



International Civil Aviation Organization

MIDANPIRG Communication, Navigation and Surveillance Sub-Group

Twelfth Meeting (CNS SG/12)
(Amman, Jordan, 2-4 May 2023)

Agenda Item 4: CNS Planning and Implementation in the MID Region

ILS PROTECTION ZONE

(Presented by the Civil Aviation Regulatory Commission of Jordan)

SUMMARY

This working paper presents analysis of potential impact of Hangar building installation on Localizer signals in space including challenges and possible solution. The aim of this WP is to share experience with MID states and encourage States and ICAO MID to build capacity on this issue.

Action by the meeting is at paragraph 3.

REFERENCES

- ICAO Annex 10, Volume I
- ICAO EUR Doc. 015, European Guidance material on managing building restricted Area third edition 2015.
- ICAO Document (8071) Volume I, 5th Edition, 2018 Testing of Ground-based Radio Navigation Systems

1. INTRODUCTION

1.1 The airport of King Hussein International Airport (KHIA) at Aqaba City is equipped with two (2) ILSs (16 Element Dual Frequency) operate in CAT I.

1.2 New Aviation Museum Granite Hangar (300 * 300 * 300 m) was proposed to be built within the Building Restricted Area of the KHIA which could lead to create reflections on Localizer signal for both sides of the Runway. A study has been conducted to evaluate the impact of the hangar on the Localizer signals in space for both sides of the Runway.

2. DISCUSSION

2.1 Jordan CARC has conducted a study to determine whether the physical presence of the hangar may have an adverse effect on the availability or quality of Localizer signals. Software ATOLL developed by the French Civil Aviation University (ENAC) has been used to simulate the impact of the hangar on Localizer signals in space.

- b) The construction will have a severe impact on both Localizers' signals on the runway, which will affect our ground periodic checks for centerline and width point.
- c) The impact of the structure on the ILS signal in space and on ground will limit our opportunity of installing and upgrading the ILS service to Cat II.
- d) Due to the severe degradation of the ILS signal on the runway, there will be no opportunity in the future to correlate the ground measurements with the flight check data which is the basis for expanding the flight check periodicity from 6 monthly to 12 monthly.
- e) Royal Aviation Museum Hangar Proposed Building is Penetrating Building Restricted Area

2.5 The meeting may wish to note that replacement the 16 element antenna with a 20 element antenna array would be a possible solution but would have a major financial impact.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) encourage MID States to share information on their experience related to this issue; and
- b) invite ICAO MID office to organize a webinar/ workshop to provide information/guidance on the Analysis of CNS facilities Building restricted areas

Appendix A: Study of the Hangar impact on Localizer BRA

1) Ideal signal of Localizer (with no obstacle / hangar) in place, see Fig (1) and (2)

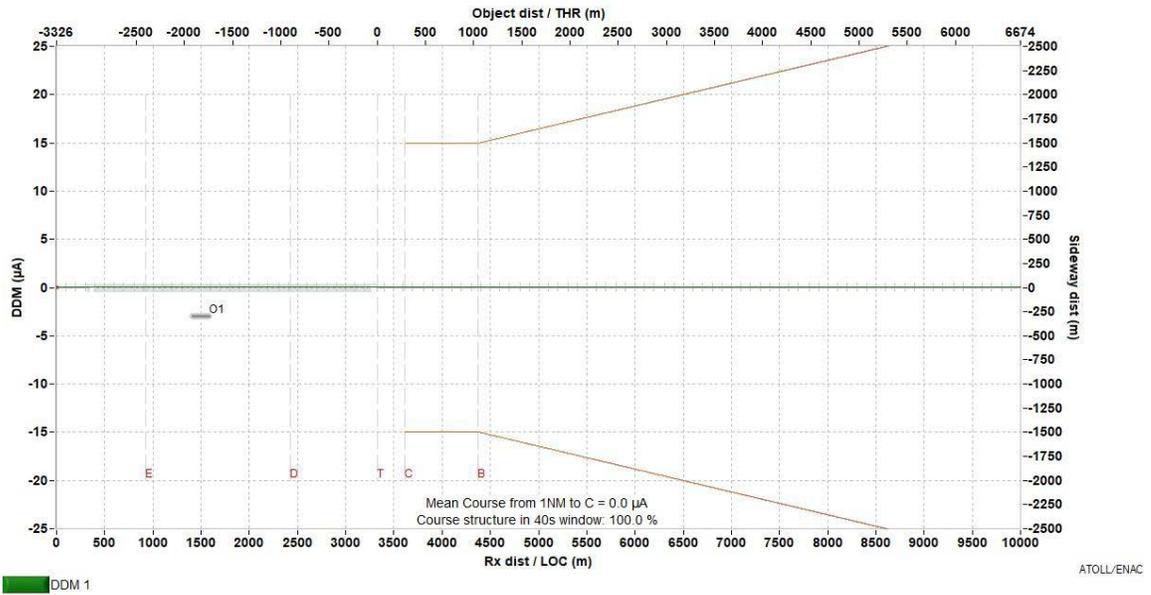


Fig (1) Localizer Approach

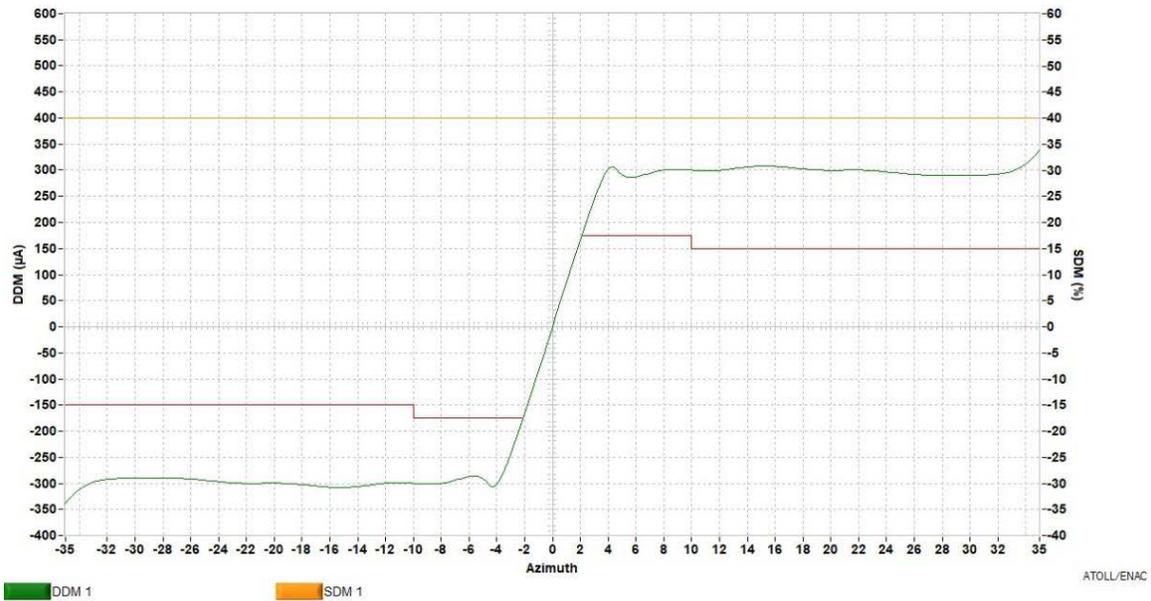


Fig (2) Localizer Orbit (Course DDM pattern)

2) The impact of the hangar on Localizer 01 (approach and orbit runs) see Fig (3) & (4)

- The effect on Localizer 01

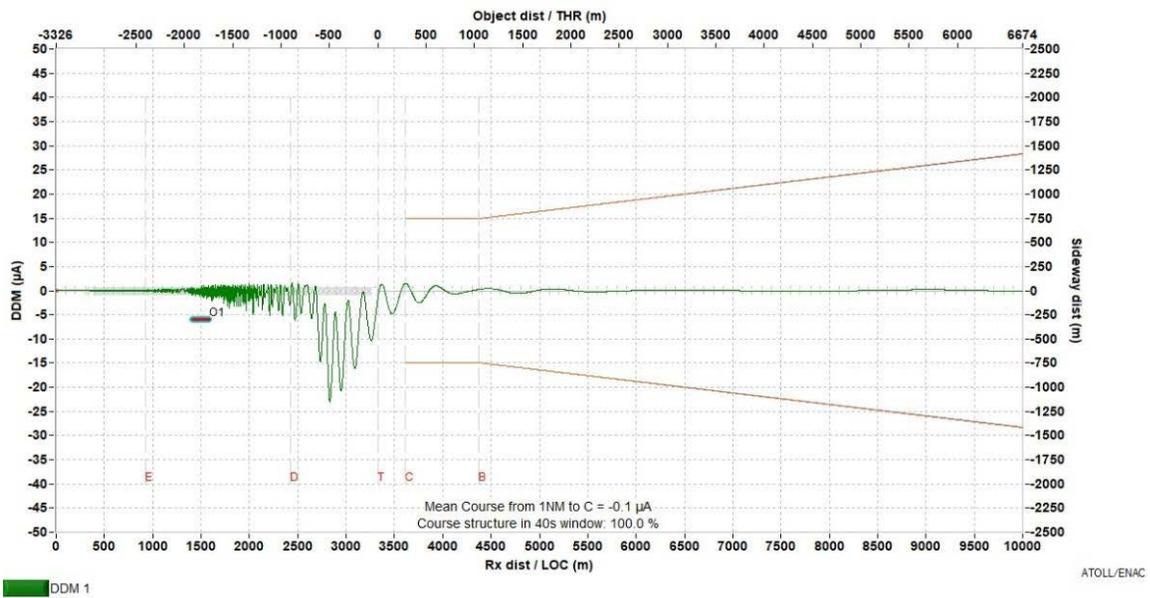


Fig (3) 01 Localizer Approach

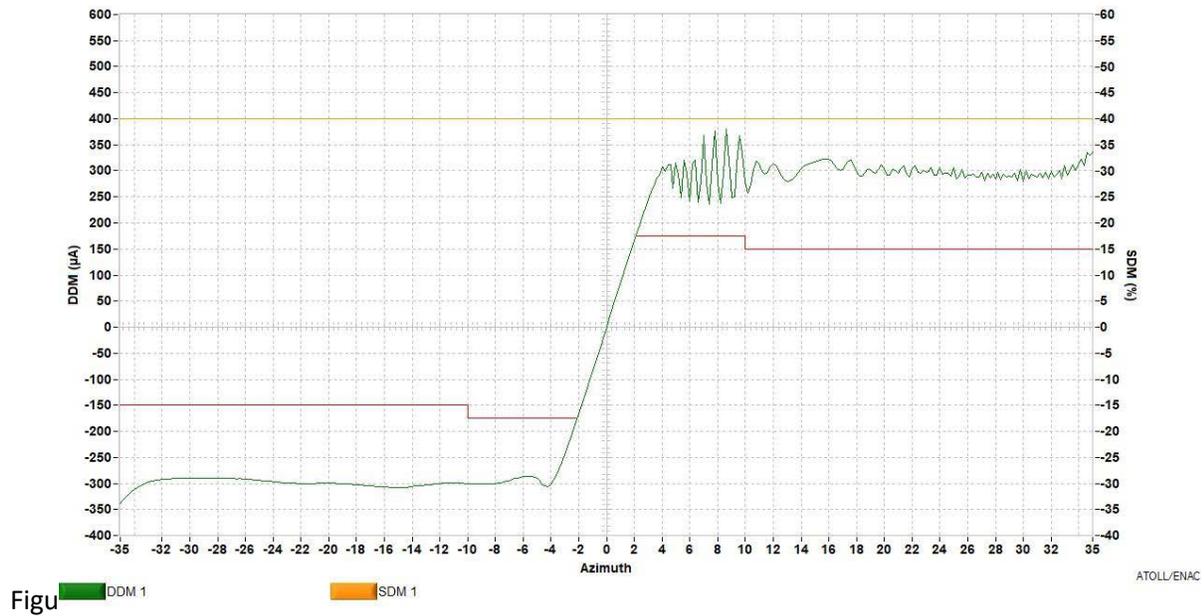


Fig (4) 01 Localizer Orbit

- Cat I Localizer is only used down to ILS zone C, the bends between zone B and C in Fig (3) might cause the autopilot to disengage.
- The roughness of the signal on the runway will prevent accurate ground check results i.e monthly checks for Center line and width points).

3) Impact of the hangar on Localizer 19 (approach and orbit runs), see Fig (5) & (6)

- The effect on Localizer 19

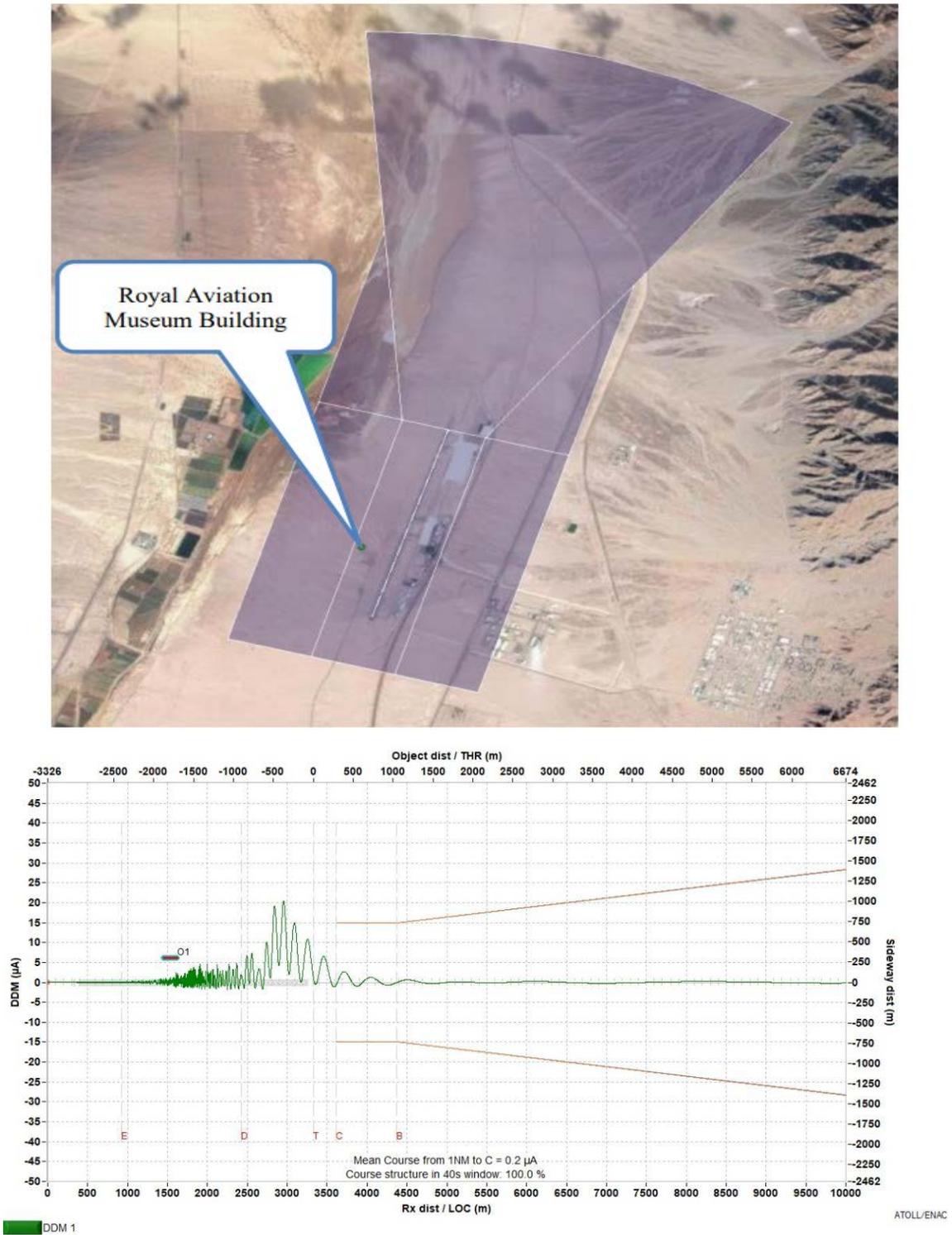


Fig (5) 19 Localizer Approach

A-5

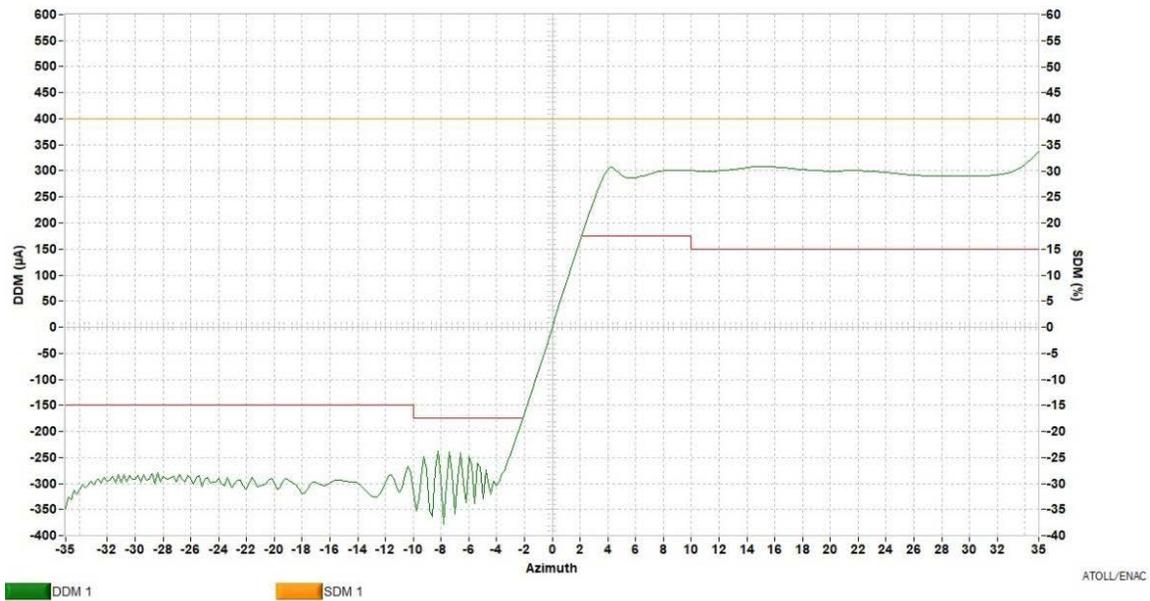


Fig (6) 19 Localizer Orbit

- Cat I Localizer is only used down to ILS zone C, the bends between zone B and C in Fig (5) might cause the autopilot to disengage.
- The roughness of the signal on the runway will prevent accurate ground check results (i.e monthly checks for Center line and width points).

5) IMPACT OF THE HANGAR ON THE ILS CAT II

- If decided to upgrade the service in the future to Cat II (both RWY 01 and 19) see Fig (7) below that shows the impact of the hanger on a Cat II ILS
- The localizer will be used down to the threshold, in which an out of tolerance value is clear in the graph. However, it may still within the 95% of cat II requirements but the auto pilot may disengage in that portion of the landing.

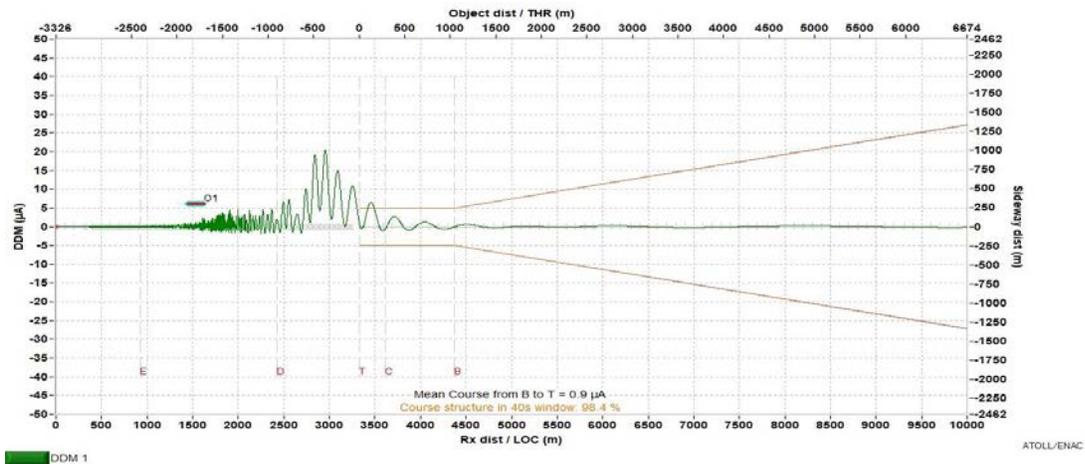


Fig (7)

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