4	**Cruise Liner Port**	Located North-West of the facility | Most likely launch point for Drones | Approach from North East |Advise escalated degree of caution.
5	**Facility Entrance**	Located South of the facility | Most likely launch point for drones targeted at facility | Approach from South |Advise high degree of caution.

Figure 1: Mesmer Installation at Site X. Map of Likely Launch Points

Incident Table – Live Tracks

The following table displays the live tracking data of drones detected and mitigated during the period 20th – 26th April.

Date	Start Time	End Time	Make	Model	Protocol	MAC Address	Mitigation
20-Apr	13:44:51	13:50:52	DJI	Phantom 3 Standard	WiFi	60:60:1F:22:71:4B	
20-Apr	14:22:11	14:28:57	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:47:21:47	
20-Apr	14:35:21	14:36:59	DJI	Lightbridge (Controller)	Lightbridge V1	4BC49AD	
20-Apr	15:10:18	15:23:59	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:72	
20-Apr	16:37:53	17:08:03	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:73	
20-Apr	16:46:15	16:46:59	DJI	Lightbridge (Controller)	Lightbridge V1	4BC49FAD	Return to Home
21-Apr	21:03:24	21:03:24	Yuneec	CGO3P Drone Camera	WiFi	62:60:1F:4D:3F:8D	
23-Apr	0:22:17	0:22:17	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:4D:3F:8D	
23-Apr	0:24:17	0:29:43	DJI	Phantom 3 Standard	WiFi	60:60:1F:22:71:4B	
23-Apr	0:38:31	0:41:23	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:50:30:5C	
25-Apr	7:07:19	7:15:45	DJI	Lightbridge (Controller)	Lightbridge V1	26210DBC	
25-Apr	8:40:10	8:40:10	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:67	
25-Apr	8:44:14	8:44:14	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:68	
25-Apr	8:50:34	8:59:32	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:69	
25-Apr	9:00:17	9:01:31	Parrot	Bebop2 Drone	WiFi	A0:14:3D:C3:8A:70	
25-Apr	10:15:31	10:16:17	DJI	Lightbridge (Controller)	Lightbridge V1	26210DAF	
25-Apr	10:36:50	10:37:22	DJI	Lightbridge (Controller)	Lightbridge V1	26210DAF	
25-Apr	10:39:48	10:39:48	DJI	Lightbridge (Controller)	Lightbridge V1	26210DAF	
25-Apr	11:57:04	12:13:05	DJI	Lightbridge (Controller)	Lightbridge V1	26210DAF	
25-Apr	12:01:16	12:01:16	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:4E:88:6D	
25-Apr	12:01:50	12:16:50	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:4E:88:6D	
25-Apr	12:21:43	12:27:45	DJI	Mavic / Spark (Drone)	WiFi	62:60:1F:51:9A:3A	
25-Apr	12:31:25	12:32:39	DJI	Mavic / Spark (Drone)	WiFi	64:60:1F:7C:E5:26	
25-Apr	12:32:41	12:39:19	DJI	Mavic / Spark (Drone)	WiFi	64:60:1F:7C:E5:26	

25-Apr	*12:42:05*	*12:44:58*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*62:60:1F:50:62:B9*	
25-Apr	*13:50:01*	*13:51:25*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*62:60:1F:51:95:6A*	
25-Apr	*13:50:35*	*13:58:13*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*62:60:1F:51:95:6A*	
25-Apr	*14:00:50*	*14:16:50*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*64:60:1F:8E:C2:E1*	
25-Apr	*14:01:50*	*14:16:50*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*64:60:1F:8E:C2:D3*	
25-Apr	*14:03:50*	*14:16:50*	*DJI*	*Mavic / Spark (Drone)*	*WiFi*	*62:60:1F:51:C6:96*	
25-Apr	*15:08:35*	*15:09:06*	*DJI*	*Lightbridge (Controller)*	*Lightbridge V1*	*081001DE*	
25-Apr	*15:12:51*	*15:12:51*	*DJI*	*Lightbridge (Controller)*	*Lightbridge V1*	*081001DE*	
25-Apr	*15:17:59*	*15:18:38*	*DJI*	*Lightbridge (Controller)*	*Lightbridge V1*	*081001DE*	
26-Apr	*16:50:16*	*16:56:25*	*DJI*	*Lightbridge (Controller)*	*Lightbridge V1*	*081001DE*	
26-Apr	*16:55:41*	*16:58:49*	*DJI*	*Lightbridge (Controller)*	*Lightbridge V1*	*081001DE*	
26-Apr	*16:56:03*	*16:57:10*	*Parrot*	*Bebop2 Drone*	*WiFi*	*A0:14:3D:C3:8A:32*	
26-Apr	*17:01:20*	*17:01:20*	*Parrot*	*Bebop2 Drone*	*WiFi*	*A0:14:3D:C3:8A:33*	

Drone Detection Data Analysis

Figure 2 displays the drone detections for each day of the week. Saturday has the most detections (23) which is consistent with data displayed in previous weeks. Higher periods of activity over each Saturday, along with new drone Mac addresses displaying weekly, correlate with time frames of cruise liners docking at the local port. There are low periods of activity on Wednesday and Friday, which could be due to the inclement weather conditions that were in the area at the time.

Drone Mitigations

Mitigations were performed at the site on a limited basis, with only detected drones regarded as likely or imminent threats targeted. As indicated in the Incident Table, a single DJI Lightbridge UAS was detected and its controller was promptly disabled. The drone was returned to its home launch point per the intended mitigation effect.

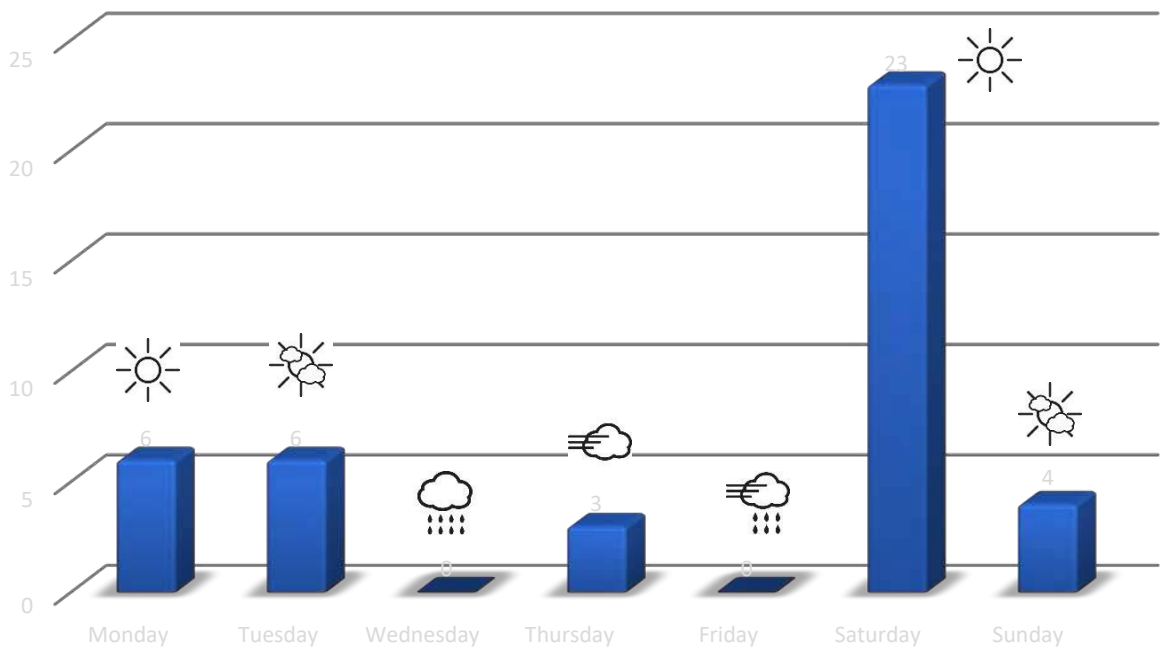

Figure 2: Daily Drone Detections

Most Active Time of the day

Figure 3 displays the number of detections for the week during each hour of the day. Most activity for drones is conducted in the afternoon from midday. This is consistent with previous data as the afternoon is the best period for capturing photographs over the ocean. There is a period of night activity on the 21st April which correlates with a local event at the time.

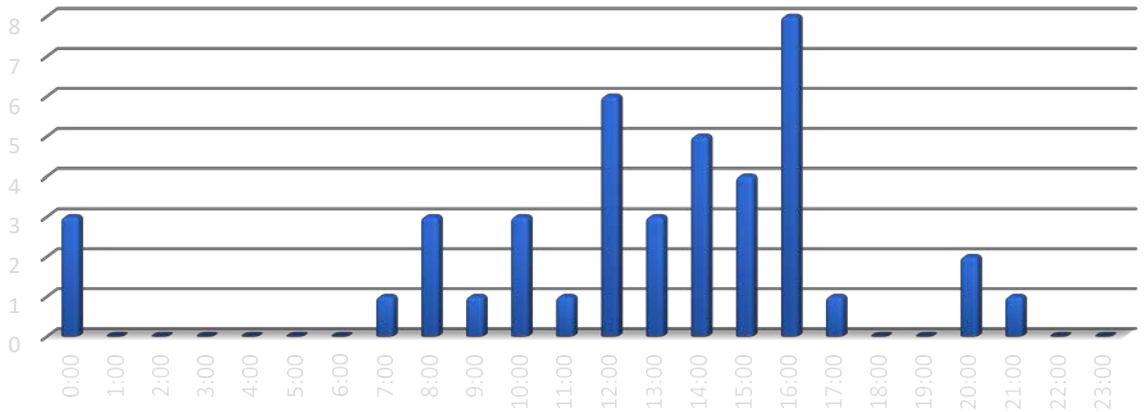

Figure 3: Most Active Time of Day

Percentage of Drone Model Types

Figure 4 displays the percentage of each type of UAS detected. Most Drones are from DJI, with Parrot and Yuneec also being detected in the area. The most common drone type detected is the Lightbridge protocol, which encompasses both Phantom 4 and Inspire drones.

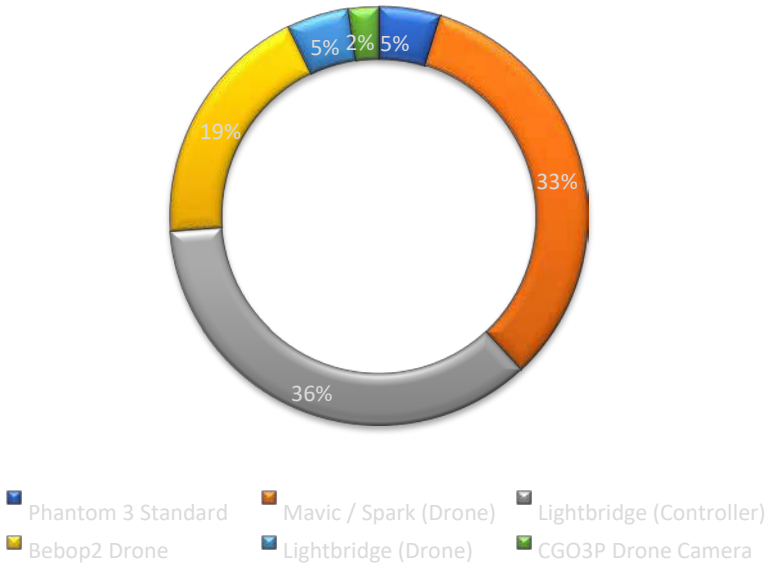

Figure 4: Percentage of Drone Model Types

Average Monitoring Time for a Drone

Figure 5 displays the average time a drone is monitored within the airspace over the period 20th – 26th April. As most of the detections are below 5 minutes it can be assumed that the majority are for photograph purposes. There are detections with extended periods, where the drone may have encroached on the facility.

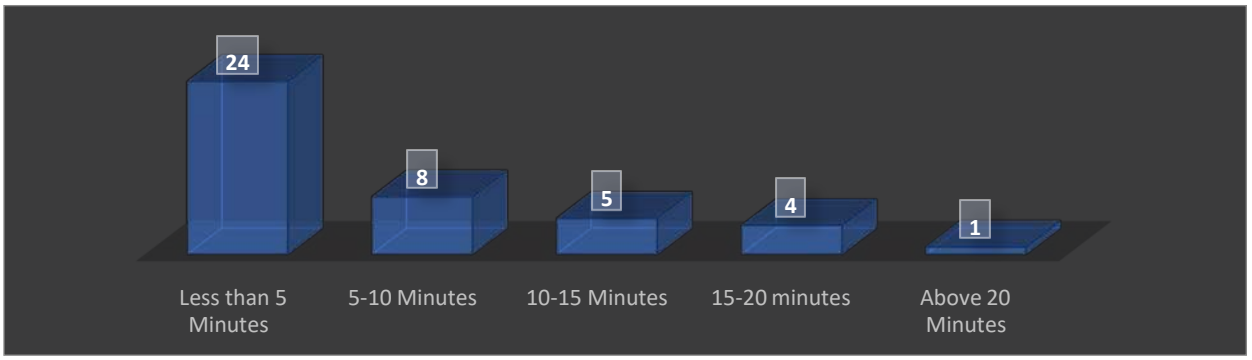

Figure 5: Average Monitoring Time for a Drone

Number of Detections Per Drone

Figure 6 displays the number of detections per drone based on the drones Mac Address. As most detected drones only appear once on the system, it can be assumed that tourists are operating drones in the area for photography purposes. The drones with multiple detections over a number of days can be assumed to be locals operating in the area.

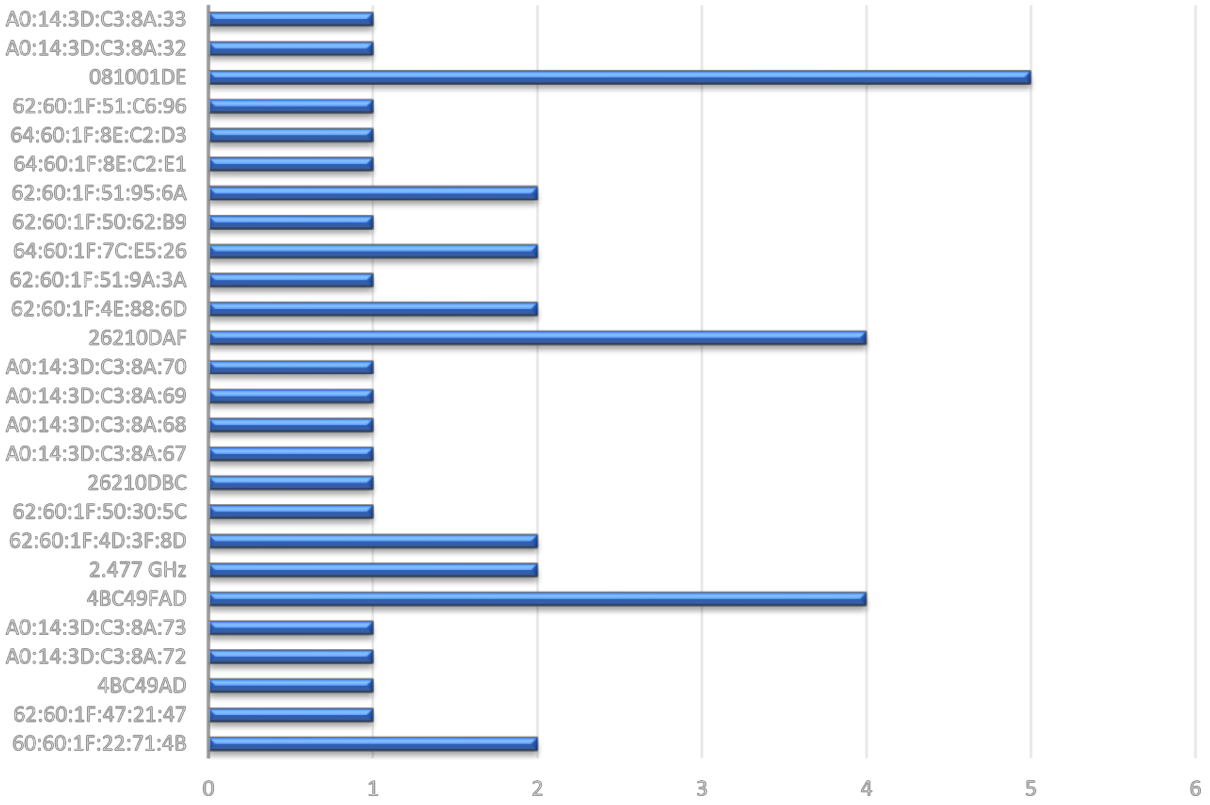

Figure 6: Number of Detections Per Drone (Mac Address)

"Drone of the Week"

With the data obtained during this reporting period the drone of the week is the DJI Phantom 4 Advanced. This drone work on the Lightbridge V1 protocol and has a detection method for both uplink and downlink.

15
Number of Detections

5
Number of Drones

DJI Phantom 4 Advanced
Communications: Lightbridge V1
Range: 3.5 – 5km (LOS)

The DJI Phantom 4 Advanced is part of the Phantom 4 series of DJI Drones. It weighs approximately 1.3kgs with battery and propellers fitted and can reach speeds up to 70km/h. The P4A was one of the first in the DJI range to be fitted with a vision system that allowed stabilization without the use of GPS. It is fitted with a 1-inch CMOS camera that allows 20MP photograph capture. The Phantom range of drones is generally used for their high video quality.

Conclusion

The Mesmer is fully operational and detecting drones within the detection range of the system. Working on the calculated assumptions detailed above it is highly possible that a number of drones are being launched and recovered from each of the specified likely launch points.

Looking at the high number of drones that have detections over a period then do not reappear on the system, it can be assumed that visitors to the area are operating these drones.

Figure 7: Most Likely Launch Point Indicating Drone Activity

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