AIRPORTS AUTHORITY OF INDIA

Department of Aerodrome Safeguarding

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[File No. AAI/ATM/DoAS/72/2019-Part]

AERODROME SAFEGUARDING CIRCULAR (ADSAC) 09 OF 2020

Subject: **Processing of NOC Applications for height clearance for Airport Equipment and Essential Navigation Aids**

1. Introduction

1.1. At airport various visual and non-visual aids (e.g. approach lighting towers, meteorological equipment, radio navigational aids) are located near runways, taxiways and aprons, where they may present a hazard to aircraft in the event of accidental impact during landing, take-off or ground manoeuvring. All such equipment and their supports should be frangible and mounted as low as possible to ensure that impact does not result in loss of control of the aircraft.

1.2. The frangibility is achieved by use of lightweight materials and/or the introduction of break-away or failure mechanisms that enable the object to break, distort or yield under impact.

1.3. **Obstacles to be made frangible**

1.3.1 Obstacles are defined as all fixed objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a surface intended to protect an aircraft in flight. The first objective should be to site objects so that they are not obstacles. Nevertheless, certain airport equipment and installations, because of their function, must be located in an operational area. All such equipment and installations as well as their supports should be of minimum

mass and frangible in order to ensure that impact does not result in loss of control of the aircraft.

1.4. Any equipment or installation required for air navigation purpose installed near runways, taxiways and apron may not be evaluated through NOC Application System (NOCAS) as whole runway strip is incorporated as No Construction Zone. Also, Obstacle Free Zone (OFZ) system (Inner Approach, Inner Transition and Balked Landing) are not incorporated in NOCAS.

1.5. For a precision approach runway, the OFZ shall be kept free from fixed objects other than light weight frangible mounted aids to air navigation, which must be near the runway to perform their function.

2. Purpose

2.1. To define the list of airport equipment or air navigations aids installed in operational area which need to meet the frangibility requirements and processing of such installations by the concerned airport and AAI DoAS office for timely issuance of necessary approvals, including No Objection Certificate if so required.

3. Scope / Applicability

3.1. This ADSAC applies to all Airports for which AAI is responsible for Aerodrome Safeguarding, vide the provisos of GSR 751(E), as amended from time to time.

4. Cancellation

4.1. AAI CHQ Letter AAI/ATM/NOC/32/2017 dated 23rd March 2017 on waiver of NOC for AWOS is withdrawn.

5. Effective date

5.1. This ADSAC will be effective from the date of its issue.

6. Obstacle Free Zone

6.1. The Inner Approach, Inner Transitional and Balked Landing Surfaces (collectively referred as Obstacle Free Zone or OFZ)

6.2. Obstacles Free Zone shall be established for a runway equipped with precision approach (ILS) category I, II and III operations. The zone shall be kept free from fixed objects other air navigation aids, which must be near the runway, to perform their function, mounted on light weight frangible fixtures.

6.3. The dimensions and slopes of the Obstacles free zone (Code 3 and 4) are given below.

6.3.1. The inner approach surface

6.3.1.1.	Width	120 meters
6.3.1.2.	Distance from Threshold	60 meters
6.3.1.3.	Length	900 meters
6.3.1.4.	Slope	2%

6.3.2. The inner transitional surface

6.3.2.1.	Slope	33.3%

6.3.3. Balked Landing Surface

6.3.3.1.	Length of the Inner edge	120 meters
6.3.3.2.	Distance from Threshold	1800 meters
6.3.3.3.	Divergence	10%
6.3.3.4.	Slope	3.33 %

7. Siting of Equipment in Operation Area and their Frangibility Requirement

(As per GSR 751 (E) and DGCA CAR Section 4 Series 'B' Part I, Aerodrome Design and Operations)

7.1. Any equipment or installation required for air navigation purposes which must be located:

(a) On that portion of the runway strip within:

i) 75 meters of the Runway centerline where the Runway code is 3 or 4 or

ii) 45 meters of the Runway centerline where Runway code is 1 or 2; or

(b) on a runway end safety area, a taxiway strip or within the distances specified in CIVIL AVIATION REQUIREMENTS SECTION-4, SERIES 'B', PART I Aerodrome Design and Operations or

(c) on a clearway and which would endanger an aircraft in the air,

shall be frangible and mounted as low as possible.

7.2 Any equipment or installation required for air navigation purposes which must be located on or near a runway strip of precision approach Runway ILS category I, II or III and which:

(a) is situated on that portion of the runway strip within 77.5 meters of the runway centerline where the code number is 4 and code letter is F; or

(b) is situated within 240 meters from the end of the runway strip and within:

(i) 60 meters of the extended runway centerline where Runway code is 3 or 4

(ii) 45 meters of the extended Runway centerline where Runway code is 1 or 2; or

(iii) penetrates the inner approach surface, the inner transitional surface or the balked landing surface,

shall be frangible and mounted as low as possible.

8. DGCA CAR Series 'B' Part I Section 4 on Aerodrome Design & Operations, Vol.1, Chapter 9 specifies Airport equipment and installations which, because of their particular air navigation function, have to be located in an operational area include:

a. Wind direction indicators
b. Instrument landing system (ILS) localizer equipment
c. ILS glide path equipment
d. ILS monitoring antenna
e. Microwave landing system (MLS) approach azimuth equipment
f. MLS approach elevation equipment
g. MLS monitoring antenna
h. Radar reflectors
i. Anemometers
j. Ceilometers
k. Transmissometers
l. Forward-scatter meters
m. Fencing

9. Standard Siting of ILS (Localizer and Glide Path) and Aviation Weather Observation System (AWOS)

9.1. Guidance or specifications on the siting of navigational aids are contained in Annex 10 — *Aeronautical Communications,* Volume I — *Radio Navigation Aids,* and DGCA CAR Section 4 Series 'B' Part I on Aerodrome Operations and Design and their related manuals. These should be taken into account when siting navigational aids. In general, equipment and security fencing should be sited as far away from the runway and taxiway centre lines as practicable.

9.2 ILS Localizer

9.2.1 The preferred location for the localizer antenna array is on the extended runway centre line beyond the far end of the runway. This location permits the radiated on-course signal to overlie the runway centre line. The following factors govern site selection:

i. Coverage requirement;
ii. Type of localizer array;
iii. Obstacles or vertical reflecting surfaces within the desired localizer coverage volume;
iv. Obstacle clearance and missed approach criteria;
v. Location of monitoring antenna; and
vi. Technical siting considerations.

9.2.2. A maximum height of 4.8 M of the LLZ antenna may be permitted so as not to penetrate the Approach Surface of the opposite runway if;

a) LLZ is located at a distance of 300m or more from the nearest Runway End; and
b) The elevations of the LLZ site and runway end are same.

9.3 ILS Glide Path Antenna System

9.3.1 The lateral displacement of the ILS glide path antenna system should not be less than 120m with respect to the runway centre line. The longitudinal location should be selected to place the ILS reference datum as close as possible to the recommended nominal value of 15m above the threshold. In general, the following factors govern site selection:

i. Desired operating limits with respect to approach speeds and rates of descent of aeroplanes;
ii. The position of obstacles in the final approach area, the aerodrome sector and the missed approach areas, and the resulting obstacle clearance limits;
iii. Runway length available;
iv. Location of monitoring antenna; and
v. Technical siting considerations.

9.3.2 A maximum height of 17 meters of the GP antenna may be permitted above the elevation of the threshold of the runway for which the ILS is planned, so as not to penetrate the Inner Transition Surface if;

a) The GP antenna is located laterally at a distance of 120m or beyond from runway centre line; and

b) The elevation of the GP site and of the threshold of the runway, for which the ILS is planned, are same.

9.4 Aviation Weather Observation Systems (AWOS)

9.4.1 The following guidelines should be followed by the India Meteorological Department (IMD) and the Airport Management for the selection of AWOS sites at the airports:

9.4.1.1 To protect the obstacle free zone, the Met Park of size 10M x 50M should be located between 105M and 120M from the runway Centre line with in a distance of 500M from runway threshold.

9.4.1.2 However, to protect LLZ signal propagation, all such installation, including the mast should not subtend elevation angle of more than 0.75° within +/- 10° azimuth and elevation angle of more than 1.1° within +/- 10° to 35° azimuth in front of LLZ antenna. (For example the location of the mast should be minimum 500M from LLZ antenna if the maximum mast height is 6M, above LLZ site elevation or 765M if the maximum mast height is 10M).

9.4.1.3 The Met Park shall not be located in front of the Glide Path.

9.4.1.4 The AWOS or Airport Meteorological Instruments should be installed beyond the No Construction Zone (NCZ) of all the CNS facilities as given in enclosed annexure 1.

9.4.1.5 The AWOS or Airport Meteorological Instruments shall be mounted on frangible masts as per the guidelines given in ICAO Doc. 9157 Aerodrome Design Manual Part 6-Frangibility.

9.4.2 IMD Officials shall submit the details of location of AWOS containing its height, route of Power cable, site plan etc. to the concerned Airport Director in accordance with the guidelines mentioned in PARA 9.4.1. The concerned APD or CEO of the airport, as the case may be, shall facilitate the IMD for the selection of the AWOS site in consultation with Aerodrome Safeguarding Team of the Airport.

10. Height determination and Processing of NOC applications

10.1. Air Navigation Aids, as stated at para 8, planned to be installed as per the standard siting criteria, as defined in Para 9, may be processed by the Directorate of CNS planning through a designated GM (CNS-P), AAI CHQ for issuance of NOC on the recommendation of the concerned Technical Site Selection Committee, comprising of officers from Directorate of CNS-Planning, RCDU and CNS-O&M as duly approved by the Executive Director (CNS-P), AAI CHQ.

10.2. For AWOS, planned to be installed as per the siting criteria of 9.4, Airport Director of AAI airport or CEO of a Private /Joint Venture airport, as the case may be, whose Aerodrome Safeguarding Team is actively involved in the site selection process, may approve the site selection on the recommendation of the Aerodrome Safeguarding Team.

11. Airport Equipment not meeting the standard siting criteria

11.1. For the equipment or Air Navigation Aids as listed in Para 8, not meeting the standard siting requirement, may be initially processed by respective airport, analysing the reasons of deviation. An e-file along with recommendation of APD /CEO should be sent to the Designated Officer for processing. An undertaking on letterhead may be submitted by the Project Manager that such equipment shall meet the frangibility requirements.

11.2. In addition to the e-file, Project Manager shall file online NOC application in NOCAS, so that calculation sheets & NOCAS GIS features are available to the DoAS office.

Since OFZ surfaces are not incorporated in NOCAS, and most of such cases are to be processed by the offline NOCC, the AGA member of the NOCC may send the case to offline NOCC by disagreeing with the NOCAS height by giving reason "Airport Equipment or Essential Air Navigation equipment"

11.3. The concerned DoAS office shall process such file and may issue NOC after ensuring that such equipment is not penetrating the Obstacle Free Zone (OFZ) of a precision approach of CAT-I, CAT-II and CAT-III ILS runway.

12. Processing of NOC of other airport equipment or CNS facility

12.1 All other equipment or Air Navigation, Surveillance and communication aids not listed in Para 8, a normal process of issuance of NOC through NOCAS will be followed.

12.2 **Processing of NOC of a replacement CNS facility:** If the height of a proposed CNS facility is restricted by the old CNS facility, which is being replaced by the proposed new facility, the height restriction due to the old facility shall be removed by the concerned CNS Member of NOC Committee (NOCC) in coordination with the Designated Officer.

12.3 **Provision of CNS Simulation Study:** If the height of an airport equipment, a CNS facility or a structure, being proposed by the airport Operator within the airport premises, is restricted by one or more CNS facilities (other than para 12.2), then CNS simulation study may be carried out as per ADSAC6 of 2020.

13. Preferred siting of non-frangible equipment components

13.1. In cases where frangible design of equipment would be impracticable or would jeopardize the operational performance to stipulated requirements, the object should be relocated or otherwise positioned so as to not present a hazard to aircraft.

13.2. In systems design, consideration should be given to the possibility of arranging components in such a way as to limit the number and/or mass of obstacles on those areas that must be maintained free of all objects, except for frangible equipment and installations required for air navigation purposes.

14. **Validity:** This ADSAC will remain valid till it is amended or withdrawn or incorporated in the Aerodrome Safeguarding Manual.

15. **Document Control and feedback:** This ADSAC has been issued by the office of ED (ATM-DoAS) with the concurrence of Directorate of CNS-OM. Any feedback, suggestion or the error in this document may be brought into the notice of GM (DoAS) at AAI CHQ at gmdoaschq@aai.aero.

(J.P. Alex)
Executive Director (ATM-DoAS)

Dated: 11th December 2020.

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