International Civil Aviation Organization

Fifth Meeting of the Asia/Pacific Regional Search and Rescue Working Group (APSARWG/5)

Video Teleconference, 09 – 11 June 2020

Agenda Item 3: Global update

- *Cospas-Sarsat Q and A session (e.g.: reporting **false alerts**)*

ELT ALERT REPORTING AND FALSE ALERT VERIFICATION IN CHINA

(Presented by China)

SUMMARY

This paper presents statistical data regarding 406MHz Emergency Locator Transmitter (ELT) beacon alerts within China during 2019 and the strategy devised by the Air Traffic Management Office of CAAC for ELT signal verification, and some related analyses.

1. INTRODUCTION

1.1 COSPAS-SARSAT system is a satellite-based beacon alert communication system supporting the search and rescue (SAR) operations around the world (*quoted by C/S G.003*). This system is used to detect and locate distress locations of aircrafts, ships and individuals. Nowadays, COSPAS-SARSAT system plays an important role in the field of aviation SAR. However, the false alert rate of aircraft is always higher than 90%, which is becoming an outstanding issue for the safe operation of global aviation.

1.2 As for the COSPAS-SARSAT system, Mission Control Centre (MCC) sends incident alert data such as ELT beacon information to the appropriate SAR authority, meanwhile MCC obtains alert data from Local User Terminals (LUTs) or other MCCs. And then, the responsible authority who has been notified will take actions responding to the incident alert message or rescuing the person(s) in distress (*quoted by C/S G.003*). However, the process of SAR for aircrafts in China which based on COSPAS-SARSAT needs the assistance from CTTIC (China Transport Telecommunications and Information Center). The basic situations of CTTIC are as follows:

a) China's LUTs and MCC are installed in CTTIC in Beijing. Like CAAC, CTTIC is subordinate to the Ministry of Transport of the People's Republic of China.

b) Once receiving the ELT beacon distress signal, CTTIC sends alert information to CAAC and then CAAC notices its relevant authority of SAR to check the distress and rescue.

c) CTTIC sends the alert information to CAAC only once without updating.

1.3 In September of 2019, the Air Traffic Management Office of CAAC (ATMB) published guidance material known as "Enhancing and improving the verification of ELT beacon false alert" for the purpose of providing some valuable information which might be applied to analyze the cause of false alert and reduce the number of unknown alerts.

2. DISCUSSION

Heading

2.1 **Table 1** shows the statistic of ELT beacon alert data from aircrafts within the territory of China, which obtaining from CNMCC(China Mission Control Centre) during 2019.

Table 1: ELT Beacon Alert Data Statistics in China during 2019

No.	Date	Alert Time（UTC+8:00）	Country
1	20190123	21:26	412/China
2	20190201	23:31	412/China
3	20190407	15:14	412/China
4	20190408	16:42	412/China
5	20190429	11:58	412/China
6	20190520	7:27	412/China
7	20190601	15:19	412/China
8	20190607	10:48	412/China
9	20190608	10:38	412/China
10	20190611	10:13	412/China
11	20190616	9:30	412/China
12	20190723	6:29	412/China
13	20190724	16:19	412/China
14	20190724	17:42	412/China
15	20190724	19:50	412/China
16	20190729	10:15	412/China
17	20190729	14:58	412/China
18	20190806	11:09	412/China
19	20190811	10:08	533/Malaysia
20	20190812	5:58	412/China
21	20190814	11:04	412/China
22	20190814	14:27	412/China
23	20190816	9:22	412/China
24	20190819	15:57	412/China
25	20190826	16:26	412/China
26	20190826	16:29	412/China
27	20190829	8:06	412/China
28	20190902	10:23	412/China
29	20190902	10:11	412/China
30	20190903	21:03	412/China
31	20190907	11:36	412/China
32	20190911	9:46	412/China
33	20190912	16:21	412/China
34	20190917	9:42	412/China
35	20190927	17:05	412/China
36	20190927	9:36	412/China
37	20190929	17:33	412/China
38	20190929	20:23	412/China
39	20191003	9:08	412/China
40	20191009	17:33	525/Indonesia
41	20191011	18:42	412/China
42	20191021	17:19	412/China

No.	Date	Alert Time（UTC+8:00）	Country
43	20191022	10:46	230/Finland
44	20191025	9:47	412/China
45	20191025	18:11	412/China
46	20191026	21:17	412/China
47	20191029	10:39	412/China
48	20191109	18:36	412/China
49	20191110	19:11	412/China
50	20191110	21:07	412/China
51	20191112	16:22	412/China
52	20191119	7:00	412/China
53	20191203	10:03	412/China
54	20191212	18:58	412/China
55	20191214	9:45	412/China
56	20191219	10:10	440/South Korea
57	20191219	11:38	412/China
58	20191224	5:05	412/China
59	20191225	16:39	412/China
60	20191227	9:50	366/American
61	20191231	11:17	412/China

2.2 According to the data in **Table 1**, the geographic distribution of the ELT beacon alert from aircrafts within China is in **Figure 1**. Almost 90% of the 406MHz ELT beacon alerts come from aircraft in Eastern China.

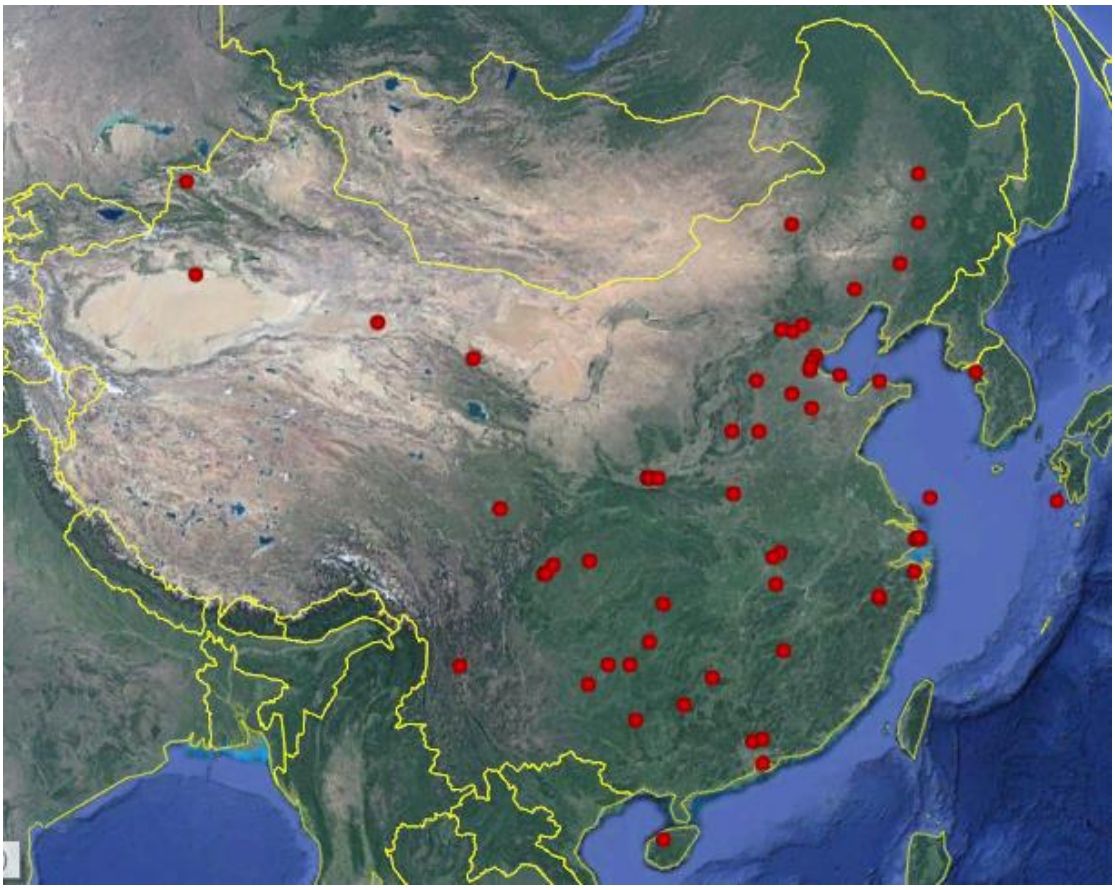

Figure 1: Geographic distribution of ELT Beacon Alerts from Aircraft within China (2019)

2.3 Based on **Table-1** and **Figure 1**, the following conclusions can be made:

a) During 2019, there were 61 ELT beacon alerts from aircrafts within the territory of China, and 91.80% of the related aircraft belonged to Chinese airlines (**Figure 2**).

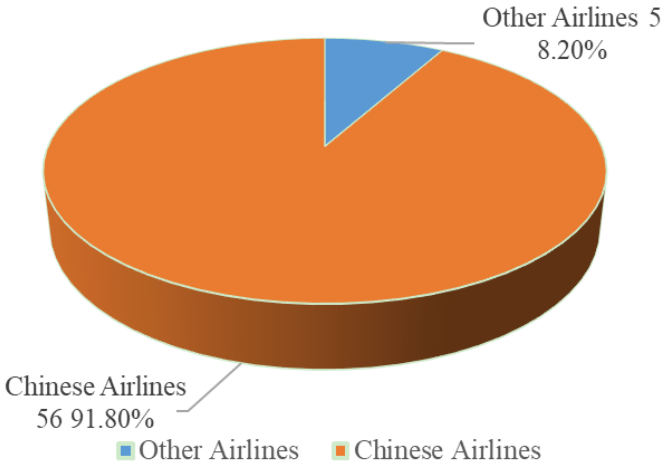

Figure 2: Ratio of Airline ELT Beacon Alerts Within China

b) The average number of ELT beacon alerts from aircrafts within the territory of China event is 5.08 per month. **Figure 3** indicates that the peak value of ELT beacon alert events was 11 during September.

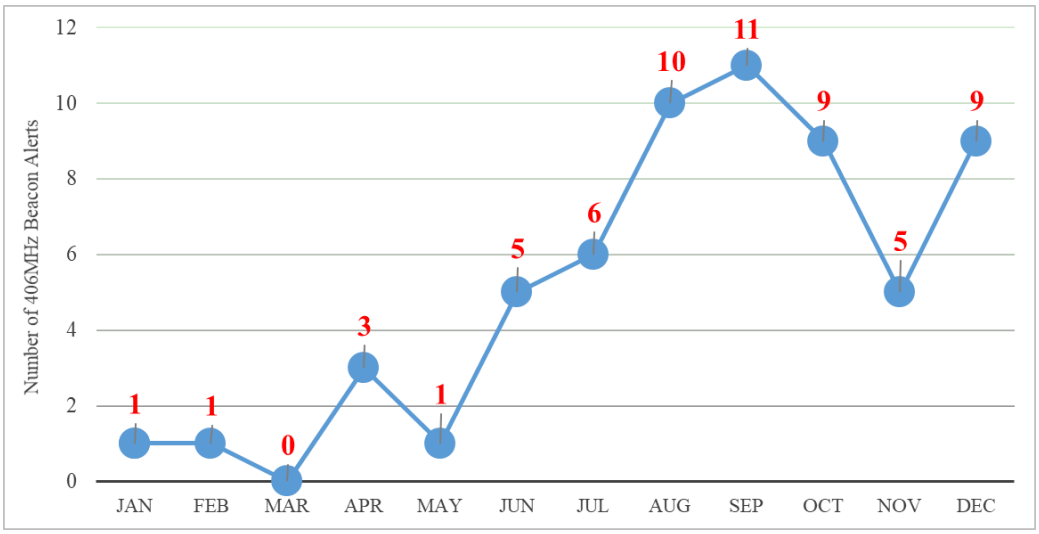

Figure 3: Monthly Statistics of ELT beacon alerts during 2019

c) According to the data, the quantity of the ELT beacon alerts from aircraft within China varies as shown as **Figure 4**. The top three highest values appeared at the time interval around 9:00, 10:00 and 16:00 (local time) respectively, probably because the heaviest airspace traffic occurs during these certain periods.

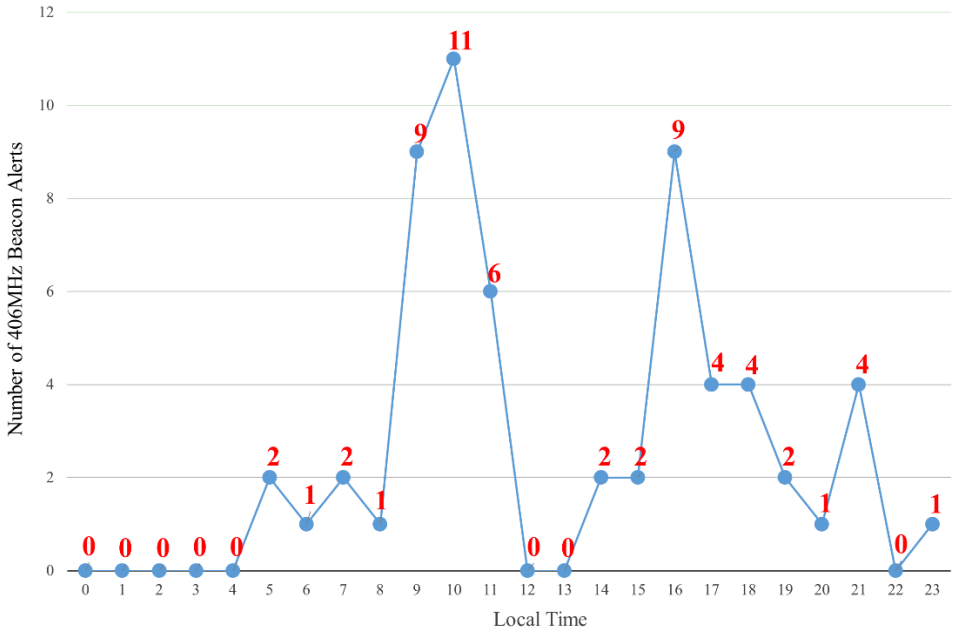

Figure 4: Time Distribution of ELT Beacon Alerts

d) There was only one real alert out of the whole events, which means that the false alerts rate of ELT from aircrafts within China was 98.36% in 2019 (**Figure 5**).

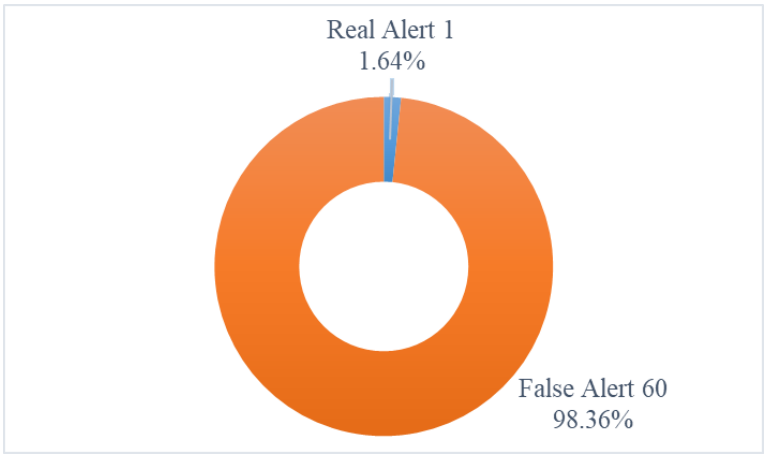

Figure 5: Comparison between Real and False Alerts

e) All the ELT beacon false alerts in 2019 were classified by four main categories which include beacon mishandling, beacon malfunction, environment conditions and unknown. As shown in **Figure 6**, there were also 51 false alerts (accounting for 85%), where the cause has not yet been determined.

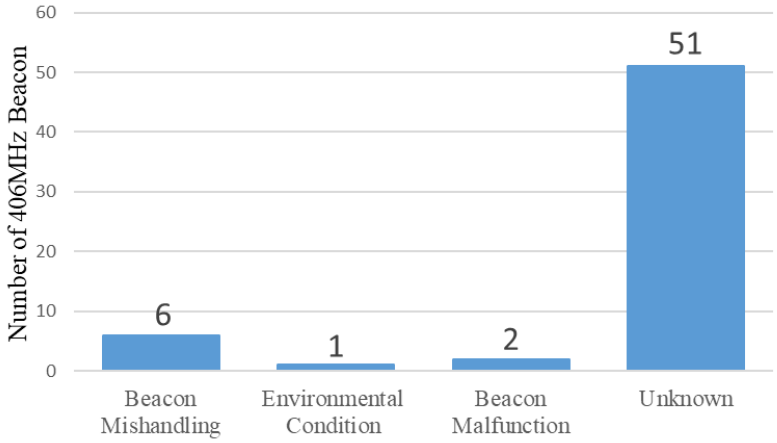

Figure 6: ELT Beacon false Alert Categories Statistics

On-Going Actions by ATMB

2.4 Regarding **Figure 6**, there are two cases related to the high proportion of unknown ELT beacon false alerts. Case I refers to the relevant departments that hadn't looked into the event or reported the cause, and Case II is the relevant departments which were unable to determine any valuable information, although they had investigated the beacon alert event.

2.5 Considering the issues identified, the ATMB released civil aviation guidance material known as *Enhancing and Improving the Verification of ELT Beacon False Alerts* in September 2019. The principles included procedures, including ELT beacon alert verification processes for managing the issue of ELT beacon alerts. The details are in **Figure 7**.

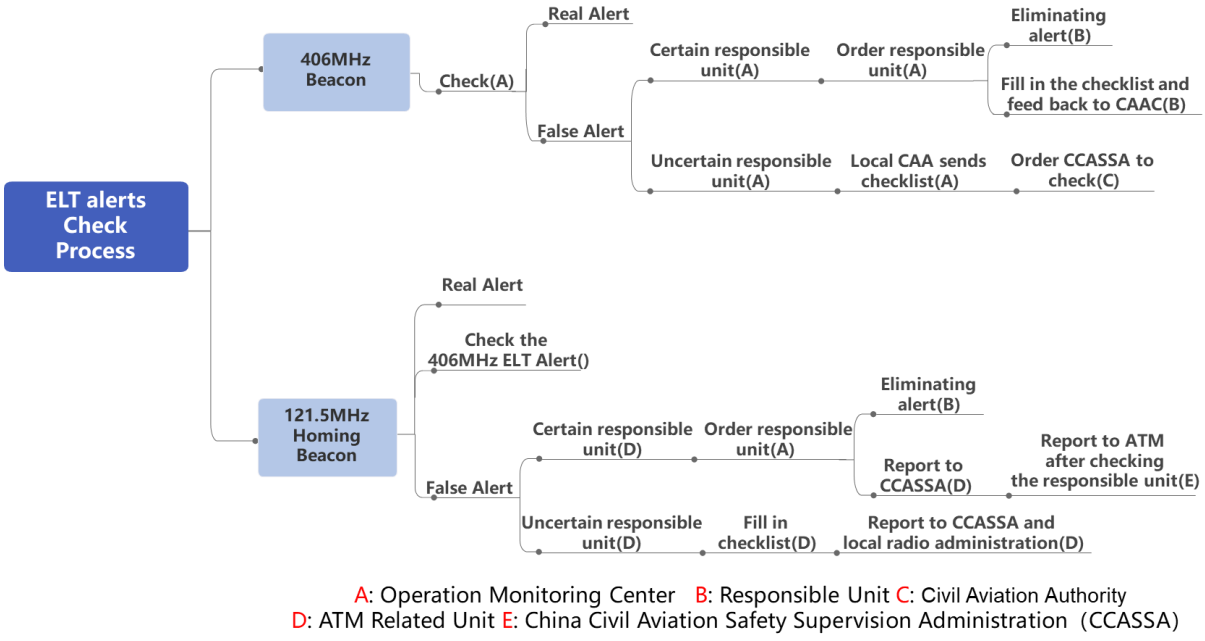

Figure 7: ELT Guidance Material Process for Alert Check Process

2.6 For each ELT alert's investigation, there are five kinds of relevant departments involved. Investigators should consider not just the alert from the 406MHz ELT beacon, but also give attention to the 121.5MHz homing beacon. According to this principle, the relevant departments must check in time once an ELT beacon alert event occurs and also receive feedback on the false alert's checklist including ELT equipment information, ELT beacon false alert impact and false alert processing result.

2.7 China compared the proportion of unknown event ratio before and after the principle released, as shown in **Figure 8**. Because of the strategy, the proportion of unknown decreased from 68.75% to 48.28%, which means that the guidance could effectively improve the ELT beacon alert investigation ability and make us better understand the truth and cause behind.

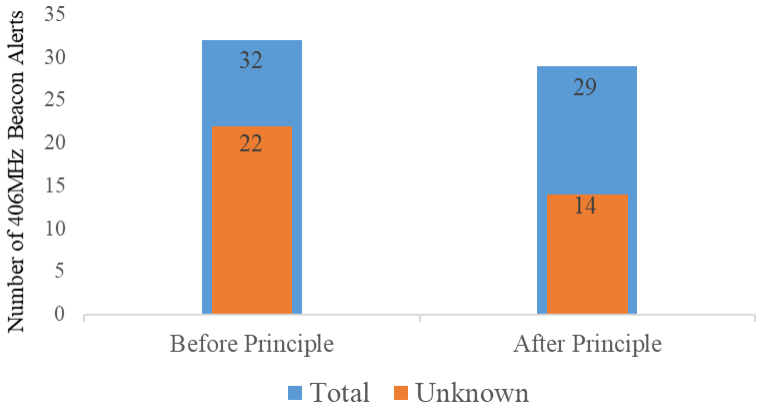

Figure 8: Comparison of the Proportion of Unknown Causes

2.8 Therefore, we conclude that this principle could effectively reduce the number of event about Case I and further enhance the safety consciousness for the relevant personnel such as pilot or air crew. With the implementation of the new verification strategy, there will be more causes about ELT beacon alerts obtained, which will give us more valuable information to do some new research and analyses about the false ELT beacon alert.

Conclusion

2.9 The meeting is invited to note the impacts of false alert from 406MHz ELT beacon, and statistics analysis, and some actions that have been taken by CAAC to manage and address the issue.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

…….