



# **THE NETHERLANDS MILITARY AVIATION REGULATIONS**

**NLD-MAR-147**

**AMC & GM**

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**MILITARY AVIATION AUTHORITY  
THE NETHERLANDS (MAA-NLD)**

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## NLD-MAR-147 AMC & GM

### **NOTES:**

1. This NLD-MAR-147 AMC/GM document is a derivative of EMAR 147 AMC/GM, version 1.1, and remains as close as is possible to the original text. The Safety Management System based on ICAO Annex 19 is incorporated in this NLD-MAR-147 AMC/GM document.
2. Future amended paragraphs from this NLD-MAR-147 AMC/GM will be indicated by using a 'sidebar' in the margin.
3. This NLD-MAR AMC/GM relies on definitions laid down in NLD-MAD-1. The Forms referred to in this document are published on the MAA-NLD Intranet and Internet sites.
4. Unless specified otherwise in the text, all references to 'maintenance training organisation' within this document are to be understood to mean a maintenance training organisation that already has an NLD-MAR-147 approval and a maintenance training organisation that is seeking an NLD-MAR-147 approval.

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# ACCEPTABLE MEANS OF COMPLIANCE

## SECTION A

### TECHNICAL REQUIREMENTS

#### AMC 147.A.15(a) Application

In a form and in a manner established by the MAA-NLD means that the application should be made on an NLD-MAR Form 12. An example of an NLD-MAR Form 12 is published on the MAA-NLD Intranet and Internet sites.

#### AMC 147.A.100(b) Facility requirements

1. The maximum number of students undergoing knowledge training during any training session should not normally exceed 28. In cases where it is necessary to exceed this number, the MAA-NLD is to be informed and the MTO should submit evidence of how an 'effective learning environment' is being maintained with this larger number of students.

#### AMC 147.A.100(d) Facility requirements

1. In the context of this paragraph, 'another organisation' means any other organisation with which the MTO has a formal agreement for the provision of practical training facilities. This organisations details should be included in MTOE paragraph 2.8.

#### AMC 147.A.100(i) Facility requirements

1. For approved basic maintenance training courses this means holding and ensuring reasonable access to copies of all national military aviation legislation, examples of typical aircraft maintenance manuals and service bulletins and Airworthiness Directives (or their national equivalents), aircraft and component records, release documentation, procedures manuals and aircraft maintenance programmes.

2. Except for the national military aviation regulations, the remainder of the documentation should represent typical examples of military aircraft and cover both aeroplanes and helicopters as appropriate for the nation. Avionic and armaments documentation should cover a representative range of available equipment that will be encountered. All documentation should be reviewed and updated on a regular basis.



### **AMC 147.A.105 Personnel requirements**

1. With regard to the Accountable Manager, it is normally intended to mean the Chief Executive Officer or senior military commander of the MTO, who by virtue of position has overall (including in particular resource allocation) responsibility for running the MTO. The Accountable Manager may be the Accountable Manager for more than one organisation and is not required to be necessarily knowledgeable on training matters as the MTOE defines the maintenance training standards. When the Accountable Manager is not the Chief Executive Officer or senior military commander, the MAA-NLD will need to be assured that such an Accountable Manager has direct access to the Chief Executive Officer or senior military commander and has a sufficiency of 'maintenance training resources' allocation.

2. The larger MTO (an organisation with the capacity to provide training for 50 students or more) should appoint a training manager with the responsibility of managing the MTO on a day-to-day basis. Such person could also be the Accountable Manager. In addition, the MTO should appoint a Quality Manager and a Safety Manager with the responsibility of managing the quality and safety system as specified in NLD-MAR-147.A.130(a) and an examination manager with the responsibility of managing the relevant NLD-MAR-147 Subpart C or Subpart D examination system. Such person(s) may also be an instructor and/or examiner.

3. The smaller MTO (an organisation with the capacity to provide training for less than 50 students) may combine any or all of the subparagraph (1) positions subject to the MAA-NLD verifying and being satisfied that all functions can be properly carried out in combination.

4. When the organisation is also approved against other NLD-MARs which contain some similar functions, then such functions may be combined.

### **AMC 147.A.105(b) Personnel requirements**

With the exception of the Accountable Manager, an NLD-MAR Form 4 should be completed for each person nominated to hold a position required by NLD-MAR-147.A.105(b). An example of an NLD-MAR Form 4 is published on the MAA-NLD Intranet and Internet sites.

### **AMC 147.A.105(c) Personnel requirements**

The MTO should have a core of permanently employed staff to undertake the minimum amount of maintenance training proposed but may contract, on a part-time basis, instructors for subjects which are only taught on an occasional basis.

### **AMC 147.A.105(f) Personnel requirements**

1. Any person currently accepted by the MAA-NLD in accordance with the national military aviation regulations in force prior to a date established in national regulation for the implementation of the requirements of NLD-MAR-147 may continue to be accepted in accordance with NLD-MAR-147.A.105(f).

Paragraph 3 of Appendix III to AMC of NLD-MAR-66 provides criteria to establish the qualification of assessors.

2. Examiners should demonstrate a clear understanding of the examination standard required by NLD-MAR-66 and have a responsible attitude to the conduct of examinations such that the highest integrity is ensured.

### **AMC 147.A.105(h) Personnel requirements**

1. Updating training should normally be of 35 hours duration but may be adjusted to the scope of training of the MTO and particular instructor/examiner.

2. Records should show for each instructor/knowledge examiner when the updating training was scheduled and when it took place.

### **AMC 147.A.110 Records of instructors, examiners and assessors**

1. The following minimum information relevant to the scope of activity should be kept on record in respect of each instructor, knowledge examiner and practical assessor:

- (a) Full Name;
- (b) Rank/Grade (if applicable);
- (c) Date of birth;
- (d) Service/Personnel number;
- (e) Experience;
- (f) Qualifications;
- (g) Training history (before entry);
- (h) Subsequent training;
- (i) Scope of activity;
- (j) Starting date of employment/contract/posting into MTO;
- (k) If appropriate – ending date of employment/contract/posting out of MTO;
- (l) Security clearance (where appropriate).

2. The record may be kept in any format but should be under the control of the MTO's quality system.

3. Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records become accessible to unauthorised persons.

4. The MAA-NLD, or qualified entity acting on behalf of the MAA-NLD, is to be considered as an 'authorised person' when investigating the records system for initial and continued approval or when the MAA-NLD has cause to doubt the competence of a particular person.

### **AMC 147.A.115(c) Instructional equipment**

1. An appropriate selection of aircraft parts means appropriate in relation to the particular subject module or submodule of NLD-MAR-66 being instructed. For example, the turbine engine module should require the provision of sufficient parts from different types of turbine engine to show what such parts look like, what the critical areas are from a maintenance viewpoint and to enable disassembly/assembly exercises to be completed.

2. 'Appropriate aircraft, engines, aircraft parts, avionic equipment, armaments, escape systems and other relevant military-specific systems' means appropriate in relation to the particular subject module or submodule of NLD-MAR-66 being instructed. For example, category B2 avionic training should require, amongst other equipment, access to different navigation systems such that maintenance and system functioning can be observed and therefore more fully understood by the student in the working environment.

3. Moved to AMC 147.A.115(d).

### **AMC 147.A.115(d) Instructional equipment**

"Access" should be interpreted to mean, in conjunction with the facilities requirement of NLD-MAR-147.A.100(d), that there may be an agreement with an NLD-MAR-145 Approved Maintenance Organisation to access the aircraft type, related parts, etc.

### **AMC 147.A.120(a) Maintenance training material**

Training course notes, diagrams and any other instructional material should be accurate. Where an amendment service is not provided, a written warning to this effect should be given.

### **AMC 147.A.125 Records of students**

In addition to each student's training, examination and assessment records, the content of the course(s) undertaken by each student (e.g. syllabus, together with the amendment state of the course content as detailed in the MTOE paragraph 4.2) should also be retained.

### **AMC 147.A.130(a) Quality policy, training procedures and quality system**

The quality policy should as a minimum include a statement committing the MTO to:

- Recognise quality as a prime consideration at all times;
- Apply Human factors principles;
- Encourage personnel to report theoretical/practical training or examination/assessment related errors/incidents;
- Recognise that compliance with procedures, quality standards and regulations is the duty of all personnel;
- Recognise the need for all personnel to cooperate with the quality auditors.

### **AMC 147.A.130(b) Quality policy, training procedures and quality system**

1. The independent audit procedure should ensure that all aspects of NLD-MAR-147 compliance should be checked at least once in every 12 months and may be carried out as one complete single exercise or subdivided over a 12-month period in accordance with a scheduled plan.
2. In a small MTO (an organisation with the capacity to provide training for less than 50 students) the independent audit function may be contracted to another MTO approved under NLD-MAR-147 by an arrangement acceptable to the MAA-NLD, or to a competent person acceptable to the MAA-NLD. Where the small MTO chooses to contract the audit function, the MAA-NLD should specify the audit periodicity.
3. Where the MTO is part of an organisation that is also approved to another NLD-MAR requiring a quality system, then such quality systems may be combined.
4. When training or examination is carried out under the 'subcontract control system' (see NLD-MAR-147.A.145):
  - (i) a pre-audit procedure should be established whereby the NLD-MAR-147 MTO should audit a prospective subcontractor to determine whether the services of the subcontractor meet the intent of NLD-MAR-147. The pre-audit procedure should focus on establishing compliance with the training and examination standards set out in NLD-MAR-147 and NLD-MAR-66.
  - (ii) a renewal audit of the subcontractor should be performed at least once every 12 months to ensure continuous compliance with the NLD-MAR-147 standard.
  - (iii) the subcontract control procedure should record audits of the subcontractor and have a corrective action follow-up plan.
5. The independence of the audit system should be established by always ensuring that audits are carried out by personnel not responsible for the function or procedure being checked.

### **AMC 147.A.132(b)1 and (c) Safety Management System (SMS)**

**Safety policy and objectives.** The organisations safety policy and safety objectives convey its expectations, objectives, commitments, and accountabilities to its employees and the MAA-NLD. The safety policy and objectives component of an SMS had to be include the following:

- (a) **Management commitment and responsibility.** The organisation has defined its safety policy and safety management structure and can demonstrate the following:
  - (i) The safety policy statement (see for an example Appendix II to AMC) is signed by the Accountable Manager and includes:
    - a commitment towards aviation safety;
    - a commitment to all defence aviation regulatory requirements;
    - a commitment to provide appropriate resources for safety management;
    - a commitment to continuous improvement in the organisations safety levels;
    - a commitment to the ongoing development of the organisations SMS;
    - the organisations safety objectives;
    - active encouragement of safety reporting.

(ii) The Accountable Manager and key safety management personnel promote and demonstrate their commitment to their safety policy through active and visible participation in the SMS, and by ensuring that this system is based on their safety policy.

(iii) The safety policy is reviewed periodically to ensure it remains current.

(iv) A disciplinary policy has been defined that clearly identifies the conditions under which punitive action would be considered, e.g. illegal activity, negligence or willful misconduct, and is used by the organisation.

(v) There is evidence of decision making, actions and behaviors that reflect a positive safety culture.

(b) **Safety Accountabilities.** The organisation has developed an organisational safety structure and can demonstrate the following:

(i) The Accountable Manager has been appointed with full responsibility and ultimate accountability for the SMS to ensure it is properly implemented and performing effectively, and has control of the financial and human resources required for the proper implementation of an effective SMS. The Accountable Manager is fully aware of their SMS roles and responsibilities in respect of the safety policy, safety standards and safety culture growth required in the organisation.

(ii) Safety accountabilities, authorities, roles and responsibilities are defined and documented throughout the organisation and safety management is shared across the organisation.

(c) **Key safety personnel.** The organisation has appointed key safety personnel and can demonstrate the following:

(i) A competent person with the appropriate knowledge, skills and experience has been nominated to manage the operation of the SMS, and fulfils the required job functions and responsibilities.

(ii) There is a direct reporting line between the Safety Manager and the Accountable Manager, and the Accountable Manager and other key safety personnel are made aware of agreed safety information.

(iii) The organisation has allocated sufficient resources to manage the SMS including manpower for safety investigation, analysis, auditing and promotion, and personnel in key safety roles are kept trained / current.

(d) **Coordination of emergency response planning.** The organisation has considered the coordination and planning of its emergency responses and can demonstrate the following:

(i) An emergency response plan, if required, that reflects the size, nature and complexity of the operation has been developed, defining the procedures, roles,

responsibilities and actions of the various organisations and key personnel, and is periodically tested.

(ii) The organisation has a process to inform all personnel of the emergency response plan requirements, and all personnel are aware of their responsibilities.

(e) **SMS documentation.** The organisation has established its SMS documentation and can demonstrate the following:

(i) There is documentation that describes the SMS and the interrelationships between all of its elements, and it is readily available to all personnel.

(ii) SMS documentation is regularly reviewed and updated with appropriate version control in place.

(iii) The SMS documentation describes the means for the storage of SMS related records.

#### **AMC 147.A.132(b)2 and (d) Safety Management System (SMS)**

**Safety risk management.** The organisations safety risk management system will enable development of structured processes to understand the critical characteristics of its systems and environment and apply this knowledge to identify aviation safety hazards, analyse and assess risk and develop risk controls (using the hierarchy of controls) and had to be include the following:

(a) Hazard Identification. The organisation will develop and maintain a process that ensures that aviation safety hazards in the aviation environment are identified. Aviation safety hazards will be identified from the analysis of critical design and performance factors, processes, and aviation activities in sufficient detail to determine associated level of risk and risk acceptability and can demonstrate the following:

(i) The aviation safety hazard identification process shall include reactive safety data collection and be a part of the formal means of collecting, recording, acting on aviation safety hazards.

(ii) The aviation safety hazard identification process shall include proactive safety data collection and shall be a part of the formal means of collecting, recording, acting on aviation safety hazards.

(iii) The aviation safety hazard identification process shall include predictive safety data collection and shall be a part of the formal means of collecting, recording, acting on aviation safety hazards.

(iv) Aviation safety hazards are periodically reviewed.

(b) Safety risk assessment and mitigation. The organisation will develop and maintain a process that ensures analysis, assessment, and control of the safety risks in aviation system activities and can demonstrate the following:

- (i) There is a structured process for the assessment of risk that includes identified aviation safety hazards, expressed in terms of severity (consequence) and probability (likelihood).
- (ii) The organisation uses a documented process that applies the hierarchy of controls to eliminate or otherwise minimise So Far As is Reasonably Practicable (SFARP) and then implements the required controls.
- (iii) Controls resulting from risk assessments, including timelines and allocation of responsibilities are documented and actioned.
- (iv) The risk evaluation process includes criteria against which an organisation makes decisions on whether to proceed with an activity after all the practicable controls are implemented.
- (v) Risk controls are being verified, monitored and reviewed to confirm they are working and effective.
- (vi) Risk management process is routinely applied in decision making processes.
- (vii) The Accountable Manager and other key safety management personnel have visibility and are advised of the medium and high-risk aviation safety hazards, including their mitigation and controls.

### **AMC 147.A.132(b)3 and (e) Safety Management System (SMS)**

**Safety assurance.** The organisations safety assurance system, will verify, monitor and measure the safety performance of the organisation. It will then evaluate the effectiveness of SMS by measuring against established safety objectives and targets. The Safety Assurance component of an SMS had to be include the following:

- (a) Safety performance monitoring and measurement. The organisation will develop and maintain a means to verify, monitor and measure the safety performance of the organisation, and to evaluate the effectiveness of safety risks controls and can demonstrate the following:
  - (i) Safety targets and performance indicators have been defined, promulgated and are being monitored and analysed for trends, forming part of the SMS review.
  - (ii) Safety targets and performance indicators are reviewed and updated periodically.
  - (iii) There is an internal safety audit programme that focuses on the safety performance of the organisation and its services.
  - (iv) The organisation has a reporting system to capture errors, aviation safety hazards and near misses that is simple to use and accessible to all personnel, and

has identified all the major aviation safety hazards and assessed the risks related to its current activities.

(v) The safety reporting system provides effective feedback to the reporter of any actions taken (or not taken) and, where appropriate, to the rest of the organisation.

(vi) Safety investigations are carried out and identify underlying causes and potential aviation safety hazards for existing and future operations.

(vii) Personnel express confidence and trust in the organisations reporting policy and process and safety reports are continuously raised and acted on in a timely manner.

(viii) Personnel responsible for investigating reports are trained in investigation techniques, and use those techniques in the conduct of their investigations.

(ix) Investigations establish causal/contributing factors (why it happened, not just what happened), and use the results as a source for aviation safety hazard identification in the system.

(x) Information obtained from safety assurance and compliance monitoring activities feeds back into the safety risk management process.

(b) Management of change. The organisation will develop and maintain a process to identify changes within the organisations working environment which may affect established processes and services. This process will be used to describe the arrangements to assure safety performance before implementing changes and can demonstrate the following:

(i) The organisation has established a process and conducts formal hazard analyses and risk assessments for major operational changes, major organisational changes and changes in key personnel.

(ii) Key stakeholders are identified and involved in the change management process.

(iii) The change management process requires previous risk assessments and existing hazards are reviewed for possible effect.

(c) Continuous improvement of the SMS. The organisation will develop and maintain a process to identify the causes of substandard safety performance, determine the implications of substandard safety performance, and eliminate or mitigate such causes and should include the following continuous improvement processes and can demonstrate the following:

(i) A safety committee has been established and has necessary authority to make decisions related to the improvement and effectiveness of the SMS.

(ii) The SMS is periodically reviewed such that improvements in safety performance can be demonstrated.



## **AMC 147.A.132(b)4 and (f) Safety Management System (SMS)**

**Safety promotion.** The organisations safety promotion system will provide employees with effective SMS training commensurate with their safety responsibilities, creating a means to deliver organisation-wide safety communication. The safety promotion component of an SMS and had to be include the following:

(a) Training and education. The organisation will ensure that personnel are trained and competent to perform their SMS duties. The scope of safety training will be commensurate with the individual's involvement in the SMS and can demonstrate the following:

(i) There is a documented process to identify safety management training requirements so that personnel are competent to perform their duties and takes appropriate remedial action when necessary.

(ii) Appropriate action is taken to measure and possibly improve the effectiveness of training.

(iii) A training record is maintained for all personnel.

(b) Safety Communication. The organisation will ensure that personnel, internal and external to the organisation, have current and pertinent safety information and can demonstrate the following:

(i) There is a communication strategy to ensure the safety policy and safety information is communicated to all personnel with the intent that they are made aware of their individual contributions and obligations with regard to safety.

(ii) Significant events and investigation outcomes associated with the organisation are communicated to all personnel, including contracted organisations where appropriate.

## **AMC 147.A.135 Examinations**

1. Examinations may be computer- or hard-copy-based or a combination of both.

2. The actual questions to be used in a particular examination should be determined by the examiners.

## **AMC 147.A.135(b) Examinations**

If the MAA-NLD approves a period of less than 12 months, this approval should be provided in writing to the MTO and kept within the student's records as detailed in NLD-MAR-147.A.125.

### **AMC 147.A.140 Maintenance Training Organisation Exposition (MTOE)**

1. The information detailed in Appendix I to the AMCs should be included in the MTOE.
2. When the MTO, or organisation it is part of, is approved in accordance with any other NLD-MAR or EASA approval which also requires an exposition, the exposition required by the other NLD-MAR or EASA approval may form the basis of the MTOE in a combined document, as long as the other exposition contains the information required by NLD-MAR-147.A.140 and a cross-reference index is included based upon Appendix I to the AMCs.
3. When training or examination is carried out under the 'subcontract control system' (see NLD-MAR-147.A.145), the MTOE should contain a specific procedure on the control of subcontractor(s) as per Appendix I to the AMCs paragraph 2.18 plus a list of subcontractor(s) as required by NLD-MAR-147.A.140(a)12 and detailed in Appendix I to the AMCs paragraph 1.8.
4. NOT APPLICABLE.

### **AMC 147.A.145(d) Privileges of the Maintenance Training Organisation**

1. When training or examination is carried out under the 'subcontract control system', it means that for the duration of such training or examination, the NLD-MAR-147 approval has been temporarily extended to include the subcontractor. It therefore follows that those parts of the subcontractor's facilities, personnel and procedures involved with the NLD-MAR-147 MTO's students should meet the requirements of NLD-MAR-147 for the duration of that training or examination and it remains the NLD-MAR-147 MTO's responsibility to ensure such requirements are satisfied.
2. The MTO approved under NLD-MAR-147 is not required to have complete facilities and personnel for training that it needs to subcontract but it should have its own expertise to determine that the subcontractor meets the NLD-MAR-147 standards. Particular attention should be given to ensuring that the training that is delivered also meets the requirements of NLD-MAR-66 and that the aircraft technologies are appropriate.
3. The contract between the MTO approved under NLD-MAR-147 and the subcontractor should contain:
  - a provision for the MAA-NLD to have right of access to the subcontractor;
  - a provision that the subcontractor had to be inform the NLD-MAR-147 approved MTO of any change that may affect its NLD-MAR-147 approval, before any such change takes place.

### **AMC 147.A.145(f) Privileges of the Maintenance Training Organisation**

NOT APPLICABLE.

**AMC 147.A.155(a)2 Continued validity of approval**

In addition to being granted access to the MTO to determine continued compliance, the MAA-NLD should also be granted access to any organisation carrying out training (and, if applicable, examination) on behalf of the MTO under the 'subcontract control system' as specified at AMC 147.A.145(d).

**AMC 147.A.200(b) The approved basic training course**

Each MAML category or subcategory basic training course may be subdivided into modules or submodules of knowledge and may be intermixed with the practical training elements subject to the required time elements of NLD-MAR-147.A.200 (f) and (g) being satisfied.

**AMC 147.A.200(d) The approved basic training course**

1. NOT APPLICABLE.
2. At least 30% of the practical training element should be carried out in a realistic maintenance working environment.

**AMC 147.A.200(f) The approved basic training course**

1. In order to follow pedagogical and human factors principles, the maximum number of training hours per day for the theoretical training should not be more than 6 hours. A training hour means 60 minutes of tuition excluding any breaks, examination, revision, preparation and aircraft visits. In exceptional cases, the MAA-NLD may allow deviation from this standard when it is properly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:

Theoretical and practical training are performed at the same time;

Training and normal maintenance duty/apprenticeship are performed at the same time.

2. The minimum participation time for the student to meet the objectives of the course should not be less than 90 % of the tuition hours. Additional training may be provided by the MTO in order to meet the minimum participation time. If the minimum participation defined for the course is not met, a certificate of recognition (see example at NLD-MAR-147 Appendix III) should not be issued.

### **AMC 147.A.200(g) The approved basic training course**

Typical conversion durations are given below:

- (a) The approved basic training course to qualify for conversion from holding an NLD-MAR-66 MAML in subcategory A1 to subcategory B1.1 or B2 should not be less than 1600 hours and for conversion from holding an NLD-MAR-66 MAML in subcategory A1 to subcategory B1.1 combined with B2 should not be less than 2200 hours. The course should include between 60 % and 70 % knowledge training.
- (b) The approved basic training course to qualify for conversion from holding an NLD-MAR-66 MAML in subcategory B1.1 to B2 or category B2 to B1.1 should not be less than 600 hours, and should include between 80 % and 85 % knowledge training.
- (c) The approved basic training course to qualify for conversion from holding an NLD-MAR-66 MAML in subcategory B1.2 to subcategory B1.1 should not be less than 400 hours, and should include between 50 % and 60 % knowledge training.
- (d) The approved basic training course to qualify for conversion from holding an NLD-MAR-66 MAML in one subcategory A to another subcategory A should not be less than 70 hours, and should include between 30 % and 40 % knowledge training.

### **AMC 147.A.205 Basic knowledge examinations**

The MAA-NLD may accept that the MTO approved under NLD-MAR-147 can conduct examination of students who did not attend an approved basic course at that MTO.

### **AMC 147.A.210(a) Basic practical assessment**

NOT APPLICABLE.

### **AMC 147.A.210(b) Basic practical assessment**

An assessed pass for each student should be granted when the practical assessor is satisfied that the student meets the criteria of NLD-MAR-147.A.200(e). This means that the student has demonstrated the capability to use relevant tools/equipment/test equipment as specified by the tool/equipment/test equipment manufacturer and the use of maintenance manuals, and the student can carry out the required inspection/testing without missing any defects, can readily identify the location of components and is capable of correct removal/fitment/adjustment of such components. The student is only required to carry out enough inspection/testing and component removal/fitment/adjustments to prove capability. The student should also show an appreciation of the need to ensure clean working conditions and the observance of safety precautions for the student and the product. In addition, the student should demonstrate a responsible attitude in respect to flight safety and the airworthiness of the aircraft.

Appendix III to AMC to NLD-MAR-66 provides criteria for the competence assessment performed by the designated assessors (and their qualifications).

### **AMC 147.A.300 Military Aircraft Type Training**

Military Aircraft Type Training may be subdivided into airframe and/or powerplant and/or avionics/electrical systems and/or armaments/escape systems/other relevant military-specific systems type training courses. An MTO approved under NLD-MAR-147 may be approved to conduct airframe type training only, powerplant type training only, avionics/electrical systems type training only, armaments/escape systems/other relevant military-specific systems type training only or any combination thereof.

1. Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.
2. Powerplant type training course means a type training course on the bare engine, including the build-up to an engine change unit.
3. The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course.
4. Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to system 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73, and 77 or equivalent.
5. Armaments/escape systems/other relevant military-specific systems type training means type training on all other military-specific systems not covered in sub-paragraphs 1-4 above, as determined by the MAA-NLD.

## **SECTION B**

# **PROCEDURES FOR THE MILITARY AVIATION AUTHORITY THE NETHERLANDS**

### **AMC 147.B.10(a) Military Aviation Authority The Netherlands**

1. In deciding upon the required organisational structure, the MAA-NLD should review the number of certificates to be issued, the number and size of potential NLD-MAR-147 approved MTOs within The Netherlands, as well as the level of military aviation activity, number and complexity of aircraft and the size of the pMS's military aviation forces.

2. The MAA-NLD should retain effective control of important surveillance functions and not delegate them in such a way that NLD-MAR-147 MTOs, in effect, regulate themselves in airworthiness matters.

3. The set-up of the organisational structure should ensure that the various tasks and obligations of the MAA-NLD are not relying on individuals. That means that a continued and undisturbed fulfillment of these tasks and obligations of the MAA-NLD should also be guaranteed in case of illness, accident or leave of individual employees.

### **AMC 147.B.10(c) Military Aviation Authority The Netherlands**

1. MAA-NLD surveyors should have:

1.1 practical experience and expertise in the application of aviation safety standards and safe operating practices;

1.2 comprehensive knowledge of:

a. relevant parts of national implementing rules/regulations, certification specifications, airworthiness codes and guidance material;

b. the MAA-NLD's procedures;

c. the rights and obligations of a surveyor;

d. quality and safety systems;

e. continuing airworthiness management.

1.3 training on auditing techniques and assessing and evaluating safety management systems;

1.4 five years relevant work experience to be allowed to work as a surveyor independently. This may include, but should not be limited to, experience gained during training to obtain the sub-paragraph 1.5 (below) qualification;

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1.5 a relevant engineering degree or an aircraft maintenance technician qualification or training qualification with additional education. 'Relevant engineering degree' means an engineering degree from aeronautical, mechanical, electrical, electronic, avionic or other studies relevant to the maintenance and continuing airworthiness of aircraft/aircraft components;

1.6 knowledge of a relevant sample of aircraft types;

1.7 knowledge of maintenance training standards.

2. In addition to technical competency, surveyors should have a high degree of integrity, be impartial in carrying out their tasks, be tactful, and have a good understanding of human nature.

3. A programme for continuation training should be developed that ensures that the surveyors remain competent to perform their allocated tasks.

### **AMC 147.B.10(d) Military Aviation Authority The Netherlands**

The documented procedures should contain the following information:

(a) The pMS's designation of the MAA-NLD.

(b) The title(s) and name(s) of the manager(s) of the MAA-NLD and their duties and responsibilities.

(c) Organisation chart(s) showing associated chains of responsibility of the senior persons.

(d) A procedure defining the qualifications for staff together with a list of staff authorised to sign certificates.

(e) A general description of the facilities.

(f) Procedures specifying how the MAA-NLD ensures compliance with NLD-MAR-147.

### **AMC 147.B.20 Record-keeping**

1. The record-keeping system should ensure that all records are accessible whenever needed within a reasonable time. These records should be organised in a consistent way throughout the MAA-NLD (chronological, alphabetical order, etc.).

2. All records containing sensitive data regarding applicants or organisations should be stored in a secure manner with controlled access to ensure confidentiality of this kind of data.

3. All computer hardware used to ensure data backup should be stored in a different location from that containing the working data in an environment that ensures they remain in good condition. When hardware or software changes take place, special care should be taken that all necessary data continues to be accessible at least through the full period specified in NLD-MAR-147.B.20.

**AMC 147.B.110(a) Procedure for approval and changes to the approval**

1. The audit should be conducted on the basis of checking the facility for compliance, interviewing personnel and sampling any relevant training course for its conduct and standard.
2. The audit report should be made on an NLD-MAR Form 22. An example of an NLD-MAR Form 22 is published on the MAA-NLD Intranet and Internet sites.

**AMC 147.B.110(b) Procedure for approval and changes to the approval**

1. The reports should include the date each finding was cleared together with reference to the MAA-NLD report or letter that confirmed the clearance.
2. Findings should be recorded on the audit report form with a provisional categorisation as a level 1 or 2. Subsequent to the audit visit that identified the particular findings, the MAA-NLD should review the provisional finding levels, adjusting them if necessary and change the categorisation from “provisional” to “confirmed”.

**AMC 147.B.120(a) Continued validity procedure**

1. Audits should be conducted to ensure the continuity of the approval; it is not necessary to sample all basic and Military Aircraft Type Training courses, but the MAA-NLD should sample, as appropriate, one basic and one Military Aircraft Type Training course to establish that training is conducted in an appropriate manner. Nevertheless, the duration of the sampling for each course should not be less than 3 hours. Where no training course is being conducted during the audit, arrangements should be made to return at a later date to sample the conduct of a training course.
2. It is not necessary to sample all examinations associated with a training course but the MAA-NLD should sample, as appropriate, one basic and one Military Aircraft Type Training course examination.

**AMC 147.B.130(b) Findings**

1. In the case of a level 2 finding, the MAA-NLD may give up to 6 months’ notice of the need for rectification. Dependent upon the seriousness of the level 2 finding(s), the MAA-NLD may choose a notice period less than 6 months.
2. When the MAA-NLD chooses to allow 6 months, the initial notification should be of 3 months duration to the Quality Manager or Safety Manager followed by the final 3 months’ notice to the Accountable Manager.



**AMC to Appendix II to NLD-MAR-147 “Maintenance Training Organisation Approval”**

The following fields on the “Maintenance Training Organisation and Examination Approval Certificate” and the “Maintenance Training Organisation Approval Schedule” should be completed as follows:

Date of original issue: It refers to the date of the original issue of the MTOE.

Date of last revision approved: It refers to the date of the last revision of the MTOE affecting the content of the certificate. Changes to the MTOE which do not affect the content of the certificate do not require the reissuance of the certificate.

Revision No: It refers to the revision No of the last revision of the MTOE affecting the content of the certificate. Changes to the MTOE which do not affect the content of the certificate do not require the reissuance of the certificate.

### **AMC to Appendix III to NLD-MAR-147 “Examples of Training Certificates”**

As stated in Appendix III to NLD-MAR-147, an NLD-MAR-147 Certificate of Recognition for Basic Training Course or Basic Examination should be issued after completion of either basic training, basic examination or both basic training and basic examination.

Some examples of cases where a Certificate of Recognition should be issued are the following:

After successful completion of a full basic course in one MAML (sub) category including successful completion of the examinations of all the corresponding modules.

After successful completion of a full basic course in one MAML (sub) category without performing examinations. The examinations may be performed at a different NLD-MAR-147 MTO (this MTO will issue the corresponding Certificate of Recognition for those examinations) or at the MAA-NLD.

After successful completion of all module examinations corresponding to a MAML (sub) category.

After successful completion of certain modules/sub-modules/subjects.

It had to be noted that “successful completion of a course” (without the module examinations) means successful completion of the theoretical and practical training including the corresponding practical assessment.


### **FINAL CLAUSES**

(a) This ruling is known as: NLD-MAR-147 AMC & GM.

(b) An announcement regarding this ruling will be published in the State paper (Staatscourant) and this ruling will be included in the Ministerial Publications.

The Hague, 13 December 2019

For the Minister of Defence,  
The Director Military Aviation Authority,

  
J.P. Apon  
Air Commodore

## APPENDICES TO AMC to NLD-MAR-147

### Appendix I – Maintenance Training Organisation Exposition (MTOE)

1. The following subject headings form the basis of the MTOE required by NLD-MAR-147.A.140.
2. Whilst this format is recommended, it is not mandatory to assemble the MTOE in this manner as long as a cross-reference index is included in the MTOE as an Appendix and the Part 1 items remain in Part 1.
3. Part 2, 3 and 4 material may be produced as separate detailed manuals subject to the main exposition containing the Part 2, 3 and 4 fundamental principles and policy on each item. It is then permitted to delegate the approval of these separate manuals to the senior person but this fact and the procedure for doing so should be specified in paragraph 1.11.
4. Where an MTO is approved in accordance with any other NLD-MARs which require an exposition, it is acceptable to combine the exposition requirements by merging the Part 1 items and adding the Parts 2, 3 and 4. When this method is used, it is essential to include the cross-reference index of Part 4 paragraph 4.3.

#### PART 1 – MANAGEMENT

- 1.1. Corporate commitment by Accountable Manager
- 1.2. Quality and safety policy
- 1.3. Management personnel
- 1.4. Duties and responsibilities of management personnel, instructors, knowledge examiners and practical assessors
- 1.5. Management personnel organisation chart
- 1.6. List of instructional and examination staff  
  
Note: A separate document may be referenced
- 1.7. List of approved addresses
- 1.8. List of subcontractors as per NLD-MAR-147.A.145(d)
- 1.9. General description of facilities at paragraph 1.7 addresses
- 1.10. Specific list of courses approved by the MAA-NLD
- 1.11. Notification procedures regarding changes to MTO
- 1.12. MTOE and associated manuals amendment procedure

**PART 2 – TRAINING AND EXAMINATION PROCEDURES**

- 2.1. Organisation of courses
- 2.2. Preparation of course material
- 2.3. Preparation of classrooms and equipment
- 2.4. Preparation of workshops/maintenance facilities and equipment
- 2.5. Conduct of theoretical training & practical training (during basic knowledge training and type training)
- 2.6. Records of training carried out
- 2.7. Storage of training records
- 2.8. Training at locations not listed in paragraph 1.7
- 2.9. Organisation of examinations
- 2.10. Security and preparation of examination material
- 2.11. Preparation of examination rooms
- 2.12. Conduct of examinations (basic knowledge examinations and type training examinations)
- 2.13. Conduct of practical assessments (during basic knowledge training and type training)
- 2.14. Marking and record of examinations
- 2.15. Storage of examination records
- 2.16. Examinations at locations not listed in paragraph 1.7
- 2.17. Preparation, control & issue of certificates
- 2.18. Control of subcontractors

**PART 3 – TRAINING SYSTEM QUALITY PROCEDURES**

- 3.1. Audit of training
- 3.2. Audit of examinations
- 3.3. Analysis of examination results
- 3.4. Audit and analysis remedial action
- 3.5. Accountable Manager annual review
- 3.6. Qualifying the instructors
- 3.7. Qualifying the knowledge examiners and the practical assessors
- 3.8. Records of qualified instructors, knowledge examiners and practical assessors
- 3.9. Hazard identification and safety risk management schemes
- 3.10. Safety action planning
- 3.11 Management of change (including organisational changes with regard to safety responsibilities)
- 3.12. Training and communication on safety
- 3.13. Management system record keeping
- 3.14 Concession control for deviations from organisations procedures

**PART 4 – APPENDICES**

- 4.1. Example of documents and forms used
- 4.2. Syllabus of each training course
- 4.3. Cross-reference index – if applicable

## Appendix II to AMC 147.A.132(b)1 – Safety policy and Objectives

### SAMPLE SAFETY POLICY STATEMENT

1. Safety is the first priority in all our activities. We are committed to implementing, developing and improving strategies, management systems and processes to ensure that all our aviation activities uphold the highest level of safety performance and meet national and international standards. In order to achieve this, our safety objectives are set down in this policy statement.

2. Our commitment is to:

- a. Develop and embed a safety culture in all our aviation activities that recognises the importance and value of effective aviation safety management and acknowledges at all times that safety is paramount;
- b. Clearly define for all staff their accountabilities and responsibilities for the development and delivery of aviation safety strategy and performance;
- c. Minimise the risks associated with aircraft operations so far as is reasonably practicable;
- d. Ensure that externally supplied systems and services that impact upon the safety of our operations meet appropriate safety standards;
- e. Actively develop and improve our safety processes;
- f. Comply with and, wherever possible, exceed legislative and regulatory requirements and standards, including but not necessarily limited to those mandated by the MAA-NLD and Ministry of Defence;
- g. Ensure that all staff are provided with adequate and appropriate aviation safety information and training, are competent in safety matters and are only allocated tasks commensurate with their skills;
- h. Ensure that sufficient skilled and trained resources are provided and available to manage safety and implement safety strategy and policy;
- i. Establish and measure our safety performance against realistic objectives and/or targets;
- j. Achieve the highest levels of safety standards and performance in all our aviation activities;
- k. Continually improve our safety performance levels;
- l. Conduct safety and management reviews and ensure that relevant action is taken;
- m. Actively encourage, promote, reward and give feedback in response to safety reporting amongst our staff; and
- n. Ensure that aviation safety is maximised through the application of an effective SMS, which is integral to all our aviation activities.

# **GUIDANCE MATERIAL**

## **SECTION A**

### **TECHNICAL REQUIREMENTS**

#### **GM 147.A.10 General**

Such an MTO may conduct its activity from more than one address.

#### **GM 147.A.100(i) Facility requirements**

Where the organisation has an existing library of regulations, manuals and documentation required by another NLD-MAR, it is not necessary to duplicate such a facility subject to student access being under controlled supervision.

#### **GM 147.A.105(c) Personnel requirements**

Moved to AMC 147.A.105(c).

#### **GM 147.A.105(f) Personnel requirements**

It is recommended that potential instructors be trained in instructional techniques.

#### **GM 147.A.105(g) Personnel requirements**

Moved to AMC 147.A.105(f)2.

#### **GM 147.A.105(h) Personnel requirements**

1. Moved to AMC 147.A.105(h)2.
2. The updating training may be subdivided during the 24 months into more than one element and may include such activities as attendance at relevant lectures and symposiums.

#### **GM 147.A.110 Records of instructors, examiners and assessors**

Instructors, knowledge examiners and practical assessors should be provided with a copy of their terms of reference.

#### **GM 147.A.115(a) Instructional equipment**

1. Synthetic training devices are working models of a particular system or component and include computer simulations.
2. A synthetic training device is considered beneficial for complex systems and fault diagnostic purposes.

**GM 147.A.130(b) Quality policy, training procedures and quality system**

1. The primary objective of the quality system is to enable the MTO to satisfy itself that it can deliver properly trained students and that the MTO remains in compliance with NLD-MAR-147.
2. The independent audit is a process of routine sample checks of all aspects of the MTO's ability to carry out all training and examinations to the required standards. It represents an overview of the complete training system and does not replace the need for instructors to ensure that they carry out training to the required standard.
3. A report should be raised each time an audit is carried out describing what was checked and any resulting findings. The report should be sent to the affected department(s) for rectification action giving target rectification dates. Possible rectification dates may be discussed with the affected department(s) before the quality department confirms such dates on the report. The affected department(s) should rectify any findings and inform the quality department of such rectification.
4. A large MTO (an organisation with the capacity to provide training for 50 students or more) should have a dedicated quality audit group whose sole function is to conduct audits, raise finding reports and follow-up to ensure that findings are being rectified. For the small MTO (an organisation with the capacity to provide training for less than 50 students) it is acceptable to use competent personnel from one section/department not responsible for the function or procedure to check the section/department that is responsible, subject to the overall planning and implementation being under the control of the Quality Manager.
5. The management control and follow-up system should not be contracted to outside persons. The principal function is to ensure that all findings resulting from the independent audit are corrected in a timely manner and to enable the Accountable Manager to remain properly informed of the state of compliance. Apart from rectification of findings, the Accountable Manager should hold routine meetings to check progress on rectification, except that in the large MTO such meetings may be delegated on a day-to-day basis to the Quality Manager as long as the Accountable Manager meets at least once per year with the senior staff involved to review the overall performance.

**GM 147.A.132(a) Safety Management System (SMS)**

1. It is difficult to employ a standard compliance audit process in the assessment of SMS effectiveness. Variations in the size, nature and complexity of organisations make it necessary to assess organisations on the 'performance' of their SMS rather than 'compliance' and 'conformance'. These performance assessments primarily focus on the effectiveness of the SMS and its maturity growth. See more information about SMS in Appendix I to GM 147.A.132(a) – Safety Management System introduction.
2. Assessment against the indicators, contained within the AMC, will be used to determine the maturity of the organisation. Following an assessment, an agreed maturity growth will be established for the organisation by the MAA-NLD. For new organisations, full SMS maturity is expected after a period of 5-7 years depending on the size, nature and complexity of the organisation.



## **GM 147.A.132(b)1 Safety Management System (SMS)**

1. **Safety policy and objectives** covers the following elements:

- a. Management commitment and responsibility
- b. Safety accountabilities
- c. Appointment of key safety personnel
- d. Emergency response planning
- e. SMS documentation.

2. Safety policy and objectives is a supporting component of an SMS, outlining what the organisation intends to do to manage safety. For organisations that are new to SMS, safety policy and objectives starts with a Gap Analysis and Implementation Plan, which is discussed in greater detail in Appendix I to GM 147.A.132(a) – Safety Management System introduction.

### **MANAGEMENT COMMITMENT AND RESPONSIBILITY**

3. The organisation is to nominate a member to be accountable to the MAA-NLD, who shall be referred to as the Accountable Manager. The Accountable Manager has overall responsibility for running the organisation. The Accountable Manager may hold the position for more than one organisation and is not required to be necessarily knowledgeable on technical or operational matters. While the Accountable Manager remains accountable, the safety responsibilities of each individual in the organisation are to be clearly defined through the organisations safety documentation.

4. With regard to the Accountable Manager, it is normally intended to mean the Chief Executive Officer or senior military commander of the MTO, who by virtue of position has overall (including in particular resource allocation) responsibility for running the MTO. The Accountable Manager may be the Accountable Manager for more than one organisation and is not required to be necessarily knowledgeable on training matters as the MTOE defines the maintenance training standards. When the Accountable Manager is not the Chief Executive Officer or senior military commander, the MAA-NLD will need to be assured that such an Accountable Manager has direct access to the Chief Executive Officer or senior military commander and has a sufficiency of 'maintenance training resources' allocation.

5. The safety accountabilities of the Accountable Manager include ensuring:

- a. Commitment the organisations personnel to their individual and collective safety responsibilities.
- b. Provision of the resources necessary for effective safety management.
- c. Promotion of awareness of the organisations SMS at all levels of the organisation.
- d. Promotion and demonstration of commitment to the safety policy through their active and visible participation in SMS processes.

- e. There are defined standards for acceptable safety behaviour.
- f. Active encouragement of safety reporting, with explicit support of a 'just and fair culture' as part of the overall safety culture of the organisation.
- g. An appropriate process by which safety culture can be measured and improvements planned.
- h. Periodic reviews are conducted of the safety policy to ensure it remains relevant and appropriate to the organisation.
- i. Commitment to continuous improvement of SMS performance.

6. The Accountable Manager should develop a succinct safety policy statement (see for an example Appendix II to AMC 147.A.132(b)1) that demonstrates genuine management commitment to, and responsibility for, the SMS. This should reflect the organisations philosophy of safety management and become the foundation on which the organisations SMS is built. The creation of a positive safety culture begins with the issuance of clear, unequivocal direction, an indication of the types of behaviours that are unacceptable, and the conditions under which administrative action would not apply.

7. The safety policy statement should also be accompanied or contain a list of the organisations safety objectives, defining what the organization aims to accomplish with its SMS. Safety objectives chosen should be designed to encompass all functions of the SMS to ensure a balanced approach to improvement and monitoring. Noting that not all objectives will be written in a SMART format (specific, measureable, achievable, realistic and timely) it is expected that they should be supported by SMART safety targets to demonstrate progress towards the objective. Further details regarding safety targets can be found in GM 147.A.132(b)3.

8. In preparing a safety policy, the Accountable Manager should consult widely with key staff members in charge of key safety areas. Consultation ensures that the document is relevant to staff and gives them a sense of ownership in it.

## **SAFETY ACCOUNTABILITIES**

9. While the Accountable Manager remains accountable for the organisations SMS to the MAA-NLD, all of the organisations management and personnel should have responsibilities related to the SMS. These responsibilities should be clearly communicated and known throughout the organisation.

10. To assist with communication of responsibilities, senior management should develop and resource an organisational structure that is capable of supporting the agreed SMS functions. It should clearly depict responsibilities, accountabilities (of the Accountable Manager), lines of communication for safety issues and recognise the commitment to the safety contributions required by all staff.

## APPOINTMENT OF KEY SAFETY PERSONNEL

11. The appointment of key safety personnel is vital to the effective functioning of an SMS. The number, type, skills, composition and appointment approach of these members will differ greatly depending on the size, nature and complexity of the business undertaken, for example:

a. **Large or complex organisations.** Large organisations could be expected to have a dedicated safety department, led by dedicated Safety Manager whose duties may encompass SMS management. There would be scope within the department to appoint deputies and additional staff as required.

NOTE: The Safety Manager may be identified by different titles in different organisations.

b. **Medium-sized organisations.** A medium-sized organisation could be expected to have a dedicated Safety Manager who might also hold responsibilities within other contributing management systems, and possibly some dedicated safety employees. There would be scope for deputies to be appointed when required.

c. **Small or non-complex organisations.** Small organisations could be expected to allocate responsibilities of the Safety Manager to one or more of its employees as a secondary duty, given the organisations limited SMS complexity.

12. Key safety positions and roles within the organisation may include:

- a. the Accountable Manager
- b. the Safety Manager
- c. strategic-level safety committee members
- d. tactical-level safety committee members
- e. emergency response coordinators
- f. safety investigators
- g. safety training facilitators
- h. assorted safety-related deputies and teams.

13. **Safety Manager.** Each SMS will have a nominated Safety Manager who is responsible for the development and maintenance of an effective SMS. The Safety Manager advises the Accountable Manager and other management personnel on aviation safety management matters and may be supported by additional staff. The Safety Manager's functions may include, but are not necessarily limited to:

- a. Managing the SMS implementation plan on behalf of the Accountable Manager.
- b. Performing/facilitating hazard identification and safety risk analysis.
- c. Monitoring corrective actions and evaluating their results.
- d. Providing periodic reports on the organisations safety performance.

- e. Maintaining SMS documentation and records.
- f. Planning and facilitating SMS training for staff.
- g. Providing independent advice on safety matters.
- h. Monitoring safety concerns in the aviation industry and their perceived impact on the organisations operations.
- i. Coordinating and communicating (on behalf of the Accountable Manager) with the MAA-NLD and other relevant agencies as necessary on issues relating to aviation safety and SMS.
- j. Coordinating and communicating (on behalf of the Accountable Manager) with international organisations on issues relating to aviation safety and SMS.

14. There are no specific selection criteria for the position of Safety Manager, however consideration should be given to experience, enthusiasm, oral and written communication skills.

15. **Safety Committees.** Other key safety personnel include members of safety committees. The size, structure and objectives of safety committees will vary depending on the organisation, but should include a combination of strategic and tactical activities/discussions. Strategic activities/discussions deal with high-level issues related to policies, resource allocation and safety performance monitoring. Tactical activities/discussions deal with specific implementation issues, generally associated with decisions made at the strategic level.

## **COORDINATION OF THE EMERGENCY RESPONSE PLAN**

16. An effective SMS should contain an Emergency Response Plan (ERP) to ensure appropriate action is taken in the event of aviation safety related emergencies. The requirements of the ERP will vary depending on the organisation. Operators and maintenance organisations will likely need to include emergency responses to in-flight incidents and accidents, whilst small component maintainers and providers will likely focus more on the quarantine of components/documentation following an aviation incident or an in-facility emergency. An effective ERP should contain the following:

- a. Instructions to ensure that there is an orderly and efficient transition from normal to emergency operations.
- b. A variety of defined foreseeable occurrences and associated actions to be taken.
- c. Plans and coordinated actions to ensure the risks attributable to a major safety event can be managed and minimised.
- d. A clear guide for the assignment of authority and responsibilities in the event of an emergency.
- e. The authorisations for action by key personnel.
- f. The means to coordinate emergency efforts internally and with those organisations it should interface with during the provision of its services.

- g. Descriptions of periodic testing and review requirements.
- h. The definition and management of appropriate initial and recurrent training for personnel assigned to emergency roles.
- i. The required coordination of efforts to cope with the emergency.
- j. Instructions to assist in the return to normal operations as soon as possible.

17. Organisations do not need to develop a new ERP if their defined emergency operations are already covered by a suitable plan. They may leverage off a corporate ERP, or a site ERP, provided they identify the interfaces to that plan, their responsibilities within it, and what circumstances would cause it to be activated.

### **SAFETY MANAGEMENT SYSTEM DOCUMENTATION**

18. Formal SMS documentation describes the organisations SMS and helps to communicate it internally to staff, and externally to interfacing organisations. Documentation provides the authoritative basis for the establishment, and improvement of, the organisations level of safety. Some organisations may elect to use an SMS manual (or equivalent) as a focal point for their SMS documentation, however this is not a requirement. Typically the detail and extent of SMS documentation should be tailored to the organisations size, scope, complexity and risk context. It is important that SMS documentation captures all four SMS components along with associated procedures, policies and activities, and be integrated for effectiveness and efficiency. Ideally SMS documentation should be effective enough to clarify how the organisations safety management activities link to the organisations safety policy.

19. SMS documentation is to contain appropriate interrelationships between the components of the SMS and should be made readily available to all personnel that may need to use or seek to read the documentation. All documentation should be reviewed regularly to capture any changes or improvements, and contain appropriate version control to track any changes that are made.

20. All SMS documents and records should be uniquely identified and stored in a consistent and logical manner.

21. Initially the SMS documentation may need to be structured as an SMS Implementation Plan, with intended scope, tasks required and phasings (see Appendix I to GM 147.A.132(a)). Over time, as SMS processes are embedded and become functional within the organisation, the Implementation Plan could transition naturally to become the full suite of SMS documentation.

## **GM 147.A.132(b)2 Safety Management System (SMS)**

1. **Safety risk management** covers the following elements:

- a. Hazard identification
- b. Risk assessment and mitigation.

2. Organisations need to ensure that the risks to aviation safety posed by their aviation activities, and the interface of those aviation activities to other organisational functions, are controlled to meet agreed safety performance targets. This process is known as safety risk management and includes hazard identification, safety risk assessment and the implementation and monitoring of appropriate safety risk controls.

3. Safety risk management is the core component of an SMS and systematically assesses risks that exist within the context of the delivery of an organisations products or services. Hazards can be identified reactively, proactively or predictively. After which hazards are assessed for related safety risks. A mature SMS caters equally for all three.

4. At the micro level, hazards may result from product, process or behaviours that are deficient in design, training, function, or human interfaces with other processes or systems (see Appendix I to GM 147.A.132(a)). At the macro level, hazards may also result from latent failures of product, process, or organisational systems to account for human performance nuances, or failures to adequately adapt to changes in the organisations operating context.

5. To effectively manage aviation risks the organisations SMS, should include:

- a. Hazard identification techniques tailored to suit the specific activity being undertaken.
- b. Risk analysis techniques commensurate with the size, nature and complexity of the organisation.
- c. Selection and prioritisation of risk controls based on the hierarchy of controls.
- d. Procedures for communicating the risk and associated risk controls to relevant stakeholders.
- e. Procedures for documenting hazards, risks and associated risk controls, should as a minimum, detail:
  - the hazard,
  - the likelihood and consequences of the risk,
  - the risk controls that have been implemented,
  - the review period applicable to each risk control,
  - the stakeholder responsible for implementing each risk control.

6. **Human Factors.** Hazards arising from Human Factors (HF) are inherent in any organisation. These hazards should be captured using hazard identification tools such as Bowtie analysis, and through the analysis of incident investigation reports.

7. An SMS should clearly demonstrate how HF has been considered in the management of risk. Of particular relevance is the implementation of controls to address the potential and actual consequences of human error. Typically, control measures for potential and actual human error might focus on HF aspects such as equipment design and usability, task and job design, workplace design, procedures, training, communication, team work, supervision, and monitoring.

8. **Fatigue.** In the aviation context, fatigue is considered a significant hazard. It impairs essential aspects of human performance resulting in increased susceptibility to error and greater risk of injury and accident. An SMS should clearly demonstrate how the organisation manages the risk of fatigue in its personnel/employees. A typical approach includes:

- a. Documenting the specific responsibilities of the organisation and its personnel for managing fatigue.
- b. Incorporating fatigue within risk management practices to support the identification, management, and ongoing review of fatigue related hazards.
- c. Documenting key fatigue risk controls, e.g. duty / rest periods and roster patterns.
- d. Reporting and record keeping of all fatigue related events.

## HAZARD IDENTIFICATION

9. Hazard identification forms the basis of safety risk management. Hazards in an organisation can be classified into a number of groups, two of which are aviation safety hazards and personal injury safety hazards. Prior to implementing an SMS required by the NLD-MAR-147, it is important to understand the difference between the two. They give rise to different risks with different consequences, and therefore the management of personal injury safety risks does not indicate appropriate management of aviation safety risks. In the context of an organisation, some hazards can generate an aviation safety risk and/or a personal safety risk, both of which need to be managed.

10. Aviation safety hazards could potentially compromise flight safety, e.g. human factors. Aviation safety hazards have the potential to significantly and adversely affect capability by causing multiple fatalities and major damage to aviation assets, i.e. an aircraft crash.

11. Personal injury safety hazards on the other hand, affect individuals but have limited potential to impact flight safety. Personal safety hazards typically lead to incidents such as slips, trips, falls, hearing damage, manual handling injuries, and radiation burns.

12. Hazards can be identified reactively, proactively and predictively from a range of sources. Obviously the more proactive and predictive hazard identification and control is present, the less we will be bound to continue learning from incidents and accidents. Other possible sources include, but are not limited to:

- a. Reactive hazard identification:
  - i. mandatory incident reporting
  - ii. investigation outcomes.

b. Proactive hazard identification:

- i. voluntary and confidential hazard reporting
- ii. brain-storming using experienced personnel
- iii. development of risk scenarios and controls for all activities
- iv. surveys and audits
- v. in-process task observations
- vi. feedback from training
- vii. maintenance program completion reviews.

c. Predictive hazard identification:

- i. objective performance improvement indicators
- ii. trend analyses of the hazard and incident database
- iii. data mining past records
- iv. information sharing to similar/related organisations.

**SAFETY RISK ASSESSMENT AND MITIGATION**

13. Safety risk assessment and mitigation follows on from hazard identification as part of the complete safety risk management process. In general, this element requires organisations to manage aviation safety risks in a systematic, rational and concise manner in order to eliminate and to treat risks. Measures to eliminate and mitigate risks also need to be assessed in order to ensure that they do not inadvertently introduce new risks. All records/output from the risk management process are to be made available to the MAA-NLD upon request.

14. Identified hazards, risks and treatments need to be reviewed at regular intervals to ensure extant safety risk management decisions remain effective.



### **GM 147.A.132(b)3 Safety Management System (SMS)**

1. **Safety assurance** component covers the following elements:

- a. Safety performance monitoring and measurement,
- b. Management of change,
- c. Continuous improvement.

2. Safety assurance processes systematically provides stakeholders with an indication of the performance of the system. Organisations need to continually monitor their internal processes as well as their environment to detect changes or deviations that may introduce emerging safety risks, or degrade the effectiveness and efficiency of existing treatments. In addition to internal monitoring, organisations need to incorporate findings from external audits/assessments. External assurance and evaluation functions provide an element of independence to complement the internal program. Changes or deviations identified can then be addressed through the organisations safety risk management process and corrective actions raised against findings.

### **SAFETY PERFORMANCE MONITORING AND MEASUREMENT**

3. Targets should be established to achieve each safety objective (safety objectives are discussed in greater detail in GM 147.A.132(b)1. Ideally the targets should be: Specific, Measurable, Achievable, Realistic and Time-based (SMART). To monitor how the organisation is achieving its targets and objectives, associated Safety Performance Indicators (SPI) should be developed.

4. Safety performance monitoring and measurement requires organisations to develop a balanced series of leading and lagging SPIs to quantitatively and qualitatively measure the effectiveness of each of their SMS elements and their intended outcomes. The number of SPIs is not as important as their coverage of the SMS components. Used effectively, SPIs can both provide an early warning of failures to maintain agreed performance or requirements, and confirmation that agreed improvements have been achieved. The selection and use of SPIs should be based on the size, nature and complexity of the organisation.

5. Potential information sources for safety performance monitoring and measurement include, but is not limited to;

- a. safety studies
- b. safety audits
- c. safety reviews
- d. safety surveys
- e. proactive and predictive hazard reports
- f. safety culture survey results
- g. aviation safety occurrences

- h. safety investigations
- i. training registers and feedback
- j. risk assessments
- k. hazard and risk registers
- l. safety days/briefs
- m. safety improvement suggestions
- n. safety meeting participation.

**6. Frequency of monitoring.** Many organisations may rely solely on audits to highlight system deterioration. However, audit intervals can be too infrequent, or may not provide an ability to collect data on all SPIs. Instead, the use of SPIs should be seen as complementing audit programs. Deficiencies uncovered by either an audit or SPI may highlight the need for a new SPI or audit item to be added. Inevitably, just like audit frequencies, some SPIs may have long lead or lag times. It is therefore important to establish balanced sets of SPIs that can be regularly reviewed in short, medium and long timeframes. Most importantly, each SPI needs to be defined so as to be clear as to what is being displayed, and what safety actions need to be taken as a result.

**7. Reporting culture.** In order to be effective, the organisation needs to establish and maintain an environment in which employees feel comfortable to report hazards, issues, and concerns, as well as occurrences, incidents, etc., and propose safety solutions and improvements. The Accountable Manager and other key safety personnel need to encourage employees to report safety issues without fear of reprisal. Policies that assure employees of fair treatment and clear standards of behaviour are an essential part of maintaining a reporting culture.

**8. Confidential reporting.** Organisations should define methods for employee reporting and de-identification of sources without losing essential information. As you develop and employ the confidential reporting procedures and include its input in safety decision making, employees will begin to trust the system to work toward elimination of systemic problems. This, in turn, will stimulate greater participation in employee reporting of safety concerns. A segment of the reports generated within an organisation, had to be provided to the MAA-NLD in accordance with SMAR-1 – Occurrence Reporting.

**9. Safety investigations.** To be effective and supported, the safety reporting system should conduct safety investigations to identify underlying causes and potential aviation safety hazards for existing and future operations. It is understood that the severity or possible severity of the occurrence will normally determine the level of investigation. The results of the report should be provided through feedback to the reporter (or whole organisation) with a description of actions taken and any other relevant information. The MAA-NLD may wish to conduct an independent investigation on any safety occurrence. This will normally be afforded to occurrences that have been identified by the MAA-NLD as ‘Accidents’ or ‘Serious Incidents’ as defined by the NLD-MAD 1 Glossary of Terms.

10. **Communication of safety findings.** Safety findings identified as part of the safety assurance process or SPI reviews should be acted upon to the extent necessary to optimise SMS performance. Those who can act on safety findings, or need to be informed, can be quite varied. Communicating important safety findings to the Accountable Manager and other key safety personnel is essential to ensure the information can be used to inform decision making. Given the volume and frequency of possible findings, a graduated approach should be used, based on criteria which may include the assessed risk of the finding, the possible affected parties or the resources required to correct the finding.

## MANAGEMENT OF CHANGE

11. Either self-generated or imposed, most changes at the organisation have the ability to affect the appropriateness or effectiveness of existing safety risk controls. Additionally, whenever change occurs, the opportunity exists for new aviation safety hazards to be inadvertently introduced. Hazards resulting from any change to what is considered to be the 'status quo' should therefore be identified and addressed through the safety risk management process. Changes can take many forms, including, for example, internal and external safety reviews and audits, nominal staff turn-over, shift-work changes, increased operational tempo, changes to work location, introduction of new technologies or processes, etc.

12. The organisations documented change management procedure should consider:

a. **Hazards, risks and mitigations.** Hazard identification and risk assessments should be conducted to understand the potential implications of the change and inform the decision maker whether to implement the change. Controls should then be implemented to mitigate any risks posed.

b. **Monitoring.** The assurance system should be used to monitor the effectiveness of implemented controls and monitor for additional risks.

## CONTINUOUS IMPROVEMENT OF THE SMS

13. Continuous improvement of the SMS is required to ensure ongoing improvements in the level of performance of the system using evidence from audits, reviews and surveys. It can be broken down into two distinct feedback cycles:

a. **System Design.** Key safety personnel need to ensure that shortfalls (policies, procedures and tools in an SMS are insufficient or ineffective) in the design of the SMS are addressed as soon as possible.

b. **System Operation.** Key safety personnel need to ensure that the SMS is operating as it is described in related SMS documentation.

14. Assurance processes could make use of the SMS assessment tools to help ensure that the system design is complete and suitable in accordance with the NLD-MAR-147.

## **GM 147.A.132(b)4 Safety Management System (SMS)**

1. **Safety promotion** covers the following elements:

- a. Training and education, and
- b. Safety communication.

2. Safety Promotion is an important component for supporting and creating an effective SMS. effective safety promotion will notify the workforce of relevant safety trends and events, train them to understand and use the SMS, and promote a generative safety culture. If executed poorly it will undermine an organisations safety culture and lead to inefficiencies due to poor understanding of processes, expectations and responsibilities. Safety promotion is essential in creating an environment that is conducive to achieving the organisations safety objectives, as agreed in the SMS implementation plan. It provides a sense of purpose to organisations safety efforts and enables the continuous improvement process. Over a period of time, effective safety promotion should:

- a. Develop a culture of doing the right thing at the right time.
- b. Support safety culture communication and dissemination of lessons learnt.
- c. Assist employees in understanding their roles in maintaining safe operations.
- d. Encourage bottom-up communication.

3. An organisations level of safety cannot be improved solely by being directed to do so, or by strict adherence to published policies. Safety promotion affects both individual and organisational culture, and supplements the organisations policies, procedures and processes by providing and supporting tangible and intangible evidence, and values, to support safety efforts. Safety culture is dynamic, and needs to be constantly reinforced as the organisation is affected by either nominal or imposed changes; e.g. postings, resignations, staff movements and reforms.

### **TRAINING AND EDUCATION**

4. Organisations need to facilitate safety training relevant to specific issues encountered in their context. The provision of training and education to appropriate staff, regardless of their level in the organisation, is an indication of management's commitment to an effective SMS. safety training and education at the local level should complement core promotion and specialisation courses, and be adapted to organizational context. Generally, local training and education should ensure coverage of the following topics and the benefits adapted for position/rank and responsibilities at the organisation:

- a. organisational safety policies, objectives, targets, and Safety Performance Indicators (SPI)
- b. safety roles and responsibilities of all staff levels
- c. safety risk management principles
- d. reactive, proactive and predictive safety reporting systems

- e. management's visible support of safety
- f. communication of safety-related information
- g. resource management
- h. human factors
- i. training effectiveness validation systems
- j. training recording and re-currency requirements
- k. continuous safety improvement methodologies.

5. As each individual within an organisation has safety responsibilities, safety training and education needs to ensure that personnel are competent to perform the safety-related duties expected. Personnel closer to the end product should be trained in practical implementation of safety concepts, and the outcomes expected. Personnel in management style positions should focus on high level SMS concepts and implementation. Given the different training coverage dependent on position and seniority, there is no one-size fits all approach to safety training and education.

## **SAFETY COMMUNICATION**

6. The purpose of safety communication is to ensure that aviation safety issues are openly, effectively and regularly discussed and disseminated within, and external to, the organisation. This includes coverage of SMS objectives, targets, SPIs and trends, procedures and remedial actions as a result of feedback or safety performance.

7. Safety communication therefore aims to:

- a. Ensure that staff are fully aware of the scope of their SMS and their part in it.
- b. Convey safety-critical information and resultant actions in language the audience can relate to.
- c. Encourage timely, relevant and clear two-way discussions.
- d. Raise awareness of hazards and treatment effectiveness.
- e. Provide transparent information regarding changes at the organisation and their assessed safety impacts.
- f. Provide feedback on organisation safety performance indicators and resultant preventive/corrective actions.
- g. Share successes and lessons learned.

8. Safety communication can take any form that most effectively imparts the outcomes sought to the audience required. Successful safety communication strategies employ multiple means of communication, each adapted for a different type of safety information and audience. Safety information has no value unless the audience learns from it, which in its simplest form reinforces safety awareness and at its most complex, stimulates action to mitigate future risks. Visual, verbal, written or interactive communication means can be used effectively. Bulletins, briefings, safety groups, scrolling banners on web pages and hazard and incident workshops, among others, have been used successfully in the past as part of an overall coordinated safety communication strategy. Lessons learned can also be gained from sharing information with, and from, other organisations.

9. Safety communication should be disseminated both internally and externally to the organisation and flow effectively between management and staff. This will ensure all stakeholders are communicating and receiving feedback on the diverse range of safety issues at the appropriate time.

### **GM 147.A.135(c) Examinations**

The MAA-NLD will determine when or if the disqualified examiner may be reinstated.

### **GM 147.A.140(c) Maintenance Training Organisation Exposition (MTOE)**

The Quality Manager should be responsible for monitoring the amendment of the MTOE, unless otherwise agreed by the MAA-NLD, including associated procedures manuals and submission of the proposed amendments to the MAA-NLD. However, the MAA-NLD may agree via a procedure stated in the amendment section of the MTOE that some defined class of amendments may be incorporated without prior approval by the MAA-NLD.

### **GM 147.A.145(d) Privileges of the Maintenance Training Organisation**

1. Moved to AMC 147.A.130(b)4(i).
2. The fundamental reason for allowing an MTO approved under NLD-MAR-147 to subcontract certain basic theoretical training courses is to permit the approval of MTOs which may not have the capacity to conduct training courses on all NLD-MAR-66 modules.
3. The reason for allowing the subcontracting of only training modules 1 to 6 and 8 to 10 of Appendix I to NLD-MAR-66 is that most of the related subjects can generally also be taught by training organisations not specialised in aircraft maintenance and the practical training element as specified in NLD-MAR-147.A.200 does not apply to them. However, training modules 7, 11 to 17 and 50 to 55 of Appendix I to NLD-MAR-66 are specific to aircraft maintenance and include the practical training element as specified in NLD-MAR-147.A.200. The intent of the “limited subcontracting” option as specified in NLD-MAR-147.A.145 is to grant NLD-MAR-147 approvals only to those organisations having themselves at least the capacity to teach on-aircraft maintenance specific matters.

**GM 147.A.145(d)3 Privileges of the Maintenance Training Organisation**

In the case of Military Aircraft Type Training and examination, the reason for restricting subcontracting to powerplant, avionic systems, armaments, escape systems and other relevant military-specific systems is that the related subjects can generally also be imparted by certain organisations specialised in these domains such as the (Military) Type Certificate Holder of the powerplant or the OEMs of these avionic systems, armaments, escape systems and other relevant military-specific systems. In such a case, the Military Aircraft Type Training course should make clear how the interfaces with the aircraft are addressed and by whom (the subcontracted organisation or the NLD-MAR-147 MTO itself).

## SECTION B

# PROCEDURES FOR THE MILITARY AVIATION AUTHORITY THE NETHERLANDS

### GM 147.B.110 Procedure for approval and changes to the approval

1. A meeting should be arranged between the applicant and the MAA-NLD who issues NLD-MAR-147 approvals to determine if the applicant's training activities justify the investigation for issue of NLD-MAR-147 approval and to ensure that the applicant understands what needs to be done for NLD-MAR-147 approval. This meeting is not intended to establish compliance but rather to see if the activity is a NLD-MAR-147 activity.

2. Assuming that the applicant's activities come within the scope of NLD-MAR-147 approval, instructions should be sent to the MAA-NLD staff requesting that an audit of the applicant be carried out and, when satisfied that compliance has been established, a recommendation for the issue of approval should be submitted to the MAA-NLD staff who grant approval unless these are the same staff. The MAA-NLD should determine how and by whom the audit should be conducted. For example, if the applicant is a large MTO, it will be necessary to determine whether one large team audit or a short series of small team audits or a long series of single person audits is most appropriate for the particular situation.

3. Where it is intended that the MTO may conduct training and examinations away from the MTO address(es) in accordance with NLD-MAR-147.A.145(c), then a sample audit of the process should be carried out by the MAA-NLD from time to time to ensure that procedures are followed. For practical reasons such sample audits will need to be carried out when the training is actually being conducted away from the MTO address(es).

4. The auditing surveyor should ensure that they are always accompanied throughout the audit by a senior member of the MTO making application for an NLD-MAR-147 approval. Normally this should be the proposed Quality Manager. The reason for being accompanied is to ensure that the MTO is fully aware of any findings during the audit. In any case, the proposed Quality Manager/senior member of the MTO should be debriefed at the end of the audit visit on the findings made during the audit.

5. There may be occasions when the auditing surveyor may find situations in the applicant's organisation on which he/she is unsure about compliance. In this case, the organisation should be informed about possible non-compliance at the time and the fact that the situation will be reviewed within the MAA-NLD before a decision is made. The organisation should be informed of the decision within 2 weeks of the audit visit in writing if the decision is a confirmation of non-compliance. If the decision is a finding of being in compliance, a verbal confirmation to the organisation will suffice.

6. A change of name of the MTO requires the MTO to submit a new application as a matter of urgency stating that only the name of the MTO has changed including a copy of the MTOE with the new name. Upon receipt of the application and the MTOE, the MAA-NLD should reissue the approval certificate valid only up to the current expiry date.

7. A name change alone does not require the MAA-NLD to audit the MTO, unless there is evidence that other aspects of the MTO have changed.



## NLD-MAR-147 AMC & GM

8. A change of Accountable Manager requires the MTO to submit such fact to the MAA-NLD as a matter of urgency together with the amendment to the Accountable Manager exposition statement.

9. A change of any of the senior personnel specified in NLD-MAR-147.A.105(b) requires the MTO to submit to the MAA-NLD an NLD-MAR Form 4 in respect of the particular person. If satisfied that the qualifications and experience meet the standard required by NLD-MAR147, the MAA-NLD should indicate acceptance in writing to the MTO. An example of an NLD-MAR Form 4 is published on the MAA-NLD Intranet and Internet sites.

10. A change in the MTOE requires the MAA-NLD to establish that the procedures specified in the MTOE are in compliance with NLD-MAR-147 and then to establish if these are the same procedures intended for use within the training facility.

11. Any change of location of the MTO requires the MTO to make a new application to the MAA-NLD together with the submission of an amended MTOE. The MAA-NLD should follow the procedure specified in NLD-MAR-147.B.110(a) and (b) in so far as the change affects such procedure before issuing a new NLD-MAR147 approval certificate.

12. The complete or partial reorganisation of an MTO should require the re-audit of those elements that have changed.

13. Any additional basic or Military Aircraft Type Training courses require the MTO to make a new application to the MAA-NLD together with the submission of an amended MTOE. For basic training extensions, an additional sample of new examination questions relevant to the modules associated with the extension being sought will be required to be submitted. The MAA-NLD should follow the procedure of paragraph 11 (above) in so far as the change affects such procedures unless the MAA-NLD is satisfied that the MTO has a well-controlled procedure to qualify such change when it is not necessary to conduct the audit elements of the paragraph 11 procedure.

### FINAL CLAUSES

(a) This ruling is known as: NLD-MAR-147 AMC & GM..

(b) An announcement regarding this ruling will be published in the State paper (Staatscourant) and this ruling will be included in the Ministerial Publications.

The Hague, 13 December 2019

For the Minister of Defence,  
The Director Military Aviation Authority,

  
J.P. Apon  
Air Commodore

# APPENDICES TO GM to NLD-MAR-147

## Appendix I to GM 147.A.132(a) – Safety Management System introduction

### Background

1. Regulations are imposed on organisations with the aim of providing a minimum level of protection against hazards. However, the effectiveness of the regulatory intent is dependent on organisational, environmental and human factor influences present in the regulated organisations. Safety Management System (SMS) regulations enhance the traditional regulation set, by providing mechanisms by which these influences can be effectively assessed for safety implications and mitigated.

### Rationale

2. Process regulation provides a minimum level of protection against hazards that threaten safety, with overall effectiveness limited by organisational, environmental and human factors. A SMS provides a higher level of safety by supporting and extending the protection afforded through process regulation alone.

### Purpose

3. The purpose of an SMS is to provide organisations with a systematic, explicit, staged and comprehensive approach to managing risks to aviation safety, including the necessary organisational structures, accountabilities, policies and procedures. An effective SMS improves the likelihood of predicting, preventing and treating hazards, errors and violations by ensuring that SMS elements are present, suitable, operating and effective. In doing so, the SMS should be seen as a capability sustainment investment, not as an overhead.

### SAFETY MANAGEMENT SYSTEM FRAMEWORK

4. NLD-MAR SMS requirements are derived from recommended practices published within the International Civil Aviation Organisation (ICAO) Annex 19 and Safety Management Manual (SMM, Doc 9859 third edition). These documents advocate SMS as a dynamic risk management system, aligning with Quality Management System (QMS) principles, in a structure scaled appropriately to the organisational risk, and applied in a safety culture environment.

5. Although the requirements of NLD-MAR SMS have been derived from ICAO's Safety Management Framework, the use of an ICAO based SMS is not mandated. Many similar systems may be utilised to achieve a similar scope and level of safety performance.

6. The structure of the GM and AMC for NLD-MAR SMS is not a compulsory structure, however, it aligns with the 'ICAO Framework' and comprises four core components and 12 elements, as follows:

- a. Safety policy and objectives
  - i. Management commitment and responsibility
  - ii. Safety Accountabilities
  - iii. Appointment of key safety personnel
  - iv. Coordination of emergency response planning
  - v. SMS documentation.

- b. Safety risk management
  - i. Hazard identification
  - ii. Safety risk assessment and mitigation.
- c. Safety assurance
  - i. Safety performance monitoring and measurement
  - ii. The management of change
  - iii. Continuous improvement of the SMS.
- d. Safety promotion
  - i. Training and education
  - ii. Safety communication.

7. The combination of safety risk management, safety assurance and safety promotion, as enacted by safety policy and objectives, supports the organisation to maintain a balance between capability and safety. These four components are discussed in greater detail in NLD-MAR GM 147.A.132(b).

8. For the aviation domain to progressively improve safety, many interfacing functions need to be considered as part of the broader SMS. These functions include operations, maintenance, design, production, airspace management, aerodrome services, and training development and delivery providers.

9. Organisations required to meet the outcomes of NLD-MAR SMS may (wholly or in part) leverage off a corporate safety management solution. If a corporate solution is used, it had to be referred to in the organisations exposition. When using a corporate safety management solution, consideration needs to be given to ensure all requirements of NLD-MAR SMS are demonstrated.

## SAFETY CULTURE

10. Safety culture reflects real commitment to safety at all levels and can be described as 'how' the organisation conducts its activities to ensure safety is considered in all cases. Simply put, the safety culture is the way safety is perceived, valued and prioritised. Practices that support the creation and nurturing of a positive safety culture evolve as the organisation continuously promotes safety as a core value. Although not directly regulated within the NLD-MAR SMS, an effective safety culture is essential for an SMS and any shortfalls will become apparent in the execution of the system.

11. Safety culture promotes a shared attitude of concern and responsibility, and is regarded as a fusion of the following desirable sub-cultures within an organisation:

- a. **Informed culture.** Staff are knowledgeable about the system (human, organizational and environmental factors) and what factors determine the level of safety.
- b. **Flexible culture.** Characterised by shifts from conventional 'hard-coded' hierarchies to flatter professional outcome-based structures, better pre-empting the need to adapt processes and objectives to suit changing organisational contexts.
- c. **Reporting culture.** Staff are willing to report hazards, errors and experiences, even when such reports may reflect poorly on their involvement. There is motivation to maintain a safe environment and the safety of their colleagues is considered the highest priority.

d. **Learning culture.** Staff have the will and competence to draw safety conclusions from information, and the will to implement corrective/preventive actions.

e. **Just and fair culture.** Staff are encouraged to reactively and proactively self-assess and generate safety-related information. A clear line exists between acceptable and unacceptable behaviour, i.e. individuals are both held responsible for their actions and treated fairly by the organisation.

12. In combination, the existence of the above-mentioned sub-cultures set the boundaries for acceptable behaviour and provides a framework for decision making. A positive safety culture should be pervasive across all SMS core components and place safety at the forefront of every task conducted. Organisations benefit from a positive safety culture through:

a. Greater integration of safety within all work practices over time.

b. Minimising the opportunity for human error, resulting in fewer accidents and incidents, reducing costs and increasing capability.

c. Increasing safety knowledge, and the consistency of that knowledge across all levels of the organisation.

d. Increasing motivation, trust and staff participation.

e. Helping to promote communication and positive attitudes towards safety throughout the organisation.

13. Safety culture maturity exists along a continuum that reflects the standard of safety performance possible in the organisation. Higher levels of safety performance can only exist with corresponding advancements in an organisations safety culture.

## **SAFETY MANAGEMENT SYSTEM IMPLEMENTATION**

14. Most organisations will possess some elements of an effective SMS due to their need to comply with civil or military airworthiness regulations or industry best-practice requirements. SMS implementation requires a gap analysis followed by an SMS implementation plan which may eventually evolve into your SMS documentation.

### **Size, nature and complexity considerations**

15. Every organisation should ensure that its SMS is tailored for its organisational mission, size, nature, complexity and risk context. There is no 'one size fits all' SMS documentation set.

16. Where one or more organisations exist within a larger business group, each organisation may leverage off a single, corporate-level SMS. A dedicated department of the group may provide any or all of the safety management functions for all organisations under its umbrella.

17. Larger or more diverse organisations may need several safety management levels and/or safety committee structures to effectively focus on strategic as well as tactical safety issues. Conversely, small organisations may not need dedicated safety staff, instead relying on a number of employees to perform the multiple functions required. In very small organisations, maintaining independence in safety assurance functions may not be possible, in which case these functions could be conducted by other parties with the requisite competencies.

### **Gap analysis**

18. Initially, a gap analysis should be conducted to compare the organisations extant safety management processes with the requirements of the NLD-MAR SMS framework. The gap analysis enables organisation specific tailoring of the SMS implementation plan to suit the organisations context.

### **Phased approach to SMS implementation**

19. Following the gap analysis, a time-phased approach to SMS implementation could be utilised. The bigger the organisation and scope of activities, the longer the period required. A phased SMS implementation approach recognises that the implementation and sustainment of a fully mature SMS can only be achieved over successive years, permitting the SMS to gradually mature. It also recognises that continuous improvement of the SMS is not possible without corresponding advancement towards a 'generative safety culture'. Other benefits of a phased approach to SMS implementation include:

- a. The provision of a manageable series of steps to follow in implementing the SMS, including the allocation of resources.
- b. Effective balancing of workloads associated with SMS implementation against capability generation.
- c. Simpler reporting of SMS implementation progress.
- d. Sequencing of SMS implementation depending upon the organisations current level of SMS maturity.
- e. Early availability of data and processes to support reactive, proactive and predictive safety risk management practices.

21. An example of a phased approach to SMS implementation is provided in Appendix II to GM 147.A.132(a) – Example of phased SMS implementation. Note that the example provided is generic; each organisation should tailor their implementation to suit their own priorities. Deficiencies identified in the gap analysis assessment tool, often highlight where additional areas of improvement can be made.

### **INTEGRATION CONSIDERATIONS**

22. The word 'integration' is used many times when discussing SMS, organisations and management systems. This section intends to clarify the NLD-MAR SMS requirements regarding 'integration' by discussing a number of interpretations.

23. An integrated SMS (sometimes referred to as 'vertical integration'). Organisations that are required to have an SMS should have each component and sub-elements within that SMS integrated. Simply put, each part of the system should work/interact/exchange information with other parts where applicable. An illustration of this at the component level is depicted below in figure 1.



Figure 1 – Integrated SMS (Vertical Integration)

24. Integrated management systems (sometimes referred to as ‘horizontal integration’). SMS is only one type of management system, and may be integrated with the functions of a number of other management systems, e.g. Occupational Health and Safety Management Systems (OHSMS), Quality Management Systems (QMS) and Security Management Systems (SeMS). Although considered a sign of a more mature SMS, the MAA-NLD does not require different management systems to be integrated with an organisations SMS. That said, the integration of management systems can provide consistency, robustness and many efficiencies. Some areas that organisations may integrate to seek efficiencies include, risk management and safety assurance activities. It should be noted that this form of integration is not mandated by NLD-MAR SMS. An illustration of this form of integration is depicted below in figure 2.

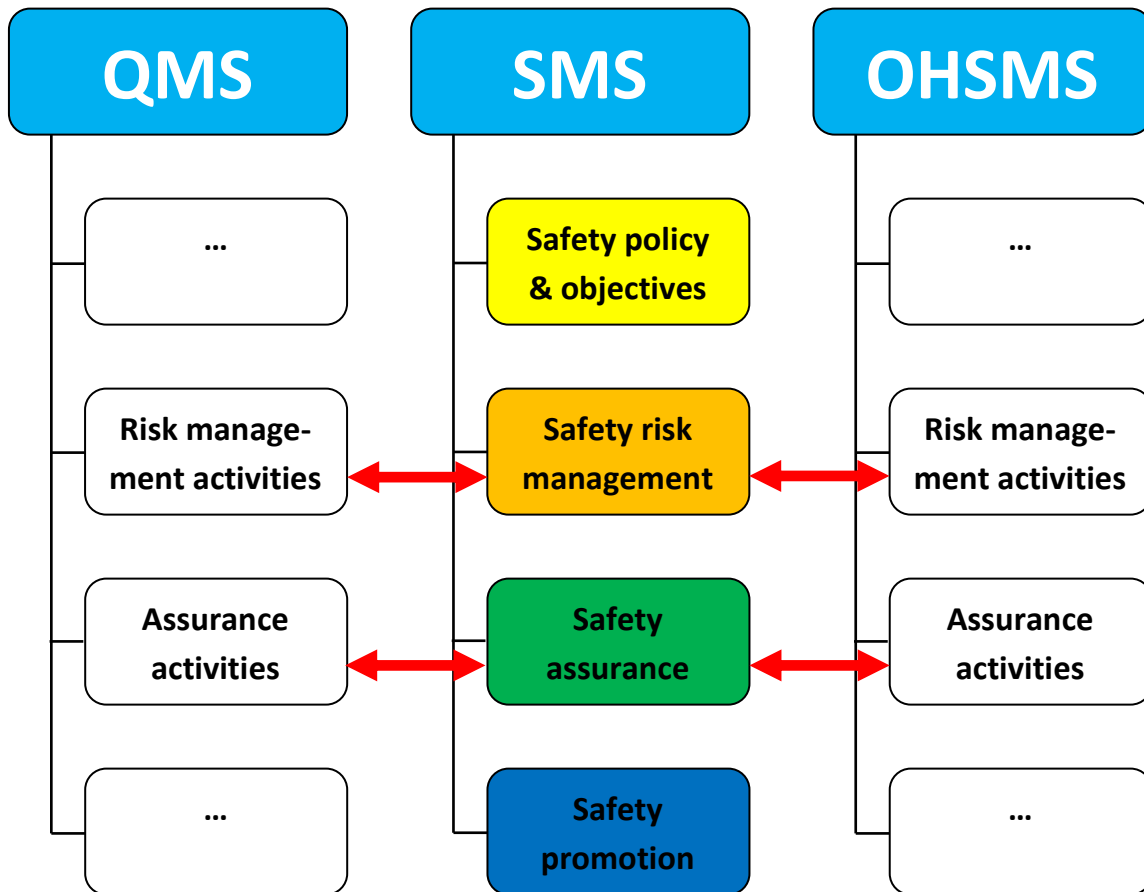


Figure 2 – Integrated Management Systems (Horizontal Integration)

25. Integration of NLD-MAR SMS for numerous approvals; Organisations with a high degree of interdependency or that are operating with numerous NLD-MAR approvals, may find it beneficial to integrate their SMSs. This form of integration is currently only mandatory within the NLD-MAR SMS construct for the Military Air Operator (MAO) and Continuing Airworthiness Management Organisation (CAMO) approvals. For other approvals this form of integration is voluntary.

**PRODUCT, BEHAVIOUR AND PROCESS INTEGRITY CONCEPT**

26. Designing management systems requires an understanding of how management decisions influence the end product. The Organisational Accident Model (OAM) is one method of visualising this relationship, another is the Bowtie model. By utilising the one of these methods, organisations can identify hazards specific to their operation not considered in regulations and standards. The resulting Bowties provide a method of communicating and visualising a variety of controls that have been identified to mitigate the risks imposed by these specific hazards.

27. An adaptation of the Bowtie model is that of the Product, Behaviour and Process (PBP) basic Bowtie, as shown below in figure 3. The real value of the high-level model of the PBP Bowtie is in its ability to provide a view of policy and processes and their interdependencies across three collective threat lines:

- a. **Product integrity.** The product/output/function satisfies a defined set of standards/requirements;
- b. **Behavioural (person) integrity.** The quality of a person, possessing and steadfastly adhering to high moral principles or professional standards; and
- c. **Process integrity.** An established set of actions to be followed to ensure a consistent outcome.

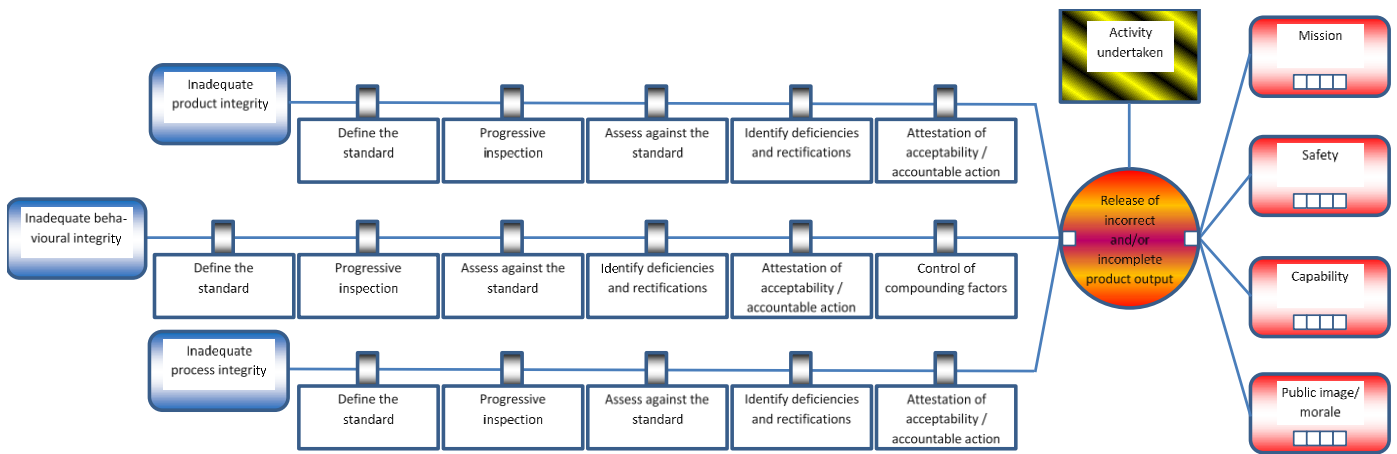


Figure 3 – Pictorial representation of the adapted Bowtie



28. Placed along these threat lines are preventative controls, representing activities put in place to prevent the top event. Within the model there can be five distinct control types that are common for each of the threat lines. These control types are:

- a. Define the standard.
- b. Progressively inspect.
- c. Assess against the standard.
- d. Identify deficiencies and rectifications.
- e. Attestation of acceptability/accountable action.

29. On the behavioural integrity threat line, there is an additional control which is titled 'compounding factors'. These compounding factors can influence inactions on part of the person or group of persons which could ultimately affect the integrity of the product/output. Examples of these compounding factors are:

- a. **Human**, e.g. shift work, sleep, inconsistent mental application;
- b. **Environmental**, e.g. hot, cold, windy, wet, dark; and
- c. **Cultural**, e.g. deliberate non-conformance to procedures, caustic management, within the organisational domain.

30. From a risk management point of view the use of the Bowtie concept can be applied to most organisations and is particularly valuable in rationalising existing policies and procedures, and safety promotion, as it is easily understood.

31. Further information on the use of Bowties can be found in the first chapter of "10 Ways to Better Aviation Regulation 2nd Edition".

**Appendix II to GM 147.A.132(a) – Phased SMS implementation**

<b>Phased safety management system implementation</b>			
<b>PHASE 1</b>	<b>PHASE 2</b>	<b>PHASE 3</b>	<b>PHASE 4</b>
<b>Planning</b>	<b>SMS processes</b>	<b>Safety assurance</b>	<b>Enhanced risk management and safety assurance</b>
<p>1. Implementation Planning:</p> <p>a) Identify the SMS Accountable Manager.                      b) Establish an SMS implementation team.                      c) Define the scope of the SMS.                      d) Perform an SMS gap analysis.                      e) Develop an SMS implementation plan.</p>	<p>1. Management commitment and responsibility:</p> <p>a) Establish the safety policy and objectives.</p>	<p>1. Safety performance monitoring:</p> <p>a) Establish a safety data collection and processing system for occurrence outcomes.                      b) Develop higher-consequence SPIs and associated targets and alert settings, and that provide predictive hazard management.</p>	<p>1. Management commitment and responsibility:</p> <p>a) Enhance the existing disciplinary procedure/ policy with due consideration of unintentional errors or mistakes from deliberate or gross violations.</p>
<p>2. Safety appointments:</p> <p>a) Establish a key person/office responsible for the administration and maintenance of the SMS.</p>	<p>2. Safety accountabilities:</p> <p>a) Define safety management responsibilities and accountabilities across relevant departments of the organisation.                      b) Establish an SMS/ safety coordination mechanism/ committees.                      c) Establish departmental/ divisional safety action groups where applicable.</p>	<p>2. Change management:</p> <p>a) Establish a 'management of change' procedure that includes proactive safety risk assessment.</p>	<p>2. Hazard identification:</p> <p>a) Integrate hazards identified from occurrence investigation reports with the voluntary hazard reporting system.                      b) Integrate hazard identification and risk management procedures with the subcontractor's or customer's SMS where applicable.</p>
<p>3. Training and education:</p> <p>a) Establish an SMS training programme for personnel, with priority for the SMS implementation team.</p>	<p>3. Emergency Response Planning:</p> <p>a) Develop an Emergency Response Plan (ERP).</p>	<p>3. Continuous improvement:</p> <p>a) Establish an internal quality audit programme.                      b) Establish an external quality audit programme.</p>	<p>3. Safety performance monitoring:</p> <p>a) Enhance the safety data collection and processing system to include lower-consequence events.                      b) Develop lower-consequence SPIs and associated targets/ alert settings, and that provide predictive hazard management.</p>
<p>4. Safety communication:</p> <p>a) Initiate SMS/safety communication channels.</p>	<p>4. SMS documentation:</p> <p>a) Initiate progressive development of SMS documentation and other supporting documentation.</p>		<p>4. Continuous improvement:</p> <p>a) Establish SMS audit programmes or integrate them into existing internal and external audit programmes.                      b) Establish other SMS review/ survey programmes where appropriate.</p>

<b>Phased safety management system implementation</b>			
<b>PHASE 1</b>	<b>PHASE 2</b>	<b>PHASE 3</b>	<b>PHASE 4</b>
<b>Planning</b>	<b>SMS processes</b>	<b>Safety assurance</b>	<b>Enhanced risk management and safety assurance</b>
	5. Hazard identification: a) Establish a voluntary hazard reporting procedure.		5. Training and education: a) Ensure that the tailored SMS training programme for all unit personnel has been completed.
	6. Safety risk management: a) Establish safety risk management procedures.		6. Safety communication: a) Promote safety information sharing and exchange internally and externally.
	7. Safety performance monitoring: a) Establish occurrence reporting and investigation procedures.		