**REPORT OF THE SIXTH MEETING OF THE
RASG-MID STEERING COMMITTEE**

(RSC/6)

(Cairo, Egypt, 25 – 27 June 2018)

The views expressed in this Report should be taken as those of the RASG Steering Committee and not of the Organization.   This Report will, however, be submitted to the RASG-MID and any formal action taken will be published in due course as a Supplement to the Report.

Approved by the Meeting
and published by authority of the Secretary General

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PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1   The Sixth meeting of the RASG-MID Steering Committee (RSC/6) was held at the ICAO Middle East Regional Office in Cairo, Egypt, 25 -27 June 2018.

2. OPENING

2.1   The meeting was opened by Mr. Mohamed Smaoui, Deputy Regional Director, ICAO Middle East Office. Mr. Smaoui welcomed all the participants to Cairo and thanked them for their participation. He also welcomed Eng. Suha Daher, Co-Chairperson of RSC and wished her all the success in chairing the meeting.

2.2   Mr. Smaoui highlighted the RASG-MID activities should be clearly linked to promote the Global Aviation Safety Plan (GASP) objectives and to harmonize all activities undertaken to address aviation safety issues on a regional basis. Accordingly, the RASG-MID should lead the coordination of regional activities by States and regional stakeholders. This cannot be done without effective collaboration by all stakeholders. Mr. Smaoui highlighted that, in line with the "No Country Left Behind" initiative, the RASG-MID should focus on States with the greatest needs such as low Effective Implementation (EI), and coordinate related assistance. At the end Mr. Smaoui highlighted the main subjects included in the RSC/6 meeting Agenda and wished the meeting fruitful deliberations and outcomes.

2.3   Eng. Suha Daher, Co-Chairperson of RSC, Director, Quality Assurance and Internal Audit Director, Amman, Jordan welcomed the participants to the RSC/6 meeting and thanked the Secretariat for the continuous support.

3. ATTENDANCE

3.1   The meeting was attended by a total of twenty five (25) participants from eleven (11) States (Bahrain, Egypt, Iran, Jordan, Kuwait, Libya, Oman, Saudi Arabia, Sudan, UAE and United States) and four (4) Organizations/Industries (ACAO, Boeing, IATA and IFATCA). The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1   The meeting was chaired by Eng. Suha Daher, Director, Quality Assurance and Internal Audit Director, Amman, Jordan and Mr. Ken Sewell, Regional Director, Safety and Flight Operations, IATA, Amman, Jordan.

4.2   Mr. Mashhor Alblowi, RO/FLS and Mr. Mohamed Chakib, RO/SAF-IMP were the Secretaries of the meeting assisted by Mr. Elie El Khoury, RO/ATM/SAR, Mrs Muna Alnadaf, RO/CNS and Mr. Mohamed Iheb, RO/AGA.

4.3   Mr. Mohamed Smaoui, Deputy Regional Director (DRD) supported the meeting.

5. LANGUAGE

5.1   The discussions were conducted in the English language and documentation was issued in English.

6. AGENDA

6.1   The following Agenda was adopted:

Agenda Item 1:   Adoption of the Provisional Agenda

Agenda Item 2:   Global Developments related to Aviation Safety

Agenda Item 3:   Regional Performance Framework for Safety

Agenda Item 4:   Coordination between RASG-MID and MIDANPIRG

Agenda Item 5:   Future Work Programme

Agenda Item 6:   Any other Business

7. CONCLUSIONS AND DECISIONS – DEFINITION

7.1   The RSC/6 records its actions in the form of Conclusions and Decisions with the following significance:

a)   **Conclusions** deal with matters that, according to the Group's terms of reference, merit directly the attention of States and its stakeholders/partners, or on which further action will be initiated by the Secretary in accordance with established procedures; and

b)   **Decisions** relate solely to matters dealing with the internal working arrangements of the Group and its subsidiary bodies.

8. LIST OF CONCLUSIONS AND DECISIONS

RSC DECISION 6/1:   *MID-ASRT TERMS OF REFERENCE (TORs)*

RSC DECISION 6/2:   *SIXTH MID ANNUAL SAFETY REPORT*

RSC CONCLUSION 6/3:   *REVISED RASG-MID SAFETY ADVISORY (RSA-11)-SAFEGUARDING OF AERODROMES*

RSC CONCLUSION 6/4:   *SURVEY ON ARFF/AEP LEVEL OF IMPLEMENTATION*

RSC CONCLUSION 6/5:   *AERODROME APRON MANAGEMENT AND GROUND HANDLING SERVICES*

RSC CONCLUSION 6/6:   *AERODROME SMS COMPLIANCE AND EFFECTIVENESS TOOLKIT AND AERODROME SMS WORKSHOP*

RSC CONCLUSION 6/7:   *FURTHER SAFETY ENHANCEMENTS RELATED TO RUNWAY EXCURSIONS*

RSC CONCLUSION 6/8:   *REVISED RASG-MID SAFETY ADVISORY ON WILDLIFE HAZARDS MANAGEMENT AND CONTROL (RSA-13)*

RSC DECISION 6/9:   *ESTABLISHMENT OF THE AIG CORE TEAM*

RSC CONCLUSION 6/10:   *RSA ON GNSS VULNERABILITIES*

DRAFT CONCLUSION 6/1:   *ROADMAP FOR AIG REGIONAL COOPERATION*

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1:   ADOPTION OF THE PROVISIONAL AGENDA

1.1   The meeting reviewed and adopted the Provisional Agenda as at paragraph 6 of the History of the Meeting.

REPORT ON AGENDA ITEM 2:   GLOBAL DEVELOPMENT RELATED TO AVIATION SAFETY

Global Safety Update

2.1   The subject was addressed in WP/2 presented by the Secretariat. The meeting was provided with an update on the latest developments in the revision of the GASP, for the 2020-2022 Edition, key points in Amendment 1 to Annex 19, Safety Management, tools to support the implementation of State Safety Programme (SSP), Fourth Edition of the Safety Management Manual, SSP Implementation Assessments under the USOAP CMA and the Global Aviation Safety Oversight Systems (GASOS).

Global Aviation Safety Plan (GASP) Update

2.2   The meeting noted that the 2020 - 2022 Edition of the GASP will contain a series of Goals, Targets and Indicators for States, Regions and Industry. It will also address high-risk categories of occurrences, which could lead to fatalities, such as Loss of Control In-Flight accidents. These categories will supersede the current global safety priorities.

2.3   It was highlighted that the GASP offers a long-term vision that will assist ICAO, RASGs, RSOOs and other regional entities, States and industry in developing a harmonized safety strategy. The inclusion of the Global Aviation Safety Roadmap in the GASP provides a structured common frame of reference for all relevant stakeholders to ensure that safety initiatives deliver the intended benefits associated with the GASP objectives.

2.4   The meeting recalled that the RASG-MID/6 meeting (Bahrain, 26-28 September 2017), through Conclusion 6/1, invited States to provide ICAO with their feedback on the new Global Aviation Safety Plan and Roadmap and suggestions for the future 2020 -2022 edition. The meeting re-iterated the RASG-MID Conclusion 6/1:

> *CONCLUSION 6/1:   GLOBAL AVIATION SAFETY PLAN (GASP)*
>
> *That, States:*
>
> a) *be requested to establish a national aviation safety plan, including goals and targets consistent with the MID Region Safety Strategy, and in line with the GASP objectives, including the global aviation safety roadmap, and based on their operational safety needs; and*
>
> b) *be invited to provide ICAO feedback on the new global aviation safety roadmap and suggestions for the future 2020 -2022 edition of the GASP via email to GASP@icao.int, by March 2018.*

2.5   The meeting underlined the need for guidance material for the development of National Aviation Safety Plan, including a Template; and agreed that the ICAO MID Office to issue a Reminder State Letter to urge States to provide their feedback/inputs on the RASG-MID Conclusion 6/1 before **30 September 2018**. The meeting agreed also that a Workshop on GASP 2020-2022 be organized by the ICAO MID Office either concurrently with the RASG-MID/7 meeting or even before.

Fourth Edition of the Safety Management Manual

2.6   The meeting noted that the advance unedited version of the Safety Management Manual (SMM, Doc 9859), Fourth Edition has been posted on the ICAO-NET (https://portal.icao.int/icao-net).

2.7   The Fourth Edition includes guidance material to address the full range of subjects covered by Annex 19, Amendment 1 and, in particular, the implementation of State Safety Programme (SSP), which is a key objective of the GASP. It also provides guidance for States and service providers on the implementation of Safety Management Systems (SMS) in accordance with the provisions of Annex 19. A Summary of the changes from the Third to the Fourth Edition is provided in **Appendix 2A**.

Safety Management Implementation Website

2.8   The meeting noted that the ICAO Safety Management Implementation (SMI) website is a public website that serves as a repository for sharing practical examples and tools to support effective SSP and SMS implementation. This SMI public website is now available at https://www.icao.int/SMI.

2.9   ICAO, through State Letter AN8/9-18/48 dated 19 April 2018, invited States and International Organizations to nominate a focal point for the submission of the practical examples and tools for validation and subsequent posting on the SMI public website. Accordingly, the meeting invited States, International and Regional Organizations to share practical examples and tools, which support the implementation of effective safety management to be considered for posting on the SMI website.

SSP Implementation Tools

2.10   The meeting noted that an SSP Foundation Tool has been developed to complement the SSP GAP Analysis Tool on iSTARS. The tool is expected to assist States in building a solid safety oversight foundation in support of an effective SSP implementation and allows States to verify the status of a subset of USOAP PQs, which have been identified as the foundation for SSP. SSP implementation plans should include the resolution of these PQs. The SSP foundation tool has been updated in March 2018 to align with the USOAP PQs 2016 version and can be found on iSTARS at http://portal.icao.int/space/Pages/SSPFoundation.aspx.

2.11   The ICAO SSP GAP Analysis tool will be updated by July 2018 to reflect Amendment 1 to Annex 19. The data already entered into the ICAO SSP GAP Analysis tool will be transferred to the updated tool.

SSP Implementation Assessments under the USOAP CMA

2.12   The meeting noted that ICAO is rolling out SSP Implementation Assessments under the USOAP CMA. In June 2018, a new set of SSP-related PQs were published by ICAO, reflecting Amendment 1 to Annex 19, the 4th Edition of the SMM and the lessons learned from the voluntary confidential SSP implementation assessments performed by ICAO. Although Amendment 1 to Annex 19 does not become applicable until November 2019, selected States will be approached by ICAO with a view to performing assessments using the amended SSP-related PQs between 2018 and 2020 on a voluntary but non-confidential basis. As of 2021, ICAO will perform assessments using the Amended SSP-related PQs on the States, which will meet the criteria to be established by ICAO, in line with the GASP.

Safety Management Training Programme

2.13   The meeting noted that ICAO Safety Management Training Programme is a blended training approach with an online portion and a face-to-face portion. The Safety Management Online Training Course is most beneficial for those who work for a State regulatory body involved in the planning, development, and implementation of SSP, and for staff who work for an aviation service provider involved in the planning, development, and implementation of SMS (http://store1.icao.int/index.php/safety-management-training-tic-course-part-1-html.html).

2.14   The Safety Management for Practitioners Course (SMxP) aims to provide regulatory and service provider staff involved in the implementation of SSP and SMS with an understanding of operational safety management processes and practical examples. The meeting thanked ICAO MID Regional Office for organizing the first SMxP course (Cairo, Egypt, 14 – 18 January 2018).

ICAO Safety Management Symposia and Workshops

2.15   The meeting noted that ICAO has delivered four (4) Regional Safety Management Symposia across all ICAO Regions including APAC/MID Safety Management Symposium and Workshop (Singapore, 23-26 April 2018). The symposia provided an important information-sharing opportunity for regulators, service providers, operational personnel and all aviation professionals involved in safety management activities.

2.16   Additional Workshops planned across all ICAO Regions. The Workshops will be tailored to the needs of the participants and will focus on the more practical aspects of safety management with case studies and hands on exercises. The Workshops are expected to provide a means for sharing of experience at a regional level and an opportunity for the further collection of examples to be posted on the ICAO SMI website.

2.17   The meeting noted that a regional Safety Management Workshop will be organized from 18 to 20 March 2019. Accordingly, the meeting invited all stakeholder to actively participate in this Workshop.

Global Aviation Safety Oversight System (GASOS)

2.18   The main objective of new Global Aviation Safety Oversight System (GASOS) is to enable the strengthening of States' safety oversight capabilities by providing States with a system for the delegation of certain safety oversight functions or tasks to ICAO recognized Safety Oversight Organizations (SOOs). GASOS will also strengthen existing SOOs to make them more effective and efficient in supporting States. The following three levels are defined, based on the complexity of tasks and functions performed:

Level 1 – advisory and coordinating tasks and functions

Level 2 – operational assistance tasks and functions

Level 3 – certifying agency tasks and functions

2.19   The meeting recalled that the RASG-MID/6 meeting (Bahrain, 26-28 September 2017) supported the conduct of the GASOS Feasibility Study and agreed to the following Conclusion:

CONCLUSION 6/3: REGIONAL SAFETY OVERSIGHT ORGANIZATIONS

That, States support:

a) *the proposed global strategy and action plan to improve RSOOs; and*

b) *the conduct of a study related to the proposed global aviation safety oversight system (GASOS).*

2.20   The meeting noted that GASOS Feasibility study was conducted in November 2017 aiming to assist stakeholders in exploring how GASOS can be developed into a viable, effective and sustainable global solution to improve safety oversight. The analysis included an identification of risks and their mitigation strategies; a review of various options for the establishment and implementation of GASOS and it provides input for the development of a Business Case that could help determine if GASOS would be financially viable as a self-funding programme.

2.21   The Conclusion of the feasibility study is that no issues have been identified to signal that the GASOS initiative would not be achievable. The review process helped clarify a number of institutional issues and pointed more clearly toward a direction where GASOS could deliver the most value. Supporting safety oversight capacity at the operational level would likely have the greatest overall impact on improving global safety oversight capacity. Therefore, whereas the GASOS assessment or recognition process would be open to any safety oversight service provider, it is recommended that its primary focus be on Level 2 service providers of operational assistance to States. A Summary of Recommendations is at **Appendix 2B**.

REPORT ON AGENDA ITEM 3: REGIONAL PERFORMANCE FRAMEWORK FOR SAFETY

Follow-up on the RASG-MID/6 Conclusions and Decisions

3.1   The subject was addressed in WP/3 presented by the Secretariat. The meeting reviewed the progress made for the implementation of the RASG-MID/6 Conclusions and Decisions as at **Appendix 3A**.

3.2   With respect to RASG-MID/6 Conclusion 6/4 related to sharing of safety recommendations, the meeting was apprised of the EASA Annual Safety Recommendation Review, which includes annual safety recommendations review and provides information on the activity carried out by the Agency in the field of safety investigation and follow up. In addition, the review highlights a range of safety issues and safety improvement efforts. The report is available at https://www.easa.europa.eu/sites/default/files/dfu/EASA_Annual-Safety_Recommendations_Report_2017.pdf

3.3   The meeting agreed that the Conclusion 6/4 should be transposed to a Safety Enhancement Initiative (SEI) in order to be addressed by appropriate Safety Team(s) within the RASG-MID framework to enhance sharing of safety recommendations and establish a regional database, which would be very beneficial to address the Focus Areas and Emerging Risks in the MID Region.

3.4   It was agreed that the Regional Database should include safety recommendations related to accidents and serious incidents. Accordingly, the meeting urged States to share their Safety Recommendations after investigation of accidents and serious incidents.

3.5   Based on the forgoing, the meeting agreed that the SEI "Sharing and Analysis of Safety Recommendations" should be included in the MID-SST work programme. The meeting noted with appreciation that UAE will be the Champion for the implementation of this SEI. It was agreed that details on actions and deliverables should be addressed by the next MID-SST/5 meeting planned to be held in Cairo, 11-14 February 2019.

MID-ASRT Terms of Reference

3.6   The subject was addressed in WP/4 presented by the Secretariat. The meeting reviewed and endorsed the revised version of the MID-ASRT Terms of Reference at **Appendix 3B**, and agreed to the following Decision:

>   *RSC DECISION 6/1:   MID-ASRT TERMS OF REFERENCE (TORs)*
>
>   *That, the Terms of Reference (TORs) of the MID Annual Safety Report Team (MID-ASRT) be revised as at **Appendix 3B**.*

Review and Endorsement of the Sixth MID Annual Safety Report (MID-ASR)

3.7   The subject was addressed in WP/5 presented by the Secretariat and PPT/1 presented by IATA on behalf of the MID-ASRT Rapporteur. The meeting commended the MID-ASRT for the development of the 6th MID-ASR for the period 2012-2016:

3.8   The following are the main highlights of the 6th MID-ASR:

-        MID Region had an accident rate of **2.3** accidents per million departures in 2016, which is slightly above the global rate (**2.1**).

- The 5-year average accident rate (2012-2016) is **2.76**, which is similar to the global rate **2.76.**

- No Controlled Flight Into Terrain (CFIT) related accident occurred in the MID Region for the period 2012-2016.

- The Loss of Control Inflight was identified as a Focus Area based on the analysis of the State of Registry and State of Operator accidents data for the period 2012-2016.

- One LOC-I accident involving MID Region aircraft occurred outside the MID Region during the period 2012-2016.

- The average overall Effective Implementation (EI) in the MID Region is **70.47%**, which is above the world average **65.15 %**. (as of January 2018).

3.9   Based on the analysis of the ICAO reactive safety information for the period 2012-2016, and in accordance with the agreed matrix used for the assessment of the different accident categories (frequency x severity), the main Focus Areas in the MID Region are as follows:

1- Runway Safety (RS); Runway Excursion (RE) and Abnormal Runway Contact (ARC) during landing;
2- System Component Failure- Power Plant (SCF-PP); and
3- Loss of Control In Flight (LOC-I).

3.10   The meeting agreed to the following list of emerging risks:

1- Controlled Flight Into Terrain (CFIT);
2- Mid-Air Collision (MAC);
3- Fire/Smoke (non-impact) – F-NI;
4- System Component Failures- Non-Power Plant (SCF-NP);
5- Runway Incursion (RI);
6- Turbulence Encounter (TURB);
7- Wildlife (WILD); and
8- Birdstrike. (BIRD)

3.11   With respect to the Emerging Risks, the meeting agreed that Runway Incursion and Birdstrike are being/should be addressed by the RGS Working Group. It was also agreed that the Mid-Air Collision (MAC) and Turbulence Encounter (TURB) should be addressed by the Regional Aviation Safety Team (MID-RAST).

3.12   The meeting highlighted the main challenges facing the MID-ASRT, as follows:

- low level of reporting by States (confidentiality concerns);
- lack of sharing of accidents and serious incidents investigation reports;
- incomplete data/information in iSTARS and ECCAIRS;
- ECCAIRS is not yet used by many States;
- unavailability of predictive safety information; and
- differences between organizations with respect to:
  ✓ Taxonomy and classifications/categories
  ✓ Reporting criteria (State of occurrence/operator/registry, MTOW..etc)
  ✓ Regional distribution (MENA, MID…etc.)

3.13   It is to be noted that the UAE raised a concern about the repeated occurrences of TCAS TA/RA including STCA warnings, due to military aircraft interfering with civil aircraft that have happened since January 2018 in the Region. UAE stated that "*these occurrences demonstrated a negative trend and require that a careful analysis of these occurrences is conducted in the next MID Annual Safety Report with the identification of mitigation measures to ensure that the exposure to MAC in the Region is not worsen*". It is to be highlighted that the UAE statement was supported also by Bahrain and Saudi Arabia.

3.14   Based on the foregoing, the meeting agreed that the Report should be finalized taking into consideration the outcomes of the meeting. Accordingly the meeting endorsed the MID-ASR and agreed to the following RSC Decision:

> ***RSC DECISION 6/2:   SIXTH MID ANNUAL SAFETY REPORT***
>
> *That, the Final version of the Sixth Edition of the MID Annual Safety Report (ASR) be published on the ICAO MID website.*

3.15   The meeting noted with appreciation that IATA will share their report on crew incapacitation.

Analysis of Data-New methodology

3.16   The subject was addressed in WP/6 presented by the Secretariat. The meeting reviewed the outcome of the MID-ASRT/2 meeting related to the methodology used for risk assessment and agreed to the following improvements:

1) **Improvement of the current risk matrix** used for the identification of focus areas:

    In order to facilitate the identification and prioritization of the main Regional Focus Areas (FAs), accidents are categorized in terms of frequency and severity. The severity assessment is based on the fatalities, injuries and damage to aircraft, property and equipment. The meeting agreed to have four (4) levels of severity instead of three (3), as follows:

    1) Catastrophic: multiple fatalities; serious damage to aircraft/equipment (destroyed);

    2) Major: serious injury/fatalities; major aircraft/equipment damage;

    3) Minor: little consequences (minor injuries, minor damage to aircraft); and

    4) No potential damage or injury.

    For Frequency rating: 1 is the most frequent and 6 is the least frequent. For Severity: 1 is the most severe and 4 is the least severe).

3.17   Based on the above, the following risk matrix was endorsed:

Frequency / Severity	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24

3.18   For grading risks, the scores obtained from the risk matrix are assigned grade as follows:

1-6: Focus areas
8-9: Emerging risks
10-24: Tolerable risks

2) **Introduction/adoption of the "feared consequence" of the risk portfolio of DGAC France** as **at Appendix A**

Preliminary Review of the Seventh MID ASR.

3.19   The subject was addressed in WP/7 and PPT/2 presented by the Secretariat. The meeting noted that Seventh MID-ASR is being developed based on the new Methodology described above; and considering the areas of improvement identified in the 6th MID-ASR:

- streamline the content of the ASR;
- expand the proactive section with incidents analysis provided by States;
- improve the look and feel (reader friendly); and
- enhance the production time of the report

MID-RAST Activities

3.20   The subject was addressed in WP/8 presented by the RAST Rapporteur. The meeting was updated on the RAST activities including the status of the progress achieved in the implementation of the DIPs related to LOC-I and CFIT as at **Appendices 3C** and **3D**, respectively.

3.21   The meeting recalled that the RASG-MID/6 meeting agreed that global priorities (RS, LOC-I and CFIT) should always be addressed within the RASG-MID framework. However, with regard to LOC-I and CFIT, global developments and measures should be followed by the RAST instead of developing new DIPs.

3.22   With respect to the System Component Failure (SCF), the meeting noted that based on the new methodology, SCF would not be anymore considered as a Focus Area, rather it would be considered as a safety event/precursor, which could lead to the CFIT, LOC-I, or RE occurrence.

Update on Development and Implementation of SEIs & DIPs related to RGS

3.23   The subject was addressed in WP/9 presented by the RGS WG Chairperson. The meeting noted with appreciation the progress achieved in the implementation of the different SEIs/DIPs related to RGS as at **Appendices 3E, 3F, 3G, 3H, 3I, 3J, 3K, 3L and 3M.**

Review of the Outcome of the RGS WG/4

3.24   The subject was addressed in WP/10 presented by the Secretariat. The meeting was apprised of the outcome of the Fourth meeting of the Runway and Ground Safety Working Group (RGS WG/4) held at the ICAO Middle East Regional Office in Cairo, Egypt, from 5 to 7 November 2017.

Aerodrome Safeguarding:

3.25   The meeting recalled that the RASG-MID Safety Advisory on Aerodrome Safeguarding (RSA-11) was endorsed by the RSC/5 meeting in January 2017 and was published in March 2017. The meeting reviewed the Aerodrome Safeguarding Toolkit and agreed to the following Conclusion:

> **RSC CONCLUSION 6/3:   REVISED RASG-MID SAFETY ADVISORY (RSA-11)-**
> **SAFEGUARDING OF AERODROMES**
>
> *That, the revised RASG-MID Safety Advisory on Aerodrome Safeguarding (RSA-11) at* **Appendix 3N**, *which includes Aerodrome Safeguarding Toolkit is endorsed.*

ARFF and Aerodromes Emergency Planning

3.26   The meeting noted that a questionnaire on the level of implementation of ARFF in the MID Region International Aerodromes was developed. Accordingly, the meeting agreed to the following Conclusion:

> **RSC CONCLUSION 6/4:   SURVEY ON ARFF/AEP LEVEL OF**
> **IMPLEMENTATION**
>
> *That,*
>
> a)   *a survey on ARFF/AEP level of implementation be carried out; and*
>
> b)   *the results of the survey be presented to the RGS WG/6 meeting for further course of actions.*

Apron Management and Ground Handling

3.27   The meeting recognized that the Ground Handling operations are a source of significant personnel safety and aircraft/equipment damage concerns. Accordingly, the meeting agreed to the following Conclusion:

RSC *CONCLUSION 6/5:*   *AERODROME APRON MANAGEMENT AND GROUND HANDLING SERVICES*

That,

a) *an Advisory Circular be developed on Aerodrome Apron Management; and*

b) *a Seminar on Ground Handling be organized and hosted by UAE and supported by ICAO, IATA and Ground Handlers in 2019.*

Aerodrome Safety Management System

3.28   The meeting agreed that an Aerodrome customized SMS Workshop should be conducted back-to-back with the next RGS WG/5 meeting with technical support provided by experts from Egypt and UAE. The meeting supported the development of an aerodrome SMS toolkit to be used by both aerodrome operators and aerodrome regulators for the implementation of SMS and monitoring of its effectiveness.

3.29   The draft Tool-kit will be presented at the Aerodrome SMS Workshop planned to be held in Cairo, 28-29 November 2018. Accordingly; the meeting agreed to the following Conclusion:

RSC *CONCLUSION 6/6:*   *AERODROME SMS COMPLIANCE AND EFFECTIVENESS TOOLKIT AND AERODROME SMS WORKSHOP*

That,

a) *an aerodrome SMS Workshop be organized by ICAO back-to-back with the RGS WG/5 meeting with the technical support of Egypt and UAE; and*

b) *sample Aerodrome SMS Compliance and Effectiveness Tool-Kit be developed and presented at the Aerodrome SMS Workshop.*

Runway Surface Conditions

3.30   The subject was addressed in WP/19 presented by the USA. It was highlighted that runway surface condition reporting system, in terms of quality and timing must be consistent with the aircraft operational performance. Also, the provision of adequate visual reference during the final stage of approach, combined with low visibility operations are critical to reduce the risk of runway excursion. The meeting supported the need for Advisory Circular consolidating best practices on Monitoring and Reporting Runway Surface Conditions at aerodromes. The meeting noted with appreciation that FAA would be the Champion supported by Egypt and UAE for the development of the RSA. Accordingly, the meeting agreed to the following Conclusion:

RSC *CONCLUSION 6/7:*   *FURTHER SAFETY ENHANCEMENTS RELATED TO RUNWAY EXCURSIONS*

That,

a) *a RASG-MID Safety Advisory on Monitoring and Reporting of Runway Surface Condition, be developed; and*

b) *States be urged to report the Runway-Excursion-related occurrences on Annual basis to the ICAO MID Office.*

Airport Master Plan

3.31   The meeting highlighted the need for:

- additional guidance on airport master planning requirements for all aerodrome open for public use to support airport capacity enhancements; and

- monitoring the status of implementation of Airport Master Plan.

3.32   Considering that the above subject is not directly related to safety, the meeting agreed that the progress be presented to MIDANPIRG for appropriate action.

Aerodrome Certification and establishment of Runway Safety Teams

3.33   The meeting was apprised of the updated status of Aerodrome Certification in the MID Region as at **Appendix 3O**. The meeting noted that 34 out of 59 International Aerodromes (representing 58%) had been certified in the MID Region. More efforts are needed to meet the target of 75% for year 2017.

3.34   The meeting was apprised of the status of implementation related to the establishment of Runway Safety Teams at International Aerodromes as at **Appendix 3P**. The Safety Target related to the establishment of RSTs is 50% by 2020, which is achieved, since the status is 56 %.

3.35   The meeting noted that a RS Go-Team visit to Muscat will take place from 29 October to 1 November 2018. The main objective of the RS Go-Team visit is to provide necessary assistance to Oman Public Authority of Civil Aviation (PACA) and the Aerodrome Operator to activate Runway Safety Team (RST) at Muscat International Airport, through the conduct of a peer-review; as well as to provide support to the State in improving runway safety and the implementation of Aerodrome Certification.

Wildlife Hazard Management and Controls (WHMC)

3.36   The subject was addressed in WP/11 presented by the Secretariat. The meeting recalled that the RASG-MID Safety Advisory on Wildlife Hazards Management and Control (RSA-13) was endorsed by the RASG-MID/6 meeting in September 2017 and was circulated to all MID States on 23 October 2017.

3.37   The meeting reviewed the WHMC Plan Template and agreed to the following Conclusion:

> ***RSC CONCLUSION 6/8:   REVISED RASG-MID SAFETY ADVISORY ON WILDLIFE HAZARDS MANAGEMENT AND CONTROL (RSA-13)***
>
> *That, the revised RASG-MID Safety Advisory on WHMC (RSA-13) at **Appendix 3Q,** which includes the WHMC Plan Template is endorsed.*

MID-SST Activities

3.38   The subject was addressed in WP/12 presented by the MID-SST Rapporteur. The meeting noted the progress made by the MID-SST for the implementation of the agreed SEIs. The meeting reviewed and updated the list of SEIs assigned to the MID-SST, as follows:

1) improve the status of implementation of State Safety Programme (SSP) and Safety Management System (SMS) in the MID Region;
2) strengthening of States' Safety Oversight capabilities;
3) improve Regional cooperation for the provision of Accident & Incident Investigation;
4) improve implementation of ELP requirements in the MID Region; and
5) sharing and analysis of safety recommendations related to accidents and serious incidents.

3.39   The meeting reviewed the actions related to the MID-SST SEIs as at **Appendix 3R**.

3.40   The meeting noted the following common challenges/difficulties related to the SSP implementation based on sharing of experiences by States during the MID-SST/4 meeting (Cairo, 6-8 February 2018):

1) agreement on the Safety Performance Indicators and Targets (SPI and SPT) with the operators/services providers;
2) establishment of an initial Acceptable Level of Safety Performance (ALoSP);
3) ineffective reporting systems, particularly the voluntary reporting system;
4) lack of expertise to support analysis of safety data;
5) allocation of resources to enable SSP implementation; and
6) lack of qualified and competent technical personnel to fulfil their duties and responsibilities regarding SSP implementation.

3.41   The meeting supported the following recommendations to support the SSP implementation:

1) participate in the new ICAO Safety Management Training Programme (SMTP);
2) use the SSP Foundation Tool to verify the status of the foundational PQs and implement CAPs to resolve the identified findings;
3) update the SSP Gap Analysis on continuous basis;
4) take advantage of the Safety Management Implementation (SMI) website, which will serve as a repository for multiple examples and tools from States and service providers to complement Doc 9859, Safety Management Manual (SMM), Fourth Edition;
5) work with the ICAO Regional Office to make use of available means (e.g. Technical Co-operation Bureau) to provide assistance needed for SSP implementation; and
6) enhance the voluntary and mandatory safety reporting systems

Second NCMCs Meeting

3.42   The subject was addressed in WP/13 presented by the Secretariat. The meeting noted that the second NCMCs meeting was held on 7 February 2018 as part of the MID-SST/4 meeting. The meeting was a great opportunity to share experiences, challenges and best practices, which were appreciated by all participants. The following common challenges/difficulties were identified:

1) lack of sufficient human resources (qualified technical personnel) to meet the State's obligations and carry out oversight functions and mandate;
2) the ability to attract, recruit and retain sufficiently qualified/experienced technical personnel;
3) training;
4) separation of oversight functions and service providers/operators;
5) independent AIG Authority as required by amendment 15 to Annex 13; and
6) political/security situation/instability in some States.

3.43   The meeting identified the following as best practices and actions:

1) high level commitment and engagement (regular briefings and meetings);
2) effective preparation well in advance (giving sufficient time);
3) assignment of focal point(s) for each audit area;
4) training of personnel (USOAP-CMA CBT, Workshop, participation in ICVMs and Audits), including the conduct of a USOAP-CMA Workshop (cost-recovery basis) at National level;
5) using the self-assessment to conduct internal audits, prepare for ICAO USOAP CMA activities; and monitor the civil aviation safety oversight system;
6) take advantage of other States experiences;
7) update all CAPs to fully address the PQ findings and report the progress made on the CAPs implementation, which is a vital factor for the planning and conduct of the USOAP-CMA validation activities; and
8) regular update of the required information such as the State Aviation Activities Questionnaire (SAAQ) and Compliance Checklist/Electronic Filing of Differences (CC/EFOD).

MID Region Safety Targets and Revised MID Region Safety Strategy

3.44   The subject was addressed in WP/15 and PPT/3 presented by the Secretariat. The meeting reviewed the status of the different Safety Indicators and Targets included in the Strategy as at **Appendix 3S**.

3.45   The meeting reviewed the MID Region Safety Strategy, which was endorsed by the RASG-MID/6 meeting. The meeting noted that the MID-SST/4 meeting initiated a brainstorming on the Safety Indicators and Targets related to the SSP and SMS implementation in the Region.

3.46   The meeting noted that the SSP Foundation is a sub-set of USOAP Protocol Questions (PQs) that have been identified as fundamentals, and are considered as prerequisites for sustainable implementation of the full SSP. Recognizing that the establishment of ALoSP is an important cornerstone in the implementation of an effective SSP, the meeting agreed to the following set of safety indicators:

Safety Indicator	Safety Target
Number of MID States that have completed the SSP gap analysis on iSTARS	13 States by **2020**
Number of MID States that have developed an SSP implementation plan	13 States by **2020**
Regional Average SSP Foundation %	70% by **2022**
Number of MID States that have achieved 70% SSP Foundation	13 States by **2022**
Number of MID States that have established an ALoSP	10 States by **2022**
Number of MID States that have implemented an effective SSP	10 States by **2025**
Percentage of MID States that have established a process for acceptance of individual service providers' SMS	80% by **2020**

3.47   The meeting noted that the MID Region Safety Strategy would be revisited during the Fourth MID Region Safety Summit (Riyadh, Saudi Arabia, October 2018) taking into consideration the global and regional developments, including the objectives and priorities of GASP 2020-2022, Amendment 1 to Annex 19 and Fourth Edition of the Safety Management Manual.

3.48   The meeting agreed to include ISAGO in the revised version of the MID Region Safety Strategy. IATA will provide proposals for the associated safety indicators and targets, based on the current status of implementation and future plans.

3.49   The revised version MID Region Safety Strategy will be presented to the RASG-MID/7 meeting for endorsement.

Fourth MID Region Safety Summit

3.50   The subject was addressed in WP/18 presented by the Secretariat. The meeting noted that he Fourth MID Region Safety Summit will be held in Riyadh, Saudi Arabia, 2-3 October 2018.

3.51   The Summit aims at raising awareness on the global aviation safety developments including the GASP, Safety Management, Regional Safety Priorities and Targets and RASG-MID activities and deliverables. The Summit will provide a forum for sharing expertise and experience for States, International and Regional Organizations, Aviation Safety Partners, Service Providers and Industry Stakeholders. It will also provide valuable panel sessions and opportunities for networking, collaboration and coordination. The Summit will focus on issues related to the safety management, particularly the establishment and implementation of State Safety Programme and achieving an Acceptable Level of Safety Performance (ALoSP). Accordingly, the meeting invited all stakeholders to actively participate in the Summit.

MENA RSOO

3.52   The subject was addressed in WP/17 presented by the Secretariat. The meeting recalled the DGCA-MID/4 meeting (Muscat, Oman, 17-19 October 2017) Conclusion 4/5:

> *CONCLUSION 4/5 – ESTABLISHMENT PROCESS OF THE MENA RSOO*
>
> *That:*
>
> a)   *the MENA RSOO be governed by a Steering Committee composed of the MENA RSOO member States (both ICAO and ACAC will be part of the Steering Committee);*
>
> b)   *the Steering Committee decides on all the details related to the establishment and operation of the MENA RSOO (organization, funding, etc.); and*
>
> c)   *Saudi Arabia (the host State) is invited to organize the first meeting of the MENA RSOO Steering Committee as soon as possible*

3.53   The meeting noted that during the ACAO General Assembly (GA/24) held in Rabat, 9-10 May 2018, Saudi Arabia re-confirmed its commitment to support the establishment of the MENA RSOO by hosting the RSOO and providing financial and in-kind support to expedite its establishment.

3.54   The First meeting of the MENA RSOO Steering Committee (DGs Level) will be held on 1 October 2018, in Riyadh, Saudi Arabia, back-to-back with the Fourth MID Region Safety Summit (2-3 October 2018).

3.55   The meeting noted that the ICAO MID Regional Office is currently working on the development of the Project Document and MOU in coordination with ACAO and Saudi Arabia. It was also noted that the Project Document and MOU would be presented to the First meeting of the MENA RSOO Steering Committee.

Strategy for the Enhancement of Cooperation in the Provision of AIG Services in the MENA Region

3.56   The subject was addressed in WP/14 presented by the Secretariat. The meeting recalled that the Strategy for the enhancement of cooperation among the MENA States in the provision of AIG functions at **Appendix 3T** was endorsed by the DGCA-MID/4 meeting (Muscat, Oman, 17-19 October 2017).

3.57   ACAO underlined that the current version of the Strategy is missing a paragraph highlighting the history of development/endorsement of the Strategy within the ACAO framework.

3.58   The meeting recognized the need to establish an AIG Core Team led by the Rapporteur of the SST to develop the Roadmap and to monitor the implementation of the Strategy. Accordingly, the meeting agreed to the following Decision

> *RSC DECISION 6/9:   ESTABLISHMENT OF THE AIG CORE TEAM*
>
> *That, the AIG Core Team composed of the following experts, is established to develop the Roadmap and to monitor the implementation of the Strategy for the enhancement of Regional Cooperation in the provision of AIG function for the MENA States:*
>
> *Eng. Ismaeil Mohamed Al Hosani (Chairman)*
> *Mr. Ibrahim Addasi from UAE*
> *Mr. Abdulelah O. Felemban from Saudi Arabia*
> *Mr. Kamil Ahmed Mohammed from Sudan*
> *Mr. Theeb Abdullah Al Otaibi from Saudi Arabia*
> *Mr. Seyed Mohammad Hosein Mousavi Sajad from Iran*
> *Mr. M'barek Lfakir, from Morocco*
> *Mr. Mohamed Chakib from ICAO*
> *Mr. Mohamed Rejeb from ACAO*

3.59   The meeting reviewed and updated the Roadmap for AIG Regional Cooperation at **Appendix 3U**, and endorsed the following Draft Conclusion.

> *DRAFT CONCLUSION 6/1:   ROADMAP FOR AIG REGIONAL COOPERATION*
>
> *That, the Roadmap for AIG Regional Cooperation at **Appendix 3U** is endorsed.*

3.60   The meeting noted that the questionnaire on AIG level 1 of cooperation at **Appendix 3V** was sent to the MENA States through State Letter Ref.: ME 4/1.3-18/074 dated 4 March 2018. The meeting noted that six (6) States (Bahrain, Egypt, Saudi Arabia, Sudan, UAE and Yemen) replied to the questionnaire. The meeting urged the remaining States to send their replies to the ICAO MID Office, as soon as possible.

International Society of Air Safety Investigators (ISASI) 2018

3.61   The subject was addressed in WP/12 presented by the MID-SST Rapporteur. The meeting encouraged States to actively participate in the International Society of Air Safety Investigators (ISASI) 2018 Seminar, which will be hosted by the Middle East and North Africa Society of Air Safety Investigators (MENASASI) and will take place at the Intercontinental Hotel, Festival City, Dubai, UAE, from 30 October to 1 November 2018.

RASG-MID Work Programme for 2018-2019

3.62   The subject was addressed in WP/16 presented by the Secretariat. The meeting reviewed and updated the Schedule of 2018 and 2019 safety events as at **Appendices 3W and 3X**, respectively. The meeting urged all stakeholders to ensure effective coordination of activities with the RASG-MID through the Secretariat.

REPORT ON AGENDA ITEM 4:   COORDINATION BETWEEN RASG-MID AND MIDANPIRG

4.1   The subject was addressed in WP/20 and WP/21 presented by the Secretariat. The meeting was apprised of the latest air navigation activities related to safety.

4.2   The meeting recalled that the Fourth MIDANPIRG/RASG-MID Coordination meeting (MRC/4) was held in Bahrain on 25 September 2017 as a side meeting of the RASG-MID/6 meeting. The MRC/4 meeting reviewed and updated the table listing the subjects in which both MIDANPIRG and RASG-MID have interest with an assignment of the leading Group as at **Appendix 4A**.

4.3   The meeting encouraged States and stakeholders to attend the MIDANPIRG/RASG-MID Coordination meeting planned to be held at the ICAO MID Office, 5-6 December 2018, back-to-back with the MSG/6 meeting to discuss the future working arrangements of the two Groups.

Accidents and Incidents Analysis

4.4   The meeting noted that based on the review of the consolidated inputs received by the ICAO MID Office from six (6) States, the ATM SG/4 meeting (Amman, Jordan, 29 April-2 May 2018) agreed that in respect to Turbulence Encounter (TURB), it would be beneficial if the analysis would be break down (at the level of the ATM SG) to the monitoring of the component related to Wake Turbulence (VORTEX).

4.5   The meeting recalled that the ATM SG/4 meeting noted with concern the significant increase in the MAC occurrences (Near Mid Air Collisions) and agreed, through Draft Decision 4/7, on the establishment of an Action Group to carry out further analysis of the reported occurrences, based on the safety analyses and recommendations emanating from the SMSs of concerned States, and provide feedback to the ASRT. The Action Group is composed of the ATM SG Chairpersons, Secretariat, and experts from Saudi Arabia, UAE and IATA. Accordingly, the meeting encouraged States and IATA to support the work of the Action Group.

Reduced Vertical Separation Minima (RVSM)

4.6   States were encouraged to visit the Middle East Regional Monitoring Agency (MIDRMA) website (www.midrma.com) for information, reports and tools related to the RVSM implementation.

4.7   The meeting noted the endorsed procedure at **Appendix 4B** by the ATM SG/4 meeting for the MIDRMA follow-up with the States and the issuance of warning related to RVSM approved aircraft without valid height-keeping performance monitoring results.

4.8   The meeting noted that, based on the initial results of the MID RVSM Safety Monitoring Report (SMR) 2017, the key safety objectives as set out by MIDANPIRG, through Conclusion 12/16, continue to be met.

4.9   Based on the above, the meeting urged States to take necessary measures to:

   a) reduce the level of reported LHDs;

   b) ensure compliance of their registered aircraft with Annex 6 requirements related to RVSM; and

   c) keep their MIDRMA Airworthiness/Flight Operations focal points up-to-date to ensure effective coordination with the MIDRMA for RVSM approval related matters.

Performance Based Navigation (PBN)

4.10   The main identified challenges impeding the advancement of PBN implementation in addition to the low number of qualified PBN Experts (PANS-OPS specialists, Airspace planner, PANS-OPS Inspectors, OPS Approval experts, and Instructors) is the lack of necessary regulations enabling service providers to implement/publish and use PBN procedures.

4.11   The PANS-OPS EIs in the MID Region per Protocol Question (PQ) as of May 2018 are reflected in **Graph 1:**
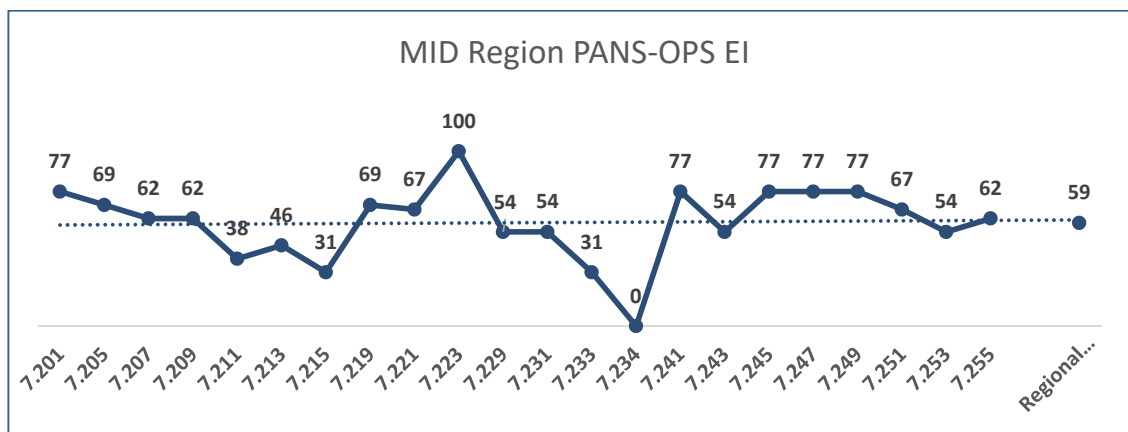
Graph 1

4.12   The meeting noted that the MID Flight Procedure Programme is on-going, with planned to start operation in January 2019. The draft MID FPP Project Document was circulated for States' review and comments on 9 May 2018. The MID FPP main objective in Phase 1 is building the MID States' regulatory, oversight and service provisions capabilities related to instrument flight procedure, which eventually will foster PBN Implementation. Accordingly, the meeting urged States to join the MID FPP.

Civil/Military Cooperation

4.13   The meeting was apprised of the outcome of the ACAC/ICAO Civil/Military Workshop organized jointly by ACAC and ICAO (EUR/NAT and MID Regional Offices) in Algiers, Algeria, from 26 to 28 March 2018. The meeting encouraged States to implement the recommendations of the Workshop at **Appendix 4C**. The Workshop documentation are available on the ICAO MID Website: https://www.icao.int/MID/Pages/2018/ACAC-ICAO%20Civ-Mil%20WS.aspx

4.14   The meeting recalled that the ATM SG/4 meeting agreed through Draft Conclusion 4/5 to the development of MID Guidance Material related to Civil/Military cooperation and implementation of FUA Concept, including State aircraft operations under Due Regard in particular over the high seas, based on the EUR Doc 032.

Contingency Planning

4.15   The meeting noted that some airspace users continue to circumnavigate Damascus, Tripoli FIRs and Yemen Airspace due to the conflict zones. With regard to Sana'a FIR, some air operators resumed operations through Sana'a FIR using the ATS routes over the high seas.

4.16   Several Contingency Coordination Teams (CCTs) have been established in accordance with the MID Region ATM Contingency Plan, which succeeded in the provision of a forum for sharing information, identifying the challenges and implementation of contingency measures/routes ensuring the safety of air traffic during contingency situations.

4.17   The meeting noted with appreciation that the recovery plan for the normalization of the use of Iraq Airspace has been successfully implemented based on the excellent cooperation of all stakeholders. However, the CCT for Iraq is still active addressing emerging operational issues, mainly at the interface with Turkey.

4.18   The meeting recalled that an Action Group has been established to carry out a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003), taking into consideration the experience gained, the latest developments, and to include in the revised version measures and procedures enabling the CCTs to deal with airports and airspace disruptions due to weather or other factors in a timely and effective manner. The Action Group is composed of the ATM SG Chairpersons (Bahrain and Qatar), experts from Iran, Iraq, Kuwait, Saudi Arabia, UAE, AACO, IATA and ICAO.

4.19   In accordance with Annex 11 provisions, Air Traffic Services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services. Taking into consideration that the signature of contingency agreements is a regional requirement in the MID Region and it is not mandated in the adjacent Regions, the ATM SG/4 meeting agreed through Draft Conclusion 4/9 that the signature of the contingency agreements with ACCs of the States at the interfaces with the ICAO MID Region be considered as "recommended" and not mandatory. Therefore, the deficiencies reported against the States at the interfaces for non-signature of contingency agreements would be removed. The status of signed ATS Contingency Agreements in the MID Region as of May 2018 is reflected in the **Graph 2**:
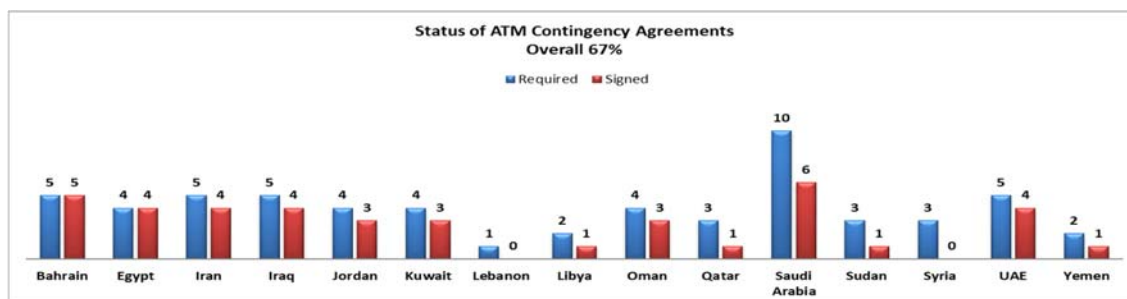
Graph 2

SIDs and STARs Phraseology

4.20   The meeting noted that the amendment to phraseology related to SIDs and STARs has been included in the latest version of ICAO Doc 4444 (PANS-ATM) with applicability date 10 November 2016. In this respect, the meeting urged States to take necessary measures for the implementation of the SIDs and STARs new phraseologies, using the guidance material available on the ICAO website: http://www.icao.int/airnavigation/sidstar/pages/changes-to-sid_star-phra-seologies.aspx.

4.21   The meeting noted that seven (7) States (Bahrain, Egypt, Jordan, Qatar, Saudi Arabia, Sudan and UAE) implemented the new phraseology. Iran, Iraq, Oman and Yemen have plan to do so by end of 2018. The meeting noted that the MID Office would follow-up with Kuwait, Lebanon, Libya and Syria for the implementation of the new phraseology and encourage States that already completed implementation, to provide support as appropriate.

SMS Implementation for ATM

4.22   The meeting noted with concern that the regional level of Effective Implementation (EI) of the ICAO USOAP CMA Protocol Questions (PQs) related to SMS with reference mainly to Doc 4444 and Doc 9859 as reflected in **Graph 3** is far below expectation:
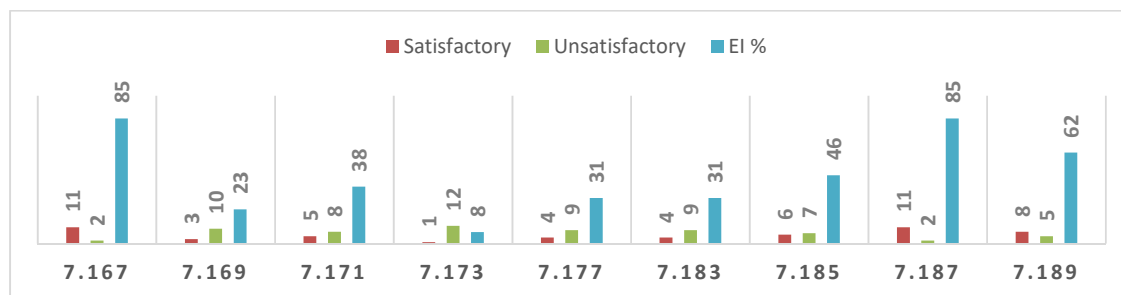
Graph 3

ELP for ATCOs and SAR Experts

4.23   The meeting noted that in accordance with the the following Safety Enhancement Initiative (SEI), the ELP Questionnaire would be circulated to States by July 2018:

SEI: Improve implementation of ELP requirements in the MID Region	
Actions	**Champion**
Develop a questionnaire to be used as the basis of a survey to assess the implementation of ELP requirements.	UAE in coordination with the ICAO MID Office
Disseminate the questionnaire to the MID States.	ICAO
Analyse the survey results and agree on next course of actions.	MID-SST in coordination with ATM SG

Air Safety Reports

4.24   The meeting recalled that the RSC/5 meeting (Amman, Jordan, 23-25 January 2017), urged States to:

      a)   publish in their AIPs (GEN 1.1) the contact details of the entity responsible for ASRs investigation, including the email addresses; and

      b)   expedite the investigation process and the provision of feedback to IATA in a timely manner.

4.25   Based on the above, the meeting urged States to provide feedback to IATA in a timely manner regarding the reported ASRs.

4.26   The meeting invited IATA to investigate if the issue is still existing and if further follow-up actions would be required.

Call Sign Confusion (CSC)

4.27   The meeting noted with appreciation the progress achieved with the implementation of the CSC initiative, and that the MID Region experience has been considered by the adjacent ICAO Regions. The meeting commended the work and efforts of the CSC Initiative Team.

4.28   The meeting noted that airlines had been experiencing challenges when filing flight plans with alphanumeric call signs even for those that had been previously approved. In case one State or airport reject a flight plan with alphanumeric call sign the airline will not be able to use the alphanumeric call sign for the entire flight. Accordingly, the meeting urged States to coordinate with their relevant authorities/departments providing flight plan approval/permissions on the acceptance of alphanumeric call signs.

4.29   The meeting reviewed the results of airports testing in the MID Region. The meeting noted that testing is expected to be completed by end of 2018. Accordingly, the meeting encouraged States to support the CSC initiative ensuring effective cooperation during the testing and implementation phase. Moreover, the meeting urged States to report call sing similarity to the following email addresses: MIDCSC@icao.int and MENACSSU@iata.org, using the format at **Appendix 4D.**

4.30   The meeting urged Sates to follow-up with their operators to implement the procedures for the de-conflicting of call sign similarities in coordination with the CSC Initiative Team and

4.31   The meeting noted with appreciation that an important decrease in the number of incidents related to call sign similarity/conflict was observed in the Emirates FIR (around 40% decrease). The meeting noted that with the increased use of alphanumeric call signs, call sign conflicts/similarities would continue to exist and ANSPs should place increased emphasis on the detection/alerting of call sign conflicts before they occur. The meeting encouraged States/ANSPs to develop unified procedures if/when potential exists and to consider that their future ATM systems should provide a 'built-in' detection and alerting tool to Air Traffic Controllers.

4.32   The meeting noted that a progress report with recommended actions would be presented to MIDANPIRG/17.

Remotely Piloted Aircraft (RPAS)

4.33   The meeting encouraged States to use the guidance material related to RPAS provided in the ICAO Doc 10019 and the information available on the RPAS webpage: https://www4.icao.int/rpas

4.34   The meeting encouraged States to consider the developments related to RPAS, and take necessary measures for the amendment of the relevant civil aviation regulations and procedures in a timely manner, in order to ensure safe integration of the RPA into the non-segregated airspace. In accordance with the RASG-MID Conclusion 5/18, the meeting urged States to report any safety occurrence related to RPA operations to the ICAO MID Regional Office on regular basis.

Search and Rescue

4.35   The meeting noted that the main USOAP CMA SAR findings in the MID Region are related to lack of:

- effective SAR oversight activities;
- English language proficiency for RCC radio operators;
- appropriate training programmes/plans of SAR experts;
- signature of SAR agreements;
- plans of operations for the conduct of SAR operations and SAR exercises;
- provision of required SAR services; and
- non-compliance with the carriage of Emergency Locator Transmitter (ELT) requirements.

4.36   The status of SAR bilateral Arrangements as of May 2018 is reflected in **Graph 4.** The meeting noted with appreciation that the level of signed SAR bilateral arrangements is improving.

Status of SAR Bilateral Arrangments as of April 2018
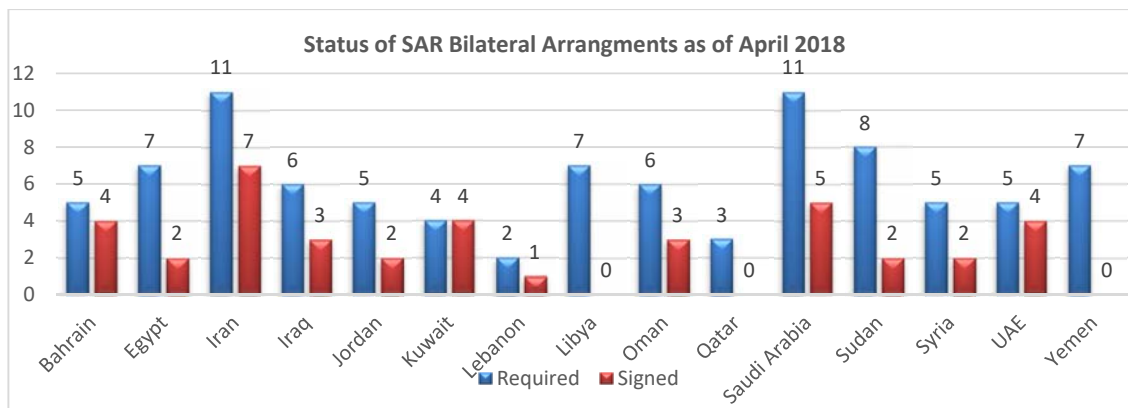
Graph 4

4.37   The meeting noted that the ATM SG/4 meeting agreed to the Draft MID SAR Implementation Plan developed by the MID SAR Action Group (SAR AG), which includes guidance material to support States to comply with global and regional requirements for SAR provision. The Plan includes also the Matrix that will be used for the analysis of the SAR status of implementation in the MID Region and Templates related to the conduct of SAREX. The meeting commended the work of the Action Group and agreed that the Plan to be presented to MSG/6 for endorsement.

4.38   The meeting urged States to keep up-to-date their SAR Point of Contact (SPOC) contact details in their AIPs (GEN 3.6) and on the COSPAS-SARSAT website: http://www.cospas-sarsat.int/en/contact-lists-mccs-and-spocs

GNSS Vulnerabilities

4.39   The meeting recalled that MIDANPIRG/16 agreed to gather data on actual GNSS interference causes and collect data from pilots using the adopted reporting form.

4.40   In connection with the above, the meeting noted that sixty-five (65) GNSS interference incidents were reported by the users in 2017 and 2018.

4.41   The meeting recalled that the RASG-MID/6 meeting agreed that IATA and ICAO MID Office develop a RASG-MID Safety Advisory (RSA) on GNSS Vulnerabilities taking into consideration the outcome of the ACAC/ICAO GNSS Workshop (Rabat, Morocco, 7-8 November 2017).

4.42   The meeting reviewed the Draft RSA on GNSS Vulnerabilities developed by the Secretariat. Accordingly, the meeting agreed to the following Conclusion:

> ***RSC CONCLUSION 6/10:   RSA ON GNSS VULNERABILITIES***
>
> *That, States and stakeholders be invited to review the Draft Safety Advisory at* ***Appendix 4E****; and provide comments/inputs to the ICAO MID Office before* ***15 September 2018****, in order to consolidate the final version for endorsement by the RASG-MID/7 meeting.*

REPORT ON AGENDA ITEM 5:   **FUTURE WORK PROGRAMME**

RASG-MID Procedural Handbook

5.1   The subject was addressed in WP/23 presented by the Secretariat. The meeting agreed that the Terms of Reference of the RASG-MID Teams (MID-ASRT, MID-RAST, and MID-SST) be included in the Procedural Handbook.

5.2   The Fourth meeting of the MIDANPIRG/RASG-MID Coordination meeting (Bahrain, 25n September 2017) agreed that, in many cases, there is a need for an expeditious decision-making process (fast track, approval by passing, etc). It was further agreed that the MIDANPIRG and RASG-MID should agree on such procedure and include it in their Procedural Handbooks.

5.3   Based on the above, the meeting agreed to include on the following paragraph related to fast track/approval by passing procedure in the RASG-MID Procedural Handbook:

> "*In case ~~of need to take~~ an urgent follow-up action on an outcome from a RASG-MID subsidiary body is identified/needed, the ICAO MID Office may coordinate with the Chairperson(s) the approval by passing of the corresponding outcome, without waiting for the RASG-MID or RSC approval.*"

5.4   The meeting agreed that the Secretariat develop a new Edition of the RASG-MID Procedural Handbook, including the TORs of the RASG-MID Teams and the fast track/approval by passing procedure for presentation to and endorsement by the RASG-MID/7 meeting.

Dates and Venue of the RSC/7 Meeting

5.5   The meeting noted that the RASG-MID/7 meeting is tentatively scheduled for beginning of April 2019. Accordingly, the meeting agreed that the RSC/7 meeting be tentatively scheduled to be held during the first Quarter of 2020. The venue will be the ICAO MID Office in Cairo, unless a State offer to host the meeting.

REPORT ON AGENDA ITEM 6:   ANY OTHER BUSINESS

Safe Cargo Operations

6.1   The subject was addressed in IP/3 presented by the USA. The objective was to increase the awareness of Member States related to cargo operations to ensure that carfo is loaded and secured in accordance with the aircraft Weight and Balance Manual (WBM) to ensure safe and efficient operations.

6.2   The meeting was appraised of USA's experience/lessons learned from accidents related to air cargo, which were attributed to improper securing of special cargo.

6.3   The meeting encouraged States to benefit from USA's experience related to cargo operations; and to ask for take a similar approach to ensure proper oversight of their air operator cargo programs. For additional information, States were invited to send inquiries to the FAA Air Cargo Focus team at: 9-NATL-Cargo-CFT@faa.gov.

Facilitation of Data Driven Decision-making in Support of Safety Risk Management

6.4   The subject was addressed in IP/4 presented by the USA. The meeting noted that the U.S. Federal Aviation Administration (FAA) is working with ICAO on initiatives that will lead to better use of the increasingly available data collected by air operators and other service providers in the aviation field. One of the initiatives is related to aviation data exchange (AVDEX).

6.5   The objective is to facilitate data-driven decision-making and assist stakeholders in identifying and managing safety risks in support of the development and dissemination of safety information and the implementation of State Safety Programme (SSP) and Safety Management Systems (SMSs).

6.6   It was highlighted that the ICAO Safety Information Monitoring Systems (SIMS) promotes cooperation among States and industry to collect and analyse data pertinent to the monitoring of safety performance, with no charge to the State.

6.7   The meeting noted that the States participating in SIMS can only view their own data. However, by signing a Memorandum of Understanding with ICAO, SIMS allows participating States to not only view their own data but also to securely share certain generated safety information with each other, such as ramp inspection information.

6.8   The meeting noted that a WP on SIMS will also be presented to the Third meeting of the Air Navigation Systems Implementation Group (ANSIG/3), which will be held in Cairo, 2-4 July 2018.

6.9   The meeting encouraged States to approach ICAO (sims@icao.int) with copy to (icaomid@icao.int) for joining the ICAO SIMS project. States were also encouraged to exchange safety and air navigation information with other Member States through SIMS in support of safety risk management.

APPENDICES

APPENDIX 2A

CHANGES FROM THE THIRD TO THE FOURTH EDITION OF THE SAFETY MANAGEMENT MANUAL (SMM)

Importantly, the 4th edition of the Safety Management Manual (SMM) is an evolution of its predecessors. Readers will see many similarities between the 4th edition and the 3rd Edition of the SMM. The key differences between the two editions are highlighted in the table below.

No.		Summary of Changes	
	3rd Edition		4th Edition
1	254 pages		• approx. 170 pages
2	Examples and tools contained in the manual as Appendices to the Chapters		• Examples and tools from the 3rd edition of SMM moved to the Safety Management Implementation (SMI) website which is complementary to the 4th edition of SMM
			• Additional examples and tools will be collected from the stakeholders and will be posted on the SMI website to support SSP and SMS implementation that is commensurate with the size and complexity of the organization
3	Aligned to *Annex 19 Safety Management, 1st edition*		• Aligned to *Annex 19 Safety Management, Amendment 1*
4	Divided into five chapters:		Divided into 9 Chapters with expanded guidance for the new Chapters:
	1. Overview of the Manual		1. Introduction
	2. Safety Management Fundamentals		2. Safety Management Fundamentals
	3. ICAO Safety Management SARPs		3. Safety Culture
	4. State Safety Programme (SSP)		4. Safety Performance Management
	5. Safety Management Systems (SMS)		5. Safety Data Collection and Processing Systems
			6. Safety Analysis
			7. Protection of Safety Data, Safety Information and Related Sources
			8. State Safety Management Responsibilities

		9. Safety Management Systems
5	No information regarding safety management applicability beyond mention of applicability dates	• Expanded introduction to address the scope of safety management provisions and their applicability, including discretionary SMS applicability
6	No information on integrated risk management	• Concept of integrated risk management is introduced in Chapter 1
7	State safety oversight (SSO) and the critical elements (CEs) limited to SSP component 3: State safety assurance.	• *Chapter 8 – State Safety Management Responsibilities* reflects the SSP with the State safety oversight (SSO) system critical elements (CEs) as the foundation of SSP. • The CEs are integrated throughout the components. • The term "framework" is no longer used in reference to SSP.
8	The role of safety objectives not strongly highlighted	• Strengthened link between safety objectives and safety performance in Chapter 4, 8 and 9
9	Some information on system description and interfaces	• General guidance on system description and interfaces contained in Chapter 1 • Specific guidance directed at States under SSP Implementation in Chapter 8 • Specific guidance directed at service providers under SMS Implementation in Chapter 9
10	Refers to SSP and SMS being commensurate with the size and complexity without clearly explaining how this is achieved.	• General guidance on scalability contained in Chapter 1 • The guidance has been updated with a focus on intended outcomes and performance in order to achieve effective implementation. The implementation of SSP and SMS should be tailored to the needs and operational context of the organization.
11	Some information on Acceptable Level of Safety Performance (ALoSP) in *Chapter 4 – State Safety Programme* under Safety Performance Indicators section	• Specific guidance directed at States under State Safety Performance section in Chapter 8 • The linkage between ALoSP and safety performance management activities of service providers is illustrated
12	General information on Management of Change	• Enhanced guidance on Management of Change in Chapters 8 and 9 for States and service providers, respectively.

13	Refers to the training requirements being consistent with the needs and complexity of the organization for each area of activity without clearly explaining how this is achieved.	• Specific guidance on the performing a Training Needs Analysis in Chapter 9 for service providers.
14	Some information on the integration of management systems and SMS-QMS integration	• Additional guidance on the integration of management systems, including the integration of SMS and QMS in Chapter 9
15	Some information on safety culture and protection of safety data and safety in Chapter 2 - Safety management fundamentals under safety culture section and safety data collection and analysis section separately.	• New chapters on safety culture and Protection of safety data, safety information and related sources.

APPENDIX 2B

GASOS Feasibility Study
Summary of Recommendations

Recommendation 1: Use USOAP Protocol for Level 3
Considering that there is already an established USOAP protocol for the assessment of Level 3 oversight service providers, it is recommended that the GASOS model be developed on the premise that any applicant for Level 3 recognition be assessed through a USOAP audit and that the EI scores derived from this process be associated with that Level 3 service provider in a GASOS directory of recognized safety oversight service providers. This process would apply to RSOOs, State CAAs and other safety oversight service providers.

Recommendation 2: Target Level 2 Market Niche
Whereas the assessment of Level 1 safety oversight service providers could be included in the GASOS model, GASOS would add the most value by expanding the pool of competent Level 2 entities capable of providing operational assistance to State CAAs. It is therefore recommended that the GASOS assessment and recognition process be focused on serving this market niche. This strategy would help strengthen some of the RSOOs by providing a benchmark, based on the USOAP methodology, for their evolution and assessment. It would also support a strategy of phased implementation, addressing financial and other risks that may exist during the inception phase of the GASOS life cycle. The validation of certain types of Level 2 safety oversight provider competencies would require a modified USOAP Audit and continuous monitoring approach for recognition of Level 2 functions.

Recommendation 3: Monitoring and Reassessment
To safeguard the validity of the GASOS assessment process, the GASOS design would need to include a monitoring mechanism that provides for quality assurance and a process by which the competencies of recognized safety oversight service providers can be reassessed. Whereas the USOAP CMA protocol has such a mechanism for Level 3, it is recommended that a similar monitoring mechanism be applied to Level 1 and Level 2 service providers.

Recommendation 4: Draw Lessons from the ICAO Global Aviation Training Model (GAT)
Break-even pricing2 will be required for GASOS to be self-funding. It is recommended that lessons are drawn from the ICAO Global Aviation Training (GAT) business model and pricing policy. Additionally, the pricing policies of other ICAO programmes could be reviewed, such as the Technical Cooperation Programme Civil Aviation Purchasing Service (CAPS) Roster of Registered Suppliers, the ICAO recognition of Instrument Procedure Design Organizations, etc.

Recommendation 5: Synergies with the Solution Centre
It is recommended that the development of the Solution Centre be followed closely to identify opportunities to create synergies with the GASOS model. Of particular relevance is the opportunity to create a directory of GASOS recognized safety oversight service providers within the Solution Centre.

Recommendation 6: Prepare a GASOS Business Case
It is recommended that a Business Case be developed to support the presentation of the GASOS concept to the Secretary General, the Air Navigation Commission, and the ICAO Council. Should the analysis indicate that GASOS would not be self-funding in the short-run, given that GASOS would be supporting the ICAO Strategic Objective on Aviation Safety, it may be possible to explore alternative funding options such as voluntary contributions and/or support from the Regular Budget.

Recommendation 7: Pilot Test the GASOS Assessment Process

It is recommended that the GASOS implementation plan is refined by pilot testing the GASOS assessment process. For example, a gap analysis of an RSOO could be conducted on the basis of a protocol envisioned for the GASOS assessment process. Also, a State CAA could volunteer to be assessed for its capacity to provide operational assistance to the CAAs of other States, and the same trial could be conducted for another safety oversight provider. Input from these pilot studies would serve to fine-tune the assessment process; provide a basis for costing; and help select progress markers for the purpose of evaluating GASOS benefits.

APPENDIX 3A

FOLLOW-UP ON RASG-MID/6 CONCLUSIONS AND DECISIONS

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/1: GLOBAL AVIATION SAFETY PLAN (GASP) That, States: a) be requested to establish a national aviation safety plan, including goals and targets consistent with the MID Region Safety Strategy, and in line with the GASP objectives, including the global aviation safety roadmap, and based on their operational safety needs; and b) be invited to provide ICAO feedback on the new global aviation safety roadmap and suggestions for the future 2020 -2022 edition of the GASP via email to GASP@icao.int, by March 2018.	- Development of national aviation safety plan - To get feedback on the safety roadmap	State Letter Feedback	ICAO States	Nov. 2017 March 2018	**Actioned** SL ME4-17/305 dated 2 November 2017. *(Replies: Bahrain and Jordan)*
CONCLUSION 6/2: SAFETY MANAGEMENT IMPLEMENTATION That States, regional and international organizations are invited to share tools and examples, which support effective safety management implementation, to be considered for posting on the ICAO safety management implementation website.	Sharing of best practices	State Letter	ICAO	Jan. 2018	**Actioned** SL ME4-18/027 dated 25 January 2018

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/3: REGIONAL SAFETY OVERSIGHT ORGANIZATIONS That, States support: a) the proposed global strategy and action plan to improve RSOOs; and b) the conduct of a study related to the proposed global aviation safety oversight system (GASOS).	Improvement of RSOO and establishment of GASOS	Supporting the proposed global strategy Study related to the proposed GASOS)	RASG-MID	Sept. 2017 TBD	**Actioned** The study was released
CONCLUSION 6/4: SHARING OF SAFETY RECOMMENDATIONS That, a) States be urged to share their Safety Recommendations after investigation of accidents and incidents; and b) MID-SST to coordinate with MID-ASRT, ICAO and stakeholders the development of a RASG-MID Safety Advisory to consolidate a set of safety recommendations addressing the Focus Areas and Emerging Risks in the MID Region.	Sharing of safety recommendations in order to agree on mitigation measures at regional level (Best practices)	State Letter RSA	ICAO MID-SST MID-ASRT ICAO Stakeholders	Jan. 2018 TBD	**Actioned** SL ME4-18/028 dated 25 January 2018

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/5: ADOPTION OF ISAGO AND IGOM FOR GROUND HANDLING OPERATIONS That, States be invited to: a) encourage airlines and aerodrome operators to implement the procedures contained in the IATA Ground Operations Manual (IGOM) for harmonization purpose and to improve safety of Ground Handling Operations; and b) use the IATA Safety Audit for Ground Operations (ISAGO) as a source of safety data which provide complementary information for the safety oversight activities of ground handling operations services.	Use of IATA Guidance material contained in the IGOM. Use of ISAGO as a source of complementary safety data for safety oversight activities	State Letter	ICAO	Jan. 2018	**Completed** SL ME4-18/028 dated 25 January 2018
CONCLUSION 6/6: DEVELOPMENT OF ADDITIONAL GROUND HANDLING OPERATIONS PROVISIONS That, ICAO be invited to consider the development of additional Ground Handling Operations provisions.	Need for additional provisions/guidance on Ground Handling Operations	Additional Ground Handling Operations provisions	ICAO	TBD	**Ongoing**

Conclusions and Decisions	Concerns/ Challenges (Rationale)	Deliverable/ To be Initiated by		Target date	Status/Remarks
CONCLUSION 6/7: EXPANSION OF THE RSP SCOPE That, ICAO be invited to consider the expansion of the ICAO Runway Safety Programme (RSP) scope to include the movement area (including aprons).	Inclusion of the movement area in RSP scope	Expansion of the ICAO RSP scope	ICAO	TBD	**Ongoing**
DECISION 6/8: DISSOLUTION OF THE AIA WG That, a) the AIA WG is dissolved; and b) the RASG-MID Organizational Structure contained in the RASG-MID Procedural Handbook be amended accordingly.	Poor attendance and support	Dissolution of the AIA WG	RASG-MID	Sept. 2017	**Completed**
DECISION 6/9: REVISED TERMS OF REFERENCE (TORS) OF THE MID-ASRT That, considering the dissolution of the AIA WG: a) the MID-ASRT develop revised version of its Terms of References (TORs) for review and endorsement by the RSC; and b) face-to-face meetings of the MID-ASRT be organized on an annual basis.	To include the tasks previously assigned to AIA WG	State Letter Revised TORs	ICAO RASG-MID	Dec. 2017 June 2018	**Ongoing** SL ME4-17/306 dated 2 November 2017 (ASRT Members) *(Replies: Bahrain, Iran, Iraq, Jordan, Oman, Saudi Arabia, UAE, IFATCA & IFALPA)*

Conclusions and Decisions	Concerns/ Challenges (Rationale)	Deliverable/ To be initiated by		Target date	Status/Remarks
Conclusion 6/10: Accident and Serious Incidents Final Reports That, a) States be urged to comply with Annex 13 provisions related to the release of Final Reports on accidents and serious incidents; and b) for the accidents and serious incidents involving aircraft of a maximum mass over 5700 kg, a copy of the Final Report should be sent to the ICAO HQ and MID Regional Office.	Sharing of final reports on accidents and serious incidents	State Letter	ICAO	Jan. 2018	**Actioned** SL ME4-18/025 dated 25 January 2018 (Egypt, Iran, Jordan and UAE shared their Final Reports)
Conclusion 6/11: Sharing of Incidents Analyses That, States be invited to present to the ASRT/1 meeting their analyses related to the following top 5 areas of concern: 1- Near midair Collision (NMAC)-TCAS RA 2- Loss of Separation 3- Take off Clearance with Runway in use 4- Wake Turbulence –Encountered 5- Callsign Confusion	Identification of trends and sharing of best practices for mitigation measures	State Letter Safety Data Analyses	ICAO States	Nov. 2018 Feb. 2018	**Actioned** SL ME 4–17/306 dated 2 November 2017 Replies received from 7 States *(Replies: Bahrain, Iran, Iraq, Jordan, Oman, Saudi Arabia, UAE, IFATCA & IFALPA) and 2 Organizations (IFALPA and IFATCA)*

DECISION 6/12: RASG-MID SAFETY ADVISORY - WILDLIFE MANAGEMENT AND CONTROL That, the RASG-MID Safety Advisory (RSA/13) on Wildlife Management and Control at *Appendix 3I* is endorsed and be published by the ICAO MID Office.	Guidance material to the Wildlife Management and Control	RSA	RASG-MID	Sept. 2017	**Completed** SL ME 4–17/292 dated 23 October 2017 RASG-MID Safety Advisory-13 (RSA-13) has been posted on the ICAO MID website.
DECISION 6/13: AMENDED RASG-MID SAFETY ADVISORY/12 – LASER ATTACK SAFETY GUIDELINES That, the revised version of the RASG-MID Safety Advisory (RSA/12) on Laser Attacks at *Appendix 3J* is endorsed and be published by the ICAO MID Office.	Updated guidance related to the Laser Attack Safety	RSA-Rev. 1	RASG-MID	Sept. 2017	**Completed** SL ME 4–17/291 dated 23 October 2017 RASG-MID Safety Advisory-12 (RSA-12) is available on the ICAO MID website.
CONCLUSION 6/14: REVISED MID REGION SAFETY STRATEGY That, the revised version of the MID Region Safety Strategy at Appendix 3N is endorsed.	Need to keep pace with developments, including the GASP 2017-2019	MID Region Safety Strategy (Edition 5)	RASG-MID	Sept. 2017	**Completed**

DECISION 6/15: RASG-MID SAFETY ADVISORY (RSA)− WAKE TURBULENCE IN THE RVSM AIRSPACE That, a RASG-MID Safety Advisory (RSA) on Wake Turbulence in the RVSM Airspace, be developed by ICAO, UAE and IATA, taking into consideration UAE safety alert 2017-10 dated 5 July 2017; and other existing practices.	Guidance related to the Wake Turbulence in the RVSM airspace	RSA	ICAO UAE IATA	TBD	**Ongoing**
DECISION 6/16: RASG-MID SAFETY ADVISORY-04 (RSA 04) That, the revised RSA-04 related to call sign confusion at *Appendix 5B* is endorsed.	Guidance material related to the Call Sign Confusion	RSA	RASG-MID	Sept. 2017	**Completed**

APPENDIX 3B

MID ANNUAL SAFETY REPORT TEAM (MID-ASRT)

TERMS OF REFERENCE

A) **Purpose of the MID-ASRT:**

The MID-ASRT is established to:

1) gather safety information from different available sources to identify and determine the main aviation safety risks in the in the Middle East Region; and

2) develop the MID Region Safety Report on annual basis, for review and endorsement by the RASG-MID; ensuring the confidentiality/de-identification of data.

In order to meet its Terms of Reference, the MID-ASRT shall:

1) gather information from different available sources on the accidents and serious incidents that:
    a) occurred in the MID Region (State of Occurrence);
    b) involved aircraft registered in the MID Region (State of Registry); or
    c) involved aircraft owned and/or operated by an Air Operator from the MID Region (State of the Operator).
2) review and analyse the accidents and serious incidents;
3) coordinate with MID States' focal points to get additional information on the accidents and serious incidents, as appropriate;
4) identify the risk category focus areas and emerging risks;
5) analyse the preliminary and final investigations reports of accidents and serious incidents conducted by States, including relevant safety recommendations; and safety analyses of incidents, and share the outcomes with the MID-RAST;
6) identify root causes and contributing factors, in order to support the MID-RAST in the development of mitigation measures;
7) develop an agreed and harmonized MID Regional dataset of accidents and incidents and provide feedback to the ICAO Safety Indicators Study Group (SISG); and
8) share the outcome of its meetings with the concerned MIDANPIRG subsidiary bodies, as appropriate.

B) **Composition:**

The MID-ASRT is composed of Members designated by the following RASG MID Member States and Partners:

States: All MID States

Partners: AACO, AIRBUS, Boeing, IATA, IFALPA and IFATCA

C) **Roles and Responsibilities:**

- MID-RAST Rapporteur – Coordinate MID-ASRT activities and provide overall guidance and leadership;

- ICAO – Support; and

- Partners – Provide technical expertise and collaborate in the development of material as requested by the MID-ASRT Rapporteur.

APPENDIX 3C

Status of LOC-I Safety Iniative

NO	Country	State Regulation	Company	Airlines Training Program	Remarks
1	Bahrain	Yes	Gulf Air	Yes	
2			Texel Air		
3			DHL Int'l		
4	Egypt	Yes	Air Arabia Egypt		
5			Almasria Universal Airlines		
6			Air Cairo		
7			Petroleum Air Services		
8			AMC Airlines		
9			Alexandria Airlines		
10			Air Leisure Egypt		
11			Egypt Air		In progress
12			Egypt Air Express		
13			Fly Egypt		
14			Nile Air		In progress
15			Nefertiti Airways		
16			Nesma Airlines		
17	Iran	NO	Iran Air		
18			Iran Airtours		
19			Mahan Air		
20			Iran Aseman Airlines		
21			Kish Air		
22			Meraj Airlines		
23			Naft Air lines		
24			Taftan Air		
25			Taban Air		
26			ATA Air		
27			Atrak Air		
28			Caspian Airlines		
29			Qeshm Airlines		
30			Sepehran Airlines		
31			Saha Airlines		
32			Jam Airlines		
33			Pars Air		
34			Fly Qeshm		
35			Zagros Airlines		
36	Iraq	NO	Iraqi Airways		
37			AlNaser Airlines		
38			Zagrosjet		
			Fly Baghdad		
39			Iraq Gate		
40	Jordan	Yes Effective 2019	Royal Jordanian	B787 (Yes)	A320 & Embarear In progress
41			Fly Jordan		
42			Jordan Aviation		
43			Arab wings		
44			Royal Wings		
45	Kuwait	NO	Gryphon Airlines		
46			Wataniya Airways		
47			Jazeera Airways		
48			Kuwait Airways		
49	Lebanon	NO	Middle East Airlines		
50			Wings of Lebanon		
51	Libya	NO	Afriqiyah Airways		
52			Libyan Arab Airlines		
53			Buraq Air		
54			Libyan wings		
55			Petro Air		
56			Kallat Al Saker		

NO	Country	State Regulation	Company	Airlines Training Program	Remarks
57	Oman	NO	Oman Air		
58			Salalah Air		
59			Salam Air		
60			Air Shabelle		
61	Qatar	Yes	Qatar Airways	Yes	
62	Saudi Arabia	Yes.Effective March 2019	Al Maha Airways		
63			Alpha Star		
64			Aviation Link		
65			FLY Nas		
66			MID East Jet		
67			Nesma Airlines Saudi		
68			Saudi Arabian Airlines		
69			Saudi Gulf Airline		
70			National Air Services		
71			ARAMCO		
72			Fly Prime Airlines		
73			Flyadeal		
74	Sudan	NO	Feeder Airlines		
75			Badr Airlines		
76			Golden wings Airline		
77			Nova Airways		
78			Sudan Airways		
79			Tarco Air		
80	Syria	NO	Syrianair		
81			FLYDamas Airlines		
82			Cham wings Airline		
83			EBLA Airlines		
84			Syrian Wings Airlines		
85	UAE	Yes.Effective Sept.2018	Abu Dhabi Aviation		
86			Air Arabia		
87			FlyDubai		
88			Emirates	Yes	
89			Etihad Airways	Yes	
90			Al Jaber Aviation		
91			Rotana Jet		
92			Dubai Air wings		
93			Empire Aviation Groupb		
94			Falcon Aviation Service		
95			Global Jet		
96			Midex Airlines		
97			Skylink Arabia		
98			Royal Jet		
99			Rizon jet		
100	Yemen	NO	Yemania		
101			Felix Airways		

APPENDIX 3D

			CIFT DIP Status			

DIP	Description	Output	Deadline	Status	Comments
CIFIT/1	The implementation of BPN Approach procedures to all runways not currently served by precision approach procedures.	1. Identify and prioritize the airports/runways, which require specific PBN approaches. 2. Concerned States, CANSO, IATA and ICAO to establish a Work Force to develop an appropriate detailed action plan for the implementation of PBN approaches at the identified airports/runways. 3. Implementation of PBN approach procedures at the identified airports/runways in accordance with their associated action plans.	Long Term	1.Completed 2.On going 3. On going	**Runway priorities** 1 OMRK 16/34 (Completed) 2.OIMM 13**. procedure design completed (pending Flight Check)** 3.OISS 11 /29. **procedure design completed (pending Flight Check)** 4.HEBA 14 5.ORMM 14/32 6.ORNI 10 (Completed)

APPENDIX 3E

DIP Tracking for MID-RAST/RGS/2

Development guidance material and training programmes to support the creation of action plans by local aerodrome Runway Safety Teams (RST)

RGS/2 DIP Deliverable	Target Date	Status	Comments
✔ Develop and issue Stop Bar guidance documentation for consideration of RSTs	End April 2014	Completed	RASG-MID Safety Advisory (RSA-01) circulated to States on 2 November 2014 (Ref: ME 4-14/253).
✔ Organise a Workshop for Regional RST Go-Teams	End June 2014	Completed	3 June 2014 – see *RASG-MID/4 WP/7 - Outcome of MID-RRSS/2* for details.
✔ Develop and issue regulatory framework supporting establishment of RSTs	End September 2014	Completed	RASG-MID Safety Advisory (RSA-02) circulated to States on 20 January 2015 (Ref: ME 4-15/014).
✔ Develop and issue a model checklist for RSTs	End December 2014	Completed	RASG-MID Safety Advisory (RSA-03) circulated to States on 16 March 2015 (Ref: ME 4-15/078).

APPENDIX 3F

DIP Tracking for MID-RAST/RGS/3

Development guidance material and training programmes to support Aerodrome Infrastructure and Maintenance Management

RGS/3 DIP Deliverable	Target Date	Status	Comments
✓ Conduct a MID-Regional Runway Safety Seminar	End June 2014	Completed	4 June 2014 – see *RASG-MID/4 WP/7 - Outcome of MID-RRSS/2* for details.
✓ Organise a Regional Aerodrome Certification Workshop	End June 2014	Completed	4 June 2014 - see *RASG-MID/4 WP/7 - Outcome of MID-RRSS/2* and *RASG-MID/4 WP/8 - Runway Safety Related Issues.*
✓ Develop a MID-Region Aerodrome Certification toolkit for States.	End March 2015	Completed	RASG-MID Safety Advisory (RSA-05) circulated to States on 10 September 2015 (Ref: ME 4-15/261).
✓ Develop and issue guidance material on periodic surveillance audits of Aerodrome Infrastructure and Maintenance	End March 2016	Completed	RASG-MID Safety Advisory (RSA-10) circulated to States on 22 August 2016 (Ref: ME 4-16/232).
Develop and issue guidance material as RSA on proactive oversight of Aerodrome Infrastructure Development	End November 2018 (RGS WG/5)	In Progress	RGS WG/4 requests to consider information presented in RGS WG/4 WP/12 presented by Egypt as part of RSA.

APPENDIX 3G

DIP Tracking for MID-RAST/RGS/4

Aerodrome Safeguarding

RGS/4 DIP Deliverable	Target Date	Status	Comments
✓ Safeguarding Guidance Toolkit	April 2016	Completed	RASG-MID Safety Advisory (RSA-11), Safeguarding of Aerodromes, was circulated to States on 29 March 2017 (Ref: ME 4-17/066).
✓ Regional Safeguarding Workshop	December 2017	Completed	The Workshop was hosted by Egypt in Cairo from 4-6 December 2017. Details of the Workshop are included in RSC/6 WP/10 regarding Outcome of the RGS WG/4.

APPENDIX 3H

DIP Tracking for MID-RAST/RGS/5

Wildlife Management Control

	RGS/5 DIP Deliverable	Target Date	Status	Comments
✓	RSA for Regulatory Framework & Guidance Materials	October 2017	Completed	RASG-MID Safety Advisory (RSA-13) circulated to States on 23 October 2017 (SL. Ref.: ME 4-17/292).
	Wildlife Hazard Management Plan Template	November 2017	Completed	The draft template presented to RGS WG/4 (Cairo, Egypt, 5-7 November 2017) with reference to WP/13. Template will be circulated to MID States as an Appendix to RSA-13 for review before endorsement.
	Wildlife Management Control Workshop	September 2018	In Progress	Sudan will host the Workshop during 2018 as noted in Final Report of RGS WG/3.

APPENDIX 3I

DIP Tracking for MID-RAST/RGS/6

Laser Attacks

RGS/6 DIP Deliverable	Target Date	Status	Comments
✔ RSA for Guidance Material	March 2017	Completed	RASG-MID Safety Advisory (RSA-12) circulated to States on 29 March 2017 (Ref: ME 4-17/067).
✔ Amended RSA-12	October 2017	Completed	Revised RASG-MID Safety Advisory (RSA-12) circulated to States on 23 October 2017 (SL. Ref: ME 4-17/291).
✔ ICAO to issue State Letter to promulgate regulations on Laser Attacks	September 2015	Completed	Letter issued by ICAO MID on 3 September 2015 (SL Ref: ME 4/1.2.1 - 15/243).
RSA with Case Studies	End December 2018	Completed	The draft content presented to RGS WG/4 (Cairo, Egypt, 5-7 November 2017) with reference to WP/13. Template will be circulated to MID States as an Appendix to RSA-12 for review before endorsement.

APPENDIX 3J

DIP Tracking for MID-RAST/RGS/7

Ground Handing Operations and Safety

RGS/7 DIP Deliverable	Target Date	Status	Comments
RSA for Aerodrome Apron Management	End March 2019	In Progress	Draft RASG-MID Safety Advisory for Aerodrome Apron Management, has been drafted by UAE and reviewed by Egypt to date.
Seminar on Ground Handling (Safety)	End March 2019	In Progress	Seminar on Ground Handling (Safety) be organized and hosted by UAE and supported by ICAO, IATA and ground handlers.

APPENDIX 3K

DIP Tracking for Proposed MID-RAST/RGS/8

ARFF and Emergency Planning

RGS/8 DIP Deliverable	Target Date	Status	Comments
Develop a survey on ARFF/AEP level of implementation	15 February 2018	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/1: Survey on ARFF/AEP Level of Implementation
Present Survey Results to RGS WG for consideration of other required actions	End November 2018 (RGS WG/5)	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/1: Survey on ARFF/AEP Level of Implementation

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APPENDIX 3L

DIP Tracking for Proposed MID-RAST/RGS/9

Safety Management

RGS/9 DIP Deliverable	Target Date	Status	Comments
Organize SMS Training/Workshop	End November 2018 (RGS WG/5)	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/4: Aerodrome SMS Compliance and Effectiveness Toolkit and Aerodrome SMS Training / Workshop
Develop Aerodrome SMS Compliance and Effectiveness Toolkit	End November 2018	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/4: Aerodrome SMS Compliance and Effectiveness Toolkit and Aerodrome SMS Training / Workshop
Present Toolkit at the Aerodrome SMS Workshop	End November 2018	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/4: Aerodrome SMS Compliance and Effectiveness Toolkit and Aerodrome SMS Training / Workshop

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APPENDIX 3M

DIP Tracking for Proposed MID-RAST/RGS/10

Runway Excursions

RGS/5 DIP Deliverable	Target Date	Status	Comments
RSA for Monitoring and Reporting Runway Surface Conditions	End June 2018	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/5: Further Safety Enhancements Related to Runway Excursions)
State Letter urging States to report the incidents on Annual Basis to the ICAO MID Office in conjunction with MID-ASRT.	End June 2018	In Progress	Reference RSC/6-WP/10 (RGS WG/4: Draft Conclusion 4/5: Further Safety Enhancements Related to Runway Excursions)

RASG-MID SAFETY ADVISORY – 11 (RSA-11)

March 2017

MID-Region

Safeguarding of Aerodromes

Date of Issue:	March 2017
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Owner:	RASG-MID

These guidelines are developed by the Runway and Ground Safety Working Group (RGS WG), as part of MID-RAST/RGS/4 DIP deliverables, based on the work of the Egyptian Civil Aviation Authority in collaboration with the ICAO MID Regional Office within the framework of RASG-MID the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document is intended to provide guidance for civil aviation regulators, aerodrome operators and other stakeholders involved in aerodromes safeguarding.

The document has been compiled by members of the aviation industry to enhance aviation safety. It is not intended to supersede or replace existing materials produced by the State or in ICAO SARPs. The distribution or publication of this document does not prejudice the State's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

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Regional Safety Advisory

TABLE OF CONTENTS

INTRODUCTION

SAFEGUARDING - AN OVERVIEW

1.   The Purpose of this Advice Note

The purpose of this Safety Advisory is to provide guidance on the Safeguarding of aerodromes by controlling proposed developments in areas surrounding aerodromes.

This publication explains the process; duties and responsibilities that will be adopted by the civil aviation regulators, service providers and concerned stakeholders.

2.   Background

In the early days of aviation, the rights of property owners were considered to extend from the surface downward to the centre of the earth and upward to infinity. Accordingly, the owner was free to erect structures on his land to unlimited heights and any encroachment in the airspace by others constituted a trespass. This meant that aircraft could not fly over private property at any altitude without permission of each property owner. Obviously, that policy could have prevented the development of civil aviation and scheduled air transportation. So, legislatures modified the ownership doctrine to specify that a property owner has exclusive rights to the airspace over his land only to the greatest height which he might reasonably be expected to use, with a right of free public transit through the air above such height.

When buildings encroach on the airspace needed for aircraft operations, restrictions limiting the aircraft operations should be established in the interest of safety. Such restrictions could seriously affect orderly and efficient air transportation to an airport and adversely affect the economy of the communities served by the airport.

Control of obstacles in the vicinity of airports is, therefore, a matter of interest and concern to national governments, local communities, property owners, and airport operators as well as civil aviation authorities (CAA). There are severe legal, economic, social and political limitations to what can be achieved by any of these interests with respect to an existing airport where obstacles already exist.

3.   What is Safeguarding?

The word "Safeguard" means, according to the Concise Oxford Dictionary, "a proviso, stipulation, quality or circumstance, that tends to prevent something undesirable", while "Aerodrome" is a defined area where aircraft can land, take-off, taxi or park, and includes airfields, airports, heliports, etc.

4.   Purpose of Safeguarding

Thus, the purpose of Aerodrome Safeguarding is to take the measures necessary to ensure the safety of aircraft, and thereby the passengers and crews aboard them, while taking-off or landing, or while flying in the vicinity of an aerodrome.

Safeguarding is achieved by a process of checking proposed developments so as to:
- protect the blocks of air through which aircraft fly, by preventing penetration of surfaces created to identify their lower limits (the minimum obstacle clearance altitude (MOCA);
- protect the integrity of radar and other electronic aids to air navigation, by Preventing reflections and diffractions of the radio signals involved;
- protect visual aids, such as Approach and Runway lighting, by preventing them from being obscured, or preventing the installation of other lights which could be confused for them; and
- avoid any increase in the risk to aircraft of a bird strike by preventing any land use that may cause increase in hazardous bird species in the vicinity of the aerodrome and, whenever the opportunity arises, to reduce the level of risk.

Safeguarding of Aerodromes is implemented by establishing a series of protection imaginary surfaces around each aerodrome as follows:

5. Safeguarding Protection Types

5.1 Obstacle Limitation Surfaces (OLS):
a. Obstacle Limitation Surfaces (OLS) represent the lower limit of the blocks of protected airspace around an aerodrome. They take the form of a complex set of 3-Dimensional surfaces, which extend upwards and outwards from the runway(s).
b. The OLS completely surround the aerodrome, but those surfaces aligned with the runway(s) used to protect aircraft landing or taking-off can be more limiting than those surrounding the rest of the aerodrome, particularly as you get closer to the aerodrome. Details of the OLS found in **Appendix A**.

5.2 PANS-OPS :
a. Surfaces established by designers of Procedures for Air Navigation Services and Aircraft Operations (PANS-OPS) are intended to safeguard an aeroplane from collision with obstacles when flying on instruments.
b. PANS-OPS specify the size and dimensions of the obstacle-free airspace needed for the approach, for the missed approach initiated at or above the OCA/H and for the visual maneuvering (circling) procedure.
c. Visual maneuvering (circling procedures) described in PANS-OPS, is a visual extension of an instrument approach procedure. The size of the area for a visual maneuvering (circling) varies with the flight speed.

d. It is permissible to eliminate from consideration a particular sector where a prominent non-removable obstacle exists by- establishing appropriate operational procedures.

e. In many cases, the size of the area will be considerably larger than that covered by the Annex 14 inner horizontal surface (as shown in figure below). Therefore circling altitudes/height calculated according to PANS-OPS for actual operations may be higher than those based only on obstacles penetrating the inner horizontal surface area (**Appendix B**).

(more information in Annex 6).

5.3 **Basic ILS surfaces:**
"The basic ILS surfaces" defined in PANS-OPS represent the simplest form of protection for ILS operations. These surfaces are extensions of certain Annex 14 surfaces, referenced to runway threshold level throughout and modified after threshold to protect the instrument missed approach.

The airspace bounded by the basic ILS surfaces is however usually too conservative and therefore another set of surfaces, "obstacle assessment surfaces", is specified in PANS-OPS. (**Appendix C**).

5.4 **Obstacle Assessment Surfaces (OAS):**
Obstacle Assessment Surfaces (OAS) establish a volume of airspace, inside which it is assumed the flight paths of aeroplanes making ILS approaches and subsequent missed approaches will be contained with sufficiently high probability.

5.5 **Radar and other Electronic Aide to Air Navigation:**
In low visibility conditions pilots are entirely dependent on the accuracy of the information displayed on the instruments in the cockpit to navigate and land their aircraft. Similarly, air traffic controllers rely on the accuracy of the information displayed on the radar screens in front of them to maintain safe separation between aircraft. It is essential, therefore, that this information has not been distorted by interference to the radio signals involved used in the operation of the navigation aids.
All effort has to be done to safeguard Navigation aid's protection area needed for each of (radar / ILS / VOR / Microwave line…..), by:
a. Contacting the Manufacturer company to provide all information about dimensions and slops of protection area for each electronic aids and any restriction needed.
b. Minimizing the effect of sources of non-visible radiation, or the presence of moving, or fixed objects that may interfere with, or adversely affect, the performance of aeronautical communications, navigation and surveillance systems.

5.6 **Visual Aids:**
Visual aids, consisting primarily of aeronautical ground lighting, assist pilots to line up the aircraft with the runway when approaching to land. These have to be protected by:
• preventing them from being obscured;
• preventing the installation and display of other lights, particularly street lighting, in a pattern or color which could be mistaken for visual aids;
• preventing a high level of background lighting which could diminish their effectiveness; and
• preventing other lights which could dazzle pilots.

5.7 **Control Tower:**
Aerodrome operator should do all effort needed to provide protection needed to keep control tower line of sight clear form any obstacles.

6. Duties and Responsibilities

A regulatory frame should be in place supported by law and includes clear duties and responsibilities for each of CAA, aerodrome operators and any other entity related to the implementation of aerodrome safeguarding management system as presented in **Appendix G**. Full description of all types of protection surfaces including OLS should be included therein.

Provisions depicting the roles of enforcement against any violation; and relation between aviation authority and other authorities should be incorporated in the national law. Such provisions should include, but not limited to the following:

6.1 **State/Regulator should:**
   a. Develop the Aviation law and regulations of safeguarding foundation and enforcement according to ICAO annex 14 and related documentations without any conflict to state's other laws and regulations.
   b. Assign Safeguarding team/division furnished with proper equipment and training to carry out their duties of safeguarding and auditing of the aerodromes.
   c. Support technical and audit operator's safeguarding team/departments
   d. Review and approve aerodromes' OLS maps according to national regulations
   e. Have Obstacles assessment system and procedures in place.
   f. Arrange with Operators and Local Planning Authority (LPA), concerned ministries and all other parties involved in aerodrome safeguarding protection area as follows:
   - Provide formal notifications of safeguarding protection area attached to maps of protection surfaces for each aerodrome in the state to LPA
   - Review all urban future development within State level to assure that none may affect aerodrome future development.
   - Review and approve different land use locations (industrial, commercial in addition to any wind-farms, electricity poles, communication antennas and advertising high masts
   - Review all new roads and bridges with its light poles in area adjacent to aerodromes.
   - Other information as may be necessary, for example, landscaping details to enable the birdstrike potential to be assessed, or the types of cladding materials proposed so that the potential for radar reflection can be modeled.
   g. As part of the Aerodrome Certificate, CAA has to review/ accept all Obstacles' data and its aeronautical studies and make sure that all are published in AIP.
   h. Audit and support operator's safeguarding Monitoring system to take necessary actions when needed.
   i. Taking all measures to insure that obstacles are removed, lowered; marked or lit.
   j. Apply law enforcement in case of violation.

6.2 **Aerodrome Operator**
   Each aerodrome operator shall:
   6.2.1. Observe the National Laws, Regulations and Advice Notes related to Aerodromes including all guidance materials issued by the competent authority on Safeguarding.
   6.2.2. Establish and implement aerodrome safeguarding protection applicable to the aerodrome on a map to be reviewed and certified by CAA to be updated from time to time by the Aerodrome in a way that will reflect the real situation/status in regard to obstacles deployment in the vicinity of the Aerodrome.
   6.2.3. Designate members of the Aerodrome staff as an official team / department to be responsible for aerodrome safeguarding and furnish them with proper equipment and training to carry out their duties efficiently.
   6.2.4. Establish procedures to:

a. Monitor all human activities and developments within areas underlying the OLS.

b. Identify the critical obstacles associated with the Non Precision Approach (NPA) procedures and have them recorded in the Aerodrome Manual.

c. Report to the procedure designer any changes of the status of the existing critical obstacles and any proposed development that is likely to be higher than the critical obstacles within the area depicted by the procedure designer.

d. Monitor changes in the obstacle environment, marking and lighting.

e. Monitor land use activities on the aerodrome and the areas surrounding the aerodrome, as specified in the relevant regulations, in coordination with the competent authorities.

f. Immediate report to CAA any violations, potential obstacles or new buildings, changes of navigation aid equipment or changes of use of any building within the aerodrome fence.

g. Conduct an obstacle survey by competent surveyor to establish the initial coordinates and details of obstacles and conduct periodic surveys thereafter.

h. Ensure that the runway and taxiway strip areas are free from obstacles or objects which are considered hazardous to aircraft operations unless required to be there for air navigation purposes.

i. Mitigate the risks associated with changes on aerodrome and its surroundings identified by the monitoring procedures.

6.2.5. Define the scope, limits, tasks and responsibilities for the monitoring process, in coordination with the local authorities and air traffic services providers, and other relevant authorities.

6.2.6. Assess the risks caused by human activities and land use, determine the tolerability thereof and define the mitigation measures required. Risks to be assess should include but not limited to:

a. Obstacles and the possibility of induced turbulence.

b. Use of hazardous, confusing, and misleading lights.

c. Dazzling caused by large and highly reflective surfaces.

d. Sources of non-visible radiation, or the presence of moving, or fixed objects which may interfere with, or adversely affect, the performance of aeronautical communications, navigation and surveillance systems.

e. Non-aeronautical ground light near an aerodrome which may endanger the safety of aircraft and which must be extinguished, screened, or otherwise modified so as to eliminate the source of danger.

f. Protect area around aerodrome visual aid located outside aerodrome boundaries by all means of land acquisition (leasing, purchasing etc.) or by preventing new developments or extensions to existing structures from infringing the aerodrome safeguarding protection surfaces.

g. Notify CAA of any infringement or potential infringement of the aerodrome safeguarding protection surfaces providing the nature and location of obstacles, and report any subsequent addition, or removal of obstacles for action as necessary, including amendment of the AIS publications.

h. Take necessary measures to assess the risks resulting from an infringement of OLS to identify whether or not the object creates an unacceptable risk or not, and carry out the necessary actions to remove the obstacle or mitigate the risk as appropriate to protect aircraft using the aerodrome.

i. Publish and mark, when needed and where necessary, and make visible by means of lights any remaining obstacles.

j. Provide electronic obstacle data for all obstacles in Area 2 (the part within the aerodrome boundary) that are assessed as hazardous to air navigation.

Note: Aerodrome operators need to liaise with appropriate planning authorities and companies that erect tall structures, to determine potential infringements. Every effort should be made to implement the OLS standards and limit the introduction of new obstacles.

When a new obstacle is detected, the aerodrome operator must ensure that the information is passed on to pilots, through NOTAM or through the Aerodrome's AIP if permanent, in accordance with the standards for aerodrome reporting procedures set out in the relevant Regulations.

7. **Obstacle's Mechanism**

7.1 **Planning Phase:**
   a. Safeguarding Process should be included in the LPAs legislation as an integral part of the planning procedure.
   b. LPAs are advised by law to contact CAA before issuance of any building certificate, or define any land use.
   c. The LPAs then refer to CAA/defined party of any new urban Planning within OLS area, to insure it meets certain criteria relating the height; location and type of use or any other restriction.
   d. In addition, any proposed developments with bird attractant properties or any wind farms within 30km of an aerodrome will also be referred for consultation.

   Who should apply:
   - Any property owner / investors
   - Local national Planning authority (LNPA)
   - Aerodrome operator

7.2 **Documents Assessment Phase:**
   To enable accurate assessment of a proposed development, CAA should require certain information to be provided by LPA / Owner as followed:
   a. Position: an accurate map reference from a 1:50,000 scale ordnance survey map so that the exact position may be plotted.   OR
   b. Grid Reference (to at least 6 figures for each of easting and northings).
   c. The ground elevation of the proposed location referred to mean sea level (MSL) [to an accuracy of ± 0.25m].
   d. Application showing the following information:
      - Responsibility: Owner's name and address (for legal action in case the need to apply enforcement).
      - Height: required height referenced to MSL measured from the highest point of the building - or above ground level (where exact figures are not available, to the nearest 5 feet).
      - Type of use   (industrial, commercial, poles, electricity towers …..ect……any additional clarification could help the processing of the application).
      - Other information may be necessary, as for example: landscaping details to enable the birdstrike potential to be assessed, or the types of cladding materials proposed so that the potential for radar reflection can be modelled.

7.3 **Processing Phase:**
It is recommended to have a committee of relevant specialists to review and process application regarding to its impact on:
a. Aerodrome OLS.
b. Obstacle Assessment Surfaces which protect Visual and Instrument Flight Paths.
c. Visual and Electronic Aids, including Radar, to Air Navigation.
d. Type of land use.

7.4 **Following Assessment:**
The reply from the aerodrome(s)/CAA to the LPA will be any of the following:
- Aviation permit (no objection).
- Aviation conditioned permit [no objection subject to certain stated condition(s)].
- Aviation Objection letter (with reasons given).

7.5 **Duration and Renewal of Permit:**
a. CAA should define validation date to Aviation permits issued thereby taking into account normal time line of construction according to related law; and
b. CAA should set rules for renewal of the permit, unless permit is surrendered by the permit is holder or revoked by the CAA in accordance with national regulation.

7.6 **Amendment of Permit:**
Provided that the requirements of OLS been met, CAA may amend a permit upon:
a. Formal request of the owner providing reasons.
b. Changes in the basic information due to inaccurate data/type of use formerly provided.
c. Changes related to regulation.
d. Change in the boundaries or component of the aerodrome (new runway or closure/extension of runway); or change of location or height of an aerodrome Navigation Aids.

7.7 **Interim Permit:**
CAA may issue an interim height permit only for:
a. new urban areas to provide guidance on permitted type of use and permitted heights.
b. guidance for design / land evaluation purposes only.

7.8 **Data Needed:**
a. Coordinates of highest point (or shown in a map);
b. Proposed type of use; and
c. Proposed height. (Above ground level).

7.9 **Compliance with Height Permits:**
a. Each aerodrome operator / property owner or local authority in areas cotangent to aerodromes should undertake the necessary arrangements to apply at CAA for compliance letter after completion of all construction work.
b. If survey process shows violation to the permitted height/use a letter should be issued to the owner to rectify the violation, and If no action is taken by the owner during the grace period specified therein, CAA/aerodrome operator should undertake all the necessary enforcement actions against such violation as prescribed by the relevant law and regulations.

7.10 **Exemption:**
   a. An applicant or a permit holder may submit to the CAA petition to be exempted from compliance with a condition stipulated in the permit issued to him or from a requirement of the relevant Regulation as the case may be. The petition must be accompanied with a statement depicting the reasons of such petition and all the details and particulars that may be of support thereto. CAA should conduct an aeronautical study of the case to identify the associated hazards and analyze the consequent risks. Based on the study and analysis results, CAA may grant an exemption after identifying the appropriate practical measures that must be undertaken and whereby an equivalent level of safety can be attained, with bearing in mind the safety objective of regulations and the applicable standards so that the intent of the regulations is not circumvented.
   b. Exemption may be, only, given in cases defined as for public interests or if the object which constitutes the subject matter of the exemption petition is shielded by non-removable obstacle.
   c. If exemption is granted for an object located within the areas underlying the safeguarding surfaces, especially the approach area of OFZ, the AIS should be notified of the exempted object location and all other details needed for publication as per the relevant Aviation Regulations.
   d. Finally exempted objects should be lighted and marked when needed according to chapter 5 annex 14.

7.11 **Cancellation / Provoke of a Permit:**
   A permit should be cancelled or provoked in case of:
   a. non-compliance with requirements/restrictions cited therein;
   b. safety reasons;
   c. new development of aerodrome; and/or
   d. new navigation aid.
   A permit cancellation notification should be served upon the concerned parties (LPA, permit holder…) indicating the reasons for such cancellation.

7.12 **Shielding Principle:**
   CAA should set rules for applying the shielding principle to an obstacle shielded by and existing obstacle that does not adversely affect safety of civil aviation; depending on the location of such obstacle:
   a. approach / take-off surface;
   b. runway sides; and
   c. near navigation Aid protection area.

7.13 **Follow-up Phase:**
   CAA should establish rules for following up implementation of and compliance with the issued aviation permit through aerodrome operator.

8. **Objects Outside the Obstacle Limitation Surfaces**

8.1 Arrangements should be made to enable the CAA to be consulted concerning proposed construction beyond the limits of the obstacle limitation surfaces that:
   a. extend to a defined height (for example 45m or more) above local ground level / or higher than the general tree height in the area;
   b. any communication antenna/ electricity poles/advertisement boards or poles……..etc; and
   c. wind farms, chimneys or any object that has outcome that could affect airspace safety.

8.2 In areas beyond the limits of the OLS, at least those objects which extend to a (defined height or) 120m or more above ground elevation should be regarded as obstacles, unless a special aeronautical study indicates that they do not constitute a hazard to aero planes.
Note: This study may have regard to the nature of operations concerned and may distinguish between day and night operations, and may be preferable to be lighted and marked.

9. Other Objects

9.1 Objects which do not project through the approach surface but which would nevertheless adversely affect the optimum siting or performance of visual or non-visual aids should, as far as practicable:
   a. be removed.
   b. Marked and/or lit.
9.2 Anything which may, in the opinion of the CAA after aeronautical study, endanger aeroplanes on the movement area or in the air within the limits of the inner horizontal and conical surfaces should be regarded as an obstacle and should be removed in so far as practicable.
Note: In certain circumstances, objects that do not project above any of the surfaces enumerated in national regulation may constitute a hazard to aeroplanes as, for example, where there are one or more isolated objects in the vicinity of an aerodrome.
9.3 Temporary and transient obstacles. Temporary obstacles as cranes and transient (mobile) obstacles, such as road / vehicles / rail carriages or ships, in close proximity to the aerodrome and which penetrate the OLS for a short duration, must be referred to CAA CASA to determine whether they will be a hazard to aircraft operations.
9.4 Fences or levee banks. A fence or levee bank that penetrates the OLS must be treated as an obstacle.

10. Reporting

Several countries have enacted Legislation or adopted regulations designed to assign responsibility for reporting new construction projects. The obligation to report such construction may rest with local agencies such as planning bodies or construction licensing authorities or with the developer himself. In some cases, height limits have been specified; these are generally consistent with the criteria of Annex 14, Chapter 4, below which local authorities may authorize a project without higher review.

If any part of a proposed development appears to penetrate an obstacle Limitation surface, then the project should be referred to CAA for review. This review would examine the effect of the envisaged construction on air navigating in general and on operation procedures in use in particular if the conclusion of the above study is that the proposed construction can be permitted under some conditions, these should also be identified, e.g. display of obstacle marking and lighting, Compliance with other appropriate measures for continued safety of air navigation, etc.

Finally, all concerned should be notified oh of the new construction through charts (in accordance with Annex 4 - Aeronautical Charts) and through Notices to Airmen (NOTAM) or Aeronautical Information Publications; (AIP) pursuant to Annex 15.

11. Other Requirement should be included in Regulation

11.1 **Protection form Light or Laser emission**
   Each person proposing to operate a light or laser should notify the CAA in accordance to Law;

a. Because of its glare or effect on a pilot's vision, the light or laser is liable to endanger aircraft; or

b. for a laser, it would produce exposures in navigable air space exceeding the maximum permissible exposure defined for that laser; or it is likely to endanger aircraft by being mistaken for:

    I.   a light or part of a system of lights established or approved for display at or near an aerodrome; or

    II.   a light marking a hazard in navigable airspace.

11.2 **Notice of use of weapons**

Each person or each person representing an organization, proposing to use weapons that will fire or launch a projectile that will have a trajectory higher than 60 m should notify the CAA in accordance with related national regulation.

11.3 **Notice of use of pyrotechnics**

Each person proposing to stage a pyrotechnics display that will involve the firing or launching of a projectile that will have a trajectory higher than 60m shall notify the CAA in accordance with law.

11.4 **Notice requirements.**

a. Each person required by national regulation to provide notice to the CAA should complete related CAA form and submit it to the Director CAA at least 90 days prior to the proposed date of commencement of construction, alteration, or use.

b. In the case of an emergency involving essential public services, public health, or public safety, that requires immediate construction or alteration of a structure, or use of a structure, lights, lasers, weapons, or pyrotechnics—

- the notice requirements in previous paragraph should not apply.

- the person responsible for the construction, alteration, or use should complete related CAA form and submit it to the Director within 5 days after the use, construction, or alteration.

c. A person proposing to use lights, lasers, weapons, or pyrotechnics, in a control zone prescribed in national regulation during times when the appropriate ATS is on watch—

    I.   is not required to provide notice under paragraph (a); and

    II.   should complete related CAA form and submit it to the CAA at least 14 working days prior to the commencement of the use.

12. Land Use Hazard

12.1 **Wildlife:**

a. Birdstrikes collisions between birds and aircraft cost the aviation industry millions per year in damage and delays to aircraft and are a major hazard. Over 80% of birdstrikes occur on or close to aerodromes and their operators are required to take necessary steps to ensure that the birdstrike risk is reduced to the lowest practicable level.

b. The risk to aircraft arises from birds that move into the path of aircraft, either because they are on the aerodrome itself, or because they are crossing the airfield or its approaches as they move between sites which may be many kilometers outside the aerodrome. Aircraft are particularly vulnerable to collisions with large birds such as swans and flocks of small, medium and large birds such as Starlings, gulls and geese.

     c.   Birds are attracted to the vicinity of an aerodrome by various types of development, including water features, landfill sites, nature reserves, gravel extraction and landscaping.

     d.   The objective of the safeguarding process is to prevent any increase in, and where possible reduce, the birdstrike risk at an aerodrome. This may be possible by altering planning proposals to remove bird attractive features or, failing this, to object outright to those that cannot be adequately redesigned.

     e.   When determining whether a planning application will increase the birdstrike risk at an aerodrome the following factors will be taken into account:

         1.   what types of development are attractive to which species of bird;

         2.   whether birds will move from existing sites to the proposed one and, in the process, cross aircraft flight paths near to the aerodrome, or indeed move onto the aerodrome itself; and

         3.   where an LPA is consulted by a developer regarding the exercise of a permitted development right under these regulations, the LPA should refer the developer direct to the aerodrome operator for safeguarding advice.

12.2   Radiation Interference:

The safeguarding process is used to protect Radar and other Electronic Navigational Aids from radio frequency interference from other sources of radio emissions; radio signal reflections or diffractions caused by physical objects.

- A recent and less obvious source of radio frequency interference is the wind-driven generator.
- Therefore, proposed wind farms within 30km of aerodromes need to be considered in the safeguarding process.

12.3   Construction Concerns (activities / ….):

12.3.1 Safeguarding aspects of a proposed development do not end with the grant of Aviation Permit.

12.3.2 The methods and equipment to be employed during construction may also need to be agreed, particularly if cranes or other tall construction equipment will be involved as these tend to be taller than the proposed structure.

12.3.3 For a project close to the aerodrome or under the approaches, the Developers must apply for a permit before operating carnage within a 6km circle of the airfield. The application for the permit must indicate the herein below listed information:

12.3.4

- Exact location of the crane marked on a map showing OS Grid.
- Maximum operating height of crane Above Ground Level (AGL) plus ground in AOD.
- Type of crane/equipment (e.g. Tower, Crane, Mobile Crane etc.)
- Radius of the jib/boom of a fixed crane/the area of operation of a mobile crane.
- Intended dates and times of operation.
- Applicant's name and address.
- Once these details have been studied by ECAA it will be determined whether the operation can proceed and whether restrictions will apply and a relevant Permit should be issued by CAA setting out any restrictions as required to ensure aircraft operation safety.

12.4 **Roads and Railways near Safeguarded Aerodromes:**

12.4.1 Roads and rail vehicles are potential obstructions to aircraft. The internationally agreed safety criteria recognize this by considering a road to be a mobile obstruction of 4.8 meters and a railway to be a mobile obstruction of 5.4 meters.

12.4.2 The CAA should adopt these provisions as part of its safeguarding practice. If a road or a railway forms part of a planning application, the LPA should regard it as development of a height of 4.8 or 5.4 meters, as the case may be, and consult in accordance with the color coding on the safeguarding map provided by CAA thereto.

12.4.3 Lighting columns and other street furniture, and signal gantries and power lines, should also be the subject of consultation appropriate to their height, in accordance with the color coding on the safeguarding maps.

12.5 **Non-aeronautical Ground Lights:**

A non-aeronautical ground light which, by reason of its intensity, configuration or color, might prevent, or cause confusion in, the clear interpretation of aeronautical ground light should be extinguished, screened or otherwise modified so as to eliminate such a possibility. A detailed assessment should be conducted.

13. Recommendations

13.1 Prior to a formal Planning Application being made, the aerodrome concerned may be prepared to offer informal advice on how to comply with the safeguarding requirement. The aerodrome advice will depend on the level of detail provided, but it is likely to be limited to lighting, landscaping and height limits. If it believes a detailed study is required in relation to specialist aspects such as the Bird Hazard or Navigational Aid installations, it may just advise that a suitable consultant be engaged so that their report(s) can be included with any subsequent Planning Application.

13.2 Any advice would be informal and without prejudice to detailed consideration of any future Planning Application(s).

13.3 The absence of any safeguarding concerns should not be construed as support for any proposed development(s).

13.4 It must be stressed that a runway protected only by the obstacle limitation surfaces of Annex 14 will not necessarily allow the achievement of the lowest possible operational minima if it does not, at the same time, satisfy the provisions of the PANS-OPS Consequently, consideration needs to be given to objects which penetrate the PANS-OPS surfaces, regardless of whether or not they penetrating Annex 14 obstacles limitation surface, and such obstacles may result in an operational penalty.

In conclusion, the foregoing should be taken into account, together with all the other responses, when the LPA determines the outcome of the Planning Application.

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Obstacle's Limitation Surfaces (Type 1)

Figure 3 Guidance on the Measurement of the Location of a Proposed Development in Relation to the Aerodrome and its Obstacle Limitation Surfaces, Where the Longest Runway is Greater Than 1800 m in Length

Obstacle's Limitation Surfaces (Type 2)
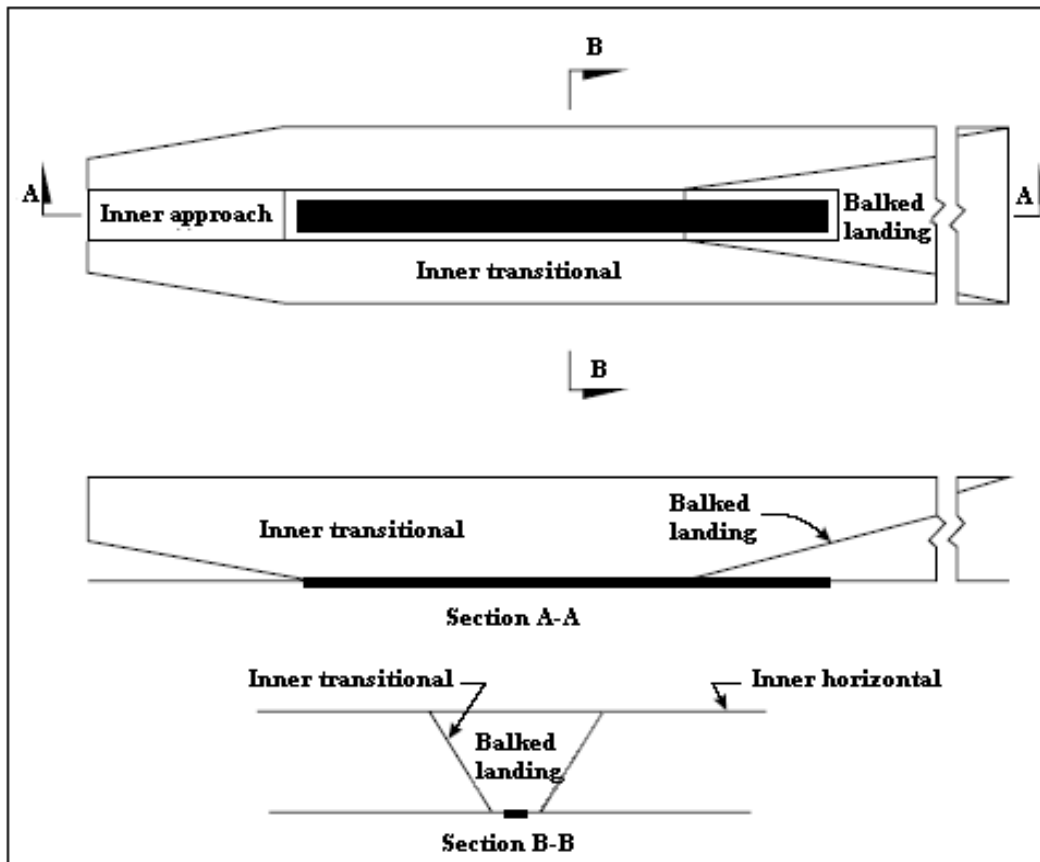
Obstacle's Free Zones

APPENDIX B
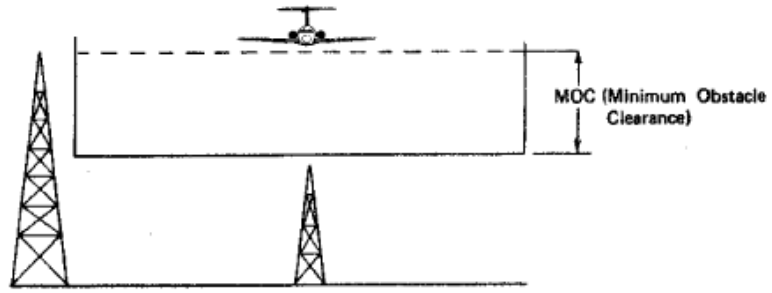
Figure 1-4.

Figure 1-5.

PANS-OPS

The funnel is formed by the set of 7 surfaces:

- The W and two X approach surfaces,
- The "footprint" A,
- The missed approach surface Z,
- The two Y transitional surfaces.
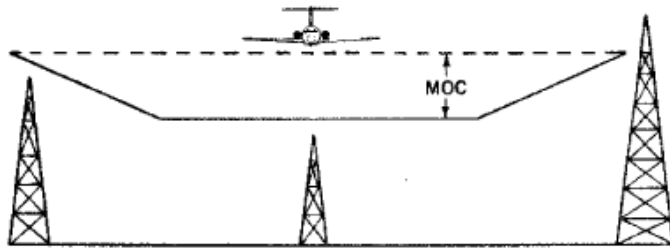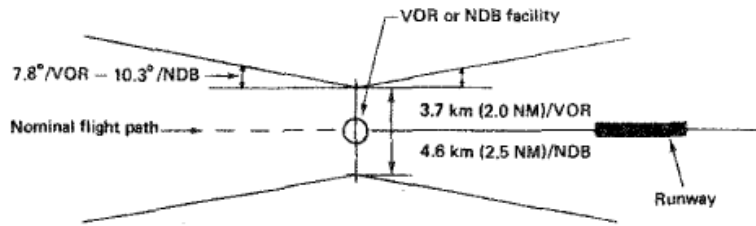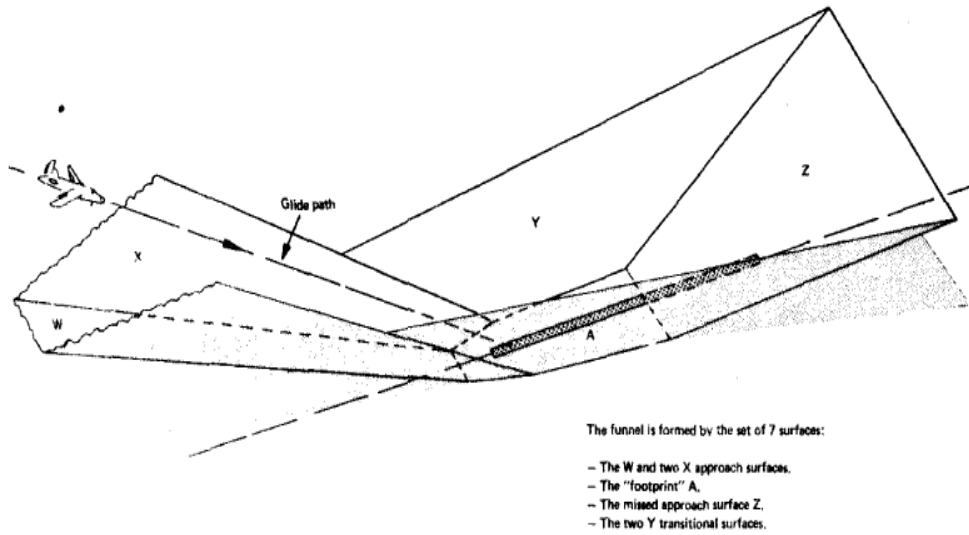
The approach Funnel (OAS)
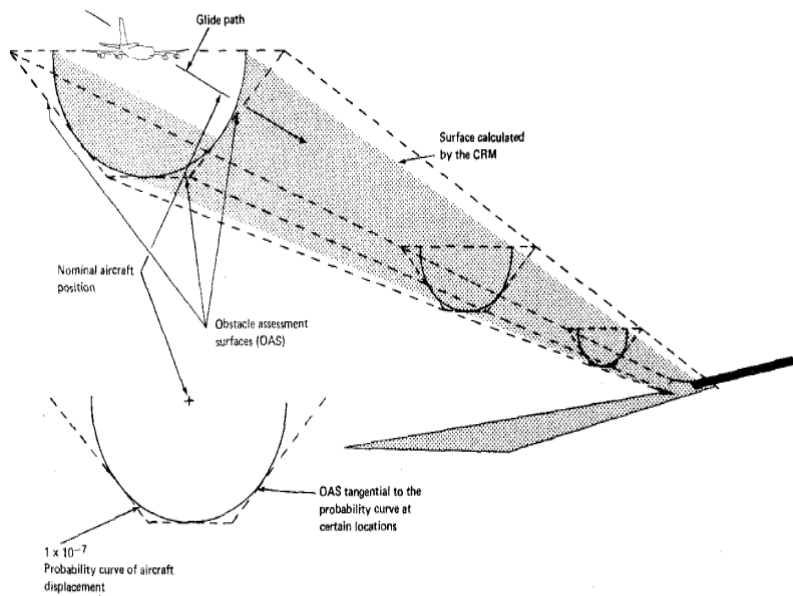
The approaches funnel (CRM)

APPENDIX D

Safeguarding Checklists

INTRODUCTION

- The following checklists are developed to give guidance for the purpose of:
    - Starting Safeguarding System; or
    - As guidance for implementation and Obstacle Monitoring.

- These checklists are result of Egypt's best Practice in Safeguarding with support of UAE, and England experience.

- It's up to each State to adjust the checklists to suit their national regulation and their view of implementation as long as keeping main line.

- **List of references:**
    1. Annex 14 V.I
    2. Annex 15 (e.TOD)
    3. Annex 10
    4. Annex 4 (Aeronautical Charts)
    5. Doc. 9137 Part 6
    6. Doc. 9774
    7. WGS-84 Manual 9674
    8. Doc. 9981 ICAO PANS Aerodromes

APPENDIX E
A. Establish new Safeguarding System

Model 1.1
Questions for Building up Safeguarding System:

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)			
	Yes	**No**	**Comment**
Are you aware by Annex14? docs 9137 "part 6"? and Related documentation			
Do you have an updated data about your civil airports: • **Number.** • **Type of each Aerodrome** • **Operation (Hours, Season...).** • **No. and code of Runways.** • **Type and number of Navigation Aids**			
Does state/airport operator has a development plan for the next 20 to 30 years with respect to : • **New aerodromes.** • **New Runways.** • **Changing Aerodrome Reference Code.** • **Installing / uninstalling or upgrading Nav. Aid equipment.**			
Clear definition of "Obstacles Limitation Surfaces" and guidance material for each aerodrome : • **Type of definition and guidance material (law, decree, national regulation, maps, electronic data…….)** • **Type of map used (contour, tourism, Cadastral…)** • **Scale of used map (if applicable)** • **Surfaces according to Annex 14 or different? list of differences?**			
Is there in place "Obstacle Assessment System" reflecting Annex 14 requirements and related documentation? • **In which type? (Digital, CAD, Paper...)?** • **Last update?** • **Degree of Accuracy?** **Metadata?**			
Do you have division/department in-charge of Safeguarding?			
Do you have restrictions to control / monitor type of construction materials in the area around the aerodromes?			
Do you have defined land use control? **Do you have procedures for bird-strike control within a circle of (13km) diameter?**			
Do you have a field survey (Footprint\Elevation) for the near-by buildings & high objects around the civil aerodromes? • **Area** • **Description.** • **Type of object/buildings?** • **Accuracy of Footprint?** • **Accuracy of Elevation?**			
Do you have procedures for implementing eTOD requirement? • **Areas of implementation** • **Degree of implementation** • **Degree of accuracy**			

Can you determine the amount of penetration for buildings/objects within the OLS & OAS? • **Do you have technical tool for checking amount of penetration? (required for high density urban area)** • **Way of performing analysis? (required for low density urban)**			
REMARK:			
Aerodrome Personnel:		**Position:**	**Signature/date:**

Model 1.2 (System's input-output)

Expected inputs, output expected and coordination needed for building Safeguarding system.

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)	Yes	No	Comment
Expected "Urban Expansion" around each civil aerodrome?			
Arrangements with other authorities / parties regarding urban extension			
Establishment of monitoring system (new/change in land use that might result of the expected urban extension)			
Database system for land-use in place which may develop bird attractant/hazard to pilots (close coordination with planning authorities to prevent landscaping / water features / land-fill sites). This may also involve the listing of trees, bushes, berries as know bird attractants			
Policy and assessment for areas used for wind farms and solar panels including, with roles for performing aeronautical study about its impact on nav. Aids.			
Regulations includes how to deal with any type of violations (height/type of material/land use….)?			
Is the current civil aviation law implemented? Is your aviation regulation reflected in the aviation law?			
Responsibility for issuance/define max allowable height permissions / monitoring new buildings / objects in the area around the civil aerodromes? • The Aerodrome Operator? or • The Civil Aviation Authority? or • The Urban Planning Authority?			
Coordination between the authorities in charge of issuance the max allowable height for buildings / objects & the Civil Aviation Authority or vice versa? • What is the mechanism of data exchange? • Does the other entities'' Law/regulation reflect the civil aviation authority regulations? • Are you informed regularly with each new building\object allowable height? Can you review its license?			
REMARKS:			

Assigned personnel name:	Position:	Signature/date:

A. Existing Safeguarding System
Model 2.1

This checklist is used for checking system compliance level with legislation's requirements.

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)		Yes	No	Comment
Procedures for issuance aviation permits/permission to building/object within OLS area? And special cases outside it?				
Is there any permission fees?				
Work plan (work cycle) to monitor buildings\objects' compliance with their max allowable heights within safeguarded area around the civil airports?				
Is there a clear steps\Phases to accurate measurement of height violation? • Steps for a building / object that already has a permitted height? (legal Case) • Steps for buildings / objects that has no max height permit? (illegal Case)				
Defined range for accepted level of violation providing that it doesn't affect safety?				
Are there clear responsibilities and procedures for assessing the violation impact on safety and issue required permission?				
For **urban** areas around the civil aerodromes:				

Manual inspection	• Procedures for field visits to inspect / monitor objects / buildings around the aerodrome?
	• Do you have arrangements in place with other department regarding Field Survey procedures for objects / buildings? Or
	• Do you have your field surveyor's team?
	• Do you have the tools for previous task? –
	  ○ Ordinary tools (levelling-total station) Or
	  ○ High technology tools (GPS) for fast and accurate results?
	• Do you have manual DEM? Area?			

Digital inspection	• Do you have an access to recent Satellite images for OLS area? • What is the horizontal / vertical accuracy of the satellite images? • Can the objects / features in these images be extracted & converted to digital form by any way? • Do you have another tool to verify the Satellite images digital output (extracted features)?			
What is the operator's role in the monitoring process? Is it approved by the concerned department in the CAA? Description of data flow? Does the result of that process been forwarded to CAA ?				
REMARK:				
Assigned personnel name:		Position:		Signature/date:

Model 2.2

This checklist is used for checking the aerodrome manual compliance with safeguarding requirement.

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)			
	Name of Aerodrome/Aerodrome:		
	Address:		
	Name of Operator:		
	Name of Aerodrome Manager:		
	Head of Safeguarding Department:		
	Operational Hours:		
	E-mail Address:		
	Telephone Numbers:		
	Reference: Regulation………… MOS........................ Advisory Circular		

Activity and Objective	Regulatory /Standards Reference	Status C/NC/O/ N/A	Comments
Aerodrome Manual			
Does the manual contain synopsis of system to control and removal of obstacles at the aerodrome and its environs (off the aerodrome) including :			
• **Establishing OLS for the aerodrome in accordance with ICAO requirement and methodology for obstacle assessment?**			
• **Reasonable measures to monitor the OLS including restriction to different areas? And**			
• **Establishment of system to Obstacle removal system**			
• **Establishing bird-strike monitor system to control a surface of (13km) in diameter?**			
• **Continuous monitoring system for area in the vicinity of the aerodrome to control new obstacles**			
• **Procedures for quick ddetection of new obstacles? Including objects, buildings, and structures** • **Procedure for CAA notification about new obstacles or additional removed obstacles?**			
• **Procedures for dealing with Wind farms / solar panels and electricity pols assessment?**			

• Monitoring the Type A chart take-off surfaces for obstacles?			
• System to obtain and report data of obstacles in each surface with full details? With a process for amending the AIS publications regarding obstacles?			
• Monitoring building developments (to ensure compliance with allowed height, nonstructural material and shape) within the horizontal limit of the obstacle limitation surfaces?			
• if the aerodrome has instrument approach procedures, is there procedures for monitoring new objects or building developments in any other areas nominated by the instrument procedure designers?			
• Arrangements between CAA and local planning authorities and other relevant organizations in relation to the approval of building developments that may infringe the obstacle limitation surfaces?			
• Arrangements and procedures for controlling and monitoring non-aeronautical lights / laser beams and fireworks			
• Arrangements between aerodromes' operators and any crane operator works within safeguarding area or outside it for heights more than 30m above ground level or more than 150m above runway threshold			
• Arrangement with CAA to assess proposed obstacles? (If applicable to the aerodrome)			
• Reporting obstacles by NOTAM including amended declared distances?			
• Procedures for conducting OLS survey requirement? How frequent? Degree of accuracy?			
• Names, telephone numbers and roles of the persons responsible for planning and implementing obstacle control?			
Protection of Radar and Navigation Sites :			
Procedures for protection, operations and maintenance of radar and radio navigation aids			
• Number and Description of aerodrome's navigation aids			
• Definition and description of protection surfaces needed for each equipment supported by Document			
• Maps reflecting protection area for each equipment.			
• Name and Details of persons responsible			
Record Keeping			
List of documents checked.			

		Regulatory /standards reference	Status C/NC/O/ N/A	Comments
List of Obstacles inside and outside aerodrome with all details				
Forms used to assess or report obstacles				
Is the operator maintaining records in accordance with the aerodrome manual? (Check OLS survey data, Inspection logbooks, Obstacle control reporting (NOTAM) etc.)				
Facilities				
Are adequate and suitable staff and resources available?				
Are adequate and suitable equipment, training and resources available?				
Are OLS surveys conducted by an appropriately trained or qualified person?				
Activity and objective		**Regulatory /standards reference**	**Status C/NC/O/ N/A**	**Comments**
Procedures				
Is the OLS monitored in accordance with the manual?				
Is type A surfaces monitored in accordance with the manual?				
Are NPA areas monitored in accordance with the manual?				
Does monitoring conducted includes temporary and permanent structures?				
And for gaseous refluxes?				
Are the procedures for liaising with other authorities being followed?				
Is the staff aware of safety requirements related to obstacles?				
Are any conditions or exemptions complied with?				
Product Check				
Is OLS plan prepared in accordance with national regulation according to ICAO requirement?				
Do survey records agree with published information?				
Does field condition appear to reflect survey data and published information?				
Does obstacle related NOTAMs reflect field condition?				
Feedback				
Are obstacle control incidents noted, reported and followed up?				

INSPECTOR'S REMARK:	
Inspectors Name:	**Position:**	**Signature / date:**

B. Obstacle's Assessment Checklist
Model 3.1

This checklist is used obstacle assessment to be to measure its impact on safety.

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)		
	Name of Aerodrome/Aerodrome	
	Name of Operator:	
	Name of Aerodrome Manager:	
	Head of Safeguarding Department:	
	Reference: **Regulation…………** **MOS........................** **Advisory Circular**	
Obstacle Assessment		
The nature of the obstacle and its location relative to the surface origin, to the extended centre line of the runway or normal approach and departure paths and to existing obstructions		
The location of the obstacle relative to Air Navigation surfaces		
The amount by which the surface is infringed		
The gradient presented by the obstacle to the surface origin		
The type of air traffic at the aerodrome; and		
Type of building materials		
Shape of Obstacle		
Nature and height of surroundings		
Is it shielded by another reported fixed obstacle		
The instrument approach procedures published for the aerodrome		
Safety Measures could be as follows:		
Promulgation in the AIP appropriate information		
Marking and /or lighting of the obstacle		
Variation of the runway distances declared as available		
Limitation of the use of the runway to visual approaches only		
Possibility of inducing turbulence, or defragment/reflection of navigation aid radiation		
Restriction on the type of traffic		
Database of land-use sites that may be in place or planned which may develop into a bird attractant/hazard to pilots (close coordination with planning authorities to prevent landscaping / water features / land-fill sites). This may also involve the listing of trees, bushes, berries as know bird attractants		

In addition to the requirements above it may be necessary to call for the other restrictions to development on and in the vicinity of the aerodrome in order to protect the performance of visual and electronic aids to navigation and to ensure that such development does not adversely affect instrument approach procedures and the associated obstacle clearance limits.		
INSPECTOR'S REMARK:		
Inspectors Name:	**Position:**	**Signature/date:**

C. Safeguarding Monitoring System Checklist
I. Pre-visit Checklists:

This checklist is used by CAA for pre-inspection visit, when the airport's operator has a system and procedures in place for obstacle's monitoring and control:

Model 4.1
Personal Personnel & equipment

<table>
<tr><td colspan="6">insert CAA Name and Logo)
CHECKLIST ON ………………
(Insert Checklist Number)</td></tr>
<tr><td colspan="6">Monitoring Implementation</td></tr>
<tr><td></td><td colspan="5">Name of Aerodrome/Aerodrome:</td></tr>
<tr><td></td><td colspan="5">Address:</td></tr>
<tr><td></td><td colspan="5">Name of Operator:</td></tr>
<tr><td></td><td colspan="5">Name of Aerodrome Manager:</td></tr>
<tr><td></td><td colspan="5">Head of Safeguarding Department:</td></tr>
<tr><td></td><td colspan="5">Operational Hours:</td></tr>
<tr><td></td><td colspan="5">E-mail Address:</td></tr>
<tr><td></td><td colspan="5">Telephone Numbers:</td></tr>
<tr><td></td><td colspan="5">Reference: Regulation…………
MOS.......................
Advisory Circular</td></tr>
<tr><td rowspan="2">In Office :</td><td colspan="2">Date of Inspection:</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Name</td><td>Response</td><td>Cooperation</td><td>Remark</td></tr>
<tr><td>Aerodrome Operator</td><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td>Obstacle Manager</td><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td>Obstacle Staff</td><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Obstacles Map"</td><td>Date of last Issuance:</td><td>Scale:</td><td colspan="2">Comments</td></tr>
<tr><td>• Cadastral map</td><td>☐</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>• Subdivisions map</td><td>☐</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>• Aerodrome Layout</td><td>☐</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>Obstacle's Data Base Table</td><td>☐</td><td rowspan="5">Comments:</td><td colspan="3"></td></tr>
<tr><td>Notifications</td><td>☐</td><td colspan="3"></td></tr>
<tr><td>Correspondence</td><td>☐</td><td colspan="3"></td></tr>
<tr><td>Aviation Permits Follow-Up</td><td>☐</td><td colspan="3"></td></tr>
<tr><td>List of Airport's Buildings</td><td>☐</td><td colspan="3"></td></tr>
<tr><td>Safeguarding Cadastral Map</td><td>Has all surfaces</td><td>Show all Obstacles</td><td></td><td colspan="2">Comment</td></tr>
<tr><td>Rules Listed</td><td colspan="5">ICAO Standards</td></tr>
<tr><td>Any for Archiving</td><td colspan="5"></td></tr>
<tr><td>INSPECTOR'S REMARK:</td><td colspan="5"></td></tr>
<tr><td colspan="2">Inspectors Name:</td><td colspan="2">Position:</td><td colspan="2">Signature/date:</td></tr>
</table>

Model 4.2

insert CAA Name and Logo) **CHECKLIST ON ....** **(Insert Checklist Number)**					
Equipment and guidance material					
	Name of Aerodrome/Aerodrome:				
	Address:				
	Name of Operator:				
	Name of Aerodrome Manager:				
	Head of Safeguarding Department:				
	Operational Hours:				
	E-mail Address:				
	Telephone Numbers:				
	Reference: Regulation........... MOS........................ Advisory Circular....................................				

In Office :	Date of Inspection:				
	Name		**Response**	**Cooperation**	**Remark**
Aerodrome Operator					
Obstacle Manager					
Obstacle Staff					
Maps		**Yes**	**No**	**N/A**	
Aerodrome-Map	**Aerodrome buildings Layout**				
	Obstacles Layout				
Safeguarding Map	**Safeguarding Limits surfaces**				
	Out Aerodrome Obstacle (Survey map)				
Forms:					
		Yes	**No**	**Remarks**	
Periodic Work Plan	**Buildings**				
	Permits				
Follow Up	**Inside aerodrome**	**Buildings**			
		Others			
	Outside aerodrome	**Notifications**			
		buildings			
Office Inspection	**Subsidiarity**				
	location				
	Supporting equipment				
Technical Equipment	**G P S**				
	Printer				
	Tel./ Fax.				
	Scanner				
Training	**Car**				
	Equipment				
	Technical:				

	• **Basic Safeguarding** • **Obstacle's Assessment and Management** • **Obstacle's monitoring system** • **Other required training**			
Personnel	**Habitat**			
	2 Week			
	Number			
	Coalification			
INSPECTOR'S REMARK:				
Inspectors Name:	**Position:**		**Signature/date:**	

This checklist is used before visit to review all available and tool needed:

II. Sit visit Checklists:

Office visit
Model 4.3.1

This checklist is used in the site visit to inspect the implementation level of procedures listed in the aerodrome's manual

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)			
Name of Aerodrome/Aerodrome:			
Address:			
Name of Operator:			
Name of Aerodrome Manager:			
Head of Safeguarding Department:			
Operational Hours:			
E-mail Address:			
Telephone Numbers:			
Reference: **Regulation…………** **MOS........................** **Advisory Circular ....**			

	Yes	**No**	**Comment**
Is there work plan (work cycle) to monitor construction work (buildings\objects) in area around the civil airport?			
Procedures for (work cycle) observing any aviation violated in areas around civil airport?			
Steps\Phase for monitoring level of compliance with max allowed height? • **Steps for monitoring a buildings\objects that already has Aviation permit? (if applicable)** • **Steps for a monitoring buildings\objects that has no Aviation permit? (illegal Case)**			
Process for Defining the exact amount of penetration.			

Field survey:
 	
• **Through operators surveyors department**
• **Through Coordination with other department**
• **Have needed tools for this task**
  ○ **Leveling/total station   or**
  ○ **(GPS) for the required accuracy**			

Procedures of periodic survey of OLS surfaces? And Repetition?			

Type of data available for urban area around the civil aerodromes:
• **DEM :**
  ○ **Manual**
  ○ **Digital**
• **Satellite imagery :**
  ○ **Up to date**
  ○ **Archival**
  ○ **Accuracy**
  ○ **Ways to extract data**			

Procedures to notify CAA about monitored Obstacles for AIS or Notam issuance			
Procedures to remove obstacles,			

INSPECTOR'S REMARK:		
Inspectors Name:	**Position:**	**Signature/date:**

Model 4.3.2

This checklist is used to assess the office and equipment and its compliance with what is listed in aerodrome's manual:

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)				
GENERAL INFORMATION:				
	Name of Aerodrome/Aerodrome:			
	Address:			
	Name of Operator:			
	Name of Aerodrome Manager:			
	Head of Safeguarding Department:			
	Operational Hours:			
	E-mail Address:			
	Telephone Numbers:			
	Reference: **Regulation…………** **MOS.......................** **Advisory Circular.....................................**			
S/N	**ITM**	**YES**	**NO**	**N/A**
1	**Does the inspector possess basic qualifications to carry out assigned responsibilities?**			
2	**Does the inspector have the required knowledge and experience on the job (OJT) to perform the responsibility at the expected level of competence?**			
3	**Does the inspector have the required tools and equipment to carry out the operation in line with**			
4	**Does the inspector has clear job description that aware of?**			
5	**Is there a personnel roster that indicates satisfactory workload for each inspector?**			
6	**Are the inspector's adequately and regularly trained to discharge the responsibility**			
7	**In demonstrating operations and maintenance competence, is the knowledge, skills and experience required to inspect aerodrome's obstacle limitation surface, obstacle's marking and lights, for conducting or supervising aerodrome works, and completing the NOTAM forms displayed?.**			
8	**Are the inspector refresher trainings at such duration/interval to guarantee currency on the job?**			
9	**Does the inspector have adequate knowledge of the working documents available for the performance**			
INSPECTOR'S REMARK:				

Model 4.4.1

This checklist is used on site to monitor the aerodrome implementation of Safeguarding roles:

insert CAA Name and Logo) CHECKLIST ON ……………… (Insert Checklist Number)					
Site Inspection					
	Name of Aerodrome/Aerodrome:				
	Address:				
	Name of Operator:				
	Name of Aerodrome Manager:				
	Head of Safeguarding Department:				
	Operational Hours:				
	E-mail Address:				
	Telephone Numbers:				
	Reference: Regulation………… MOS........................ Advisory Circular......................................				

Inspection Date:			Inspector's Name:		Remarks:
Day Inspection	**Inside Aerodrome**	**Area 1**	Surface Affected	Building	
				Antennas/masts/pols	
		(strip/inner transitional/transitional)		Obstacles (marking.)	
				Others (land use…)	
		Area 2	Surface Affected	Building	
				Antennas/masts/pols	
		(Inner Approach/Approach/Take-Off)		Obstacles (description / lighting / marking)	
				Others (land use…)	
		Area 3	Surface Affected	Building	
				Antennas/masts/pols	
		(Inner Horizontal / Conical/ Outer Horizontal)		Obstacles (description / lighting / marking)	
				Others (land use…)	
		Area 4	Affected Nav. Aid	Markers	
				Singe	
		Nav. Aids protection area		Material of surrounded buildings	
	Outside Aerodrome	**Area 1**	Surface Affected	Building	
				Antennas/masts/pols	
		(strip/inner transitional/transitional)		Obstacles (description / lighting / marking)	
				Others (land use…)	
		Area 2	Surface Affected	Building	
				Antennas/masts/pols	
		(Inner Approach/Approach/Take-Off)		Obstacles (description / lighting / marking)	
				Others (land use…)	
		Area 3)	Surface Affected	Building	
				Antennas/masts/pols	
		(Inner Horizontal / Conical/ Outer Horizontal)		Obstacles (description / lighting / marking)	
				Others (land use…)	

		Area 4 (f Applicable)	Affected Nav. Aid	Markers		
				Singe		
		Nav. Aids protection area		Material of surrounded buildings		
	General	Surface Affected		Is there any Cranes detected		
Night Inspection	**Inside Aerodrome**	**Area 1**	**Surface Affected**	Building		
				Antennas/masts/pols		
		(strip/inner transitional/transitional)		Obstacles (description / lighting / marking)		
				Others (land use…)		
		Area 2	**Surface Affected**	Building		
				Antennas/masts/pols		
		(Inner Approach/Approach/Take-Off)		Obstacles (description / lighting / marking)		
				Others (land use…)		
		Area 3)	**Surface Affected**	Building		
				Antennas/masts/pols		
		(Inner Horizontal / Conical/ Outer Horizontal)		Obstacles		
				Others (land use…)		
		Area 4	**Affected Nav. Aid**	Lighting		
				Singe		
		Nav. Aids protection area		Material of surrounded buildings		
	Outside Aerodrome	**Area 1**	**Surface Affected**	Building		
				Antennas/masts/pols		
		(strip/inner transitional/transitional)		Obstacles (description/ lighting / marking)		
				Others (land use…)		
		Area 2	**Surface Affected**	Building		
				Antennas/masts/pols		
		(Inner Approach/Approach/Take-Off)		Obstacles (description/ lighting / marking)		
				Others (land use…)		
		Area 3)	**Surface Affected**	Building		
				Antennas/masts/pols		
		(Inner Horizontal / Conical/ Outer Horizontal)		Obstacles (description/ lighting / marking)		
				Others (land use…)		
		Area 4(f Applicable)	**Affected Nav. Aid**	Lighting		
				Singe		
		Nav. Aids protection area		Material of surrounded buildings		

INSPECTOR'S REMARK:	

Inspectors Name:	Position:	Signature/date:

APPENDIX F

STUDY CASE

An Example of

Note - This material is prepared as an example "case scenario" only not intended to serve as standard for how study should be conducted. Procedure used by safeguarding personnel is dependent on the needs, capabilities, and complexities of the participating organizations

a. **Discovery of the case**

   1. Authority listed in aviation law reviews all aviation permits issued with all details of location and allowed height showed in a map or in geographical coordinate's format.

   2. Aerodrome operator shall monitor OLS area and report it to the authority any building/object that was done without approval or violating the allowed limits /restriction

   3. When an obstacle is monitored then,

b. **Dealing with identified case in-house:**

   1. The airport's Safeguarding team reports the case to the concerned authority with all details collected on site.

   2. Concerned authority shall study the case according to the details and in relation to OLS and ensure the penetrates or the surfaces,

   3. If the study shows the violation of the case a higher-level group/committee (includes member of operation / Navigation Aids/Radar…..….) to carry on the study

c. **Committee:**

   1. Each member of the committee will review all details in relation to their specialist.

   2. If the violation might, has an impact on the safety of any Nav. Aid, a recommendation of a site visit to do engineering survey and collect accurate data about surroundings (buildings' heights, type and material in certain area around the violated object).

d. **Site visit:**

   1. A technical committee form airport Safeguarding personnel and survey engineers will make a site visit with needed equipment.

   2. A technical report showing details of all buildings within the specified area supported with photos (distance form each runway/navigation aids….) actual height related to mean see level (MSL), height of the highest objects around related to MSL.

e. **Decision:**

1. The technical committee will review the report and find if the object is shielded by any other object/s and actual height in this area

2. If the study shows:

   a. The object is standing alone, then a review of the design procedures done to find if the object's height affect the height minima or not:
      i. if not, no action will be taken against that object and data collected to be saved in the obstacle's data base,
      ii. But if it affects the safety, then action has to be done to reduce height or removal of that object according to aviation law.

   b. The object is shielded by other existing permanent object/s, then a revision of the design procedures to find the relation between the obstacle and the shielded building, then if:
      i. the object is shielded by a higher object.
      ii. no action will be done against that object and data collected to be saved in the obstacle's data base,

   c. If the object's height is higher than the shielding object a study should be done to study the effect of the difference of height on the defined minima , then,
      i. if it doesn't has effect on safety, no action will be taken against that object and data collected to be saved in the obstacle's data base,
      ii. But if it affects the safety, then action has to be done to reduce height /removal of that object. Or increase the minima.

3. In the case of obstacle's removal an agreement should be done with the owner to reduce height or an legal action should be done if no response found, and a demolish note will be issued with name of the owner and any other parties listed in related Law.

4. Legal department should be involved to follow up with the note and take all action needed.

Safeguarding Regulatory System Toolkit

GUIDANCE ON REGULATORY FRAMEWORK SUPPORTING ESTABLISHMENT OF SAFEGUARDING SYSTEM

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INTRODUCTION

BACKGROUND

Safeguarding (SFg) had been identified by the MID Region Annual Safety Report Team (ASRT) as one of three main risk areas (Focus Areas) to be addressed under the MID Region Aviation Safety Group (RASG-MID) framework.

The MID-RAST RGS has undertaken a Safety Enhancement Initiative (SEI) to develop guidance material and training programs to support creation of action plans for Safeguarding.

The Detailed Implementation Plan (DIP) for the SEI included the action to develop and issue regulatory framework supporting establishment of Safeguarding teams.

PURPOSE

The purpose of this circular seeks to propose a regulatory framework to support the creation and success of national Safeguarding entity consisting of the following elements:

1. **National Law** to include articles related to Safeguarding that clarifies the establishment of entity, procedures and enforcement related to Safeguarding aerodromes with general responsibilities of CAA, Aerodrome Operator, and their relation with other national entities.

   (Chapter 1)

2. **Supporting Ministerial Decree(s)** to reflect OLS approved and other surfaces related to Radar and Navigation Aids with ways of protection and as optional the establishment of a permanent Safeguarding committee in charge of the obstacle's assessment and implementation of new ICAO requirements.

   (Chapter 2)

3. **Primary Regulation** to be included in the national regulation reflects Annex 14 items and relevant to Safeguarding stakeholder who holds primary responsibility for Safeguarding. In the model framework this has been identified as the joined responsibility between Authority and Aerodrome Operator.

   (Chapter 3)

4. **Supporting Regulation** to be included in the national regulation relevant to other Authorities who have not been identified as primarily responsible for Safeguarding.

   (Chapter 4)

5. **Guidance Material** to be developed in support of the regulation and to provide details regarding the conduct of the Safeguarding entity. This is to be considered in conjunction with the ICAO PANS Aerodrome.
   (Chapter 5)

6. **Oversight Material** to be developed to be added to the existing safety oversight processes of national regulators. This material can also be used by the Safeguarding stakeholders' part of their internal safety assurance processes.

(Chapter 6)

These guidelines are based on the expertise and experience of the Egyptian Safeguarding Team and the Egyptian Civil Aviation Authority as an integral part of their joint commitment to enhancing safety through the creation of aerodrome Safeguarding complete system.

In doing so, there is one single concern: safety.

This circular as it serves to further empower national authorities in their efforts to support Safeguarding system through model national regulation, guidance materials.

USING THIS CIRCULAR

The Table of Contents provides key points of the regulatory framework supporting the creation of Safeguarding entity.

The reader will go through the steps of building its own safeguarding system and could make any changes to any part of it the way suite their needs and assure the implementation of minimum level of safety

Chapter 1

NATIONAL AVIATION LAW

1.1 Application

It is recommended the below articles be included in the national aviation law relevant to the entities primarily responsible for Safeguarding in order to support the development of Safeguarding entity. In this example that stakeholder is the Aerodrome Operator.

1.2 Model Regulation

Aerodrome Safeguarding Management

> *National regulation and laws for aerodromes' safeguarding should be established that includes but not limited to the following articles:*

1. *Safeguarding right shall be established for all aerodromes according to ICAO requirements and reflected into national regulation.*

2. *Control of Human Activity within Safeguarding Area:*

   a) description of the word human activities (construction; lights; material used; change of land use; laser; …….); and
   b) clear statement about the mandatory of reporting any human activity within safeguarding area and other areas motioned into the national regulation to safeguarding entity for assessment.

3. *General Description of Aerodrome Operator Roles and Duties for Safeguarding as followed but not limited to:*

   The Aerodrome Operator shall:

   a) follow CAA National Regulations and related laws regarding Safeguarding;
   b) establish, lead and implement Safeguarding requirement to promote safety and the exchange of safety-relevant information;
   c) put in place Safeguarding monitoring system, and implement it; and
   d) require the organisations operating or providing services at the aerodrome to be involved in such programmes.

4. *Clear Statement of CAA Duties of but limited to:*

   a) review and approve Safeguarding area for each aerodrome and the protection system that been put in place by aerodromes' operators;
   b) auditing aerodromes operators to ensure implementation of safeguarding system;
   c) carry out safeguarding regular inspection; and
   d) implement enforcement related to safeguarding.

5. *Safeguarding Enforcement:*

   a) CAA safeguarding personnel has the judicial officers' right to protect safeguarding area and other areas listed in related national regulations;

   b) criminalization of any human activities or change of existing activity within safeguarding area and other areas listed in national regulations; if done without approval of Safeguarding entity mentioned in this law;

   c) optional: the right of auditing specific human activities within safeguarding area and other areas listed in national safeguarding regulation before operating to ensure compliance with CAA regulation; and

   d) ways and entities in charge of removing any safeguarding violation and any fines needed to be paid.

Chapter 2

SUPPORTING MINISTERIAL DECREE(S)
ESTABLISHMENT OF OLS SURFACES AND
SAFEGUARDING COMMITTEE

2.1 Application

It is recommended that the following model ministerial decree(s) be included in the national regulation relevant to the Safeguarding stake holders, but are not primarily responsible for the establishment of the entity.

The model regulation is included as part of the supporting stakeholder's safety management system requirements.

2.2 Model Regulation

Safeguarding Committee Requirements (Excerpt in Support of Safeguarding Entity):

Supporting decree(s) should include the following main elements:

a) Definitions/ description and purpose of OLS and other protection surfaces which defines distances and slops needed for Runway, Radar and Navigation Aids in addition to any restriction needed.

b) Establishment of Safeguarding committee:

   1) Following is list of recommended member of Safeguarding Committee (but not limited to):
       - Authority;
       - Aerodrome Operator;
       - Radar and Air Navigation Service Providers (ILS, VOR, , MICOWAVE….);
       - Operational Representative; and
       - Other Stakeholders when needed.

   2) Roles of meeting including periodic meetings and clear deception of duties and responsibilities of each member and committee outcome.

.

Chapter 3

PRIMARY REGULATION

3.1 Application

It is recommended the following guidance be adopted to support the model regulation for the primary Safeguarding stakeholder. In this example; stakeholder is the Aerodrome Operator. The guidance includes various.

3.2 Model Guidance for Aerodrome Safeguarding Management

The Primary Regulation should include (but not limited) to the following:

1.1 Definitions
1.2 Obstacle Limitation Surfaces
1.3 Obstacle Limitation Requirements
1.4 Terrain and Obstacle Data Collection
1.5 Obstacles Restriction and Removal
1.6 Inspection
1.7 Assessment
1.8 Exemption
1.9 Shielding Principle
1.10   Objects outside OLS
1.11   Other Objects
1.12   Land Use Hazard
1.13 Enforcement

Chapter 4

SUPPORTING REGULATION

It is recommended the following model regulation be included in the national regulation relevant to the stakeholder who are critical to the success of the Safeguarding Management system, but are not primarily responsible for the establishment of the system

The model regulation is included as part of the supporting stakeholder's safeguarding management system requirements.

It is recommended that this regulation is included in the national regulations for the following parties:

1. Aerodrome Operators
2. Local Planning Authority
3. Any land Owner (personnel or organization)
4. Communication and Advertising Companies

4.1 Model Regulation

CAA:

1.1. CAA shall establish national safeguarding management, assessment and regulatory system.

1.2. The Aerodrome operator shall establish safeguarding management system acceptable to the [national regulator] that, as a minimum complies with the requirements of [national safeguarding regulation] and includes requirements such as:

  i. establishment of Safeguarding Team with clear structure;

  ii. establishment of Obstacles' Monitoring System;

  iii. ways of Dealing with Obstacles;

  iv. procedures and documentations needed to contact CAA for assessment of new development around aerodromes; and

  v. land use roles and restrictions.

Chapter 5

GUIDANCE MATERIAL

5.1 Application

It is optional the following guidance be adopted to support the model regulation for the safeguarding stakeholder. In this example that stakeholder is the Aerodrome Operator.

5.2. Model Guidance for Safeguarding System

Safeguarding System

1.1.   CAA should:

    1.1.1.   *Establish and implement national safeguarding system to promote safety inside or outside all aerodromes; which include but not limited to:*

        i.   Develop regulations and law of safeguarding roles and enforcement according to ICAO annex 14 and related documentations and state's roles.

        ii.   Assign Safeguarding team/division in charge of state's aerodromes safeguarding assessment and auditing.

        iii.   Support technically and audit operator's safeguarding team/departments

        iv.   Review and approve aerodromes' OLS maps according national regulations.

        v.   Arrange with LPA, concerned ministries and all other parties about safeguarding protection area as followed:

            a)   formal notifications of safeguarding protection area attached to maps of protection surfaces for each aerodrome in the state to LPA.

            b)   Urban future development within State level to assures it doesn't affect aerodrome's future development.

            c)   Approve of different land use locations (industrial, commercial in addition to any wind-farms, electricity poles, communication antennas and advertising high masts.

            d)   New roads and bridges with its light poles in area tangent to aerodromes.

            e)   Other information as may be necessary, for example, landscaping details to enable the bird-strike potential to be assessed, or the types of cladding materials proposed so that the potential for radar reflection can be modelled.

            f)   As part of the Aerodrome Certificate, CAA has to review/ accept all Obstacles' data and its aeronautical studies and make sure it's published in AIP.

            g)   Audit and support operator's safeguarding Monitoring system to take necessary actions when needed.

            h)   Taking all measures to insure the removal; lower; mark or light obstacles.

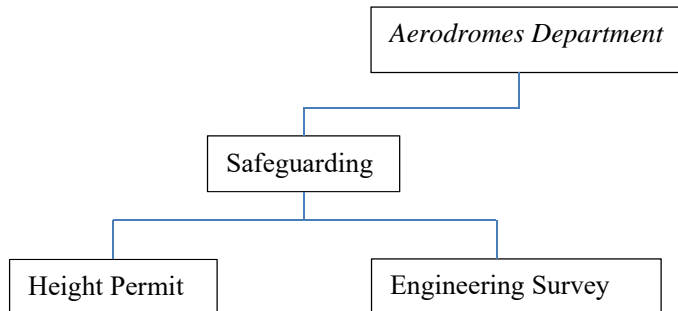   i)   Apply enforcement of any violation according to law.

1.2. The Aerodrome Operator should:

1.2.1. Establish and implement Safeguarding System to promote safety within and outside the aerodrome; which include but not limited to:

   i. Include safeguarding team / division into aerodrome's HR structure.
   ii. Establish the OLS applicable to the aerodrome and implement it in a map after CAA review.
   iii. Designate members of his staff as an official team / department to be responsible for aerodrome safeguarding supported by proper equipment and training to carry out their duties.

1.2.2. Monitor all human activities and developments within the OLS

1.2.3. Coordinate with Local Planning Authority and other authorities to improve safety outside aerodrome.

1.2.4. Have procedures for:

   i. Have procedures to insure aerodrome safeguarding.
   ii. Have procedures for Obstacles Survey; and continues survey.
   iii. Defining obstacles inside or outside aerodrome.
   iv. Reporting defined obstacles.

1.3. Aerodromes' Safeguarding team / division should:

1.3.1. Have Specialized training to ensure:

   i. Understanding safeguarding management and obstacles assessment.
   ii. Familiarization of safeguarding duties; responsibilities and data collection.
   iii. Good use of safeguarding tools.
   iv. Accurate data collection and reporting system.
   v. Put in place and implement continues monitoring plan in addition to any contingency monitor.
   vi. Develop and implement safeguarding filling system.
   vii. Monitor the changes in the obstacle environment, marking and lighting and in human activities or land use on the aerodrome and the areas around the aerodrome, as defined in coordination with the competent authority
      (a) The procedure designer must be advised of any changes of the status of the existing critical obstacles and any proposed development that is likely to be higher than the critical obstacles within the area depicted by the procedure designer (details on process of monitoring; documentation and equipment in.
      (b) Immediate report to CAA of any violation or intended obstacle or new buildings, navigation aid equipment's or changes of use to any building within the aerodrome fence.
      (c) Ensure the conduct of an obstacle survey by a competent surveyor to establish the initial coordinates and details of obstacles and periodic survey thereafter.
      (d) Ensure that the runway and taxiway strip areas are free from obstacles or objects which are considered hazardous to aircraft operations unless required to be there for air navigation purposes.

(e) Mitigate the risks associated with changes on aerodrome and its surroundings identified with the monitoring procedures.

(f) Define the scope, limits, tasks and responsibilities for the monitoring in coordination with the relevant local authorities and air traffic services providers, and other relevant authorities.

(g) Assess and mitigate the risk caused by human activities and land use which should include but not limited to:

1. obstacles and the possibility of induced turbulence;
2. the use of hazardous, confusing, and misleading lights;
3. the dazzling caused by large and highly reflective surfaces;
4. sources of non-visible radiation, or the presence of moving, or fixed objects which may interfere with, or adversely affect, the performance of aeronautical communications, navigation and surveillance systems; and
5. non-aeronautical ground light near an aerodrome which may endanger the safety of aircraft and which should be extinguished, screened, or otherwise modified so as to eliminate the source of danger.

(h) Protect area around aerodrome's visual aid outside aerodrome boundary by all means of land leasing or preventing new developments or extensions to existing structures from infringing the OLS.

(i) Report to CAA any infringement or potential infringement of the OLS of nature and location of obstacles, and any subsequent addition, or removal of obstacles for action as necessary, including amendment of the AIS publications.

(j) Take necessary measures to assess whether any infringement of these surfaces will require an assessment to identify whether or not the object creates an unacceptable risk, and take needed action to be removed or appropriate mitigating action shall be taken to protect aircraft using the aerodrome.

(k) Publish and mark when needed and where necessary made visible by means of lights any remaining obstacles.

(l) Provide electronic obstacle data for all obstacles in Area 2 (the part within the aerodrome boundary) that are assessed as being a hazard to air navigation.

Note: Aerodrome operators need to liaise with appropriate planning authorities and companies that erect tall structures, to determine potential infringements. Every effort should be made to implement the OLS standards and limit the introduction of new obstacles.

- When a new obstacle is detected, the aerodrome operator must ensure that the information is passed on to pilots, through NOTAM, in accordance with the standards for aerodrome reporting procedures set out in.

Examples

```
                    ┌─────────────────────────┐
                    │  Aerodromes Department  │
                    └─────────────────────────┘
                                 │
                      ┌──────────────────┐
                      │   Safeguarding   │
                      └──────────────────┘
                       │                  │
          ┌──────────────────┐   ┌──────────────────────┐
          │  Height Permit   │   │  Engineering Survey  │
          └──────────────────┘   └──────────────────────┘
```

CAA Safeguarding Structure

```
                    ┌──────────────────────────────┐
                    │  Engineering Safety Department │
                    └──────────────────────────────┘
                                 │
                      ┌──────────────────────────┐
                      │  Safeguarding Department  │
                      └──────────────────────────┘
                       │                      │
          ┌────────────────────┐   ┌────────────────────┐
          │ Monitoring Personnel│   │  Survey Personnel  │
          └────────────────────┘   └────────────────────┘
```
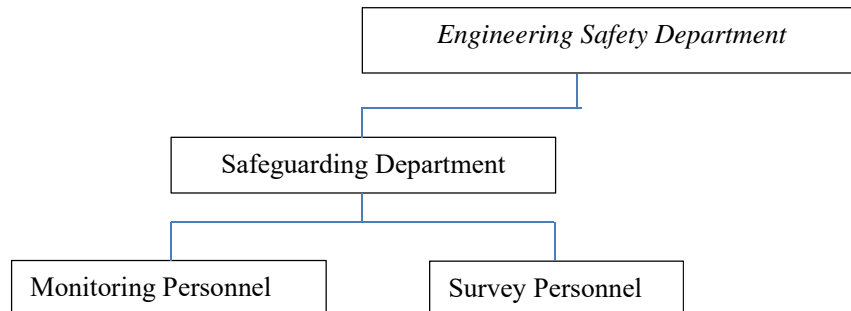
Operator's Safeguarding Structure

APPENDIX 3O

	State	**Number of Intl Aerodromes (AOP Table 1-1 -MID ANP)**	**Number of Certified Intl Aerodromes**	**Percentage Certified**	**List of Certified Intl Aerodromes**	**Remarks**
1	Bahrain	1	1	100%	BAHRAIN/Bahrain Intl (OBBI)	
2	Egypt	7	5	71%	- CAIRO/Cairo Intl (HECA) - SHARM EL-SHEIKH/Sharm El Sheikh Intl (HESH) - HURGADA/Hurghada Intl (HEGN) - MARSA ALAM /Marsa Alam Intl (HEMA) - ASWAN/Aswan Intl (HESN)	Certification Status for LUXER/Luxor Intl Airport (HELX) is to be verified
3	Iran	9	4	44%	- TEHRAN/Mehrabad Intl (OIII) - ZAHEDAN/Zahedan Intl (OIZH) - YAZD /Yazd Intl (OIYY) - ISFAHAN/Isfahan Int'l (OIFM)	Certification Status for: TEHRAN/IKIA Intl (OIIE) and BANDAR Abbas /Bandar Abbas Intl (OIKB) are to be verified
4	Iraq	6	2	33%	- BAGHDAD/Baghdad Intl (ORBI) - ERBIL/Erbil Intl (ORER)	Information to be verified
5	Jordan	3	2	67%	- AMMAN/Queen Alia Intl (OJAI) - AQABA/ King Hussein Intl (OJAQ)	
6	Kuwait	1	1	100%	KUWAIT/Kuwait Intl (OKBK)	
7	Lebanon	1	0	0%		
8	Libya	3	0	0%		
9	Oman	2	2	100%	- MUSCAT/Muscat Intl (OOMS) - SALALAH/Salalah (OOSA)	

STATUS OF AERODROME CERTIFICATION IMPLEMENTATION IN MID REGION

	State	Number of Intl Aerodromes (AOP Table 1-1 -MID ANP)	Number of Certified Intl Aerodromes	Percentage Certified	List of Certified Intl Aerodromes	Remarks
10	Qatar	2	2	100%	- DOHA/Doha Intl (OTBD) - DOHA/Hamad Intl (OTHH)	
11	Saudi Arabia	4	4	100%	- DAMMAM/Kind Fahid Intl (OEDF) - JEDDAH/King Abdulaziz Intl (OEJN) - MADINAH/Prince Mohammad Bin Abdulaziz Intl (OEMA) - RIYADH/King Khalid Intl (OERK)	
12	Sudan	4	3	75%	-KHARTOUM/Khartoum (HSSS) - EL OBEID/El Obeid (HSOB) - PORT SUDAN/Port Sudan (HSPN)	Certification Status for: NYALA/Nyala (HSNN) to be verified
13	Syria	3	0	0%		
14	UAE	8	8	100%	- ABU DHABI/Abu -Dhabi Intl (OMAA) - ABU DHABI/Al Bateen Intl (OMAD) - DUBAI/Dubai Intl (OMDB) - DUBAi/Al Maktoum Intl (OMDW) - AL AIN/Al Ain Intl (OMAL) - FUJAIRAH/Fujairah Intl (OMFJ) - RAS AL KHAIMAH/Ras Al Khaimah Intl (OMRK) - SHARJAH/Sharjah Intl (OMSJ	
15	Yemen	5	0	0%		
	Total Certified	**59**	**34**	**58%**		**MID Region Safety Target 75% by end of 2017**

APPENDIX 3P

Establishment of Runway Safety Teams (RSTs)

at international Aerodromes in the MID Region

(Updated September 2017)

	State	Number of Int'l Aerodromes	Number of established Runway Safety Teams	List of Aerodromes having established Runway Safety Team
1	**BAHRAIN**	1	1	Bahrain/Bahrain Intl (OBBI)
2	**EGYPT**	7	4	- Cairo/Cairo Intl (HECA) - Sharm El Sheikh Intl (HESH) - Hurghada Int'l (HEGN) - Marsa Alam Intl (HEMA)
3	**IRAN**	9	6	- Tehran/Mehrabad Intl (OIII) - Tehran/ IKIA Intl (OIIE) - Zahedan/Zahedan Intl (OIZH) - Yazd /Yazd Intl (OIYY) - Isfahan/Isfahan Int'l (OIFM) - Bandar Abbas /Bandar Abbas Intl (OIKB)
4	**IRAQ**	6		
5	**JORDAN**	3	1	- Aqaba/King Hussein Intl (OJAQ)
6	**KUWAIT**	1	1	Kuwait/Kuwait Intl (OKBK)
7	**LEBANON**	1		
8	**LIBYA**	3		
9	**OMAN**	2	2	- Muscat/Muscat Intl (OOMS) - Salalah/Salalah (OOSA)
10	**QATAR**	2	2	- Doha/Doha Intl (OTBD) - Doha/Hamad Intl (OTHH)

	State	Number of Int'l Aerodromes	Number of established Runway Safety Teams	List of Aerodromes having established Runway Safety Team
11	**SAUDI ARABIA**	4	4	- Dammam/King Fahad Intl (OEDF) - Jeddah/King Abdulaziz Intl (OEJN) - Riyadh/King Khalid Intl (OERK) - Madinah/Prince Mohammad Bin Abdulaziz Intl (OEMA)
12	**SUDAN**	4	4	- Khartoum/Khartoum (HSSS) - El Obeid/El Obeid (HSOB) - Port Sudan/Port Sudan (HSPN) - Nyala/Nyala (HSNN)
13	**SYRIA**	3		
14	**UNITED ARAB EMIRATES- UAE**	8	8	- Abu Dhabi/Abu -Dhabi Intl (OMAA) - Abu Dhabi/Al Bateen Intl (OMAD) - Dubai/Dubai Intl (OMDB) - Dubai/Al Maktoum Intl (OMDW) - Al Ain/Al Ain Intl (OMAL) - Fujairah/Fujairah Intl (OMFJ) - Ras Al Khaimah/Ras Al Khaimah Intl (OMRK) - Sharjah/Sharjah Intl (OMSJ
15	**YEMEN**	5		
	Total **Percentage**	**59**	**33** **56%**	

RASG-MID SAFETY ADVISORY – 13 (RSA-13)

September 2017

MID-Region

Wildlife Management and Control Regulatory Framework & Guidance Material

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Owner:	RASG-MID

These guidelines are developed by the Runway and Ground Safety Working Group (RGS WG), as part of MID-RAST/RGS/4 DIP deliverables, based on the work of the Sudanese Civil Aviation Authority, the United Arab Emirates Civil Aviation Authority and the Egyptian Civil Aviation Authority in collaboration with the ICAO MID Regional Office within the framework of the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document has been compiled by members of the aviation industry to provide guidance for civil aviation regulators, aerodrome operators and other stakeholders in order to enhance aviation safety. It is not intended to supersede or replace existing materials produced by the States national regulators or in ICAO SARPs. The publication of this document does not prejudice the National Regulator's ability to enforce existing national regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

Regional Safety Advisory

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

Wildlife Management and Control had been identified by the MID Region Annual Safety Report Team (ASRT) as part of one of three main risk areas (Focus Areas) to be addressed under the MID Region Aviation Safety Group (RASG-MID) framework.

The MID-RAST RGS has undertaken a Safety Enhancement Initiative (SEI) to develop guidance material and training programs to support creation of action plans for Wild Life Management and Control. The Detailed Implementation Plan (DIP) for the SEI included the action to develop and issue regulatory framework supporting establishment of Wild Life Management and Control Teams.

PURPOSE

The purpose of this circular seeks to propose a regulatory framework to support the creation and success of local Wild Life Management and Control entity consisting of the following elements:

(Chapter 1)

Model Regulation including articles related to Wildlife Management and Control that clarify main responsibilities of Civil Aviation Authority (CAA) and Aerodrome Operator and their relation with other national entities regarding wildlife management and control roles and enforcement.

(Chapter 2)

Guidance Material provides detailed instructions on the implementation of the requirements contained in the State's National Civil Aviation Regulations regarding the control of wildlife in the vicinity of an aerodrome. It sets the regulatory framework applicable in each State for wildlife hazard assessment, the recording and reporting of wildlife strikes to aircraft as required by ICAO. These materials should be considered in conjunction with the ICAO PANS Aerodrome. This chapter includes requirements for the evaluation of the wildlife hazard by airport operators as well as the development and implementation of wildlife control measures to minimize the likelihood of collisions between wildlife and aircraft.

(Chapter 3)

Model Guidance for Development of Wildlife Hazard Management Programs at Airports provides guidance to evaluate the Ecological Study (Wildlife Hazard Assessment) and Wildlife Hazard Management Plan (WHMP) submitted by Aerodrome Operators. These materials are developed by the Aerodrome Operator and may be evaluated as part of Aerodrome Certification, during periodic surveillance audits or during the change management process. The evaluation may be conducted by the Aerodrome Operator or the CAA depending on the responsibilities as established by the State.

_____

USING THIS CIRCULAR

The Table of Contents provides key points of the regulatory framework supporting the creation of Wildlife Management and Control Teams.

The reader will choose the depth at which the circular will be used at any given time. Reading may range from using the Table of Contents or elements of the model regulation as a benchmark for gap analysis – to adopting and/or adapting the content of the proposed model regulation and guidance/oversight materials as part of a national regulatory framework.

CHAPTER 1

MODEL REGULATION IN SUPPORT OF
AERODROME WILDLIFE MANAGEMENT & CONTROL

1.1 Application

Each State should publish applicable National Civil Aviation Regulation, which includes requirements for Wildlife Management at and in the vicinity of aerodromes. The following paragraphs contain articles, in support of this objective, which should be assessed by each CAA.

1.2 Preface to Model Regulation

The following provides a model order summarising the links between the National Civil Aviation Law, the Civil Aviation Authority (CAA), National Civil Aviation Regulation and the Aerodrome Manual by way of example. The specifics of these relationships will vary from State to States however, the obligations of the CAA and Aerodrome Operator should always be clear.

Model Order entitled Wildlife Control (example)

- The National Civil Aviation Law gives the CAA the powers to set aerodromes standards.

- The aerodromes standards have been further specified in National Civil Aviation Regulation and include the requirements for wildlife strike hazard reduction in the vicinity of aerodromes.

- National Civil Aviation Regulation requires an Aerodrome Operator to evaluate the wildlife hazard in the vicinity of the aerodrome and adopt measures to minimize the likelihood of collisions between wildlife and aircraft.

- National Civil Aviation Regulation requires the development and implementation of a procedure for recording and reporting wildlife strikes to aircraft as well as wildlife hazard assessment and control measures, which are included in the Aerodrome Manual.

1.3 Model Regulation

1.3.1 Wildlife Strike Hazard Reduction

1.3.1.1 The wildlife strike hazard on, or in the vicinity of, an aerodrome Shall be assessed through:

    a)   the procedure for recording and reporting wildlife strikes to aircraft prescribed;

b) the collection of information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and

c) an ongoing evaluation of the wildlife hazard by the airport operators.

1.3.1.2 The wildlife hazard assessment should be documented in the Aerodrome Manual.

1.3.1.3 The aerodrome operator should forward wildlife strike reports to the CAA for onward transmission to the ICAO Bird Strike Information System (IBIS) database.

1.3.1.4 Action should be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft. The wildlife control measures should be documented in the Aerodrome Manual.

1.3.1.5 Action by the CAA Authority and Aerodrome Operator is required to eliminate or to prevent the establishment of garbage disposal dumps or any other source, which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

1.3.1.6 A due consideration should be given by the State to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.

1.3.2 Roles & Responsibilities

1.3.2.1 **Civil Aviation Authority (CAA)**

1.3.2.1.1 The CAA is responsible for the development and issuance of the regulatory and guidance material applicable to aerodromes design and operations.

1.3.2.1.2 The CAA evaluates the Aerodrome Manual submitted by an Aerodrome Operator including the wildlife hazard assessment and the wildlife control measures to determine whether it complies with National Regulation and indicate whether the applicant will be able to operate and maintain the aerodrome properly.

1.3.2.1.3 The CAA collects, through its reporting systems, information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations.

1.3.2.1.4 The CAA adopts the mutual coordination and communication among aerodrome operator and any other state departments regarding land-use planning and development In the vicinity of aerodrome as long as this development affects the likelihood of wildlife existence.

1.3.2.1.5 Finally, the CAA submits Wildlife Strike Reports to the ICAO Bird Strike Information System (IBIS) database.

1.3.2.2   **Aerodrome Operator**

1.3.2.2.1   The Aerodrome Operator is responsible for the conduct of a wildlife hazard assessment in the vicinity of the airport.

1.3.2.2.2   The Aerodrome Operator is also required to include in the aerodrome manual, the wildlife hazard assessment and the measures adopted to control the identified hazards and minimize the likelihood of collisions between wildlife and aircraft.

1.3.2.2.3   The Aerodrome Operator, in cooperation with CAA, approaches and communicates with the different state-related departments in the aerodrome vicinity to be notified with any development or land-use planning which may affect the likelihood of wildlife existence. In order that the aerodrome operator may evaluate the expected impact behind that development or land-use planning.

1.3.3   Wildlife Hazard Assessment

1.3.3.1   **Initial Assessment:** An Aerodrome Operator must conduct for each aerodrome an initial assessment of the existence and level of hazard posed or likely to be posed by wildlife in the vicinity of the aerodrome.

1.3.3.2   The initial Wildlife Hazard Assessment must be conducted by wildlife specialists, with proven knowledge of the types and behaviours of the wildlife specifies present or likely to be present in the area where the aerodrome is located.

1.3.3.3   The initial Wildlife Hazard Assessment should:

   a) identify the wildlife species that have access to the airport, in accordance with 1.3.3.5 cross;
   b) describe the features that may attract wildlife, in accordance with 1.3.3.6;
   c) assess the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome, in terms of:
        i.   the likelihood of occurrence of a wildlife strike; and
        ii. its impact on the flight; and
   d) recommend actions for reducing identified wildlife hazards to aircraft operating to or from the aerodrome, using one or more of the control measures prescribed in Chapter 3.

1.3.3.4   The methodology used for the identification of wildlife species must be documented in a standardized procedure. As a minimum, it should include the number and location of the survey points established, the duration of the observation, and how the selected duration allows for adequate assessment of the wildlife species and seasonal patterns.

1.3.3.5   For each type of wildlife species, the following information must be provided:
      a) methodology used for observation;
      b) its scientific and local name;
      c) estimated numbers and locations; and
      d) local movements, daily and seasonal occurrences.

1.3.3.6   Potential wildlife attractants may include:
      a) waste disposal;
      b) water management facilities;
      c) wetlands;
      d) confined disposal facilities;
      e) agricultural activities (livestock, aquaculture, farming ...etc.);
      f) landscaping; or
      g) any other specific land-use activities that may attract wildlife.

1.3.3.7   The description of the potential wildlife attractants should include:
      a) name;
      b) distance from the aerodrome reference point;
      c) direction from nearest approach / take-off path;
      d) dimensions;
      e) type of activities;
      f) seasonality (if applicable); and
      g) wildlife species that may be attracted to it.

1.3.3.8   The wildlife hazards or potential hazards can be categorized on the basis of their probability and severity.

1.3.3.9   An example of classification of the hazards is given in appendix c, table's appendix c -1 to appendix c-3 indicating the probability of occurrence, its severity if it occurs and the combination of probability/severity.

1.3.3.10 A colour coding may be used to indicate what is intolerable (Red – unacceptable under the existing circumstances), tolerable (Yellow – acceptable based on mitigation measures to control wildlife) or acceptable (Green – acceptable).

1.3.3.11 **Continuous Assessment:** The Aerodrome Operator should establish a procedure for continuous assessment of the wildlife hazard.

1.3.3.12 **Periodicity:** The Wildlife Hazard Assessment should be reviewed :
      a) at least once a year; or
      b) after a wildlife occurrence.

1.3.3.13 **Nature and Level of the Hazards:** The review of the wildlife hazard assessment should identify any changes in:
      a) wildlife species;
      b) the features that may attract wildlife on, or in the vicinity of the aerodrome; or
      c) the assessment of the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome.

1.3.3.14   **Effectiveness of the Control Measures:** The review of the wildlife hazard assessment should identify:

  a) new wildlife control measures that may be required of address newly identified hazards; and
  b) existing wildlife control measures that may need to be reinforced, and/or wildlife control measures to be discontinued because they are no longer required or are ineffective.

1.3.4   Wildlife Control

1.3.4.1   **General:**   The aerodrome operator should demonstrate that the proposed wildlife control measures are adequate to reduce the risk posed by wildlife to aircraft operating to or from the aerodrome as identified in the wildlife hazard assessment or its subsequent review. Examples of wildlife control measures are provided in 1.3.4.2 to 1.3.4.6.

1.3.4.2   **Description of the Control Measures:**   The description of the selected control measures should include:

  a) type of control measures selected;
  b) wildlife species;
  c) potential wildlife attractants;
  d) actions to be implemented;
  e) periodicity, or season(s) where applicable;
  f) equipment to be used, where applicable; and
  g) personnel involved and the training requirements where applicable.

1.3.4.3   **Habitat Modification and Exclusion:** Habitat modification means changing the environment to make it less attractive or inaccessible to the problem wildlife identified during the wildlife hazard assessment. It can be achieved through the reduction, elimination, or exclusion of one or more of the elements that attract wildlife such as:

  a) Food;
  b) Water; or
  c) shelter.

1.3.4.4   **Wildlife Removal:** if legally allowed for the species being considered , wildlife removal may include:

  a) Capturing;
  b) destroying eggs and nests;
  c) shooting;
  d) oral or contact toxicants;
  e) fumigants; or
  f) lethal traps.

1.3.4.5   **Repellent and Harassment Techniques:** Repellent and harassment techniques may be used to keep hazardous wildlife away from specific areas on or near an airport by affecting the animal's senses through chemical, auditory or visual means. Repellent and harassment techniques may include:

    a)   patrols of airside areas to disperse birds and other hazardous wildlife;

    b)   chemical repellents legally allowed for use in Sudan by the relevant national authorities;

    c)   audio repellents appropriate to the type of bird or mammal; or

    d)   visual repellents appropriate to the type of bird or mammal.

1.3.4.6   **Aircraft Schedule Modification:** The flight schedules of some aircraft may be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement.

1.3.5   Recording and Reporting Wildlife Strikes

1.3.5.1   **Recording:** Aerodrome Operators should maintain a log of wildlife strikes containing the date, types and numbers of birds or animals, and aircraft involved. The procedure for recording the wildlife strikes must be documented in the Aerodrome Manual.

1.3.5.2   **Reporting:** A Wildlife Strike Reporting Form is made available to aircraft operators, airport personnel and air traffic controllers to report wildlife strikes.

1.3.5.3   **Submission of Wildlife Strike reports to ICAO:** CAA should have wild life strike database and mechanism to ensure that all strike reports are consistent, error-free data before entering a single, consolidated report into the database. Time interval for update and review the stored date should be implemented   (may be every six weeks); the CAA should send a current version of the database to the International Civil Aviation Organization (ICAO) for incorporation into ICAO's Bird Strike Information System (IBIS) Database.

*Note: **Appendix F** provides a guide for the bird strike reporting form, for further information can be found: ICAO airport service manual, part 3, item 3.5   Figure 3-1. and 3-2.*

Chapter 2

MODEL PROCESS FOR ASSESSMENT OF
WILDLIFE HAZARD MANAGEMENT

2.1   Purpose

To provide guidance to personnel appointed to evaluate of Ecological Study (Wildlife Hazard Assessment) and Wildlife Hazard Management Plan (WHMP) submitted by Aerodrome Operators. These materials are developed by the Aerodrome Operator and may be evaluated as part of Aerodrome Certification, during periodic surveillance audits or during the change management process. The evaluation may be conducted by the Aerodrome Operator or the CAA depending on the responsibilities as established by the State.

The model process below is based on requirement for the Aerodrome Operator to submit the Ecological Study (Wildlife Hazard Assessment) and WHMP directly to the CAA for evaluation and acceptance.

2.2   Applicability

This model Operating Procedure is applicable to the assessment of Ecological Study (Wildlife Hazard Assessment) and WHMP.

2.3   Regulatory System

    a.   Civil Aviation Law […..]
    b.   [Caa Regulation]
    c.   [Advisory Circular]
    d.   [Inspector Handbook/ …]
    e.   […]

2.4   Responsibilities

    a.   The Ecological Study (Wildlife Hazard Assessment) may be evaluated by specialist (third party contract / competent inspectors).
    b.   The WHMP shall be evaluated by the [xxxx] appointed by [xxxx].
    c.   The Team Leader is responsible for conducting and reporting the evaluation process.
    d.   The WHMP are approved by the [xxxxx].

2.5   Procedure

2.5.1   Introduction

It is required that aerodromes exposed to wildlife hazards analyse the level of risk posed by the existing hazards to enable a determination of the need for a WHMP. It is not anticipated that such a determination can always be reached before the commencement of initial operations at the aerodrome. Data collection on wildlife activity in the vicinity of the aerodrome and subsequent analysis may take some time after aerodrome operations begin before meaningful conclusions can be drawn concerning the Wildlife Management Program to be implemented, where applicable. However, it is anticipated that a procedure for monitoring bird activity and of recording and reporting bird, strike be established and incorporated in the Aerodrome Manual before approval of the Manual by the CAA.

2.5.2 Application of Ecological Study

Aerodrome Operators are required to submit all the documents needed to demonstrate the level of risk posed by the existing hazards to enable a determination of the need for a WHMP.

The application should be accompanied by the following documentation at least:

1. Hazard Analysis of the event, which prompted the study.
2. Identification of the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife observed.
3. Identification and location of features on and near the airport that attract wildlife.
4. Description of the wildlife hazard to air carrier operations.
5. Form provided in Attachment 1, signed by the Accountable Manager and by the Safety Manager.
6. Any other document deemed useful by the aerodrome operator or requested by CAA.

2.5.3 Approval/Acceptance of Ecological Study

Step 1: Upon receipt of an application, the [assign Team] should conduct a preliminary check in order to establish if it is compliant with the relevant provisions of Regulation - and if all the documents have been submitted.

Step2: After the preliminary check, the [Team] should evaluate the content of the submitted application, in order to establish if the proposed study can be accepted, taking into account the potential impact of the wildlife hazard on aircraft operation.

Step3: [DASS] (or equivalent directorate) should communicate in writing to the concerned Operator the - positive or negative - result of evaluation or the request for further explanations, within the applicable timeframe (ref. [Law…]).

Step 4: Once accepted [DASS] (or equivalent directorate) request from the concerned Operator to submit the Wildlife Hazard Management Plan.

2.5.4 Approval of Wildlife Hazard Management Plan (WHMP)

Step 1: Upon receipt of an application, the [assigned Team] should conduct a preliminary check in order to establish if it is compliant with the relevant provisions of the National Civil Aviation Regulation.

Step 2:
- After the preliminary check, the [assigned Team] should evaluate the content of the submitted application, in order to establish if the proposed procedure and hazard mitigation can be accepted.

- The assessment can be obtained by using different methods, use form no. 1 (the aim is to demonstrate that the proposed solution ensures the safety of the aircraft operation). By ensuring the following:
    1) Its effectiveness in dealing with the wildlife hazard.
    2) Indications that the existence of the wildlife hazard, described in the ecological survey, should be re-evaluated.
    3) Procedures outlined in the Plan, such as inspections prior to air carrier operations, are carried out.
    4) The reporting system are clear and applicable related to size of the aerodrome and the traffic density.
    5) Procedure to deal with the habitat modification projects or changes in land us identified in the Plan.
    6) Procedures are established by the Aerodrome Operator for the conduct of a wild life risk assessment.
    7) Implementation Plan (timeline) be prioritized and respect the mitigation measure.

For the purposes of the assessment* - in addition to examining the submitted documents - [CAA] may require to conduct audits or inspections as well as to participate in demonstrations or tests carried out by the operator, as deemed appropriate.

*may use (form 1) and (Model Aerodrome Pre-Audit Assessment Form appendix D RASG-MID SAFETY ADVISORY – 05 (MID-Region Aerodromes Certification Toolkit)

Step 3: The [assigned Team] should verify if the Aerodrome Operator has reported the related information in the appropriate sections of the Aerodrome Manual and has arranged with the AIS Provider for publishing the relevant data on the AIP (if it needs to demonstrate the hazard to air carrier).

2.6   Records

In order to comply with National Civil Aviation Regulation the [Team Leader] is responsible for ensuring that all the relevant documents relating to wildlife management plan (as listed in the preceding paragraphs) are properly maintained in the [Aerodrome File], providing for adequate storage, accessibility, traceability of data.

The above-mentioned documents are maintained in the Aerodrome file for the lifespan of the Certificate.

2.7   Forms

Appendix A - Wildlife Hazard Management Assessment Checklist

Chapter 3

MODEL GUIDANCE FOR DEVELOPMENT OF
WILDLIFE HAZARD MANAGEMENT PROGRAMS AT AIRPORTS

3.1 Introduction

The extent of a wildlife hazard at particular airport locations is widely variable. Many solutions are available but none are likely to be useful at any one airport, the most important action, upon which any risk management strategy must be founded, is knowing the nature of the hazard; this may vary by time of day and seasonally and must be related to the likely pattern of aircraft movements. For that, Aerodrome Operators are required to establish all the documents needed to demonstrate the level of risk posed by the existing hazards of the wildlife hazard to enable them to establish the effective criteria for mitigate the hazard of the wildlife

3.1.1 Phase I: Wildlife Hazard Assessment /Ecological Study

Starting with a Wildlife Hazard Assessment Study is highly recommended which is starting with collecting data (information, records, etc…) (INPUTS), then analyses all these data to identify the hazard, which will affect to aircraft operation.

Step 1: Data Collection
1. All the previous events and bird strikes records and statistics.
2. Analysis of the event, which prompted the study.
3. All the records of damaging collisions with wildlife other than birds.
4. Observed wildlife species.
5. Observed wildlife numbers and sizes.
6. Observed wildlife locations and local movements.
7. Observed wildlife daily and seasonal occurrences.
8. Identification and location of wildlife attractants on and near the airport.

*Note: An Airport Operator may use the form in **Appendix B - Data Collection Template for Observed Wildlife** to describe the observed wildlife related to the number, location and wildlife movement period - Otherwise an Airport Operator may establish maps including details about habitats, major topographical features, wildlife movements, etc. (Highlighting the wildlife that are pertinent to the objectives) / Maps over the course of several seasons so as to account for changes in wildlife and habitat. List in details the resources, habitats, and wildlife present on your land. Include details about size of species, movements of animals, seasonal change, etc…*

Step 2: Data Analysis
Analysis all collected data of the wildlife hazard to air carrier operations.

Step 3-4: Document Preparation: The study describe in above paragraph should be introduced to CAA to determine whether or not there is a need for a Wildlife Hazard Management Plan (WHMP) taking into consideration some important parameters refer to (Chapter 2 in this manual).

3.1.2   Phase II: Establish Wildlife Hazard Management Plan (WHMP)

The goal of this Wildlife Hazard Management Plan (WHMP) is to promote aviation safety for passengers and flight crews by reducing wildlife hazards and associated risks to aircraft and airport operations caused by wildlife activities on and in the airport vicinity. A wildlife management plan is a document used by airport operator to outline and implement steps for preserving, altering, or exploiting wildlife on /off airport, a management plan usually contains maps, descriptive documents. A WHMC Plan Template is presented in **Appendix G**.

The WHMP should be establish based on the ecological study (Wildlife Hazard Assessment) and should contain <u>at least the following:</u>

1. Foreword
2. Glossary
3. Definitions
4. Objective
5. Duties & Responsibilities
6. Wildlife Hazard identification and Assessment
    (a) All the previous events and bird strikes records and statistics.
        i. The most significant wildlife hazard that induces events.
        ii. The potential time and date of events occurrences.
    (b) All the records of damaging collisions with wildlife other than birds.
    (c) Observed wildlife species.
        i. Basic information about the wildlife at the airport region.
        ii. The airport region relevant biodiversity.
        iii. The most significant wildlife species behaviour.
        iv. The main reasons for such wildlife species existence or flying over.
        v. Migratory flyway (If it is migratory bird species).
        vi. Flyway altitude.
        vii. Determination of the altitudes and geographical sites of interference between aircrafts pathway and the migratory birds' flyway.
    (d) Observed wildlife numbers and sizes.
    (e) Observed wildlife locations and local movements.
        i. The most significant bird flocks gathering points and geographical distribution at the airport region (on or within the airport vicinity).
        ii. The local movement of bird flocks determination.
    (f) Observed wildlife daily and seasonal occurrences.
    (g) Identification and location of wildlife attractants on/in the vicinity of aerodromes.

<u>On Airport</u>	<u>Airport Vicinity</u>
i. Solid waste transfer stations	i. Landfills
ii. Water treatment facilities	ii. Waste water oxidation ponds
iii. Maintenance hangers	iii. Forestry
iv. Landscapes	iv. Agricultural activities
v. Recycling stations	v. Landscapes
vi. Wetlands	vi. Golf courses
vii. Agricultural activities	
viii. Others	

7. Description of the wildlife hazard to air carrier operations
8. Wildlife Control
   (h) Monitoring
      i. Daily Wildlife Management Log
      ii.   Monthly Summary
9. Establishment of Performance Indicators and Self-Assessment
10. Recording and Reporting Wildlife Strikes.

3.2   WHMP Implementation Phases

3.2.1   The purpose of this Section is to establish criteria for implement the WHMP by the following components:
   1.   Phase I : Planning Phase
      (a)   Conduct Gap Analyses
      (b)   Resource Allocation
      (c)   Responsibility Identification
      (d)   Hazard Identification
   2.   Phase II : implementation phase
      (a)   WHMP Implementation Procedures
      (b)   Periodic Evaluating
   Note: see Figure 1 – *WHMP implementation phases*

WHMP IMPLEMENTATION PHASES
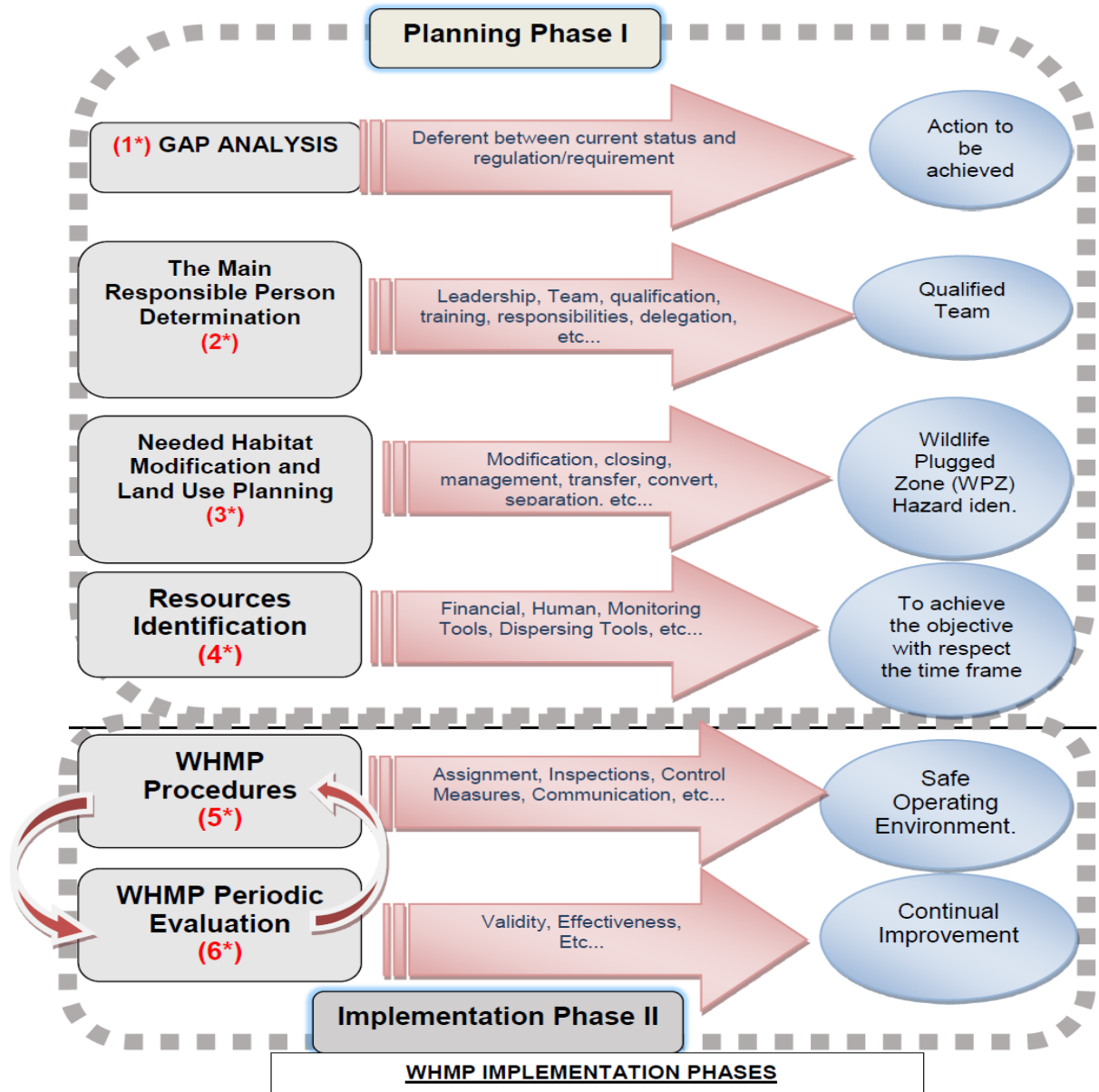
Process #	Task Title	Process	Deliverable
Phase I: Planning Phase			
1*	Gap Analysis	Current situation vs objectives	Requirements needed to be fulfilled
2*	Resource Identification	Human, financial, tools, etc…	Allocated all needed resource for Suitable work environment
3*	Responsible Person Determination	Team assignment and training	Qualified team

4*	Habitat Modification	Management, closing, transfer, etc…	Passively created considerable safe operating environment
Phase II: Implementation Phase			
5*	WHMP Implementation Procedures	Inspection, wildlife dispersing, recording, analysis, etc…	Actively created considerable safe operating environment
6*	Periodic Evaluating	WHMP Validity and effectiveness verification	Verified and audited plan which includes continual improvement

Figure -1 WHMP implementation phases

3.2.2 Phase I: Planning Phase

Step 1*: Gap Analysis (Where Are You? And What Should You Be?

A gap analysis is a method of assessing the differences in performance between a current situation (present state) and standard situation (the target state) to determine whether requirements are being met and, if not, what steps should be taken to ensure they are met successfully. Gap refers to the space between "where we are" (the present state) and "where we want to be".

The first step in conducting a gap analysis is to establish specific target objectives by looking at the strategic goals and improvement objectives, which are stated in WHMP.

The next step is to analyse current state processes by collecting relevant data on performance levels and how resources are presently allocated to these processes. This data can be collected from a variety of sources depending on what is being analysed, such as by looking at documentation and observing current activities. Lastly, after an airport compares its target goals against its current state, it can then draw up a comprehensive implementation plan to fulfil the gap between its current and future states, and reach its objectives level.

Note:
C - Risk Analysis may be used to conduct gap analysis

Step 2*: Resources Allocation:

Airport Operator responsible for allocate the resources to implement the appropriate wildlife hazard management techniques these resource is define as:

Human Resources Identification: assign key person from the following department (the Wildlife Hazards Control Team) and other contributing airport personnel for implementing each phase of the plan
   a.   Environmental Department
   b.   Safety Department
   c.   Operations Department
   d.   Maintenance Department
   e.   Security Department
   f.   Air Traffic Control (ATC)
   g.   Planning Department
   h.   Financing Department

i.   Wildlife Controller (Coordinator):   (To oversee the daily activities and analyse the collected data and carry out risk assessments in order to develop and implement the WHMP).

Financial Resources Identification: In coordinating with Planning and Financing Departments, the Airport Operator should determine the most appropriate wildlife monitoring and dispersing tools to be purchased and the training to be provided.

Step3*: Responsibility Determination:

- The Airport Operator's responsibilities should be borne by the senior manager role and this should be specified in the aerodrome Safety Management System (SMS). The Wildlife Control Coordinator is in charge of the implementation of the WHMP. The Wildlife Control Operators carry out the required tasks and field work. A Wildlife Committee will ensure that all stakeholders are engaged in the WHMP.

- The assignment of actual roles, titles and tasks will vary from airport to airport. At smaller airports, the roles might be divided or merged to just 1 or 2 levels. Larger airports will require larger, possibly dedicated teams. Some tasks or roles may be contracted to an external company or organization.

*Note: see **Figure 2 – Organisation Chart** ((this organization chart may be differ from one State to another).*
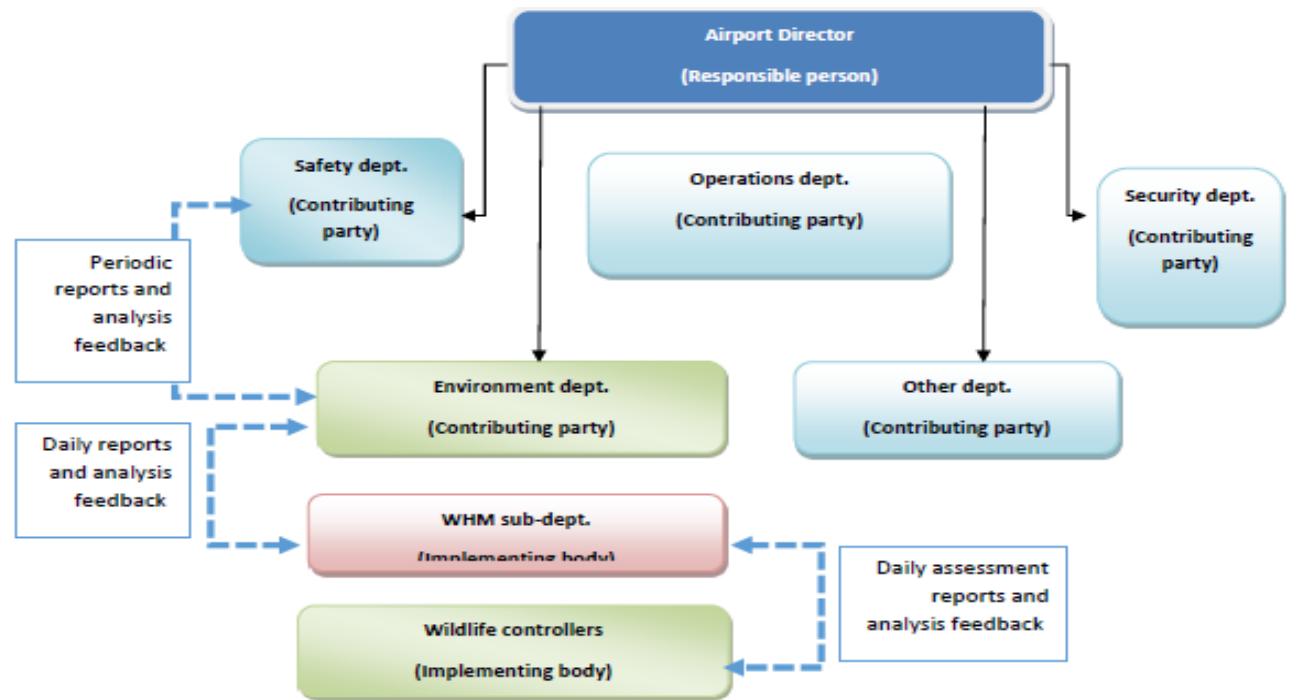

Figure 2: Organisational Chart

Roles & Responsibilities of Wildlife Hazard Management (Coordinator) and Relevant Team (Front-Line Personnel (Wildlife Controllers)):

1. Monitoring birds local movements area on/in the airport vicinity using one of the monitoring tools from the highest point at airport (as much as possible) especially the airport movement area with the aim of quick intervention in case of presence of such wildlife hazards to prevent the likelihood of bird strikes or any other damaging collisions.

2. Daily inspections and patrolling of the airport movement area to verify wildlife hazard and/or wildlife hazard attractants absence.

3. Periodical inspection of the wildlife hazards attractants on/in the aerodrome vicinity.

4. Wildlife hazard management and control relevant records, checklist filling out, and keeping.

5. Raising up weekly and monthly reports conveying the current situation of his activities, performance, and any other relevant duties.

6. Keeping in contact with quick reaction with the ATC department in case of any emergency notifications regarding wildlife existence.

7. Coordinate the activities of the WHMP with air traffic control (ATC) and other stakeholders and contributors (as mentioned in the following flowchart).

8. Bird/wildlife observations, control and reporting.

9. Review strike reports, monitor daily activity records and maintenance reports to determine the requirements for short- and long-term management plans, and this information should be passed to managers accountable for safety on a regular basis at least on monthly basis (Ref: ICAO Service manual part 3).

10. Regular coordinating with WHMP other contributing parties and informing them with their roles and responsibilities in WHMP implementation.

    *Note: **Appendix E Key Roles and Responsibilities** provides a guide for the key roles and responsibility, for further information can be found: ICAO Airport Service Manual, part 3, Wildlife Control and Reduction, 3.3 Role of the Airport Operator and 3.4 Role of Bird/ Wildlife Strike Control Coordinator and ACI Wildlife Hazard Management Handbook Section 2.*

Step 4*: Needed for Habitat Modification and Land Use Planning:
Hazards attractants recognizing (description of wildlife habitats and resources): Habitat management is the heart of airport's Bird/Wildlife Hazard Management Program because it offers ecologically based, long-term measures for reducing the number of hazardous birds/wildlife at the airport. Before undertaking activities to manage the environment, it is important to first carry out an Ecological Survey (refer to item (3.1.2) of the airport and surrounding area to identify sources of food, water and shelter attractive to wildlife on and in the vicinity of the airport.

Categorized the hazard as the following:

o **1st Landscape Category**, which is the airport itself, where habitats and the wildlife using them will be described in detail. This will rely on site-specific field work and standard techniques for describing vegetation communities (e.g., Ecological Land Classification) and wildlife communities, their use patterns and seasonal variations that have been observed or that might be expected.

o **2nd Landscape Category**, which is the nearby lands, those are not under direct control of the airport. The physical area included in this category generally includes lands up to 8 km from the airport reference point, which should include an area of sufficient size to provide an adequate picture of wildlife movements through the airspace identified later in this document. This assessment is largely based on existing information and remotely sensed habitat analysis rather than site-specific field work. It will describe the location of moderately hazardous land use practices such as wastewater discharge plants and sewage lagoons, crop production, recreational sites and managed or created wildlife habitats. There is no requirement under the regulation to manage these lands however, it is important to be aware of potentially hazardous off airport land uses.

o **3rd Landscape Category**, which is the determination of the presence of extremely hazardous land, use practices that may be many kilometres from the airport. At a minimum, food waste disposal sites, outdoor composting and commercial fish plants will be mapped when they occur within 15 km of the airport reference point. Such features may be mapped at greater distances where wildlife associated with them may become a hazard to aircraft using the airport.

3.2.3   Phase II: Implementation Phase

Step 5*: WHMP Operational Process:
The Wildlife Hazard Implementation Process should have formal mechanism to ensure that the Wildlife Hazard Management Plan (refer to item 3.1.2 in Establishment Phase) will be implemented effectively for that is the following procedures should be followed (Figure 3):

1ˢᵗ Administrative Mechanism

2ⁿᵈ Control Wildlife Mechanism including:
   a.   Habitat (wildlife hazard attractants) management mechanism on/in the airport vicinity.
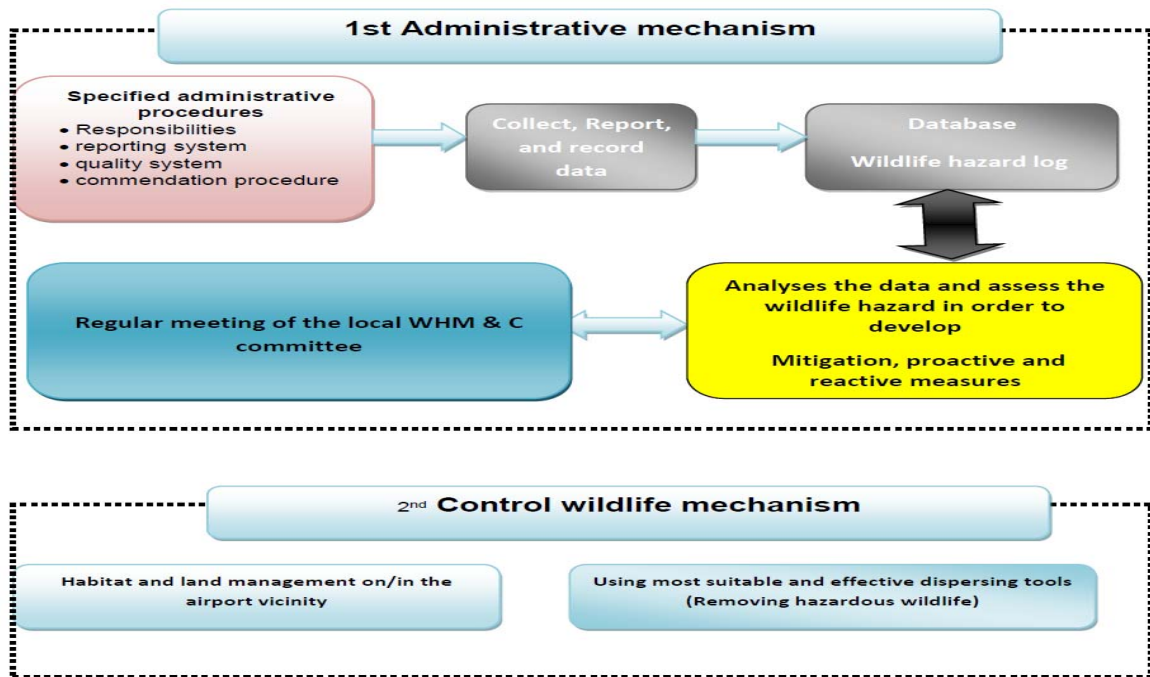   b.   Using most suitable and effective dispersing tools (removing hazardous wildlife).

Figure 3

1ˢᵗ Administrative Mechanism

- For effective implementation the Airport Operator should have specified administrative procedures whether to activate the key person responsibilities, writing reports and quality system include documents control system.

- Senior airport staff will be responsible for the implementation of this WHMP. This includes the acquisition of the various permits, the provision of training and awareness programs and the review and submission of the annual strike reports and two-year updates.

- Senior management, or their designate, will be responsible for coordinating, supervising and the overall management of the WHMP on a long-term and a daily basis at the site-specific level. This will include the nomination of the key Wildlife Management Officer, co-ordination of training, safety assurance and ensuring that the necessary equipment is available.

- **Appendix E - Key Roles & Responsibilities** provides the roles and responsibilities for all key person

    Note: Further information can be found: ICAO Airport Service Manual, Part 3, Wildlife Control and Reduction, 3.3 Role of The Airport Operator and 3.4 Role Of Bird/ Wildlife Strike Control Coordinator and Wildlife Hazard Management Handbook Section 2.

- Regular meeting of the Local Wildlife Hazard Management and Control Committee.

- Wildlife Hazard Management on an airport often requires communication, cooperation, and coordination among various groups on the aerodrome. Establishment of the Airport Wildlife Committee is required to facilitate this communication, cooperation and coordination. This committee might be included within the Safety Management Committee.

  Members:
  a. Airport Operator.
  b. Bird/Wildlife Department Team.
  c. Maintenance Department Representative/s.
  d. Planning Department Representative/s.
  e. Financing Department Representative/s.
  f. Operations Department Representative/s.
  g. ATC Representative/s.
  h. Security Department Representative/s.
  i. Environment Department Representative/s.
  j. Agriculture Department Representative/s.
  k. Airport Using Airlines Representative/s.
  l. Local Runway Safety Team Representative.

  Roles and Responsibilities:
  a. Review strike data collected.
  b. Assess bird/wildlife risks.
  c. Summarize trends in order to evaluate and determine what effective and most suitable control measures should be implemented in order to manage the bird/wildlife hazards.

  Committee Meeting Intervals:
  Based on the airport complexity and the level of bird/wildlife existence (recommended monthly).

- An integrated approach is needed to coordinate throw the airport organizations. It is important to have effective communication between those involved in bird/wildlife dispersal and air traffic control. Upon receipt of notice of a specific wildlife threat, air traffic control should issue appropriate warnings to aircraft on and in the vicinity of the airport. (Aircraft operators also are part of such an integrated approach by implement their roles upon receipt of the warning of a specific threat.)

  Note: Further information can be found: ICAO Airport Service Manual, Part 3, Wildlife Control and Reduction, Chapter 5.

Example of communication procedures should be stated in Wildlife Management Plan *(see figure 4)*:

1. Information will be provided directly from the wildlife observer on duty to Air Traffic Services (ATS) via radio contact.

2. Wildlife observer responsible for ensuring that updated wildlife information is provided to ATS immediately if an urgent situation arises and on a regular basis depending on the current conditions, or when requested by ATS.

3. ATS deployment any information received from aircraft operator concern wildlife observations to wildlife observer in a timely manner.

4. ATS will provide information to pilots on current wildlife hazards and will ask pilots to report any wildlife observations to ATS especially those observed while taxiing.
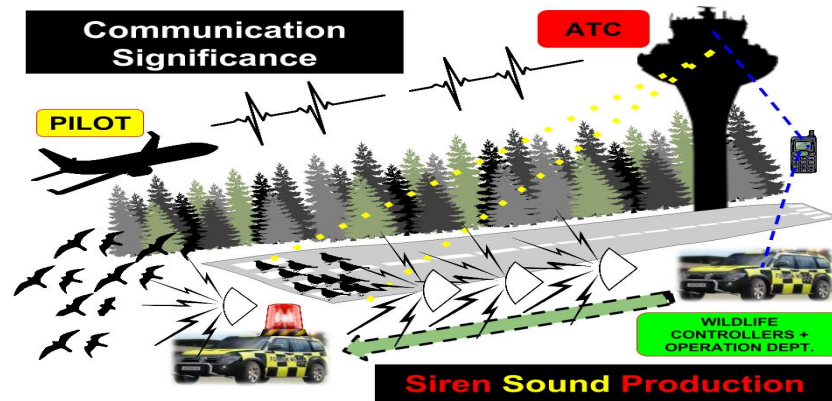

Figure 4

Further information can be found: ICAO Airport Service Manual, part 3, 3.4 Role of Bird/ Wildlife Strike Control Committee- ACI Wildlife Hazard Management Handbook item 2.5

2nd: Wildlife Control Mechanism (*Operational Mechanism*)

Habitat (Wildlife Hazard Attractants) Management Mechanism on/in the Airport Vicinity

- The airport's WHMP should provide details on the actions and procedures necessary to manage both habitat and wildlife given the specific local conditions and considerations Actions to deal with wildlife on a daily basis starts with patrols and inspections, observation of wildlife and other conditions, making interventions and assessing the response to inventions. It is also crucial to record all actions and observations in order to be able to review the effectiveness of the WHMP and development improvements.

- After working hazard identification and analysis (item 3-1-1) airport operator should have machoism to control of wildlife attractants through the following:
    a. Avoid establishment such kind of wildlife attractants anymore in the airport new projects or expanding.
    b. Reduce the wildlife attractants from its original source as much as possible.
    c. Destroying the food chain of such wildlife species at airports by using a series of insecticides, herbicides and rodenticides applications.
    d. Management of airport's airside ground cover as appropriate with its relevant wildlife species and its behaviours.
    e. Choosing the optimum way of habitat modification based on the existing and expected wildlife.
    f. Definitely short grass cover is more convenient for visual and physical access of wildlife control team.
    g. Eliminate all standing water on an airport to the greatest extent possible.
    h. Modify waste water oxidation ponds whether by monitoring and dispersing birds regularly to form a wildlife plugged zone (WPZ) or covering it using nets or any other relevant suitable techniques (exclusions techniques).
    i. Proper fencing installation.
    j. Others.

Using Most Suitable and Effective Dispersing Tools

- Repellent and harassment techniques should be used to keep hazardous wildlife away from specific areas on or near an airport. The long-term cost-effectiveness of repelling hazardous wildlife does not compare favourably with habitat modification or exclusion techniques. Wildlife will return as long as the attractant is accessible. However, habitat modification and exclusion techniques will never rid an airport of all hazardous wildlife. Repellent techniques are a key ingredient of any wildlife hazard management plan.

- Repellents work by affecting the animal's senses through chemical, auditory or visual means. Habituation or acclimation of birds and mammals to most mechanical repellent techniques is a major problem. When used repeatedly, without added reinforcement, wildlife soon learns that the repellents or techniques are harmless and the repellents or techniques are ignored.

    When Using Repellents, Four Critical Factors should be remembered:
    1. there is no single solution to all problems;
    2. there is no standard protocol or set of procedures that is best for all situations. Repelling wildlife is an art and a science. Motivated, trained and suitably equipped personnel who understand the wildlife on the airport are critical for the successful use of repellents;
    3. each wildlife species is unique and will often respond differently to various repellent techniques. Even within a group of closely related species, such as gulls, the various species will often respond differently to various repellent techniques; and
    4. to lessen habituation to repellent techniques:
        - use each technique sparingly and appropriately when the target wildlife is present;
        - use various repellent techniques in an integrated fashion; and
        - Reinforce repellents with occasional lethal control (only when necessary depredation permits are in place) directed at abundant problem species.

- Advances in electronics, remote sensing and computers have resulted in "intelligent'' systems that can automatically dispense repellents (for example, noisemakers, chemical sprays) when targeted wildlife enter selected areas. These devices are used to reduce habituation and increase the effectiveness of other repellent techniques. It should be remembered that automated repellents are not a substitute for trained people on the ground, who can respond appropriately to incursions by various wildlife species, and should be considered only when more traditional methods of control and dispersal have proved ineffective.

Note: for further information can be found: ICAO Airport Service Manual, Part 3, and chapter 8 Wildlife Control and Reduction and ACI Wildlife Hazard Handbook section 4

3.3   WHMP Periodic Evaluation

3.3.1   Purpose:

Aerodromes should have a process to review and evaluate the wildlife management plan to provide safety assurance that the plan is fully effective and correctly implemented. The review should be completed on an annual basis but also must include an on-going review process to ensure that the plans are always current and fully functional at all times.

Procedures to monitor and evaluate the effectiveness of bird or wildlife control strategies might include:

- Airport's WHMP include wildlife control performance monitoring, measurement and improvement systems;
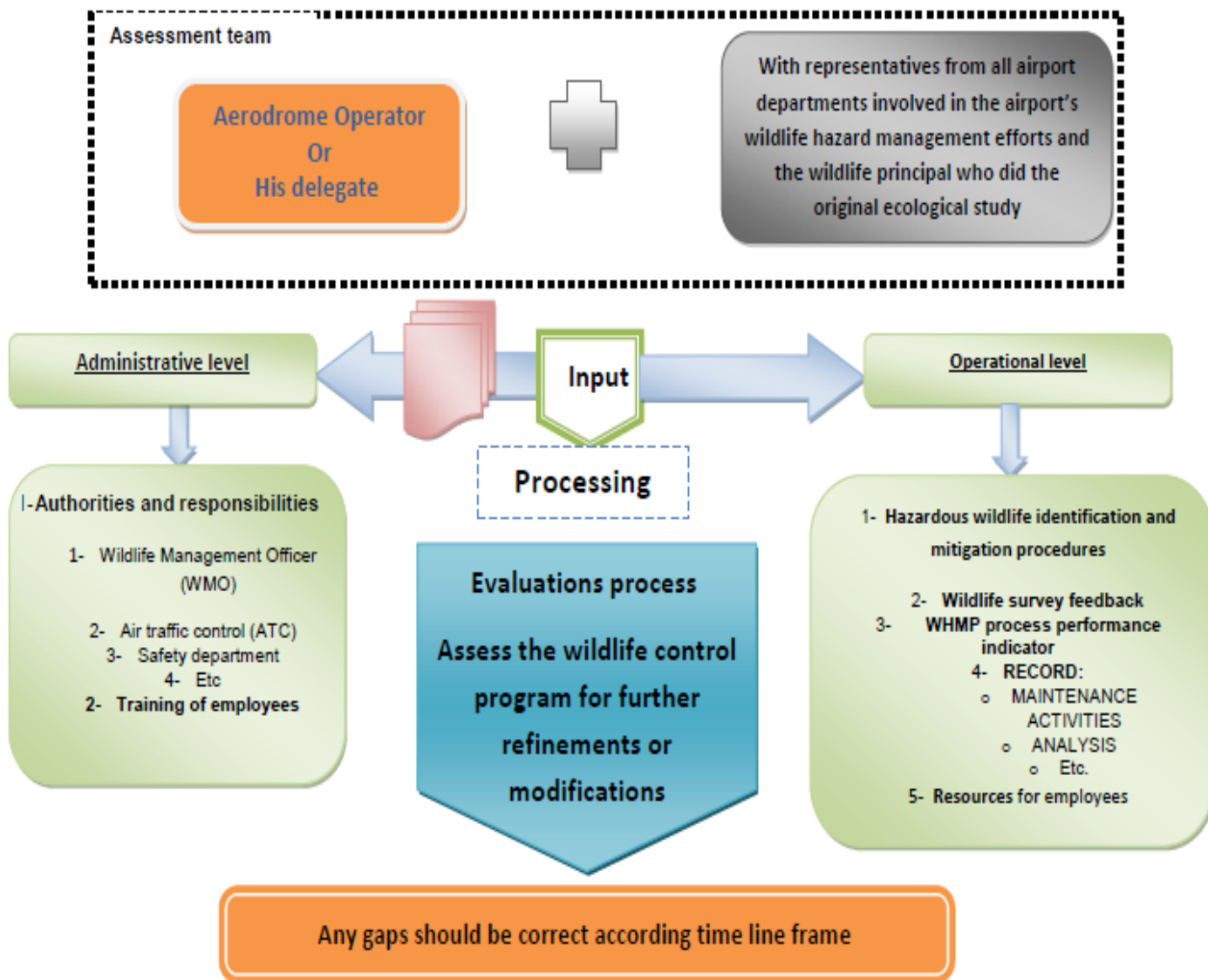- Personnel training, competence assessment and appraisal.

Figure 5 -Evaluation Process

3.4   Evaluation of the Airports Wildlife Hazard Management Program:

3.4.1   Administrative Level

   i.   **Evaluation the Authorities** and responsibilities: to ensure that all roles clearly defined and understood by all and the aerodrome personnel understand their roles and responsibilities.

   ii. **Evaluation the Training** of employees: to ensure the computability with the training program.

   Note: For further information about the training program can be found in the ICAO Airport Service Manual, Part 3, Chapter 4 Wildlife Control and Reduction and ACI Wildlife Hazard Handbook Section 5

3.4.2   Operational Level: Assessment should include at least the following:

   i.   **Evaluation The Hazardous Wildlife Identification and Mitigation Procedures:** include assessment the records of any habitat modifications and adjacent land use management, which will consequently affect the presence of wildlife (time, locations, dates, migratory flyways, numbers, etc.…).

   ii. **Wildlife Survey Feedback:** is a valuable tool for aerodromes to ensure their wildlife management and habitat plans are effective, meet all regulations and standards required (ATC, Airlines and ……etc.).

   iii. **Evaluation the WHMP Process Performance Indicator*:** Performance indicators are critical to determine the need for enhancement or modification. It is also very necessary because actions to reduce one wildlife hazard will inevitably result in improved conditions for some other wildlife species.
      a-   The number of wildlife strikes;
      b-   Strike rate;
      c-   Damage associated with strikes;
      d-   Individual species' hazard assessments;
      e-   Risk rankings for airport; and
      f-   The status of action items that have been recommended in the plan.

   *Taken together, these seven measurements will form an effective and objective measurement of performance of the WHMP for airport. The hazard and risk assessment will be updated and compared to the previous assessments in the WHMP every two years (or earlier if there is a significant change in hazards or risk). A discussion of any changes will be provided. Feedback from airport users will be sought and reported in time for each two-year update this will help determine if the wildlife program is being responsive to their needs.

3.4.3   Evaluation of the Keeping Records:

a)   **Records of wildlife activity**, wildlife strikes, and wildlife management actions.

b)   **Maintenance activities** and any other corrective and preventative actions: keep records of any corrective and preventative actions serving wildlife hazard management and control concept, such actions might be installing or repairing fencing, thinning trees, clearing construction debris, applying pesticides or repellents, conducting grass-height management, installing netting in hangers or wires over ponds or oxidation tanks, and regarding pavement or grass areas to eliminate standing water.

c)   **Recorded Information Analysis:** the information recorded will be most useful if it is summarized into monthly and annual statistics. The use of computerized database systems customized to provide summaries of wildlife control activities is recommended.

Note: Furthermore, without accurate records and proper evaluation, it might be difficult to justify and defend certain management actions such as wildlife removal.

d)   **Evaluation of Resources for Employees:** Periodic analyses of daily wildlife reports, will reveal:

- The effectiveness of applied control techniques for various wildlife species;
- The effectiveness of different dispersal techniques at different times of the day and under different weather conditions; and
- The amount of time wildlife remains dispersed.

Note: see figure 5 -Evaluation Process

APPENDIX A
WILDLIFE HAZARD MANAGEMENT ASSESSMENT CHECKLIST

Name of Aerodrome: Name of Operator: Regulation ……………………			Inspection Date: Inspector(s) Name (s):			
	Item	Reg Ref	Yes	No	N/A	Remark
1.	Has Bird/Wildlife Control Officer(s) at the site been appointed and responsibilities assigned?					
2.	Has a training programme been developed to train those involved in Bird/Wildlife Control Programme?					
3.	Have the control officer(s) being trained accordingly?					
4.	Has the Bird/Wildlife Control Co-Coordinating Committee been established with well-defined responsibilities?					
5.	Has a Bird/Wildlife Control Programme (Management Plan) been developed?					
6.	Is level of implementation of measures in control programme (including those below) satisfactory?					
7.	Does the Aerodrome Operator maintain an observation log? Does the content of the log give an indication of the actual status during inspection					
8.	Does the aerodrome operator on a regular basis remove the attraction to birds particularly water, food, nesting sites and resting places?					
9.	Does the operator maintain a wildlife/bird dispersal log? Does the content of the log give an indication of the actual status during inspection?					
10.	Does the Aerodrome Operator regulate the creation of refuse dumps that would attract birds in the vicinity of the aerodrome where the safety of aircraft operations is					
11.	Has a reporting procedure been documented covering all aspects of the Bird/Wildlife Control Programme?					
12.	Does the Aerodrome Operator keep records of timely reports on bird strike incidents or accidents occurring at the aerodrome?					
13.	Does the Aerodrome Operator submit reports to the CAA for onward submission to ICAO on a regular basis, bird strike reports to facilitate effective use of the IBIS programme in accordance with eac139-20?					
14.	Does the operator make available information on the presence of birds and associated hazards to ATC for advising arriving and departing aircrafts?					
15.	Does the Aerodrome Operator take active part in workshops on bird hazard control and reduction organized by ICAO and other relevant bodies for exchange of views and experiences conclusion?					
16.	Has a list of all bird/wildlife attractants at the aerodrome been completed?					
17.	Has a list of all birds/wildlife surrounding the aerodrome been completed?					
18.	Has a Land Use Plan been established with regard to effective land use on and off the aerodrome as it pertains to the bird/wildlife control programme?					
Inspector's Remarks: Recommendation: Name Of Inspector:_____ Sign:_____ Date:_____						

APPENDIX B

DATA COLLECTION TEMPLATE FOR OBSERVED WILDLIFE

Wildlife Description	Location and Round Figure of No.				Movement period Season/ month
	1st point	2nd point	3rd point	4th point	
White Stork					August
Prey					May- Jun- July
Water Birds					From September
Others					all over the year

APPENDIX C

RISK ANALYSIS

Table Appendix C-1: Probability

Qualitative Definition	Meaning	Value
Frequent	Likely to occur many times (has occurred frequently)	3
Occasional	Likely to occur sometimes (has occurred infrequently)	2
Remote	Unlikely, but possible to occur (has occurred rarely)	1

Table Appendix C-2: Severity

Qualitative Definition	Meaning	Value
Major Damage	Aircraft may incur damage or structural failure that adversely affect the structure strength, performance, or flight characteristics and that would normally require major repair or replacement of the affected component, or make it inadvisable to restore aircraft to airworthy condition.	C
Damage	Aircraft may incur at least some damage (destroyed, substantial, minor, or unknown) from strike	B
Effect on Flight	Aborted take-off, engine shutdown, precautionary landing, or other	A

Table Appendix C-3 Probability /Severity

	Severity		
Probability	Major Damage C	Damage B	Effect on Flight A
Frequent 3	3C	3B	3A
Occasional 2	2C	2B	2A
Remote 1	1C	1B	1A

APPENDIX D

GAP ANALYSIS FOR WILDLIFE HAZARD MANAGEMENT PROGRAMME IMPLEMENTATION

Priority Level	Target state	Current State	Reg. Ref.	Remarks
High	Ecological study	○yes ○partial ○no		
High	Events and Strikes records	○yes ○partial ○no		
High	Other wildlife damaging collision records	○yes ○partial ○no		
High	Wildlife species identification	○yes ○partial ○no		
Medium	Wildlife species numbers and sizes	○yes ○partial ○no		
High	Wildlife locations on/in aerodrome vicinity	○yes ○partial ○no		
Medium	Daily and seasonal occurrence records	○yes ○partial ○no		
High	Recognizing wildlife attractants	○yes ○partial ○no		
High	Most significant wildlife species identification	○yes ○partial ○no		
High	Most potential date and time of event occurrence identification	○yes ○partial ○no		
High	Migratory birds flyways identification	○yes ○partial ○no		
High	Flyway altitude identification	○yes ○partial ○no		
High	Migratory birds flyway interference with aircraft pathway mapping	○yes ○partial ○no		
High	Most important wildlife gathering points identification and mapping	○yes ○partial ○no		
High	Responsible person determination	○yes ○partial ○no		
High	Wildlife controllers determination	○yes ○partial ○no		
High	Wildlife controllers qualifications and training requirements identification	○yes ○partial ○no		
High	Providing the needed training for both wildlife controller and other airport personnel	○yes ○partial ○no		
High	Wildlife attractants modifications procedures identification	○yes ○partial ○no		

Priority Level	Target state	Current State	Reg. Ref.	Remarks
High	Individual roles and responsibilities assignment	○yes ○partial ○no		
High	Resources identification	○yes ○partial ○no		
High	Suitable wildlife control strategies determination	○yes ○partial ○no		
High	Suitable wildlife control measures (Monitoring and Dispersing tools) determination	○yes ○partial ○no		
Medium	Daily inspection checklist preparation	○yes ○partial ○no		
Medium	Weekly inspection checklist preparation	○yes ○partial ○no		
Medium	Monthly inspection checklist preparation	○yes ○partial ○no		
Medium	Actions taken records	○yes ○partial ○no		
Medium	Wildlife hazard management and control internal committee records	○yes ○partial ○no		
Medium	Wildlife hazard management and control internal committee recommendations and enforcement follow-up sheets	○yes ○partial ○no		
Medium	Wildlife hazard management and control national committee records	○yes ○partial ○no		
Medium	Wildlife hazard management and control national committee recommendations and enforcement follow-up sheets	○yes ○partial ○no		
Medium	WHMP implementation evaluation forms	○yes ○partial ○no		
Medium	WHMP evaluation forms for its effectiveness	○yes ○partial ○no		

APPENDIX E

KEY ROLES AND RESPONSIBILITIES

Title	Key WHMP Responsibilities
Airport Manager	• Implementation of this WHMP; • Acquisition of the various permits; • Provision of training and awareness programs; • Review and submission of the annual strike reports and two year updates.
Assistant Manager	• Coordinating, supervising and the overall management of the WHMP; • Nomination of the key Wildlife Management Officer (WMO); • Co-ordination of training, safety assurance; • Ensuring that the necessary equipment is available.
Wildlife Management Officer (WMO)	• Maintenance of the Wildlife Management Log (e.g., including strike data, details on wildlife numbers and activity; • WHMP measures undertaken, firearm use details; • details on the use of lethal reinforcement and monthly summaries); • Co-ordination of the monitoring program; • Preparation of the annual strike report; • Ensuring that Airport operations are consistent with the requirements of the WHMP; • Ensuring that the appropriate permits are current and present on-site; • Undertaking deterrent activities; • Ensuring all activities are undertaken following standard practices and safety protocols; and • identification of equipment, resource and training needs.
Back-up to WMO	• Filling in for WMO during vacations, lunch, sick time etc.
Air traffic Control (ATC)	• Informing wildlife hazards controllers, environmental dept. and operations dept. in case of observing any of these birds and/or wildlife gathering on/in airport vicinity or when receiving any relevant notification from pilot. • Warning pilots in case of wildlife observations (risky operating environment) and hazards expectation. • Report any unsafe conditions including hazardous wildlife on or in airport vicinity to the appropriate airport personnel anytime they are observed. • Actively attend the local wildlife hazard control committee meetings and any other relevant meetings.

Title	Key WHMP Responsibilities
Safety Department	• Receiving all wildlife strikes and events with the aim of risk assessment formation to ease the future forecasting based on accurate database and risk assessment strategy. • Actively attend the local wildlife hazard control committee meetings and any other relevant meetings
Maintenance Department	• Periodical inspection of the wildlife attractants (such as ponds, transfer stations and water treatment facilities) or airport infrastructure (such as fence) which ease the wildlife invasion. • Corrective maintenance actions and preventative maintenance actions to be taken for wildlife hazards management and control verification.
Environmental Department	• Receiving wildlife strike reports from the wildlife hazard coordinator or wildlife hazards controllers. • Wildlife existence notification receiving from ATC and then verification of wildlife hazards controllers moving to the place of wildlife existence. • Database formation including wildlife species, numbers, sizes, date and time of existence, local movements, behaviours, the most suitable way of dispersing, etc… • Wildlife hazards management plan evaluating for effectiveness and verification of its compliance with the original wildlife hazard assessment (Ecological study). • Preparing under direct supervision of aerodrome operator for the local wildlife hazards control and management committee and other relevant meetings. • Follow-up decisions and recommendations taken by the mentioned above committee.
Other governmental municipalities (such as agriculture offices/corporations, solid waste and sewage disposal offices / corporations, state national environmental offices, natural reserves corporations, defense, representatives of the major airlines using airport, even the private sectors located in airport vicinity and others)	• Advance cooperation and coordination with airport management regarding land use planning for those located in airport vicinity. • Exchange information on research and development in airport wildlife control. • Providing and updating much relevant information for those in the aviation community.

APPENDIX F   BIRD STRIKE REPORTING FORM

Send to: _____

Operator	_____
Aircraft Make/Model	_____
Engine Make/Model	_____
Aircraft Registration	_____
Date day ☐ month ☐ year ☐	
Local Time ☐	
dawn ☐ day ☐ dusk ☐ night ☐	
Aerodrome Name	_____
Location if En Route	_____
Height AGL _____ ft	
Speed (IAS) _____ kt	

Effect on Flight

none	☐	penetration of airframe	☐
aborted take-off	☐	vision obscured	☐
precautionary landing		engines shout down	
forced landing		engine ingestion	
fire		engine uncontained failure	
penetration of windshield	☐	other (specify)	☐

Sky Condition

no cloud	☐
some cloud	☐
overcast	☐

Precipitation

fog	☐
rain	☐
snow	☐

Phase of Flight

parked	☐	en route	☐
taxi	☐	descent	☐
take-off run	☐	approach	☐
climb	☐	landing roll	☐

Damage (aircraft)

royed	☐
substantial	☐
minor	☐
none	☐
unknown	☐

Injury (index of)

fatal	☐
serious	☐
minor	☐
none	☐
unknown	☐

Part(s) of Aircraft

	Struck	Damaged
radome	☐	☐
windshield	☐	☐
nose (excluding above)	☐	☐
engine no. 1	☐	☐
2	☐	☐
3	☐	☐
4	☐	☐
propeller	☐	☐
wing/rotor	☐	☐
fuselage	☐	☐
landing gear	☐	☐
tail	☐	☐
lights	☐	☐
Pilot/static head	☐	☐
antenna	☐	☐
tail rotor	☐	☐
helicopter transmission	☐	☐
other (specify)	☐	☐

Bird Species

Confirmed Bird Species _____

Number of Birds

	Seen		Struck	
1	☐		☐	A
2 - 10	☐		☐	B
11-100	☐		☐	C
more	☐		☐	D

Size of Birds

small	☐
medium	☐
large	☐

Pilot Warned of Bird

yes	☐	no	☐

Remarks (describe damage, injuries and other pertinent information)

[_____]

Reported by	_____
Report Number:	

THIS INFORMATION IS REQUIRED FOR AVIATION SAFETY

Wildlife Hazard Management and Control Plan Template

AERODROME "NAME"

WILDLIFE HAZARD MANAGEMENT PLAN

TABLE OF CONTENTS

Chapter 1: The Management of the Wildlife/Bird Strike Risk (Policy Statement)

Chapter 2: Roles & Responsibilities

Chapter 3: Risk Identification

Chapter 4: Risk Reduction

Chapter 5: Wildlife/Bird Strike Reporting

Chapter 6: Bird/Wildlife Management of the Airfield

Chapter 7: Aerodrome Ornithology

Chapter 1

THE MANAGEMENT OF THE WILDLIFE/BIRD STRIKE RISK
(POLICY STATEMENT)

1.1 Goals and Objectives

The goal of this WHMP is to minimise risk for passengers and flight crews by reducing wildlife hazards and associated risks to aircraft and airport operations caused by wildlife activities on and in the vicinity of the airport.

The objectives of the WHMP are to:
- Target high and moderate risk species and habitats that primarily support them both on and off the airport.
- Ensure compliance with all relevant airport operational and environmental legislation and regulations.
- Ensure that adequate systems are in place to define roles, responsibilities and procedures for managing wildlife risks at [ANY AIRPORT].
- Define the methods by which wildlife hazards are managed at [ANY AIRPORT].
- Develop performance goals and targets for management of wildlife issues and outline how these will be assessed and reviewed.

[*Add to or delete as appropriate*]

1.2 The Airport
[ANY AIRPORT] is situated in the [LOCAL GOVERNMENT AREA NAME] in [STATE/TERRITORY]. A description of the airport is provided in Table 1 below.
Table 1 - [ANY AIRPORT] general information

Element	Description
Airport location	[DESCRIPTION]
Surrounding land use(s)	[DESCRIPTION]
Elevation	[DESCRIPTION]
Airport ownership	[DESCRIPTION]
Airport operator	[DESCRIPTION]
Traffic profile	[DESCRIPTION]
Runways no./ designation	[DESCRIPTION]
Navigation aids	[DESCRIPTION]
Communications	[DESCRIPTION]
Hours of operation	[DESCRIPTION]
Climate	[DESCRIPTION]
Other	[DESCRIPTION]

1.3   The Management Of The Wildlife / Bird Strike Risk (Policy Statement)

[ANY AIRPORT] is committed to ensuring the safety of aircraft using [ANY AIRPORT]. While the safety of aircraft at [ANY AIRPORT] is paramount, it is not possible to prevent all wildlife strikes. The WHMP aims to reduce the frequency and severity of strikes by focusing management efforts on species and habitats that constitute significant hazards to aircraft that operate at [ANY AIRPORT].

[*Add to or delete as appropriate or insert your existing airport policy relating to wildlife management*].

ANYAIRPORT have measures in place, which are aimed at deterring wildlife and birds from settling, and flying on and in the lower flight paths in the vicinity of the airfield as is reasonably practicable.

These measures include:

- Hazard Identification and Risk Assessment of bird activity (see SMS Doc).
- A Wildlife Hazard Management Plan (WHMP).
- Control procedures introduced aimed at reducing the presence of wildlife on the airfield and therefore reducing the risk of a wildlife / bird strike.
- The effective use of resources and equipment?
- A suitably trained wildlife / bird Control Co-Ordinator (WCCO) to oversee the Wildlife Hazard Management Plan.

These measures reflect the principles of safety management, which the Aerodrome Operator is required to apply to all aspects of aircraft operations within its responsibility.
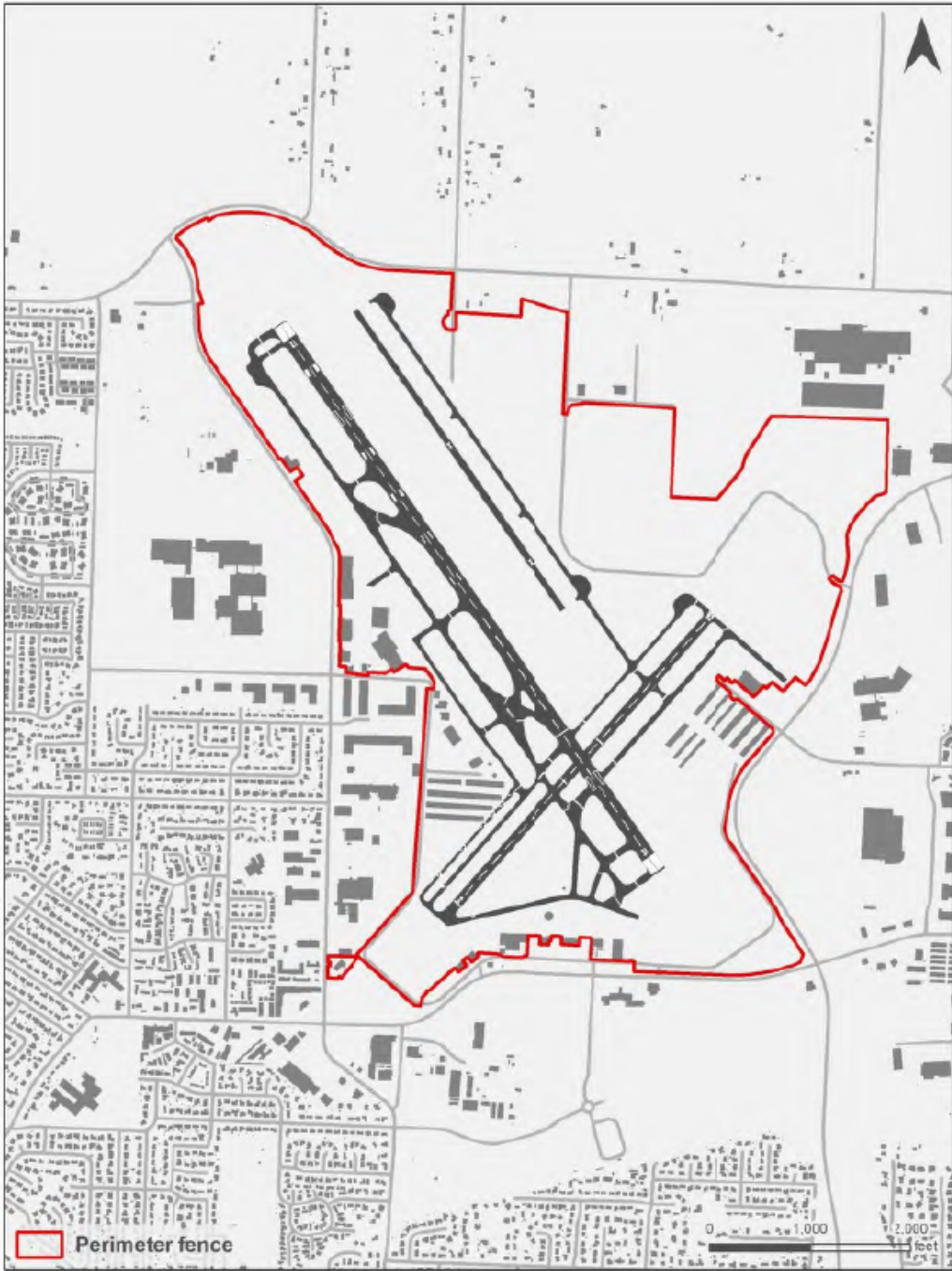
Airport Layout Plan

Chapter 2

ROLES & RESPONSIBILITIES

1.   Roles & Responsibilities

The roles and responsibilities of <u>ANYAIRPORT</u> staff are important elements of the Aerodrome Operator's Safety Management System and a contribution to the effectiveness of the WHMP. All staff will have a thorough understanding of their roles within the plan. The roles and responsibilities are detailed below:

1.1.   Aerodrome Manager/wildlife/bird Control Manager

The Overall accountability for bird control lies with the Aerodrome License holder/Director/Safety Action Group (SAG), However, the responsibility could be delegated to the Aerodrome Manager/BCCO whose core responsibilities are to:

- Assess the **wildlife/bird** strike risk level
- Determine policy and produce and review the WHMP
- Implement the WHMP
- Ensure the inclusion in the Aerodrome manual is correct

The role includes the following tasks:

- Monitoring and acting on **wildlife/bird** behavior on and in the vicinity of the Aerodrome.
- Implementation of habitat management i.e.: Vegetation policy, maintenance programmes in accordance with WHMP and to review and introduce modifications to this programme when necessary.
- Analyze and interpret the log records of bird control activity and bird strike.
  Reports and ensure this information is promulgated to all stakeholder and the accountable person.
- Regular surveys of **wildlife/bird** concentration and movements in the local area.
  Liaising with local **wildlife/bird** watchers associations for further information.
- Liaise with local landowners and game keepers to obtain information on farming plans, game conservation etc.
- Seeking advice and assistance where appropriate from Local Planning Authority and outside specialists on matters requiring expert advice.
- To ensure the WHMP reflect the current policy of the CAA and best practice in the aviation industry.

1.2.   Wildlife /~~bird~~ **Control Co-Ordinator (WCCO) and Deputy (***or equivalent position*)

The overall responsibility for wildlife/bird control lies with the Aerodrome Manager/wildlife/bird control manager however, the day-to-day management and efficient implementation of the WHMP lies with the wCCO. (The wCCO should have had some training on the subject and preferably have an active interest in bird control).
Ref. to attachment 2-a describe the example of training program.

Their role includes the following tasks:

- Advise the Aerodrome Manager on all matters relating to wildlife/bird activity and wildlife/bird strike prevention.
- Plan and organize all wildlife/bird control operations in accordance with the WHMP.
- Ensure bird control operations are implemented in accordance with the WHMP.
- Supervise bird control record keeping.
- Assist with the supervision of intelligence gathering and planning.
- Ensure the correct maintenance of the wildlife/bird control equipment.
- Provide information and communications between all interested parties/stakeholders.
- Provide a periodic (could be quarterly, six monthly or annual) wildlife/bird control report to the accountable person/s.

1.3.   The Wildlife/Bird Control Operator Performs the Front Line Role

Their role includes the following tasks:

- Maintain proactive surveillance of wildlife/bird activity on the airfield.
- Implement active wildlife/bird control measures in accordance with the WHMP.
- To reduce wherever possible any identified wildlife/bird strike risk.
- Record wildlife/bird and wildlife/bird control activity including any dispersal methods used.
- Record and report actual, potential or suspected wildlife/bird strikes.

> *Note:* **Appendix E Key Roles and Responsibilities** *in RSG 4provides a guide for the key roles and responsibility, for further information can be found: ICAO Airport Service Manual, part 3, Wildlife Control and Reduction, 3.3 Role of the Airport Operator and 3.4 Role of Bird/ Wildlife Strike Control Coordinator and ACI Wildlife Hazard Management Handbook Section 2.*

2. Flow Chart

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                     │
│   Accountable Director/License Holder/Safety Action Group (SAG)     │
│                                                                     │
│        Name/s _____             │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────────┐
│                                                                     │
│   Aerodrome/Safety Manager?                                         │
│                                                                     │
│                    Name _____                           │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────────┐
│                                                                     │
│   Wildlife/Bird Control Co Ordinator                                │
│                                                                     │
│                    Name _____                           │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────────┐
│                                                                     │
│          Deputy Wildlife/Bird Control Co Ordinator?                 │
│                                                                     │
│                    Name _____                             │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
            │                                       │
┌───────────────────────┐               ┌───────────────────────┐
│                       │               │  Wildlife/Bird Control │
│  Wildlife/Bird Control│               │     Operator/Dept      │
│     Operator/Dept     │               │                        │
│                       │               │   Name/s _____ │
│   Name/s _____│               │                        │
└───────────────────────┘               └───────────────────────┘
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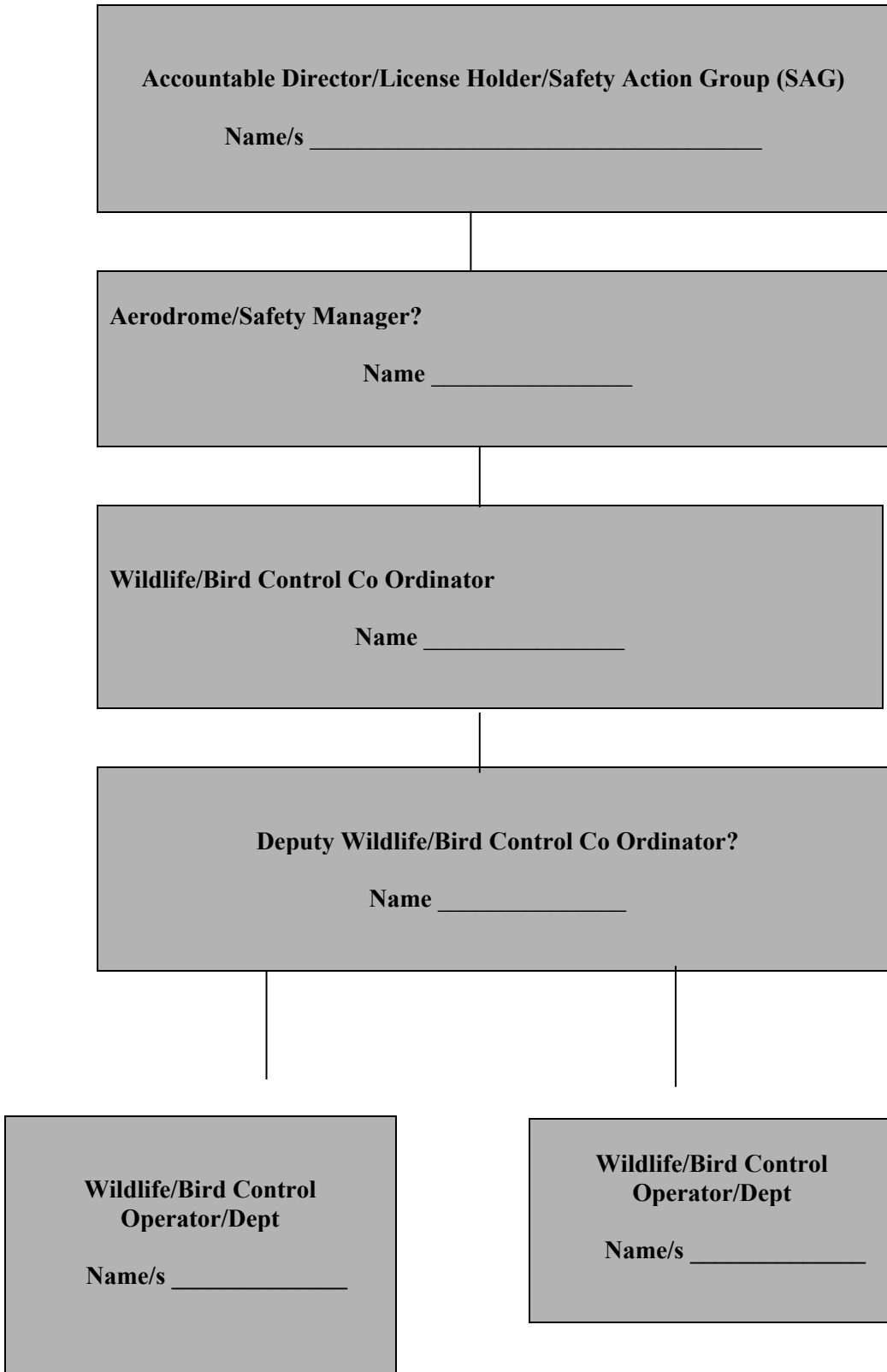
ATTACHMENT 2-A

TRAINING PROGRAM

The Wildlife Management and Planning Regulation requires that a training program be established for the AWMP in accordance with the airport standards. Properly trained staff to implement the plan, to reassess risks and to provide updates to this plan every two years, is an essential and required part of the regulation.

Effective wildlife management is critically dependant on staff with the tools, knowledge and motivation to complete the task. The program will address the following:

- Nature and Extent gof the Wildlife Management Problem;
- Regulations, Standards and Guidance;
- Wildlife Control Procedures Manual;
- Species of Conservation Concern;
- Liability;
- Habitat Management;
- Issues Outside of the Airport Boundary;
- Active Management;
- Removal Techniques;
- Wildlife Management Planning;
- Development and Implementation of Awareness Programs;
- Monitoring; and,
- Training Record and Schedule.

In addition to training directly associated with wildlife behaviour and the application of management techniques as part of the AWMP, it is essential that safety requirements are fully reviewed and addressed. This should include at a minimum:

- Safe use and storage of pyrotechnics;
- Safe use, storage and maintenance of pyrotechnic launchers; and
- Identification and mandatory use of safety equipment.

The following table details the staff who have attended the training program or are proposed to do so:

Training Program Table

Name	Responsibility/ Title	Attended Training Program	Will Attend Training Program by
	• Airport Manager • Wildlife Management Officer		
	• Duty Manager • Back-up WMO		

Chapter 3

RISK IDENTIFICATION

1. Hazard Identification

In order to manage the risk of a wildlife/bird strike, aerodrome has developed a procedure for obtaining information regarding the potential wildlife/bird strike risk. Wildlife/bird Activity on and in the vicinity of the airfield is assessed on a regular basis and a Hazard Log/Risk Assessment produced.

Probability and severity of a risk vary with species, i.e. geese or skylark and time of year for a particular species i.e. rooks peek in March/April.

> NOTE: **APPENDIX C** IN RSG4 PROVIDES A GUIDE FOR THE RISK ANALYSIS
> *for further information can be found: ICAO Airport Service Manual, part 3, Wildlife Control and Reduction, ch 6 , icao doc 9859 and ACI Wildlife Hazard Management Handbook Section 3*

2. Example Hazard Log

HAZARD IDENTIFICATION	RISK ASSESSMENT DONE	RISK ACCEPTABLE?
Wood pigeon activity on the south side of the aerodrome	03/07/08 and filed in ref	Yes

3. **Example Risk Assessment** carried out for
_____Bird Activity on the Aerodrome_____

Significant Hazards identified from (name source) eg MOR	Severity Value (S) *(see 1)*	Likelihood Value (L) *(see 1)*	Level of Risk (S x L) *(see 2)*	Control Measures to be Implemented	Action By:	Revised Level of Risk *(see 3)*
Wood pigeon activity on the south side of the aerodrome						

1. For Severity and Likelihood Value, refer to Risk Assessment Matrix attached

2. For Level of Risk, multiply Severity Value x Likelihood Value

3. For Revised Level of Risk, repeat Severity Value x Likelihood Value after

   implementing control measures

Level of Risk Key:	
1 to 4	
5 to 9	Risk **undesirable** (but tolerable)
10 to 25	Risk **Unacceptable**

Chapter 4

RISK REDUCTION

Risk Reduction

Prevention of a bird strike is not always possible, so to reduce the risk a WHMP has been formulated and introduced as part of <u>Anynames</u> Aerodromes Safety Management System (SMS).

Our Airfield activities include (Examples: the correct use of the 'Scarecrow Bio-acoustic system', trained staff, recording bird activity and dispersal, habitat management i.e. vegetation removal/cutting and/or grass treatment, culling activity with the local gun club).

Good control should be achievable on the airfield: however, off airfield, control could be less achievable. (See page 10).

Chapter 5

WILDLIFE/BIRD STRIKE REPORTING

1.   Bird strike Reporting

1.1.   Bird/wildlife incidents are defined as follow:
(Demonstrate   your incident reporting system; this system may be electronic or other)

1. Confirmed Strikes
2. Unconfirmed Strikes
3. Serious incidents

1.2.   The airfield records all bird strikes as far as it is able. This data is submitted to the CAA by electronic/other format standard reporting form.

The form can be found in (Aerodrome Reference Document _____).

2.   Online Reporting

The UAE online reporting system, can be used as a guide to establish reporting system of incident reported

https://www.gcaa.gov.ae/en/rosi/Pages/home.aspx

APPENDIX 3Q

Chapter 6

BIRD/WILDLIFE MANAGEMENT OF THE AIRFIELD

1.   **Bird/Wildlife Management of the Airfield**

1.1.   ICAO defines the vicinity of an aerodrome as a 13km bird circle surrounding the airfield. The anytime aerodrome conducts annually a survey of 'Off airfield' issues. These include current developments and proposed developments such as for example:

- Landfill sites (food waste attracts gulls and starlings, which travel up to 3O miles).
- Aggregate developments (large areas filled with water attract feral geese etc).
- Industrial developments with flat roofs (these provide a safe breeding habitat for gulls and waders).
- Sustainable Drainage Schemes (SUDS), which attract feral geese and wildfowl.
- Amenity planning (short grass and bird feeding by the public attract various species).
- Golf Courses (water and short grass attract feral geese etc.).
- Nature Reserves (designed to improve bio-diversity attract several species).

Airport Developments.

1.2.   The airport operator liaison with non-airport agencies and local landowners for any development that may attract significant numbers of hazardous birds/wildlife. Any new developments (crop harvesting, seed planting, ploughing, establishment of land or water features, hunting, etc., that might attract birds/wildlife) are subjected to the aerodrome safeguarding policy and to a risk assessment process and changes to the proposal sought or opposed if a significant increase in bird activity is likely and bird strike risk is increased as a result.

2.   **List All Sites Below (High Risk within 5km)**

2.1.   These sites identified are all within 5km of the airfield and are listed below, numbered in order of risk to the aerodrome, with a summary of the site, and these sites are illustrated on the Bird Circle map /wild life attraction maps.

1. Any name mere
2. Any name water park
3. Any name nature reserve
4. Any name refuse disposal site

2.2.   These sites are outside the 5km, but fall within the ICAO 13km circle surrounding the airfield, however they attract significant wildlife /bird species and are included for the purpose of bird/wildlife management off airfield.

3.   List All Sites Below (Low Risk outside 5km but within 13km)

5.   Any name Fishing Club
6.   Any name Housing Development

EXAMPLES of what a LOW/HIGH Risk Site Information Plan Might Look Like:

Protocol of site information for priority targets

Ref: 5	Risk: LOW	Site:	NAME OF SITE		
Description	**Medium sized fishing lake?**				
Os grid ref	**SJ813713**		**Co-ordinates**	**381375**	**371375**
Distance from airport	**6.4 miles**		**Bearing in degrees**	**178.50**	
Contact	**Name of Fishing Club or person in charge.**		**Telephone**		
Month visited/date			**Time**		
Site description					
Area/size of water body	Approx.				
Adjacent terrestrial habitat					
Photograph					
Aerial photograph					
Usage	**Private fishing club. No public access and no sign of disturbance other than fishing.**				
Management	Well-managed site by the Fishing Club Committee and happy to provide updates on bird activity when requested?				

Species name	Population count	ACITIVITY			
Canada Geese	**4**	**roosting**			
Coot	**3**	**present**			
Mallard	**8**	**present/ roosting**			
Little Grebe	**1**	**Calling (territorial display)**			

Ref: 1	Risk: HIGH	Site:		ANYNAME MERE		
Description	**Mere with island**					
Os grid ref (Optional)	**SJ766785**		**Co-ordinates**		**376750**	**378434**
Distance from airport	**2.8 miles**		**Bearing in degrees**		**219.00**	
Contact	Could be Local Council		**Telephone**			
Month visited/date			**Time**			
Site description						
Area/size of water body	Approx.					
Adjacent terrestrial habitat						
Photograph						
Aerial photograph						
Usage	There appears to be public access around most of the mere's perimeter. There is evidence of dog walking and recreational use by family and children for picnics etc that could be a bird attractant.					
Management						

Species name	Population count	ACITIVITY
Canada Geese	**200**	**feeding**
Moorhen	**1**	**present**
Lapwings	**300+**	**present**
Mallard	**30**	**feeding/ roosting**
Coot	**6**	**territorial disputes**
Swans	**2**	**feeding**
Black Headed Gulls	**40**	**present**

EXAMPLES of what a site plan might look like:
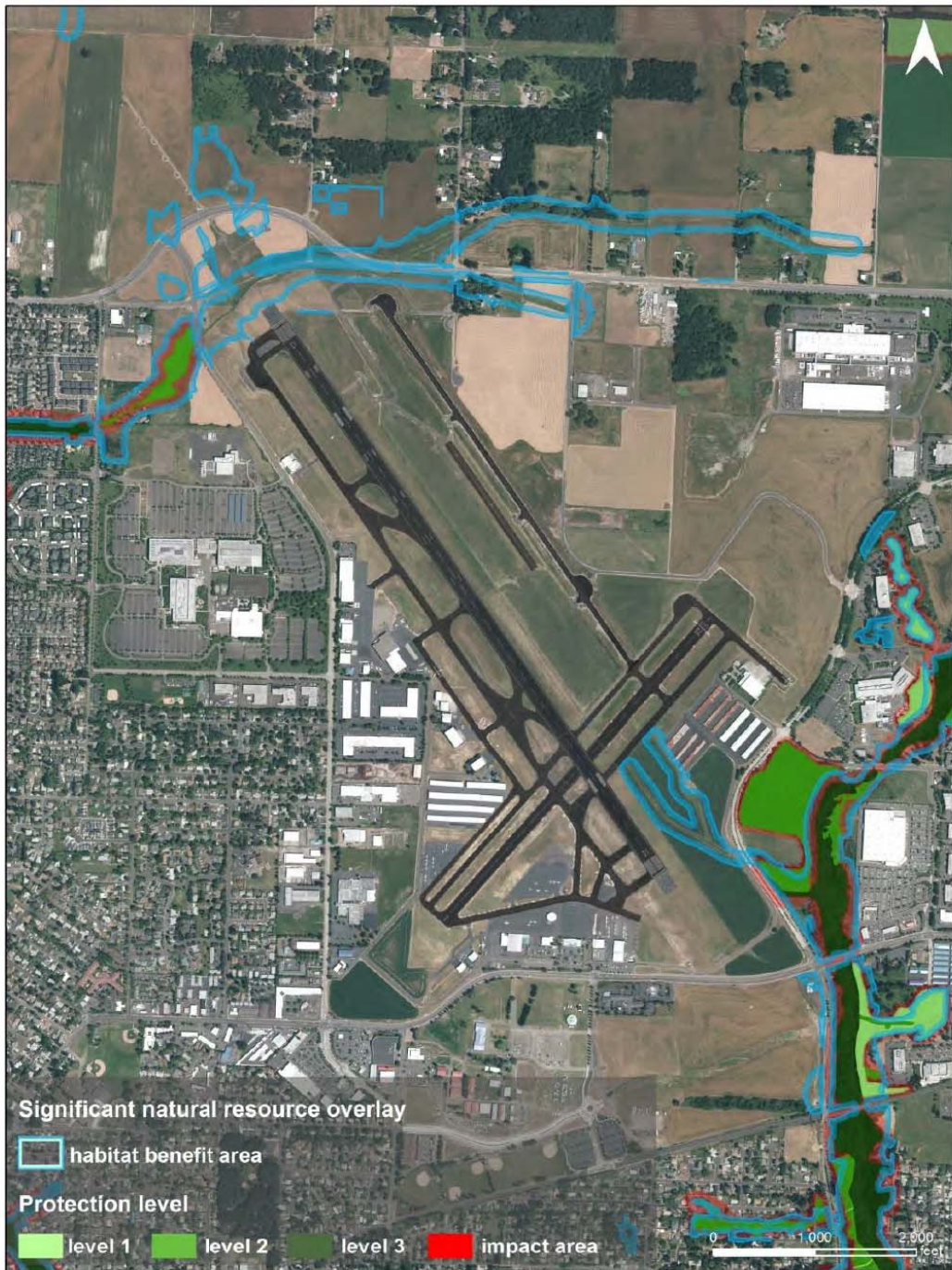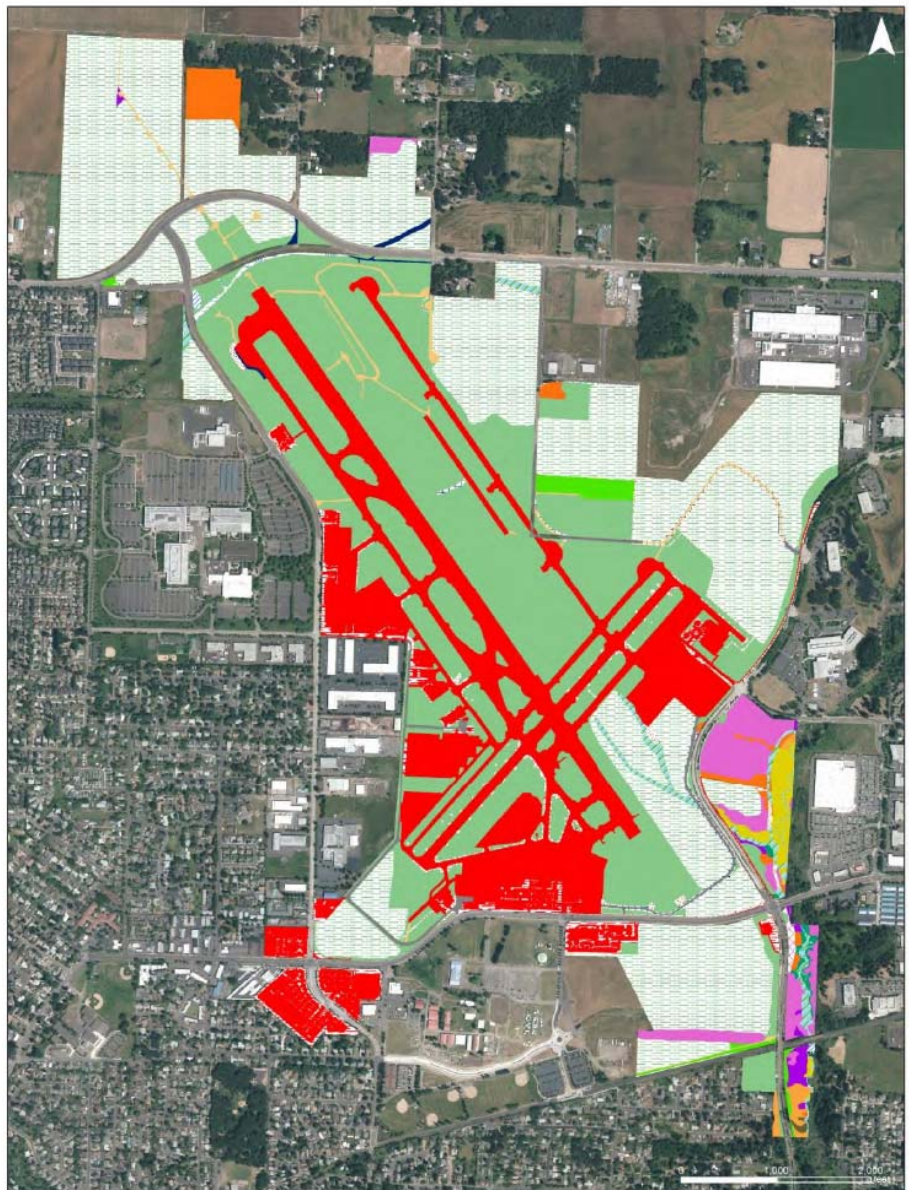
Local wildlife habitat classes

blackberry scrub - shrub	ditch	mixed conifer - hardwood (planted)
channel	ditch - roadside	pond
conifer	grass/forb - mowed	railroad - crushed rock
conifer (planted)	hardwood	road - dirt
cottonwood, willow scrub - shrub	herbaceous upland	road - gravel
cottonwood, willow, ash forest	herbaceous upland (planted)	road - paved
developed - cultivated	hydrophytic vegetation	scrub - shrub
developed - impervious	improved pasture - perennial grass seed/hay	stream
developed - pervious	mixed conifer - hardwood	
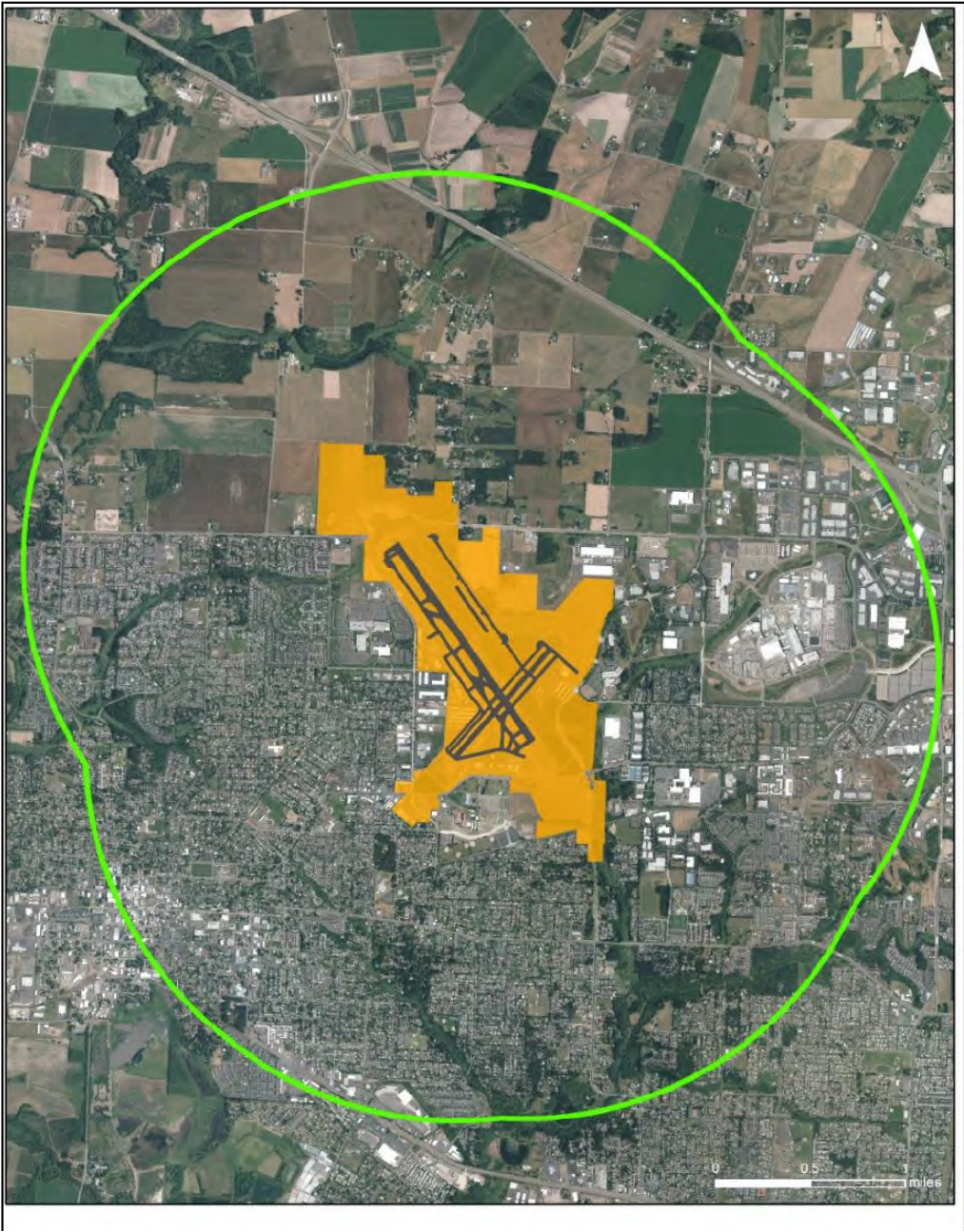
Insert Maps   / Bird Circle Map

Plot the sites identified on to the Bird Circle map

Chapter 7

AERODROME ORNITHOLOGY

Aerodrome Ornithology

Wildlife/Bird control personnel are able to identify correctly and be familiar with the behavior of all birds species commonly encountered on the airfield and identified with in this WHMP. This information can be found in the WHMP file (wildlife/bird description and possibly a photograph).

Add photographs of most common species with a description and some information in regards to behavior and seasonal activity.

APPENDIX 3R

List of Actions to support the SEIs

SEI: Improve the status of implementation of State Safety Programme (SSP) and Safety Management System (SMS) in the MID Region		
Actions	**Champion**	**Progress/Remarks**
Conduct of Safety Management Training Courses, Symposia and Workshops.	ICAO	**Ongoing** ICAO Safety Management for Practitioners (SMxP) Course held in Cairo, Egypt, 14 – 18 January 2018. APAC/MID Safety Management Symposium held in Singapore, 23-26 April 2018. Fourth MID Region Safety Summit (Riyadh, 2-3 October 2018).
Establish the MENA RSOO to support States in the expeditious implementation of SSP.	Saudi Arabia, ACAC and ICAO	**In Progress** First MENA RSOO Steering Committee (Riyadh, 1 October 2018).
Improve the status of implementation of SMS at International Aerodromes.	Egypt, Saudi Arabia and UAE	**In Progress** Aerodrome Customized SMS Workshop would be conducted back-to-back with the RGS WG/5 meeting with technical support provided by experts from Egypt and UAE.

Improve the status of implementation of SMS by ANSPs (ATM).	CANSO/ICAO	**In Progress**
		ICAO MID Office send a reminder to States in order to urge their ANSPs to complete the EUROCONTROL/CANSO Standard of Excellence in SMS Questionnaire and send it back to CANSO before the end of October 2017 (only 2 replies received from Jordan and Oman).
		CANSO Middle East SMS Training Workshop (Muscat, Oman, 27-29 November 2017) with the objective to primarily focus on effective implementation of an SMS, mapping the CANSO Standard of Excellence in Safety Management Systems against Annex 19.
		Reminder to be sent to States
		ATM SG to follow up on the subject
Improve the status of implementation of SMS by air operators.	IATA	**In Progress**
		A Survey was developed in coordination between ICAO MID Office and IATA and sent to the MID States through State Letters (December 2017) in order to measure and monitor the SMS implementation by air operators, (only 6 replies received from Bahrain, Jordan, Oman, Qatar, Syria and Yemen).
		A Reminder was sent on 10 January 2018.
		IATA to provide an update on SMS implantation including IOSA status to be presented to the RSC/6 meeting

Improve the status of implementation of SMS by maintenance organizations.	IATA	**In Progress** A Survey was developed in coordination between ICAO MID Office and IATA and sent to the MID States through State Letters (December 2017) in order to measure and monitor the SMS implementation by air operators, (only 6 replies received from Bahrain, Jordan, Oman, Qatar, Syria and Yemen). A Reminder was sent on 10 January 2018.
Improve the status of implementation of SMS by training organizations (involved in flight training).	ACAO and ICAO	**In Progress** A Survey was developed in coordination between ICAO MID Office and IATA and sent to the MID States through State Letters (December 2017) in order to measure and monitor the SMS implementation by air operators, (only 6 replies received from Bahrain, Jordan, Oman, Qatar, Syria and Yemen). A Reminder was sent on 10 January 2018.

SEI: Strengthening of States' Safety Oversight capabilities		
Actions	**Champion**	**Progress/Remarks**
Conduct USOAP CMA Workshops including cost-recovery.	ICAO	**Completed** USOAP-CMA Regional Workshop conducted in Cairo, Egypt 6-9 February 2017. Cost-Recovery Workshops provided when requested by States.
Establish the MENA RSOO to assist States to resolve safety oversight deficiencies and carry out tasks and functions in the area of PEL, OPS, AIR, AGA and ANS.	Saudi Arabia, ACAC and ICAO	**In Progress** First MENA RSOO Steering Committee (Riyadh, 1 October 2018).

Organize Government Safety Inspector (GSI) Courses (OPS, AIR, ANS, and AGA).	ICAO	**Ongoing** GSI Course ATM (Cairo, Egypt, 17-21 September 2017). GSI-AIR Course (Cairo, Egypt, 1-18 July 2018).
Conduct ICAO missions to States to provide assistance related to the preparation of USOAP-CMA activities.	ICAO	**Ongoing** ICAO MID Office conducts mission to States to all States scheduled for USOAP-CMA activities.
Develop and implement a specific NCLB plan of actions for prioritized States according to established criteria.	ICAO/States/Stakeholders	**Ongoing** The MID Region NCLB Strategy endorsed by the DGCA-MID/4 Meeting (Muscat, Oman, 17-19 October 2017). ICAO MID Office develop/ implement NCLB plan of actions IAW the established criteria in the Strategy.

SEI: Improve Regional Cooperation for the provision of Accident & Incident Investigation		
Actions	**Champion**	**Progress/Remarks**
Improve the draft version of the Strategy for the establishment of a Middle East RAIO, in order to be presented and reviewed during the Workshop.	UAE in coordination with Bahrain, Saudi Arabia, Sudan and the ICAO MID Office	**Completed**
Organize the ACAO/ICAO AIG Workshop.	Saudi Arabia	**Completed** ACAO/ICAO AIG Workshop (Jeddah, Saudi Arabia, 25-27 April 2017).
Finalize the Strategy for the establishment of a Middle East RAIO by the ACAC/ICAO AIG Workshop.	States/ACAO/ICAO/Stakeholders	**Completed**

Final endorsement by RASG-MID and the ACAO Executive Council.	ICAO and ACAC	The Strategy endorsed by the DGCA-MID/4 Meeting (Muscat, Oman, 17-19 October 2017). The Roadmap for the implementation of the Strategy be further finalized by the RASG MID.
Organize MENASASI 2017 Seminar in Saudi Arabia.	Saudi Arabia	**Completed** 5th Annual MENASASI Seminar & Workshop (7-9 Nov 2017)
Organize Training related to AIG.	UAE/Saudi Arabia	To be updated by UAE/Saudi Arabia.

EI: Improve implementation of ELP requirements in the MID Region		
Actions	**Champion**	**Progress/Remarks**
Develop a Questionnaire to be used as the basis of a survey to assess the implementation of ELP requirements.	UAE in coordination with the ICAO MID Office	UAE to present a draft to the ATM-SG/4 UAE to coordinate with FAA to contribute
Disseminate the Questionnaire to the MID States.	ICAO	**Not started**
Analyse the survey results and agree on next course of actions.	MID-SST in coordination with the ATM SG	**Not started**

EI: Sharing of Safety Recommendations related to Accidents and Serious Incidents		
Actions	**Champion**	**Progress/Remarks**
TBD		

APPENDIX 3S

STATUS OF THE MID REGION SAFETY INDICATORS TARGETS

<table>
<thead>
<tr>
<th colspan="2">Safety Indicator</th>
<th>Safety Targets</th>
<th>MID Average Rate 2012-2016</th>
<th>Global Average Rate 2012-2016</th>
<th>MID 2016</th>
<th>Global 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td rowspan="7">Reactive Part</td>
<td>Number of accidents per million departures.</td>
<td>Reduce/Maintain the regional average rate of accidents to be in line with the global average rate by 2016.</td>
<td>2.76</td>
<td>2.76</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Number of fatal accidents per million departures.</td>
<td>Reduce/Maintain the regional average rate of fatal accidents to be in line with the global average rate by 2016.</td>
<td>0.64</td>
<td>0.26</td>
<td>1.54</td>
<td>0.26</td>
</tr>
<tr>
<td rowspan="2">Number of Runway Safety related accidents per million departures.</td>
<td>Reduce/Maintain the regional average rate of Runway Safety related accidents to be below the global average rate by 2016.</td>
<td>1.39</td>
<td>1.48</td>
<td>1.54</td>
<td>1.23</td>
</tr>
<tr>
<td>Reduce/Maintain the Runway Safety related accidents to be less than 1 accident per million departures by 2016.</td>
<td colspan="4" align="center">1.54</td>
</tr>
<tr>
<td>Number of LOC-I related accidents per million departures.</td>
<td>Reduce/Maintain the regional average rate of LOC-I related accidents to be below the global rate by 2016.</td>
<td>0</td>
<td>0.07</td>
<td>0</td>
<td>0.09</td>
</tr>
<tr>
<td>Number of CFIT related accidents per million departures.</td>
<td>Reduce/Maintain the regional average rate of CFIT related accidents to be below the global rate by 2016.</td>
<td>0</td>
<td>0.08</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Safety Indicator	Safety Target	MID
USOAP-CMA Effective Implementation (EI) results: a. Regional average EI. b. Number of MID States with an overall EI over 60%. c. Number of MID States with an EI score less than 60% for more than 2 areas (LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA).	Progressively increase the USOAP-CMA EI scores/results: a. Increase the regional average EI to be above 70% by 2020. b. 11 MID States to have at least 60% EI by 2020. c. Max 3 MID States with an EI score less than 60% for more than 2 areas by 2017.	a. 71.96% b. 10 States c. 7 States
Number of Significant Safety Concerns.	a. MID States resolve identified Significant Safety Concerns as a matter of urgency and in any case within 12 months from their identification. b. No significant Safety Concern by end of 2016.	None
Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA by 2015 at all times. b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities, by 2018.	a. 57% b. 4 States
Number of certified international aerodrome as a percentage of all International Aerodromes in the MID Region.	a. 50% of the International Aerodromes certified by 2015. b. 75% of the International Aerodromes certified by 2017.	58%
Number of established Runway Safety Team (RST) at MID International Aerodromes.	50% of the International Aerodromes by 2020.	56%
Percentage of MID States that use ECCAIRS for the reporting of accidents and serious incidents.	a. 60% by 2018 b. 80% by 2020	27% already using ECCAIRS 13% Planning to use ECCAIRS in 2017

Proactive Part (vertical label, left margin)

	Safety Indicator	Safety Target	MID
Predictive Part	Number of MID States, having completed the SSP Gap Analysis on iSTARS.	10 MID States by 2015.	13 States
	Number of MID States that have developed an SSP implementation plan.	10 MID States by 2015.	10 States
	Number of MID States with EI>60%, having completed implementation of SSP Phase 1.	All MID States with EI>60% to complete phase 1 by 2016.	3 States completed implementation of SSP Phase 1. 4 States partially completed implementation of SSP Phase 1.
	Number of MID States with EI>60%, having completed implementation of SSP Phase 2.	All MID States with EI>60% to complete phase 2 by 2017.	1 State completed implementation of SSP Phase 2. 6 States partially completed implementation of SSP Phase 2.
	Number of MID States with EI>60%, having completed implementation of SSP Phase 3.	All MID States with EI>60% to complete phase 3 by 2018.	7 States partially completed implementation of SSP Phase 3.
	Number of MID States with EI>60%, having completed implementation of SSP.	All MID States with EI>60% to complete SSP implementation by 2020.	None
	Number of MID States with EI>60% that have established a process for acceptance of individual service providers' SMS.	a. 30% of MID States with EI>60% by 2015. b. 70% of MID States with EI>60% by 2016. c. 100% of MID States with EI>60% by 2017.	75%
	*Average Fleet Age.	States are required to monitor their fleet age.	N/A
	*Percentage of fleet above 20 years of age.	No regional Safety Targets are defined.	

APPENDIX 3T

STRATEGY FOR THE ENHANCEMENT OF COOPERATION AMONG THE MIDDLE EAST
AND NORTH AFRICA (MENA) STATES IN THE PROVISION
OF AIG FUNCTIONS

1-   Background

Whereas it is incumbent on the State in which an accident occurs to institute an inquiry into the circumstances of the accident in conformity with Article 26 of the Convention;

Whereas Assembly Resolution A36-10, inter-alia:

-    urges Contracting States to undertake every effort to enhance accident prevention measures, particularly in the areas of personnel training, information feedback and analysis and to implement voluntary and non-punitive reporting systems, so as to meet the new challenges in managing flight safety, posed by the anticipated growth and complexity of civil aviation;

-    urges Contracting States to cooperate with ICAO and other States in a position to do so, in the development and implementation of accident prevention measures designed to integrate skills and resources to achieve a consistently high level of safety throughout civil aviation;

Whereas, amendment 15 of Annex 13 (STD 3.2) stipulates that a State shall establish an accident investigation authority that is independent from State aviation authorities and other entities that could interfere with the conduct or objectivity of an investigation;

Whereas, owing to the growing sophistication and complexity of modern aircraft, the conduct of an accident or serious incident investigation requires participation by experts from many specialized technical and operational fields and access to specially equipped facilities for investigation;

Whereas many Contracting States do not have such specialized technical and operational expertise and appropriate facilities;

Whereas the costs of salvage and investigation of major aircraft accidents may place a heavy financial burden on the resources of the State where the accident occurred;

Whereas Assembly Resolution A37-15 (Appendix U), recommends that Contracting States cooperate in the investigation of major aircraft accidents or accidents in which the investigation requires highly specialized experts and facilities;

Whereas, the ICAO Universal Safety Oversight Audit Programme (USOAP) audit findings indicate that a number of States have not been able to implement an effective accident and incident investigation system for their aviation activities;

Recognizing that the USOAP findings have been associated, in general, with a lack of resources (both human and financial), lack of appropriate legislation and regulations, lack of an organization for the investigation of accidents and incidents, lack of a training system for investigators, lack of equipment to conduct investigations and lack of policies, procedures and guidelines for accident and incident investigations;

Recognizing that combined with the expected increase in air transport operations, the relatively unchanged trend in the accident rate over the past several years might lead to an increase in the number of accidents per year;

Recognizing that there are many challenges to effective accident prevention, and that more effective identification and correction of aviation hazards and system deficiencies are required in order to complement regulatory efforts in further reducing the number of worldwide accidents and to improve the accident rate;

Recognizing that a regional investigation system can provide economies of scale by allowing for the sharing of required resources, and that by working together, States of a region or sub-region can have a more persuasive voice on the world stage and can help secure a more favorable climate aimed at a safer international air transportation system;

Acknowledging that during the AIG Divisional Meeting (2008) several States highlighted that, in regions where individual States do not have investigation capability, implementing a regional accident and incident investigation organization (RAIO) would ensure the effectiveness of investigations, reinforce conformity with the provisions of Annex 13, and contribute to the enhancement of aviation safety;

Whereas, Annex 13 (STD 5.1 and 5.1.2) stipulates that the State of Occurrence shall institute an investigation into the circumstances of the accident and serious incident (maximum mass of over 2 250 kg) and be responsible for the conduct of the investigation, but it may delegate the whole or any part of conducting of such investigation to another State or a RAIO by mutual arrangement and consent. In any event, the State of Occurrence shall use every means to facilitate the investigation;

Considering that the DGCA-MID/2 meeting (Jeddah, Saudi Arabia, 20 - 22 May 2013) noted that it is widely considered that implementing a RAIO would ensure the effectiveness of investigations, reinforce conformity with the provisions of Annex 13, and contribute to the enhancement of aviation safety; and accordingly through Conclusion 2/11 endorsed the First version of the Strategy for the establishment of RAIO(s);

Considering the AIG needs and capabilities of the Middle East and North Africa (MENA) States; and the implementation of different levels of cooperation for the provision of AIG services/functions at the regional/sub-regional level; and

Considering the challenges related to the establishment of a RAIO;

A strategy is crucial for the enhancement of cooperation in the provision of AIG services/functions among the Middle East and North Africa (MENA) States.

2- Objective

Contribute to improvement of aviation safety in the MENA States by enabling States to conduct effective and independent investigations of aircraft accidents and incidents; and support States in fulfilling their investigation obligations in Annex 13.

3- Methodology

During the ACAC/ICAO AIG Workshop held in Jeddah, Saudi Arabia, 25-27 April 2017, three (3) levels of cooperation for the provision of AIG services/functions in the MENA States have been defined as follows:

Level 1:

Cooperation among MENA States under the framework of Annex 13 and/ or a standard bilateral MOU to share, on ad-hoc basis, resources, training, information, documentation and capabilities; and strengthen conformity with Annex 13.

Level 2:

Cooperation among MENA States under the framework of a regional cooperation mechanism (well-defined scope and set of coordinated, organized and harmonized procedures and mechanisms) for the conduct of accidents and serious incidents investigations.

Level 3:

Establishment of a RAIO with well-defined mandate, roles and responsibilities, organization (human resources), funding mechanism, etc.; with a centralized decision-making process on RAIO activities.

The Table in **Attachment 1** provides more details about each level.

4- Strategic Plan

(a) States are urged to develop and further strengthen regional/sub-regional cooperation for accidents and incidents investigation.

(b) MENA States should take necessary measures to reach at least level 2.

(c) An implementation Roadmap for MENA States should be developed, under the framework of RASG-MID, to provide the details and timelines related to the implementation of the different levels.

(d) Key Performance Indicators (KPIs) should be developed for the monitoring of the implementation of the Roadmap to ensure that the agreed goals are achieved.

(e) The decision on whether to continue towards the establishment of a full MENA RAIO, or to be satisfied with level 2 cooperation, will be taken in due course, depending on the achievement of the expected KPIs/goals.

ATTACHMENT 1

	Level 1 (Bilateral Agreements)	Level 2 (Regional Cooperation Mechanism)	Level 3 (RAIO)
Human resources	Shared between the two States	List of MENA States' investigators available to support States in the conduct of investigations, as required. The State conducting the investigation will hold the cost	Investigators from RAIO will lead/participate in investigation conducted by a member State, The cost share is determined by RAIO
AIG training	Shared between the two States	List of planned training courses in all member States is maintained by a voluntary State. Member States may benefit from training conducted by other member States.	- The syllabus of the basic training is RAIO-centralized. - Advanced and specialized trainings are determined by RAIO
Equipment, tools, and technology	Shared between the two States	List of MENA States' special equipment is determined and maintained by a voluntary State for use by all member States, as required. The State conducting the investigation will hold the cost	RAIO-centralized tools and equipment are used by member States. Cost share is determined by RAIO
Accidents and incidents database	Access may be granted to the other State's accident/incident database	Database is shared voluntary and managed by a voluntary State	Database is obliged to be shared and is RAIO-centralized
Data repository	Access may be granted to the other State's data repository	Common data repository is managed by a voluntary State	Data repository is RAIO-centralized
Knowledge, safety information, and procedures	Shared between the two States	- Knowledge and information is stored in data repository managed by a voluntary State - Procedure is common	- Knowledge and information is stored in RAIO-centralized data repository - Procedure is centralized

	Level 1 (Bilateral Agreements)	Level 2 (Regional Cooperation Mechanism)	Level 3 (RAIO)
Services of State's National Centers of research, laboratories, institutions, experts, etc. (External to the AIG)	A State can utilize the other State's National Centers	List of MENA States' Centers that can be utilized by any member State. The State conducting the investigation will hold the cost	RAIO-centralized list of Centers. Cost share is determined by RAIO
Investigation regulations	Individual, but a State can benchmark the other State	Harmonized and coordinated by a voluntary State	RAIO-centralized
Oversight of the State investigation authority	Individual, but a State may conduct a peer-review upon the other State request	Pooled peer-review group maintained by a voluntary State	RAIO oversight (either by a RAIO group or by outsourced organization)
Funding of conducting investigations	The State responsible for initiating the investigation holds the cost	The State responsible for initiating the investigation holds the cost	Investigations into certain category of accidents are conducted by RAIO based on published criteria. Cost share is determined by RAIO
Funding of regional investigation organization	-	-	Centralized fund by States' contributions

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ROADMAP FOR AIG REGIONAL COOPERATION

Level of Cooperation	No.	Description	Target date	Deliverable	Champion	KPI
		Action				
	No.	**Description**	**Target date**	**Deliverable**	**Champion**	**KPI**
Level 1 Cooperation among MENA States under the framework of Annex 13 and/ or a standard bilateral MoU to share, on ad-hoc basis, resources, training, information, documentation and capabilities; and strengthen conformity with Annex 13	1	Develop a questionnaire and disseminate to States through a State Letter for surveying the current status of the MENA States in bilateral cooperation, and their willingness to move to Level 2	30 Sep. 2018	Survey	AIG Core Team ICAO States	• Number of States' responses
	2	Analyze the received responses including the assessment of the effective implementation of the cooperation elements as listed in the Strategy (Level 1)	31 Oct . 2018		AIG Core Team	• Number of bilateral agreements per State • Level of effective implementation of Level 1 elements • Number of States willing to move to Level 2
Level 2 Cooperation among MENA States under the framework of a regional cooperation mechanism (well-defined scope and set of coordinated, organized and harmonized procedures and mechanisms) for the conduct of accidents and serious incidents investigation	3	Develop a Draft Questionnaire to survey States AIG capabilities	31 Dec. 2018	Draft Questionnaire	AIG Core Team	
	4	Develop a Draft AIG RCM MoU	31 Dec. 2018	Draft AIG RCM MoU	AIG Core Team	
	5	Endorsement of the Questionnaire by the RASG-MID/7 Meeting	Apr. 2019	RASG-MID/7 Report	ICAO/RASG-MID	Questionnaire endorsed
	6	Endorse the Draft AIG RCM MoU by the DGCA-MID/5 Meeting and ACAO EC	Nov. 2019	DGCA-MID/5 Report and ACAO EC Report	ICAO/DGCA-MID/5 ACAO EC	AIG RCM MoU endorsed
Remaining level 2 actions will be detailed in due course						

APPENDIX 3V

Questionnaire on Accidents and Incidents Investigation (AIG) Level 1 Cooperation-MENA States

State Name: …………………………….

Name of AIG Organization: ……………………………………..

No.	Question	State Reply
1	Has the State established an accidents and incidents investigation (AIG) Organisation?	
2	Is the AIG Organisation structured on a form of authority independent from the State's aviation authorities?	
3	Has your AIG Authority/Organization established bilateral agreements (e.g. Memoranda of Understanding (MoUs)) with other States or with AIG Regional Organization (RAIO) for the delegation of whole or any part of conducting accidents and serious incidents investigation? If YES, please provide the total number of signed agreements and list them, then answer the following questions.	
The following questions are to be answered by States who had established agreements with other States or with RAIO. **Does the agreement contain a clause for the parties, to:**		
3	Support each other with expertise in the event of an accident or serious incident investigation?	
5	Cooperate with each other for the provision of initial, recurrent, and/or OJT training to their investigators?	
6	Support each other with investigation equipment/tools?	

No.	Question	State Reply
7	Share investigation procedures/policies manuals, guidance material, safety information, etc.?	
8	Share accidents and incidents data?	
This question is to be answered by all States (whether they had established agreements or not)		
9	Is your State willing to move to the level 2 of cooperation in accordance with the Strategy for the enhancement of cooperation among the Middle East and North Africa (MENA) States in the provision of AIG Functions?	

APPENDIX 3W

2018 RASG-MID Safety Related Events in Middle East Calendar

PART A

RASG-MID EVENTS

Dates	Organizers	Activity	Location	Target Attendance
January 2018				
14-18	ICAO	Safety Management Course for Practitioners (SMxP)	Cairo	
February 2018				
4-5	ICAO	Members of the MID-Annual Safety Report Team (MID-ASRT)	Cairo	
6-8	ICAO	Fourth Meeting of the MID Safety Support Team (MID-SST/4) and the States' National Continuous Monitoring Coordinators (NCMCs) Meeting	Cairo	
March 2018				
April 2018				
23-26	APAC/ICAO	APAC/MID Safety Management Symposium	Singapore	
May 2018				
June 2018				
25-27	ICAO	Sixth Meeting of the Regional Steering Committee (RSC/6)	Cairo	
July 2018				
1-18	ICAO	GSI-AIR Course	Cairo	
4-5	ICAO	MID RCM/5	Cairo	

August 2018					
September 2018					
4-6	ICAO		Wildlife Hazard Management and Control (WHMC) Workshop	Khartoum	
October 2018					
1	Saudi Arabia, ICAO		First MENA RSOO Steering Committee	Riyadh	
2-3	Saudi Arabia, ICAO		Fourth MID Region Safety Summit	Riyadh	
November 2018					
20-22	ICAO		Third Meeting of the Members of theAnnual Safety Report Team (MID-ASRT/3)	Cairo	
25-27	ICAO		Fifth Meeting of the Runway and Ground Safety Working Group (RGS WG/5)	Cairo	
28-29	ICAO		Aerodrome SMS Workshop	Cairo	
December 2018					
5-6	ICAO		MIDANPIRG/RASG-MID Coordination Meeting	Cairo	

PART B
OTHER EVENTS IN THE REGION

Dates	Organizers	Activity	Location	Target Attendance
January 2018				
February 2018				
March 2018				
April 2018				
May 2018				
June 2018				
July 2018				
2	IATA	Global Aviation Data Management (GADM) Workshop	Amman	
10-12	IATA	Fuel Efficiency + CORSIA Workshop	Cairo	
17-18	AACO/IATA	Ground Operations Workshop	TBD	
August 2018				
September 2018				
5-6	ACAO/IATA	FRMS + IOSA/ISAGO Workshop	Tunis	
TBC	ACAO	Safety Committee	Rabat	

October 2018				
November 2018				
12-16	ACAO	SSP Training (in cooperation with Singapore Aviation Academy)	Tunis	
December 2018				

APPENDIX 3X

2019 RASG-MID Safety Related Events in Middle East Calendar

PART A

RASG-MID EVENTS

Dates	Organizers	Activity	Location	Target Attendance
January 2019				
21-23		EDTO Workshop	TBD	
February 2019				
11-14	ICAO	Fifth Meeting of the MID Safety Support Team (MID-SST/5	Cairo	
26-28	ICAO/UAE	Ground Handling Seminar	Dubai	
March 2019				
4-7	ICAO	RASG-MID/7 (and probably MIDANPIRG/17) Meetings	TBD	
25-27	ICAO	Safety Management Workshop	Cairo	
April 2019				
May 2019				
June 2019				
16-20	ICAO	ECCAIRS-END User Course	Cairo	
July 2019				
August 2019				
September 2019				
October 2019				

November 2019				
4-6	ICAO	Fifth Meeting of the Director General of Civil Aviation (DGCA-MID/5)	Kuwait	
19-21	ICAO	Sixth Meeting of the Runway and Ground Safety Working Group (RGS WG/6)	Cairo	
December 2019				

PART B
OTHER EVENTS IN THE REGION

Dates	Organizers	Activity	Location	Target Attendance
January 2019				
February 2019				
March 2019				
April 2019				
May 2019				
June 2019				
July 2019				
August 2019				
October 2019				
November 2019				
December 2019				

APPENDIX 4A

Coordination between MIDANPIRG and RASG-MID

Subjects of interest for MIDANPIRG and RASG-MID	Responsible/Leading Group	
	RASG-MID	**MIDANPIRG**
Aerodrome Operational Planning (AOP)		X
Runway and Ground Safety	X	
AIM, CNS and MET safety issues		X
CFIT	X	
SSP Implementation	X	
SMS implementation for ANS and Aerodromes	X	
Accidents and Incidents Analysis and Investigation	X	
English Language Proficiency	X	
RVSM safety monitoring		X
SAR and Flight Tracking		X
PBN		X
Civil/Military Coordination		X
Airspace management		X
Call Sign Similarity and Confusion		X
~~Conflict Zones~~		~~X~~
Contingency Planning		X
USOAP-CMA	X	
COSCAP, RSOO and RAIO	X	
Air Navigation Deficiencies		X
Training for ANS personnel		X
Training other civil aviation personnel	X	
Laser attack	X	
Fatigue Risk Management	X	
RPAS		X
~~GPS Jamming~~ <mark>GNSS vulnerability</mark>		X
~~Aeromedical~~	~~X~~	
Airborne Collision Avoidance System (ACAS)		X

APPENDIX 4B

MIDRMA procedure to ensure the compliance of RVSM approved aircraft registered in the ICAO Middle East Region for height monitoring

a) The MIDRMA will notify the States concerned every 3 months about their aircraft non-compliance with ICAO RVSM Height Monitoring requirements.

b) States should take remedial actions to rectify the situation and ensure that their relevant aircraft are complying with ICAO RVSM Height Monitoring requirements in a timely manner, and notify the MIDRMA about their corrective action plans.

c) States should develop corrective action plans in coordination with the airlines concerned and MIDRMA, which includes a time frame to allow the concerned airline operator rectify this violation as early as possible, this period should not exceed **90 days** to perform the height monitoring.

d) If **no** height monitoring would be conducted during the **90 days**, the concerned States must withdraw the RVSM approval of the aircraft concerned and inform the MIDRMA .

e) The MIDRMA should issue a warning to all MID States and RMAs related to non-compliance aircraft registered in the MID Region.

f) The MIDRMA in coordination with the ICAO MID Office will continue working closely with the States concerned to resolve the issue.

g) Once the issue would be resolved, a notification should be issued by MIDRMA to all MID States and RMAs.

APPENDIX 4C

ACAC/ICAO CIVIL/MILITARY Workshop
(Algiers, Algeria, 26-28 March 2018)

Recommendations

The Workshop emphasized the need to manage the airspace in a flexible and dynamic manner that should be shared between civil and military airspace users to cope with economic development as well as security and air defence aspects.

The Workshop encouraged States to take necessary measures to implement the ICAO provisions related to civil/military cooperation ensuring the effective implementation of the flexible use of airspace concept.

States were encouraged to:

a) establish necessary national legislative/regulatory framework for civil/military cooperation at the highest level;

b) develop National civil/military cooperation policy/principles and practices supported by national high-level commitment;

c) establish a high-level policy body, and the necessary civil/military committees and working groups of subject matters experts to address, among other things: identification of shared goals, airspace management principles, collaboration proccesses and procedures, technical considerations, sharing of information, and human factors, etc.;

d) review national provisions related to airspace management to accommodate the requirements of all airspace users (civil and military) to enhance major traffic flows and accommodate expected future growth of traffic;

e) develop/update and implement a National FUA Plan with clear procedures related to the application of the three FUA levels (strategic, pre-tactical and tactical) with due consideration to mutual understanding, trust and communication;

f) develop integrated plan for the use of technology in support of civil/military cooperation ensuring systems interoperability, effective data exchange, while addressing associated cyber security issues in a proactive manner;

g) establish key performance indicators to measure the performance/efficiency of the FUA implementation, where applicable;

h) organize workshops, seminars, meetings at national level related to civil/military cooperation and FUA (with the support of ICAO, ACAC and International Organizations);

i) share experience and best practices related to civil/military cooperation and FUA implementation;

j) participate in cross border initiatives to enhance the regional ATS route network, airspace management and Search and Rescue at regional and inter-regional levels; and

k) use the ICAO EUR Doc 032 (Interim Guidance material on Civil/Military Cooperation In ATM) in particular the guidance related to FUA over the high seas and the example for State aircraft operations under Due-Regard.

APPENDIX 4D

Call Sign Similarity/Confusion Reporting Template

Case	Reporting ANSP or AO	Place of occurrence (Airport, sector, etc)	Date of occurrence (26/04/2013)	Time (UTC)	Call signs (one line for each)	Departure airport (ICAO 4-letter code)	Arrival airport (ICAO 4-letter code)	Type of aircraft (ICAO type desig)	Aircraft Operator (ICAO 3-letter code)	Type of Occurrence (CSS or CSC)	AO using CSST (YES or NO)
1											
2											
3											
4											
1											
2											

RASG-MID SAFETY ADVISORY – 14

(RSA-14)

June 2018

MID-Region

GUIDANCE MATERIAL REALTED TO

GNSS VULNRABILTIES

Date of Issue:	June 2018
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Disclaimer

This document has been compiled by the MID Region civil aviation stakeholders to mitigate the safety and operational impact of GNSS service disruption. It is not intended to supersede or replace existing materials produced by the National Regulator or in ICAO SARPs. The distribution or publication of this document does not prejudice the National Regulator's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

TABLE OF CONTENTS

ACRONYMS

ABAS	AIRCRAFT BASED AUGMENTATION SYSTEM
ADS-B	AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST
AHRS	ATTITUDE AND HEADING REFERENCE SYSTEMS
ANS	AIR NAVIGATION SERVICES
ATC	AIR TRAFFIC CONTROLLER
DME	DISTANCE MEASURING EQUIPMENT
EGPWS	ENHANCED GROUND PROXIMITY WARNING SYSTEM
FIR	FLIGHT INFORMATION REGION
FMS	FLIGHT MANAGEMENT SYSTEM
GBAS	GROUND BASED AUGMENTATION SYSTEM
GLONASS	GLOBAL NAVIGATION SATELLITE SYSTEM
GNSS	GLOBAL NAVOGATION SATELLITE SYSTEM
GPS	GLOBAL POSITION SYSTEM
HAL	HORIZONTAL ALERT LIMIT
ILS	INSTRUMENT LANDING SYSTEM
IRS	INERTIAL REFERENCE SYSTEM
ITU	INTERATIONAL TELECOMMUNICATION UNION
MIDANPIRG	MID AIR NAVIGATION PLANNING AND IMPLEMENTATION GROUP
NAV	NAVIGATION
NOTAM	NOTICE TO AIRMEN
PBN	PERFORMANCE BASED NAVIGATION
POS	POSITION
RAIM	RECEIVER AUTONOMOUS INTEGRITY MONITORING
RF	RADIO FREQUENCY
RNAV	AREA NAVIGATION
RNP	REQUIRED NAVIGATION PERFORMANCE
SBAS	SPACE BASED AUGMENTATION SYSTEM
TAWS	TERRAIN AVOIDANCE WARNING SYSTEM
TSO	TECHNICAL STANDARD ORDER
VHF	VERY HIGH FREQYENCY
VNAV	VERTICAL NAVIGATION
VOR	VERY HIGH OMNI DIRECTIONAL RADIO RANGE
WAAS	WIDE AREA AUGMENTATION SYSTEM

GNSS VULNERABILITIES

1.   INTRODUCTION

GNSS supports positioning, navigation and timing (PNT) applications. GNSS is the foundation of Performance Based Navigation (PBN), automatic dependent surveillance – broadcast (ADS-B) and automatic dependent surveillance – contract (ADS-C). GNSS also provides a common time reference used to synchronize systems, avionics, communication networks and operations, and supports a wide range of non-aviation applications.

GNSS Vulnerability has been identified as a safety issue and one of the main challenges impeding the implementation of PBN in the MID Region. The sixteenth meeting of the MID Air Navigation planning and Implementation Regional Group (MIDANPIRG/16Kuwait, 13-16 February 2017) recognized the impact of the GNSS signal interference and vulnerabilities and agreed that the subject should be addressed by the Regional Aviation Safety Group-Middle East (RASG-MID) in order to agree on measures to ensure effective reporting of GNSS interferences, which could be mandated by the States' regulatory authorities. The meeting invited the RASG-MID to consider the development of a RASG-MID Safety Advisory (RSA) related to GNSS vulnerabilities, highlighting the Standard Operating Procedures (SOP) for pilots, including the reporting procedures.

The RASG-MID/6 (Bahrain, 26 – 28 September 2017) agreed that IATA and ICAO MID Office should develop a RSA on GNSS vulnerabilities.

With the increasing dependence on GNSS, it is important that GNSS vulnerabilities be properly addressed. This Safety Advisory provides guidance on set of mitigation measures that States would deploy to minimize the GNSS vulnerabilities impact on safety and air operation. The RSA also includes the regional reporting and monitoring procedures of GNSS anomaly with the aim to analyze the threat and its impact on performance, and assess the effectiveness of the mitigation measures in place.

2.   DESCRIPTION

Dependence on GNSS is increasing as GNSS is used for an ever-expanding range of safety, security, business and policy critical applications. GNSS functionality is being embedded into many parts of critical infrastructures. Aviation is now dependent on uninterrupted access to GNSS positioning, navigation and timing (PNT) services.

Aviation relies heavily on GNSS for area navigation and precision approach. Aircraft avionics such as the Flight Management Systems (FMS) require GNSS timing for a large number of onboard functions including Terrain Avoidance Warning System (TAWS) or Enhanced Ground Proximity Warning Systems (EGPWS). Onboard avionics are highly integrated on commercial aircraft and are very dependent on GNSS timing data. At the same time, GNSS vulnerabilities are being exposed and threats to denial of GNSS services are increasing.

There are several types of threat that can interfere with a GNSS receiver's ability to receive and process GNSS signals, giving rise to inaccurate readings, or no reading at all, such as radio frequency interference, space weather induced ionospheric interference, solar storm, jamming and spoofing. The disruption of GNSS, either performance degradation in terms of accuracy, availability and integrity or a complete shutdown of the system, has a big consequence in critical infrastructure. For example, local interference in

an airport could degrade position accuracy or lead to a total loss of the GNSS based services, which could put safety of passengers in jeopardy.

There are two types of GNSS Interference Sources; Intentional and Unintentional sources, the latter is not considered a significant threat provided that States exercise proper control and protection over the electromagnetic spectrum for both existing and new frequency allocations. Solar Effect, Radio Frequency Interference and On-board systems are examples of Unintentional GNSS interference sources. However, the Intentional sources such as Jamming and spoofing are considered as serious threats to the continued safety of air transport.

GNSS Jamming occurs when broadcasting a strong signal that overrides or obscures the signal being jammed. The GNSS jamming might occur deliberately by a military activity or by Personal Privacy Devices (PPDs). GNSS jamming has caused several GNSS outages in the MID Region.

In some States, military authorities test the capabilities of their equipment and systems occasionally by transmitting jamming signals that deny GNSS service in a specific area. This activity should be coordinated with State spectrum offices, Civil Aviation Authorities and ANS providers. Military and other authorities operating jamming devices should coordinate with State/ANS providers to enable them to determine the airspace affected, advise aircraft operators and develop any required procedures.

Spoofing is another source of intentional GNSS Interference, which is a deliberate interference that aims to mislead GNSS receivers into general false positioning solution.

Detailed information about the GNSS Implementation and Vulnerabilities can be found in MID DOC 010 – The Guidance on GNSS implementation in the MID Region.

3.   RISK ASSESSMENT

The risk assessment covers affected operations during en-routre, terminal, and approach phase of flights. In addition, the aircraft impact at table (1), which presents an overview of different potential impacts from GNSS interference, needs to be considered for risk assessment.

Understanding the different types of threat and how likely they are to occur is key to conducting an accurate risk assessment. Broadly, the threat types break down as follows:

Threat Source	Threat Type	Description	Impact on the User
Solar Storms	Unintentional	Electromagnetic interference from solar flares and other solar activity "drowns out" the satellite signals in space.	Loss of signal, or range errors affecting the accuracy of the location or timing information.
Jamming	Intentional	Locally-generated RF interference is used to "drown out" satellite signals.	Loss of signal (if the jammer is blocking out all satellite signals) or range errors affecting the accuracy of the location or timing information

Spoofing	Intentional	Fake satellite signals are broadcast to the device to fool it into believing it is somewhere else, or at a different point in time.	False location and time readings, with potentially severe impacts on automated and autonomous devices and devices that rely on precise GNSS timing.
RF Interference	Unintentional	Noise from nearby RF transmitters (inside or outside the device) obscures the satellite signals.	Loss of signal (if the transmitter is blocking out all satellite signals) or range errors affecting the accuracy of the location reading (if the receiver is at the edge of the transmitter's range).
Signal Reflection	Unintentional	Reflection due objects such as buildings	GNSS signals can reflect off relatively due to distant objects, such as buildings, which would cause gross errors in position accuracy if the receiver falsely locks onto the reflected signal instead of the direct signal
User Error	Unintentional	Users over-rely on the GNSS data they are presented with, ignoring evidence from other systems or what they can see.	Can lead to poor decision-making in a range of scenarios

Table 1: Threats types

Depending on the nature of the interference and the nature of the application, a user may be affected in several ways; the impact may range from a small nuisance to an economic, operational or a safety impact. The detailed risk assessment methodology is addressed at **Appendix B**.

4. MITIGATION STRATEGIES

To minimize the risks associated with GNSS vulnerabilities, several mitigation strategies can be deployed to reduce the likelihood and impact of the threat.

4.1 REDUCING THE LIKELIHOOD OF GNSS INTERFERENCES

The likelihood of interference depends on many factors such as population density and the motivation of individuals or groups in an area to disrupt aviation and non-aviation services. To reduce the likelihood of GNSS interference, the following measures may be applied:

a) Effective spectrum management; this comprises creating and enforcing regulations/laws that control the use of spectrum and carefully assessing applications for new spectrum allocations.

b) The introduction of GNSS signals on new frequencies will ensure that unintentional interference does not cause the complete loss of GNSS service (outage) although enhanced services depending upon the availability of both frequencies might be degraded by such interference.

c) State should forbid the use of jamming and spoofing devices and regulate their importation, exportation, manufacture, sale, purchase, ownership and use; they should develop and enforce a strong regulatory framework governing the use of intentional radiators, including GNSS repeaters, pseudolites, spoofers and jammers. The enforcement measures include:

- detection and removal of jammers / interference sources; and
 - direct or indirect detection (e.g. use of dedicated interference detection equipment).

d) Education activities to raise awareness about legislation and to point out that 'personal' jammers can have unintended consequences.

e) Multi-constellation GNSS would allow the receiver to track more satellites, reducing the likelihood of service disruption.

4.2   REDUCING THE IMPACT OF THE GNSS VULNERABILITIES

The GNSS signal disruption cannot be ruled out completely and States/ANSPs must be prepared to deal with loss of GNSS signals, and that States conduct risk assessment and implement mitigation strategies. The risk and impacts from these threats can be managed by evaluating the growing threat of GNSS interference, jamming and spoofing.

The disruption of GNSS signals will require the application of realistic and effective mitigation strategies to both ensure the safety and regularity of air services and discourage those who would consider disrupting aircraft operations. There are three principal methods, which can be applied in combination:

a) taking advantage of on-board equipment, such as Inertial Reference System (IRS);

IRS provides a short-term area navigation capability after the loss of GNSS updating. Many air transport aircraft are equipped with IRS and these systems are becoming more affordable and accessible to operators with smaller, regional aircraft. Most of these systems are also updated by DME.

b) Development of contingency procedures and processes to enable operations in a fallback mode in case of loss of GNSS (aircrew and/or ATC).

Procedural (aircrew or ATC) methods can provide effective mitigation in combination with those described above, taking due consideration of:

> the airspace classification;
> the available ATC services (radar or procedural);
> the avionics onboard
> aircrew and air traffic controller workload implications;
> the impact that the loss of GNSS will have on other functions, such as ADS-B based surveillance; and
> the potential for providing the necessary increase in separation between aircraft in the affected airspace.

c) taking advantage of conventional navigation aids and radar, conventional aids can provide alternative sources of guidance.

The regulator should conduct safety oversight of the service provider's GNSS based Services and validate the safety aspects of mitigation strategies, considering the impact on ATM operations. Details on Risk assessment process including some examples are at **Appendix B.**

The data analysis of the reported GNSS vulnerabilities for the period January 2015to June 2018, showed that the impact of the GNSS interference on Aircraft Operations in the MID Region were as follows:

1. Loss of GPS1 (fault)/ Loss of GPS2 (fault)
2. Observation of "Map shift" on Navigation display
3. Switching to an alternative navigation mode (IRS displayed, VOR/DME)
4. Degraded PBN Capability (NAV Unable RNP)
5. GPS POS Disagree
6. EGPWS warning
7. ADS-B Traffic triggered

5.   MONITORING

The success of many of countermeasures is dependent on having a detailed understanding of the threats. In order to establish this understanding and to maintain an up-to-date knowledge of the threats - in terms of both types and number of threats – it is necessary to States to monitor the threat environment and the impact on performance.

Monitoring and reporting is required to inform stakeholders of the threats that exist. This would helps directly with enforcement (detecting and removing sources of interference) as well as monitoring the response to changes in legislation or education activities.

Receiver autonomous integrity Monitoring (RAIM) provides integrity monitoring by detecting the failure of a GNSS satellite. It is a software function incorporated into GNSS receivers.

In the event of GNSS performance degrading to the point where an alert is raised, or other cause to doubt the integrity of GNSS information exists, the pilot in command must discontinue its use and carry out appropriate navigation aid failure procedures. Should RAIM detect an out-of-tolerance situation, an immediate warning will be provided. When data integrity or RAIM is lost, aircraft tracking must be closely monitored against other available navigation systems.

States may consider the deployment of GNSS threat monitoring system, which allows monitoring of local GNSS interference environment; signal recording and monitoring for situational awareness of any drop in signal quality or signal outage and ground validation of GNSS-based flight procedures. The detection equipment may include localization utilities.

With reference to ICAO Doc 9849:

Given the variety of avionics designs, one service status model cannot meet all operators' requirements. A conservative model would produce false alarms for some aircraft. A less conservative model would lead to missed detection of a service outage for some and false alarms for others. Regardless, only the aircrew, not ATC, is in a position to determine whether, for example, it is possible to continue an ABAS-based instrument approach. In contrast, ATC has access to ILS monitor data and can deny an ILS approach clearance based

on a failure indication. The real time monitor concept is neither practical nor required for GNSS ABAS operations. It may be practical for SBAS and GBAS, but implementation would depend on a valid operational requirement.

Aircraft operators with access to prediction software specific to their particular ABAS/RAIM avionics will find it advantageous to employ that software rather than use the general notification service. In the case of SBAS and GBAS, operators will rely on service status notifications.

6.   REPORTING

ANSP must be prepared to act when anomaly reports from aircraft or ground-based units suggest signal interference. If an analysis concludes that interference is present, ANS providers must identify the area affected and issue an appropriate NOTAM.

From the perspective of the aircrew, a GNSS anomaly occurs when navigation guidance is lost or when it is not possible to trust GNSS guidance. In this respect, an anomaly is similar to a service outage. An anomaly may be associated with a receiver or antenna malfunction, insufficient satellites in view, poor satellite geometry or masking of signals by the airframe. The perceived anomaly may also be due to signal interference, but such a determination requires detailed analysis based on all available information.

In case of GNSS anomaly detected by aircrew, **Pilot** action(s) should include:
    a) reporting the situation to ATC as soon as practicable and requesting special handling as required;
    b) filing a GNSS Interference Report using the Template at **Appendix A**, and forwarding information to the IATA MENA (sfomena@iata.org) and ICAO MID Office (icaomid@icao.int) as soon as possible, including a description of the event (e.g. how the avionics failed/reacted during the anomaly).

Controller action(s) should include:
    a) recording minimum information, including aircraft call sign, location, altitude and time of occurrence;
    b) cross check with other aircraft in the vicinity;
    c) broadcasting the anomaly report to other aircraft, as necessary;
    d) notify the AIS Office in case NOTAM issuance is required; andenable the fallback mode and implement related procedure and process (contingency measures).

ANSP action(s) should include:
    a) ensuring the issuance of appropriate advisories and NOTAM, as necessary;
    b) attempting to locate/determine the source of the interference, if possible;
    c) notifying the agency responsible for frequency management (the Telecommunication Regulatory Authority);
    d) locate and eliminate source in cooperation with local regulatory & enforcement Authorities;
    e) tracking and reporting all activities relating to the anomaly until it is resolved; and
    f) review the effectiveness of the mitigation measures for improvement.

ICAO MID Office action(s) should include:
   a) collect anomaly related information and determine the course of action required to resolve reported anomalies;
   b) follow-up with State having interference incident to ensure implementation of required corrective actions;
   c) coordinate with concerned adjacent ICAO Regional Office(s) to follow-up with States under their accreditation areas, when needed; and
   d) Communicate with ITU Arab Office and Arab Spectrum Management Group to resolve frequent interference incidents, when needed.

7. REFERENCES:

- Annex 10 Aeronautical Telecommunications, Volume I ─ Radio Navigation Aids
- Annex 11 Air Traffic Services
- PANS-ATM, ICAO doc 4444
- ICAO Doc 9613 PBN Manual
- ICAO Electronic Bulletin 2011/56, Interference to Global Navigation Satellite System (GNSS) Signals.
- GNSS Manual, ICAO Doc 9849
- Standardization of GNSS Threat reporting and Receiver testing through International Knowledge Exchange, Experimentation and Exploitation, STRIKE3 EUROPEAN Initiative, Paper 74
- The report of Vulnerabilities Assessment of the Transportation Infrastructure relying on the Global Position System, US Department of Transportation.
- Operational Impacts of Intentional GPS Interference. (A Report of the Tactical Operations Committee in Response to Tasking from the Federal Aviation Administration. March 2018.
- CANSO Cyber security and Risk Assessment guide.
- ICAO GNSS RFI Mitigation Plan and associated EUROCONTROL Efforts, 8 Nov 2016
- European Global Satellite Agency System, GNSS Market Report issue 4, March 2015
- MID Doc 007 (MID Region PBN Implementation Plan
- MID Doc 010 (The Guidance on GNSS implementation in the MID Region)

Appendix A

1. **GNSS interference reporting form to be used by pilots**
   Mandatory field

Originator of this Report:	
Organisation:	
Department:	
Street / No.:	
Zip-Code / Town:	
Name / Surname:	
Phone No.:	
E-Mail:	
Date and time of report	
Description of Interference	
*Affected GNSS Element	[ ] GPS [ ] GLONASS [ ] other constellation [ ] EGNOS [ ] WAAS [ ] other SBAS [ ] GBAS (VHF data-link for GBAS)
Aircraft Type and Registration:	
Flight Number:	
*Airway/route flown:	

Coordinates of the first point of occurrence / Time (UTC):	UTC: Lat: Long:
Coordinates of the last point of occurrence / Time (UTC):	UTC: Lat: Long:
*Flight level or Altitude at which it was detected and phase of flight:	
Affected ground station (if applicable)	Name/Indicator; [e.g. GBAS]
*Degradation of GNSS performance:	[ ] Large position errors (details): [ ] Loss of integrity (RAIM warning/alert): [ ] Complete outage (Both GPSs), [ ] Loss of GPS1 or Loss of GPS 2 [ ] Loss of satellites in view/details: [ ] Lateral indicated performance level changed from:___to ___ [ ]Vertical indicated performance level changed from: __ to __ [ ] Indicated Dilution of Precision changed from __ to__ [ ] information on PRN of affected satellites (if applicable) [ ] Low Signal-to-Noise (Density) ratio [ ] Others
*Problem duration:	[ ] continuous for 20 minutes [ ] intermittent

Note: Only applicable fields need to be filled!

Appendix B

Risk Assessment

Threats and vulnerabilities

A threat assessment should be performed to determine the best approaches to securing a GNSS against a particular threat. Penetration testing exercises should be conducted to assess threat profiles and help develop effective countermeasures.

Table (B1) presents an overview of different potential impacts from GNSS interference. This is a snapshot of impacts based on input from two manufacturers and not intended to be a comprehensive list of all impacts:

Effect	Affected Operation	Impact
Loss of GNSS-based navigation	Enroute/ Terminal/ Approach	Aircraft with Inertial Reference Unit (IRU) or Distance Measuring Equipment (DME)/DME may have degraded RNP/RNAV. Aircraft may deviate from the nominal track May increase workload on aircrew and ATC May result in missed approach or diverting to other runway in case the aerodrome operating minima cannot be met through conventional precision or visual approaches. Conventional ATS routes, SIDs and STARs would be used.
Larger than normal GNSS position errors prior to loss of GNSS	Enroute/ Terminal/ Approach	Interference could cause the GNSS position to be pulled off but not exceed the HAL (2NM , 1NM, 0.3NM for enroute, terminal and approach phases, respectively).
Loss of EGPWS/ TAWS	Enroute/ Terminal/ Approach	Reduced situational awareness and safety for equipped aircraft. Terrain Awareness and Warning System (TAWS) is required equipment for turbine-powered airplanes > 6 passengers. Loss of GPS results in loss of terrain/obstacle alerting. Position errors as GPS degrades can result in false or missed alerts.
Loss of GPS aiding to AHRS	Flight Control	Can result in degradation of AHRS pitch and roll accuracy with potential downstream effects such as was experienced by a Phenom 300 flight.

Loss of GNSS to PFD/MFD	All flight phases	Can result in:
		     -Loss of synthetic vision display and flight path marker on PFD
		     -Loss of airplane icon on lateral and vertical electronic map displays, georeferenced charts, and airport surface maps without DME-DME or IRU
		     -Loss of airspace alerting and nearest waypoint information without DME-DME or IRU
		 Overall loss of situational awareness to flight crew and increased workload.

No GNSS position for ELT	Search and Rescue	Loss of GNSS signal could result in larger search areas for the Emergency Locator Transmitters (ELTs)

Table B1: Potential Impact from GNSS

Consequence/Impact of risk occurring

Category	Effect on Aircrew and Passengers	Overall ATM System effect
Catastrophic 1	Multiple fatalities due to collision with other aircraft, obstacles or terrain	Sustained inability to provide any service.
Major 2	Large reduction in safety margin; serious or fatal injury to small number; serious physical distress to air crew.	Inability to provide any degree of service (including contingency measures) within one or more airspace sectors for a significant time.
Moderate 3	Significant reduction in safety margin.	The ability to provide a service is severely compromised within one or more airspace sectors without warning for a significant time.
Minor 4	Slight reduction in safety margin.	The ability to provide a service is impaired within one or more airspace sectors without warning for a significant time
Negligible 5	Potential for some inconvenience.	No effect on the ability to provide a service in the short term, but the situation needs to be monitored and reviewed for the need to apply some form of contingency measures if the condition prevails.

Table B2: Impact of Risk Occurring

Likelihood of risk occurring

The definitions in the table (B3) were adopted for estimating the likelihood of an identified risk occurring, for this purpose, five situations are considered:

Event is expected to occur	
1	More frequently than hourly
2	Between hourly and daily
3	Between daily and yearly
4	Between yearly and 5 yearly
5	Between 5 and 50 years
6	Less frequently than once every 50 years

Table B3: Likelihood of risk occurring

Assessment of the level of risk and risk tolerance

All identified risks were reviewed and provided for each an overall risk ranking which is a combination of the two characteristics of consequence and likelihood. For example, a risk with a major consequence but a "5" likelihood would be described as having a "A" or "unacceptable" risk rating. The conversion of the combination of consequence and likelihood into a risk rating has been achieved by use of the following matrix.

Likelihood Criteria		Consequence Criteria				
Event expected to occur:		Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5
1	More frequently than hourly	A	A	A	A	C
2	Between hourly and daily	A	A	A	B	D
3	Between daily and yearly	A	A	B	C	D
4	Between yearly and 5 yearly	A	B	C	C	D
5	Between 5 and 50 years	A	B	C	D	D
6	Less frequently than once every 50 years	B	C	D	D	D

Table B4: Risk Assessment Table

The previous matrix provides a guide to determine which risks are the highest priorities from the perspective of the timeliness of the corrective action required. The following table outlines the position in more definitive terms.

Safety tolerability risk matrix

Risk Index Range	Description	Recommended Action
A	Unacceptable	Stop or cut back operation promptly if necessary. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range
B	High Risk	Urgent action. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range
C	Moderate Risk	Countermeasures actions to mitigate these risks should be implemented.
D	Low Risk	Acceptable as is. No further risk mitigation required

Table B5: Risk Tolerability Matrix

Sample risk assessment

The risk assessment table (B6) could be used to identify and capture the threats, select the risk rating based on the risk matrix above considering the existing controls. In addition, recommended actions could be selected to minimize the risk.

L = Likelihood
C = Consequence
R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R

Table B6: Sample Risk Assessment tables

The table (B7) below is an example of risk assessment for approach phase of flight, the detailed Risk assessment process is at Appendix B

L = Likelihood
C = Consequence
R = Risk

Threat	Initial Risk			Existing controls	Accept/ Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between daily and yearly	3	2	A	-Error message notification by avionic	Reduce	1)using of on-board equipment (IRS); 2)Interference detector by ANSPs 3) executing miss-approach	3	4	C

Table B7: Example Risk Assessment for Approach phase of flight

Another example risk assessment for en-route phase of flight at table (B8)

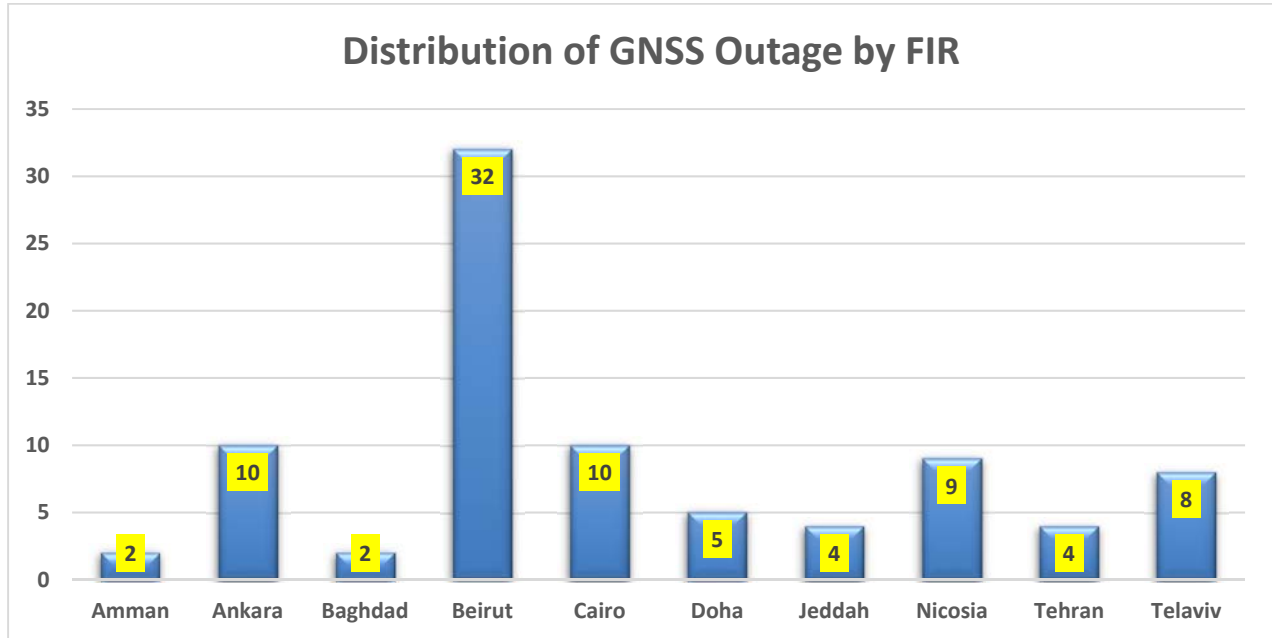L = Likelihood
C = Consequence
R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between 5 and 50 years (short time GNSS Outage)	5	5	D	-Error message notification by avionic -Regulations/ law to protect the GNSS signal	Accept	-			

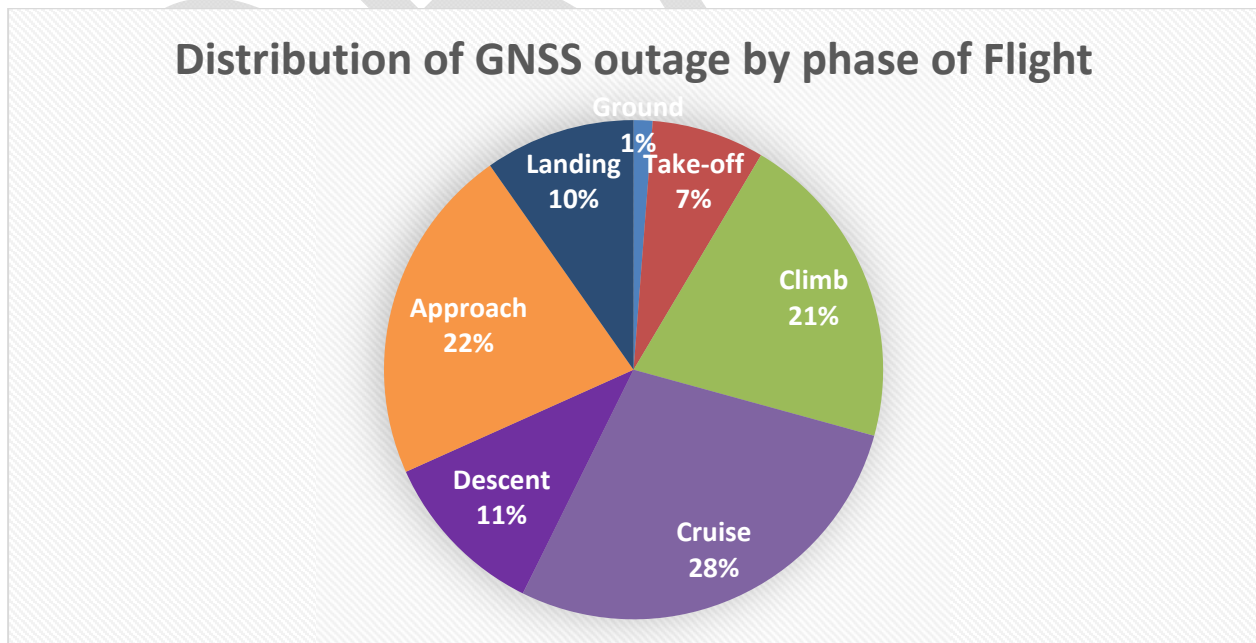*Table B8: Example risk assessment for enroute phase of flight*

## Appendix C

GNSS Anomaly for the Period January 2015- June2018

Brief data analysis of the incidents reported during Brief data analysis of the incidents reported by Air Operator are as follows:

Distribution of GNSS Outage by FIR

| FIR	Count
Amman	2
Ankara	10
Baghdad	2
Beirut	32
Cairo	10
Doha	5
Jeddah	4
Nicosia	9
Tehran	4
Telaviv	8

The data revealed that the most significant Flight Information Regions (FIRs) affected Beirut, followed by Cairo, Ankara, and Nicosia.

Distribution of GNSS outage by phase of Flight

Phase	Percent
Ground	1%
Take-off	7%
Climb	21%
Cruise	28%
Descent	11%
Approach	22%
Landing	10%

The data shows that the highest GNSS Outage occurred during the phase of flights cruise, approach, climb, and descent.

GNSS OUTAGE DURATION

Seconds-1mn	4%
1mn-- 5mn	7%
5mn-30mn	19%
30mn-3hrs	6%
3hrs-Days	0%
UNK	64%
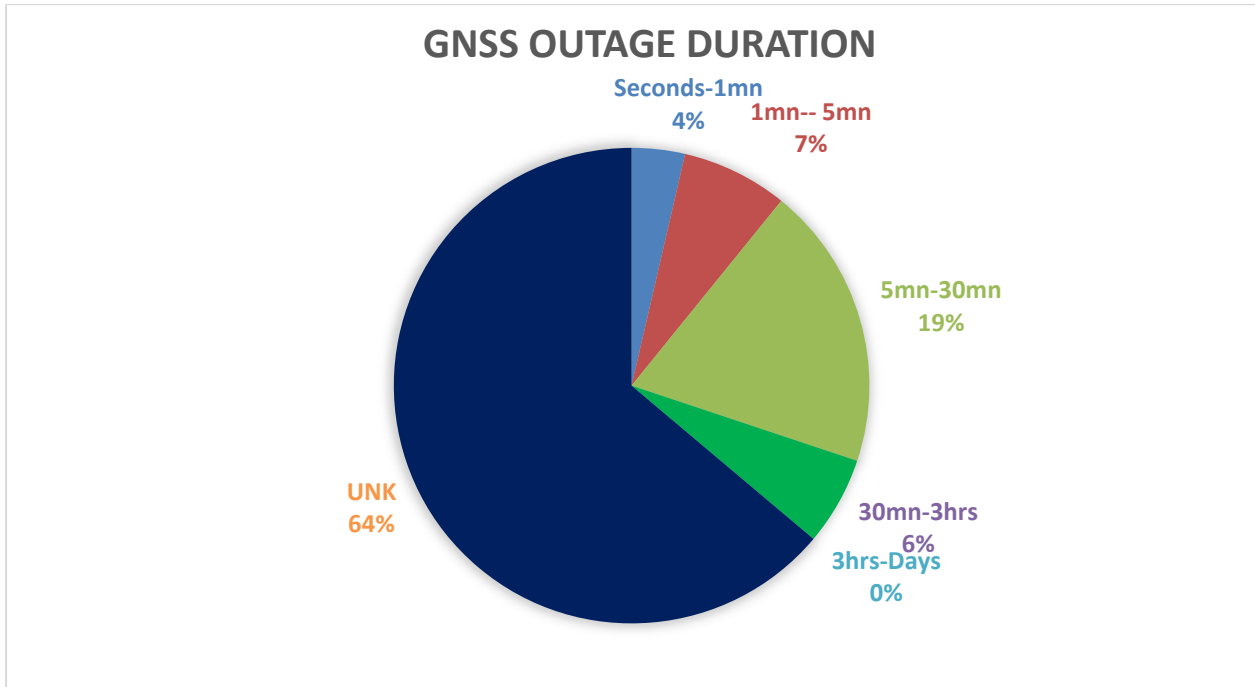
The data shows the highest GNSS outage duration was between 5 minutes- 30 minutes. Regarding the Unknown (UNK) it could not be determined as the data was not provided.

GNSS OUTAGE TYPE OF AIRCRAFT INVOLVED

A320	13%
A321	28%
A330	13%
A340	1%
A350	2%
B737	17%
B777	26%
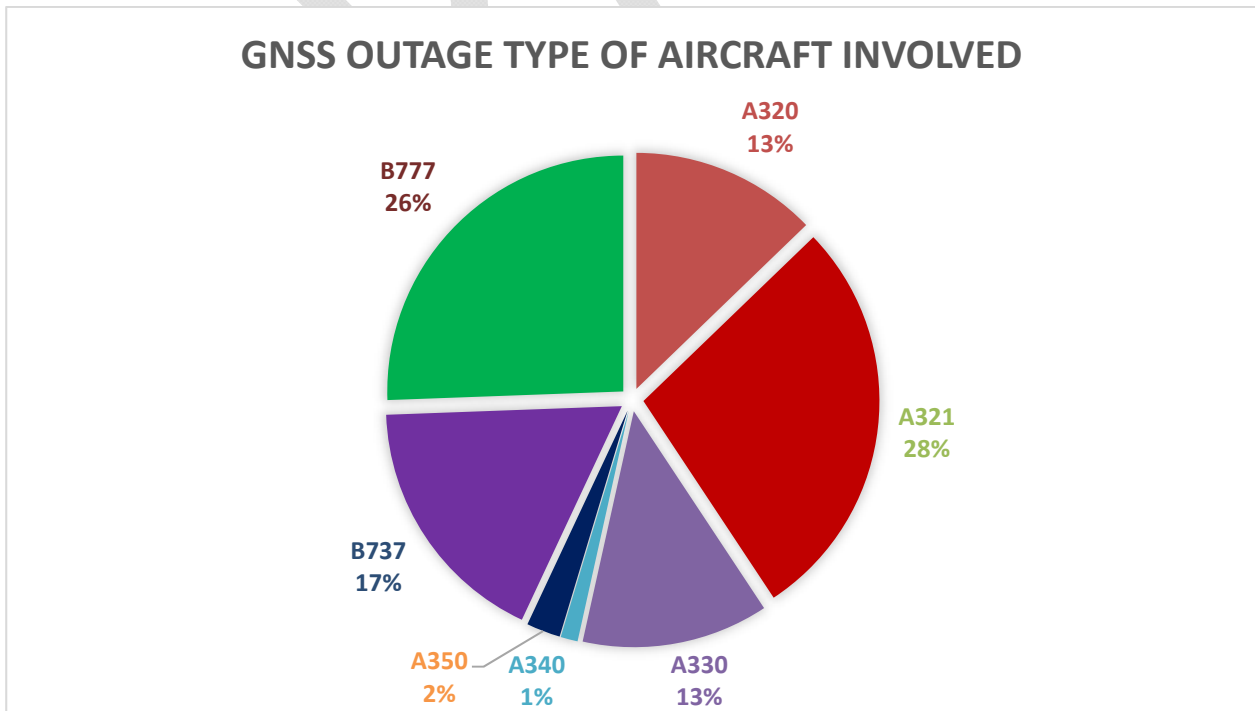
The A321, B777, and B737 were most flown aircraft type in areas most affected.

ATTACHMENT A

LIST OF PARTICIPANTS

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