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**ASSEMBLY — 40TH SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 30: Other issues to be considered by the Technical Commission**

**ENGINEERED MATERIALS ARRESTING SYSTEM (EMAS)  
IMPLEMENTATION IN CHINA**

(Presented by China)

**EXECUTIVE SUMMARY**

This information paper presents the Civil Aviation Administration of China's (CAAC) certification process of Engineered Materials Arresting System (EMAS) and the EMAS implementation in China, to increase the airport's safety level by reducing the severe consequence of overrun. At present, Lanzu-1 EMAS is the only EMAS which obtained the approval from CAAC, and has been installed in several domestic airports in China. The CAAC is planning to progressively install EMAS in the airports where the overrun consequence may be catastrophic.

<i>Strategic Objectives:</i>	This information paper relates to Strategic Objectives of Safety.
<i>Financial implications:</i>	
<i>References:</i>	Annex 14 — <i>Aerodromes</i>

**1. INTRODUCTION**

1.1 According to ICAO Annex 14, a 90 meters runway end safety area (RESA) is required, and a 240 meters RESA is recommended to improve the safety margin of airports. However, numbers of airports with high risks of overrun cannot meet such requirement. Besides, some airports with limits of geographical conditions cannot extend RESA. Under such circumstances, EMAS offers an alternative with an equivalent effect as RESA. Because there are dozens of airports in China with the above limits, CAAC started the study and approval of EMAS since 2010 and ultimately established the related standards.

<sup>1</sup> Chinese and English versions provided by China.

## 2. RESEARCH AND CERTIFICATION PROCESS

### 2.1 Research

2.1.1 China Academy Civil Aviation Science and Technology (CAST) started the initial research of Lanzu-1 EMAS in 2007, and finally finished in 2010. During this process, a complete set of exclusive calculation model and manufacture method were established.

### 2.2 Certification Process

2.2.1 In 2011, CAST began to apply the approval from CAAC. CAAC composed a high-class approval group, with strict requirements and procedures.

2.2.2 Covering all technical specifications and capabilities of EMAS, the approval process includes: design theory and design methods of EMAS, simulation models, performances of EMAS material and system, single wheel loading tests, tests of a real aircraft tests and production capability and quality assurance (QA) system of the material supplier.

2.2.3 In order to verify the arresting ability, CAST even bought a Boeing 737 to conduct 6 times real aircraft test (Figure.1).



**Figure1. Real aircraft arresting tests**

2.2.4 On July 12, 2012, after completion of all steps in the approval process, CAAC issued the document The Permission of Engineering Applications of EMAS, in which the final conclusion was drawn by CAAC: “LANZU-1 EMAS reaches standards of approval; real aircraft tests indicate that EMAS arrests airplanes effectively, which satisfies the requirement of engineering applications; CAAC permits the design, production and construction of EMAS for industrialized applications.” LANZU-1 EMAS obtained the approval of CAAC.

2.2.5 December 31, 2015, CAAC issued the EMAS industry standard MH/T 5111 -2015, and it was implemented in April 1, 2016. This is the 1st and only EMAS industry standard up to now, which served as an important reference by AASWG during the establishment of related guidance material.

2.2.6 In 2016, Lanzu-1 EMAS was listed as one of the special purpose equipment at civil airports, subject to authority regulations. Any new-entrant manufacturer and their new model must be tested according to the industry standard through a third-party inspection agency recognized by the CAAC before they can be officially put into service.

### 3. IMPLEMENTATION IN CHINA

#### 3.1 Installed Airports

3.1.1 In 2013, the first Lanzu-1 EMAS was successfully installed at Tengchong airport (Figure 2). It's been more than 6 years since Lanzu-1 EMAS was installed. It shows great weather resistance and durability. Tengchong airport's safety level has been improved, and the flight number has been increased. The airport authority is very satisfied with Lanzu-1 EMAS.



**Figure2. Lanzu-1 EMAS at Tengchong Airport**

3.1.2 In 2017, the 2nd Lanzu-1 EMAS was installed at the north end of the runway at Panzihua airport (Figure 3). Currently, the south end of the runway has received implementation approval from CAAC as well.

3.1.3 Linzhi airport is located in the Tibet, it's a high altitude airport with water body surrounded and complex weather condition (Figure 4). Linzhi Airport Lanzu-1 EMAS project was completed at the end of 2018.



**Figure3. Lanzu-1 EMAS at Panzihua Airport**



**Figure4. Linzhi Airport**

3.1.4 So far, Lanzu-1 EMAS has been successfully installed and implemented at four airports, including Tengchong, Panzihua, Linzhi etc. According to the provisions stipulated by the standard, any system must undertake a thorough performance evaluation every 5 years after installation, so as to make sure that its arresting ability is compliant with the design specifications.

## 3.2 Future Plan

3.2.1 Since Lanzu-1 EMAS was installed in Tengchong airport 6 years ago, the airport safety level was improved, flight crew's mental pressure was reduced, flight's OTP was significantly increased.

3.2.2 In China, there're more than 30 airports are high filled or high altitude or water body surrounded just like Tengchong airport, where the aircraft overrunning consequence may be catastrophic. In order to increase all these airports safety margin, CAAC is planning to progressively install EMAS in these airports.

3.2.3 Evaluations will be carried out for domestic airports which then will be classified according to the climatic conditions of the area where the airport is located, as well as the topographic and operational conditions of RESA, so that more targeted technical measures can be adopted to improve the environmental adaptability and weather resistance of EMAS, and as a result reduce the cost of use.

3.2.4 CAAC is willing to share our experience obtained during EMAS approval, industry standard making and its applications, and make our effort to drive innovation and the sustainable development of aviation industry.

## 4. CONCLUSION

4.1 The Assembly is invited to note the information in this paper and discuss any relevant matters as appropriate.