

|  |   |  |
|--|---|--|
| Telephone No. : 011-24622495<br>Aeronautical : VIDYAYX<br>E-Mail: dgoffice@dgca.nic.in<br>Fax 011-24616783 | GOVERNMENT OF INDIA<br>AERONAUTICAL INFORMATION SERVICES<br>DIRECTOR GENERAL OF CIVIL AVIATION<br>OPPOSITE SAFDARJUNG AIRPORT<br>NEW DELHI-110003 | AIC<br>Sl. No. 20/2017<br>29 <sup>th</sup> September, 2017 |
|--|---|--|

No. AV. 27039/02/2010-ANS

The following circular is issued for information, guidance and compliance, in supersession of AIC 06/2000.



(B.S. BHULLAR)

Director General of Civil Aviation

### **FREE BALLOON FLIGHTS (UNMANNED)**

#### **1. INTRODUCTION**

- 1.1** The purpose of this A.I.C. is to disseminate the information regarding balloon operations in India. A pilot in command should use this information for the safety of aircraft.

#### **2. GENERAL**

- 2.1** Large hydrogen-filled balloons of various sizes are launched periodically, normally from October through May, from Hyderabad in India. These balloons are unmanned and carry scientific equipment which records data from the upper atmosphere. Ascent is made to altitudes between 25 Kms and 52 Kms with flight durations from 3 to 12 hours.
- 2.2** Separations between an aircraft and a balloon, whether operating inside or outside controlled airspace, is the responsibility of the pilot in command, who is in the position to use his aircraft radio and radar navigation equipment and visual observation to any possible conflict. Balloon operations will be confined to visual meteorological conditions and a flight information service will be provided to assist pilots in the safe conduct of flight. The following additional general information is published to provide the pilot-in-command with a more detailed knowledge of unmanned balloon operations.

### 3. BALLOON LAUNCHING SITE

- 3.1 Balloon Facility, Hyderabad, India:  
Latitude: 17°28'26"N, Longitude: 78°34'53"E, Altitude: 545m (1800 ft.) AMSL

### 4. IMPACT / RECOVERY AREAS

- 4.1 The flight paths will be selected so that the impact/recovery areas will normally occur within the area bounded by 210002.6N 735957.2E 210002.8N 815953.4E 140004.9N 815953.7E 140004.7N 735957.3E 210002.6N 735957.2E.

**NOTE:** In some cases, especially when the scientific experiments require longer exposure or longer duration flight, the flight path and the impact zone may fall outside above limits. However, the extent of enlarged area in such cases would be appropriately notified.

### 5. BALLOON TRACKING

- 5.1 Positive tracking of the balloon will be made from the launching site and position information would be available with Area Control Center, Shamshabad.

### 6. BALLOON DIMENSIONS AND EQUIPMENT (ASCENT)

- 6.1 The size of a balloon used for a particular project is primarily related to the Payload carried for convenience of description; they are referred to as large or small types in accordance with the following details.

#### (a) Large Balloons -TIFR

|                                    |                                  |
|------------------------------------|----------------------------------|
| Total Weight (Balloon + Payload) : | between 1200Kg & 2000Kg.         |
| Weight of the Payload :            | between 600Kg & 1200Kg.          |
| Diameter (top of ascent) :         | between 70 meters and 125 meters |
| Rate of Ascent :                   | 4 to 5 meters per second         |

#### (b) Small Balloons -TIFR

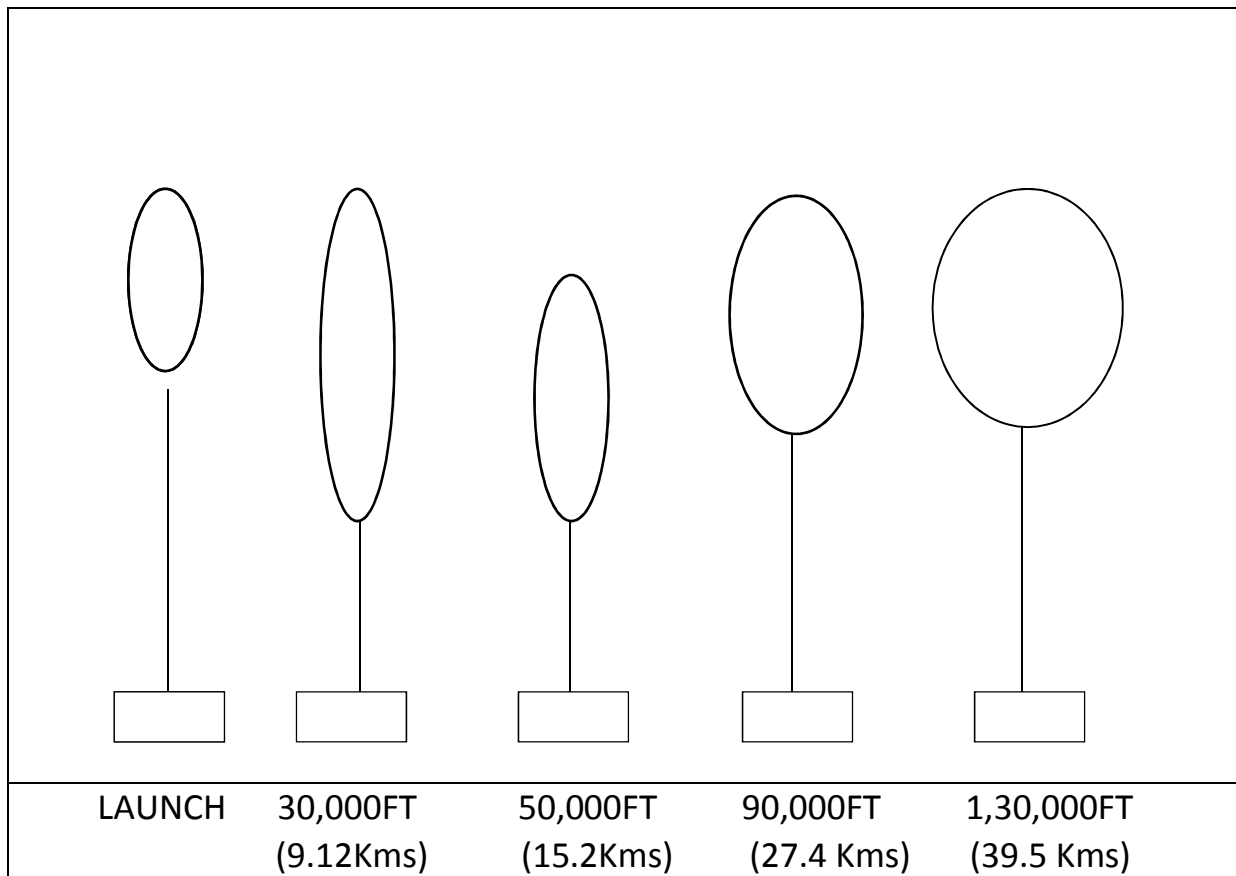
|                                    |                               |
|------------------------------------|-------------------------------|
| Total Weight (Balloon + Payload) : | between 400Kg & 1000Kg.       |
| Weight of the Payload :            | between 100Kg & 600Kg.        |
| Diameter (top of ascent) :         | between 35 meters & 70 meters |
| Rate of Ascent :                   | 4 to 5 meters per second      |

#### (C) Small Balloons – TIFR

|                                   |                 |
|-----------------------------------|-----------------|
| Total Weight (Balloon +Payload) : | up to 100Kg.    |
| Weight of the Payload :           | up to 50Kg.     |
| Diameter (top of ascent) :        | up to 30 meters |

Rate of Ascent : 4 to 5 meters per second

**NOTE:** In all cases, but particularly with the large types, the shape of the balloon is very long and narrow when launched but expands with increase in altitude (see diagram below)



- 6.2 In addition to the scientific equipment which is carried aloft in a flight train beneath the balloon, other devices are attached as follows:
- Automatic pre-set electronic timer.
  - Radio controlled cut-down facilities on all balloons.
  - Pressure switch for separation of balloon or parachute in case balloon descends below 50,000feet.
  - A parachute to limit the terminal descent velocity of the payload to about 5 to 6 meters per second.
  - A navigation light (blinker) which operates during both ascent and descent below 15Kms.
  - A radio beacon which operates on frequency 1665 KHz with call sign TFR Will be put on all balloons for anti-collision purpose. This beacon will always operate on descent when balloon is below (20km) 60000feet and shut down below 2km.
  - An ATC Transponder giving both its altitude and position.
  - One GPS unit on the main payload provides continuous position information through telemetry RF link.

- (i) One GPS radiosonde on the load line provides continuous position information through another RF (403MHz) link.

**NOTE:** The flight train which connects various pieces of equipment to the balloon may be as long as 80 meters on the larger types. The 1665 KHz radio beacon long wire antenna of 85 meters length is deployed below the last payload on the flight train.

## **7. BALLOON AND EQUIPMENT (DESCENT)**

- 7.1 On termination of flight, balloons and payload are cut down by command signal. The standby cut-down device will automatically function at a later pre-set time in case command signal fails. Although separated during the cut down operation, the payload and balloons will descend in close proximity to one another. The balloon in free fall as a billowing mass of thin polythene fabric material and the payload beneath a brightly coloured aviation orange / white or aviation orange / green parachute. The size of the parachute will vary from 5 meters to 20 meters depending on the size of the payload. In case of standby cut-down device failure, a pressure switch separates the balloon and the parachute with payload when the balloon comes down to 50,000feet.
- 7.2 The initial rate of descent is quite rapid but below 12Km descent average approximately 5 to 7.5 meters per second.

## **8. PRE- FLIGHT AND IN-FLIGHT INFORMATION**

- 8.1 Available information on proposed balloon flights will be available at pre-flight briefing units to pilots of aircraft likely to be affected.
- 8.2 In-flight information on operation of balloons will be passed to all flights.
- 8.3 Separation between an aircraft and the balloon is a pilot responsibility on the basis of information provided in accordance with the preceding paragraphs, irrespective of whether the aircraft is operating inside or outside controlled airspace. When operating in controlled airspace and when so requested by a pilot in command, ATC will offer a diversion or approve a pilot request for a diversion from track subject to other controlled traffic in order that the aircraft will remain clear of the balloon and equipment.

\*\*\*\*\*