AC 119-2-2(Rev 0)
17 September 2018

Civil Aviation Authority of Singapore

Advisory Circular

SAFETY MANAGEMENT SYSTEMS – SAFETY PERFORMANCE INDICATORS FOR AN AIR OPERATOR CERTFICATE HOLDER

GENERAL
Advisory Circulars (ACs) are issued by the Director-General of Civil Aviation (DGCA) from time to time to provide practical guidance or certainty in respect of the statutory requirements for aviation safety. ACs contain information about standards, practices and procedures acceptable to CAAS. An AC may be used, in accordance with section 3C of the Air Navigation Act (Cap. 6) (ANA), to demonstrate compliance with a statutory requirement. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.

PURPOSE
This AC provides to demonstrate compliance with, and information related to, requirements regarding the establishment of safety performance indicators as part of the Safety Management System required in the Air Navigation (119 – Air Operator Certification) Regulations (ANR-119).

APPLICABILITY
This AC is applicable to an AOC holder conducting operations under ANR-121 or ANR-135.

RELATED REGULATIONS
This AC relates specifically to Regulation 16 of ANR-119.

RELATED ADVISORY CIRCULARS
- AC 1-3 Safety Management Systems

CANCELLATION
This AC supersedes AC AOC-30.

EFFECTIVE DATE
This AC is effective from 1 October 2018.

OTHER REFERENCES

- ICAO Doc 9859 Safety Management Manual
- FAA AC 00-58B Voluntary Disclosure Reporting Program

1 INTRODUCTION

1.1 As part of safety assurance under the Safety Management System (SMS) specified in Regulation 16 of ANR-119, the AOC holder is to monitor and improve its safety performance to a level that is acceptable to CAAS.

1.2 Further to the guidance provided in CAAS AC 1-3, this AC presents the processes that an AOC holder may apply in identifying its Safety Performance Indicators (SPIs).

2 SAFETY PERFORMANCE MEASUREMENT

2.1 Safety performance measurement provides an indication on the effectiveness of an AOC holder's SMS and is achieved through a well-developed and the tracking of the SPIs and Safety Performance Targets (SPTs). These SPIs and SPTs, identified by each AOC holder are used to express the organisation's safety objectives and provide objective evidence of its effectiveness in managing safety while conducting its core business.

2.2 Safety objective is a brief high level statement of the desired outcome that the AOC holder plans to accomplish for its SMS. Safety objectives should be developed from:

(a) the identified top safety risk hazards that the AOC holder has derived from its safety data acquisition and analysis processes (SDCPS), and

(b) the top safety risk events that are identified by CAAS and the AOC holder.

3 SAFETY PERFORMANCE INDICATORS (SPIS) DEVELOPMENT

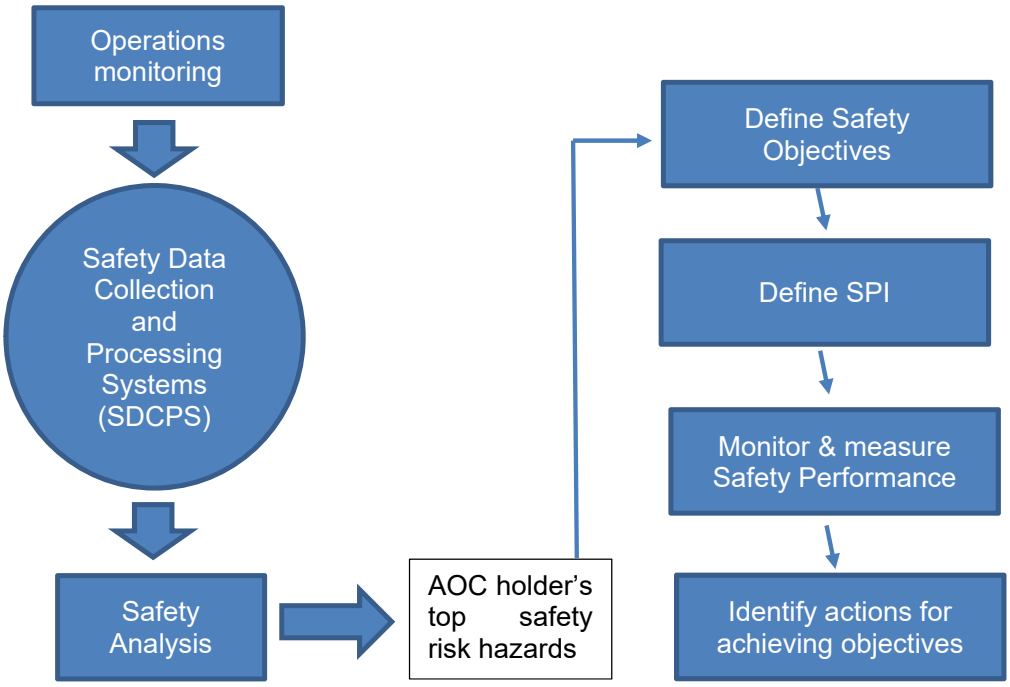
3.1 The formulation of an organisation's SPIs should be done systematically and express a strong relation to the AOC holder's safety objectives. By doing so, the SPTs the AOC holder sets for the SPIs will provide an indication of its progress towards achieving its safety objectives.

Safety Performance indicators derived from air operator's SDCPS

3.2 The AOC holder may identify its SPIs using the information from its SDCPS.

Safety data are collected from a variety of sources, such as its Flight Data Analysis Programme (FDAP), Pilot Reports (PIREPs), Confidential Human Factors Incident Reporting Programme (CHIRP), Fatigue Risk Management System (FRMS), fleet technical performance and other voluntary and mandatory reporting system. Through processing and analysing of such data, together with monitoring of its operations, the AOC holder may identify hazard.

These hazards are then assessed on their safety risks in the AOC holder's risk assessment programme. The AOC holder would then decide during its routine safety performance review, its safety objectives for managing those identified hazards, considering if their safety risk is acceptable or a reduction is necessary. Where the safety objective is to reduce the safety risk then actions in the form of defences or mitigation processes are planned and executed. Suitable SPIs that will monitor its achievement towards the corresponding safety objectives are identified.



3.3 As an illustration of the above, an AOC holder may via its SDCPS identify ***fatigue hazards as its top risk hazards*** for its operations. It may decide, as one of its ***safety objectives to monitor and reduce the safety risk of fatigue hazards.***

Some of the ***SPIs*** that the AOC holder may use could be: deviation rate exercised by the Pilot-in-Command, or hazard report rate.

AOC holder may also consider some ***action plans*** for example increasing the number of operational audits and analysing their findings for continuous improvement; or increase its frequency of fatigue related communication programmes;

SPIs that are related to fatigue may also be considered such as measurements on the effectiveness of the operating plan (planned vs actual time work) or effectiveness of the crew rostering plan (rate of standby crew activated); or trend of bi-annual fatigue surveys.

Safety Performance Indicators derived from safety events that are identified by the AOC holder and CAAS

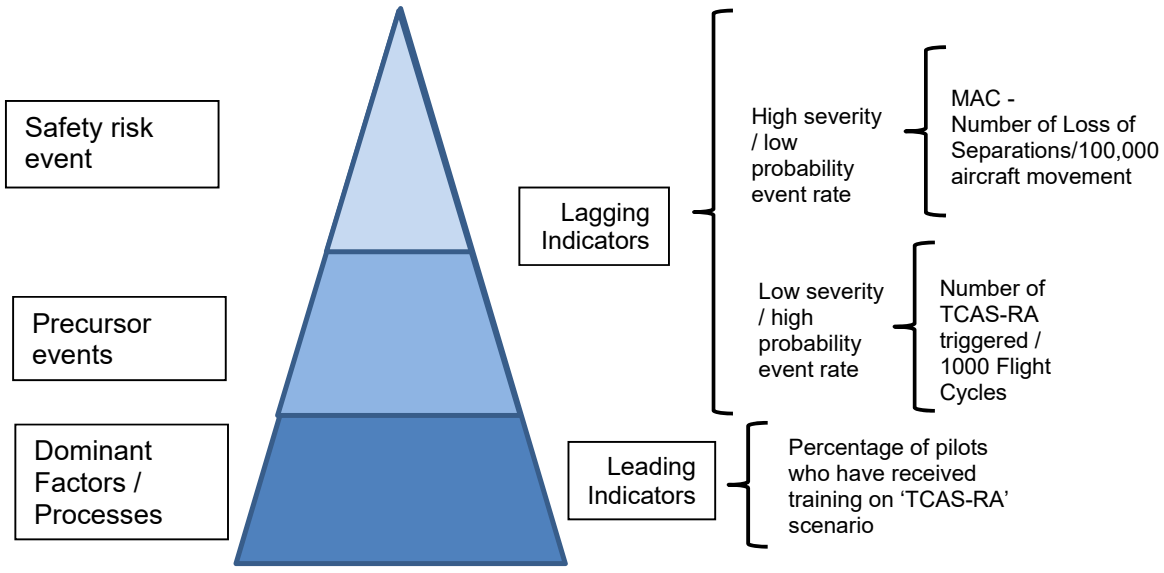
3.4 The AOC holder should also identify its top safety risk events from the safety information gathered from its hazard identification and risk assessment schemes such as its mandatory reporting and safety investigation programme. CAAS, from its safety data collection sources, will list the events that it viewed as significant. Together these two lists of events form the top safety risk events list for the AOC holder which the AOC should monitor and/or improve their safety risks. SPIs have to be developed for each of these events.

3.5 Safety risk event occurrence rate is a suitable SPI. For most safety risk events, there would be precursor events that could potentially escalate to the safety risk event. Such precursor events have to be identified and their occurrence rate monitored together with the safety risk event, as SPIs.

3.6 Plan for actions (Action Plan) can then be developed to reduce the risk of the safety risk event, usually by first controlling the occurrences of the precursor events. These actions can be quantified and monitored as SPIs.

3.7 An example of a top safety risk event (composite of high probability and high severity) may be 'Mid-Air Collision (MAC)'. To address MAC, the AOC holder should include the mitigation of safety risks contributing to MAC as a safety objective. The safety risk characterised from the MAC is the number of 'Loss of Separation' events. Therefore, the AOC holder will have to identify the precursor events of a 'Loss of Separation' event and both 'Loss of Separation' event and its precursor events are suitable SPIs for the monitoring and measurement for the safety risk of a MAC.

3.8 Safety risk events and their precursor events are generally considered as lagging indicators. Factors and processes that contribute directly to the performance of the lagging indicators have to be measured and monitored as indicators as well. These are commonly termed as leading indicators. By analysing the precursor events over a period of time the AOC holder should have identified a few dominant factors or processes that it may consider for monitoring. Accordingly, any positive improvements over these dominant leading indicators would possess a knock-on effect on the lagging indicators. For example, a leading indicator that the AOC holder may wish to adopt to mitigate the occurrence of TCAS-RA events would be the monitoring of the 'percentage of pilots who have received training on 'TCAS-RA' scenario.



4 SAFETY PERFORMANCE TARGETS (SPTS) AND CONTINUOUS IMPROVEMENT

4.1 The AOC holder should monitor its identified SPIs, normally using time-series charts. Any adverse trend of a SPI should be investigated and corrected so that the safety objectives may be met.

4.2 Periodically, AOC holder's Safety Committee should evaluate its overall safety performance and review its safety objectives:

(a) accounting for the development of new key safety risks or the de-escalation of certain safety risks which was previously identified as key risks to be addressed. With a new set of safety objectives, the AOC holder will revise its set of leading and lagging SPIs.

(b) deciding on planned or intended SPT for a SPI over a given period of time for achieving the safety objectives.

In the example on MAC, the Safety Committee may identify improvement in the TCAS-RA events as its safety objective. In this case, the action plan may be to increase the percentage of pilots who have received training on 'TCAS-RA' scenario to a high value by a certain time period.

4.3 Upon completion of the safety performance review, the AOC holder should submit its list of SPIs and SPTs to CAAS for acceptance.