KENYA CIVIL AVIATION AUTHORITY

ADVISORY CIRCULAR

CAA-AC- CNS 003

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GUIDANCE ON FLIGHT INSPECTION OF RADIO NAVIGATIONAL AIDS

1.0 Purpose

The purpose of this Advisory Circular is to provide guidance necessary for the flight inspection of radio navigational aids, including inspection types and facilities subject to inspections as prescribed in Regulation 35 of the Civil Aviation ANS Regulations.

2.0 References

2.1 Regulations 35 of Air Navigation Services Regulations;
2.2 ICAO DOC. 8071;
2.3 ICAO Annex 10 Vol. 1;
2.4 Manual of Standards Part II- CNS.

3.0 Guidance and Procedures

3.1 Pre- Flight Inspection Preparations

3.1.1 Ground Technician/Engineers shall make preparations prior to a flight inspection to ensure that the flight inspection is efficiently conducted.

3.1.2 Ground CNS Technician/Engineers shall complete equipment adjustments and other technical preparations for the air navigation aid in question

3.1.3 The following are the points to be observed during preflight inspection preparation:

a) Ensure that the result of all possible ground calibration and checking equipment are correct.

b) Competent maintenance personnel are available to make corrections and adjustments during flight inspection.

c) Availability of dedicated transport for equipment and personnel is ensured during the entire course of flight check.

d) Ensure all special tools and instruments are available at the site.

e) Availability of last flight inspection report.

f) Any requirement of special investigation during flight inspection shall be submitted in advance and followed up with Authority during flight inspection.

g) In case the facility is not expected to be ready as per the regular scheduled inspection, the Authority must be advised accordingly.

h) NOTAM for withdrawal of facility during Flight Inspection shall be issued without fail in coordination with local ATC.

3.2 Coordination during Flight Inspections

3.2.1 When equipment needs to be adjusted while flight inspection is in progress, the ground technical staff shall notify the flight inspector and make the necessary adjustment.

3.2.2 An ANS provider shall notify relevant agencies that the air navigation aid in question is undergoing a flight inspection.

3.3 Types of Flight Inspections

3.3.1 Flight inspections are classified and shall be carried out as follows:

a) **Site approval:** Inspection to be carried out to confirm that the location selected for installation of a new air navigation aid is appropriate, it may include checks normally made during a commissioning inspection and any additional tests which may be required.

b) **Commissioning:** is a comprehensive inspection to be carried out to obtain complete information regarding all aspects of performance of navigational aids. The facility shall not be declared operational before this check.

c) **Periodic:** Inspection to be conducted on a regular basis to confirm the validity of air navigation aids.

d) **Surveillance:** surveillance inspection shall be carried out to ensure that Navigational aids facility is being maintained within tolerance limits in spite of the inherent drift in the equipment. Surveillance inspections do not normally involve major adjustments unless the performance is observed to have drifted either close to, or beyond the applicable tolerance limits.

e) **Special Inspections:** Special flight inspection shall be made on special request to confirm satisfactory performance. It may follow a major maintenance on the equipment especially the antenna system. Special Flight Inspection may also be carried out for investigation purpose after any incident or accident.

3.4 Flight Inspection Unit

Flight inspection of air navigation shall be conducted by organizations or units that are approved by the Authority

3.5 Flight Inspection Aircraft

3.5.1 This section describes the concept for the special requirements of the aircraft, flight inspection crew members and ground support equipment used for flight Inspection.

3.5.2 Appropriately equipped aircraft shall be used when required to undertake flight inspection. The general characteristics of a flight inspection aircraft shall be as follows:

a) Aircraft equipped with special instrument for flight check
b) Sufficient capacity for a flight inspection crew, ground maintenance and/or installation personnel, and required electronic equipment.
c) Sufficient range and endurance for a normal mission.
d) Aerodynamically stable throughout the speed range.
e) Low noise and vibration level
f) Adequate and stable electrical system capable of operating required electronic and recording equipment and other aircraft equipment.
g) Wide speed and altitude range to allow the conduct of flight inspections under normal conditions as encountered by the users.
h) Appropriate for modifications for flight inspection of new and improved navigation services.

3.6 Flight Inspection Crew Members

The members of the flight inspection crew shall be experts in their individual fields, have sound knowledge and experience in flight inspection procedures and be capable of working as a team.

3.7 Airborne and Ground Support Equipment

The selection and utilization of flight inspection equipment used to determine the validity of navigation information shall minimize the uncertainty of the measurement being performed. Aircraft and ground support flight inspection equipment shall be calibrated to appropriate standards.

3.8 Preparation of Flight Inspection Plan

3.8.1 ANS provider shall prepare the following year's flight inspection plan for air navigation aids that require flight inspections and notify the Authority.

3.8.2 ANS provider shall send one copy of the flight inspection records of the previous year to the Authority.

3.8.3 When it is necessary to change the flight inspection date, ANS provider shall notify the Authority, of the changed flight inspection date.

3.9 Priority of Flight Inspections

3.9.1 ANS provider shall conduct flight inspections according to the following priorities:

a) Inspection requested from a concerned agency in relation to an aircraft accident

b) Inspection to correct a malfunction of an air navigation aid, inspection of a reported malfunction, or malfunction inspection after repairs according to a plan

c) Periodic, Commissioning, inspection of instrument flight procedures, and site approval.

3.10 Inspection after upgrading or modification of facility

Inspection shall be carried out when the conditions below prevail:

a) Upgrade/modification of feeders, antennas, and other major components;
b) Change in location of antenna or upgrade/modification of VOR counter poise;
c) Modification or replacement of main components of the transmitter;
d) Change in operation frequency and/or ID code;
e) Change in transmission output following increase or decrease of an air navigation aid's service area;
f) Where there is concern for signal interruption from construction of a building, a power line, or other obstacles in the vicinity of an operating air navigation aid;
g) Partial upgrade/modification or extension of any operating light system (approach light, approach angle indicator light, runway indicator light); and
h) Other special flight inspections deemed necessary.

3.11 Basic Schedule for Periodic Flight Inspection

3.11.1 This section prescribes the minimum frequency of periodic flight inspections. More frequent inspections may be made when deemed necessary. Facilities subject to flight inspections and frequency of their inspections are as follows

NAVAIDS Facility	Maintenance Standards	Maximum Periodicity, GI	Maximum Periodicity, FI
DVOR	8071 V ol. 1 Annex 10 Vol. 1	360 days	3 years
CVOR	8071 V ol. 1 Annex 10 Vol. 1	360 days	1 year
ILS	8071 V ol. 1 Annex 10 Vol. 1	90 days	6 Months
DME	8071 V ol. 1 Annex 10 Vol. 1	90 days	6 Months
NDB	8071 V ol. 1 Annex 10 Vol. 1	180 days where operationally	1 year

LIGHTING SYSTEMS	1 year	required

3.11.2 ATC Facility (VHF, UHF) and aeronautical information broadcasting facilities shall be inspected when the radar facilities are commissioned .

Note: NDBs are not subjected to flight inspection except where operationally required.

3.12 Flight Inspection Notification Status

3.12.1 ANS provider shall determine operation levels of air navigation aids as follows based on the results of flight inspections and notify relevant agencies for publication in AIP.

3.12.2 Usable is a status assigned to air navigation aids that are deemed to be operational in a flight inspection and shall be assigned one of the following operational status:

a) *Unrestricted* : Assigned in cases where signals-in-space can be generated within the air navigation aid's coverage area to maintain safety and continuity of the air navigation aid and precise signals can be sent.

b) *Limited or Restricted* : Assigned in cases where there are spaces that cannot send normal signals in all or some sections within the coverage area of the air navigation aid. In such cases, limited/restricted use of air navigation aid can be assigned in sections where there are no impediments in use of the air navigation aid in question by an aircraft. However, limited/restricted status shall not be assigned when judged that it is difficulty to secure safety and continuity of the air navigation aid.

3.12.3 *Unusable* : Assigned in cases where it is judged that the air navigation aid cannot be used due to difficulty in securing safety and continuity of the air navigation aid within its operational range or in cases where there are airspaces wherein flight inspections cannot be conducted because of signal failure, designation as a no fly zone, or airspace use is restricted for other reasons.

3.13 Notification of Status Levels of Air Navigation Facilities

3.13.1 When it is deemed necessary to newly assign or change the status level of an air navigation aids following results of a flight inspection, ground CNS engineer /technician shall notify the relevant agencies for status to be published in the AIP. When it is deemed that an immediate action is needed, the following shall be observed.

a) For an air navigation aid assigned unrestricted, restricted or usable, a request shall be made to the relevant agency so that notification of the assignment or change in operational status can be made immediately in the NOTAM.
b) For an air navigation aid assigned unusable status, action shall be taken to immediately suspend operation of the air navigation aid.

3.14 In-Flight Inspection

During the inspection, flight inspector shall advise CNS Engineer of observed conditions which require adjustment of ground equipment. Request for adjustment shall be specific and readily understandable. Normally the flight inspector is not expected to diagnose the fault, but shall furnish sufficient information to enable the maintenance team to make the corrective adjustment when the aircraft is airborne and record the adjustments done for post analysis. Relevant measurements on ground for establishing a meaningful correlation with the flight check results after each run shall be taken.

3.15 Post-Flight Inspection Measures

3.15.1 The flight inspector shall determine the operational status of the air navigation aids in question after completing the flight inspection and notify the ground technical staff whether or not the air navigation aid passed or failed the flight inspection.

3.15.2 ANS provider shall prepare a report of flight inspection results within 14 days after completion of the flight inspection and notify the ground technical staff. An immediate report shall be made to the Authority of any air navigation aid that fails flight inspection.

3.15.3 ANS provider shall keep commissioning data records of the air navigation aid in question until its permanent disuse and shall keep records of scheduled inspections and other flight inspections for at least 5 years.

3.16 Post-Flight Inspection

Ground CNS engineer shall complete the following actions:

a) Take action as per the advice of Flight Inspector;
b) Take relevant measurements on ground for establishing a meaningful correlation with the flight check results;
c) Implement the suggestions in the final report; and
d) Advice the Authority and all concerned regarding any major change in the facility performance through NOTAM.

Civil Aviation Authority