SMS Optimised Practice/Good Practice Submission			
ANSP	IAA	Date of submission	05/08/2022

SoE Study Area	Study Area 6.2
OP/GP title	Safety Performance and Risk Monitoring
In use since	2018
ANSPs using this practice	Unknown

SA 6.2: *"Assessed risks are mitigated or controlled. Risk controls are monitored for effectiveness, and remedial action is taken if controls are not working effectively.*

Safety Performance and Risk Monitoring

Real time Safety Intelligence

As a *Corporate Safety Strategy* thematic *Tailored & Proportionate* Goal, the implementation of integrated Safety Tools including APF, TOKAI and RAT, is a key enhancement element of our Safety Performance Monitoring and improvement function. The IAA ANSP introduced a Business Intelligence Tool integrated with the Safety Tools, to facilitate real time active monitoring of occurrences, the associated risks and overall, of the safety performance.

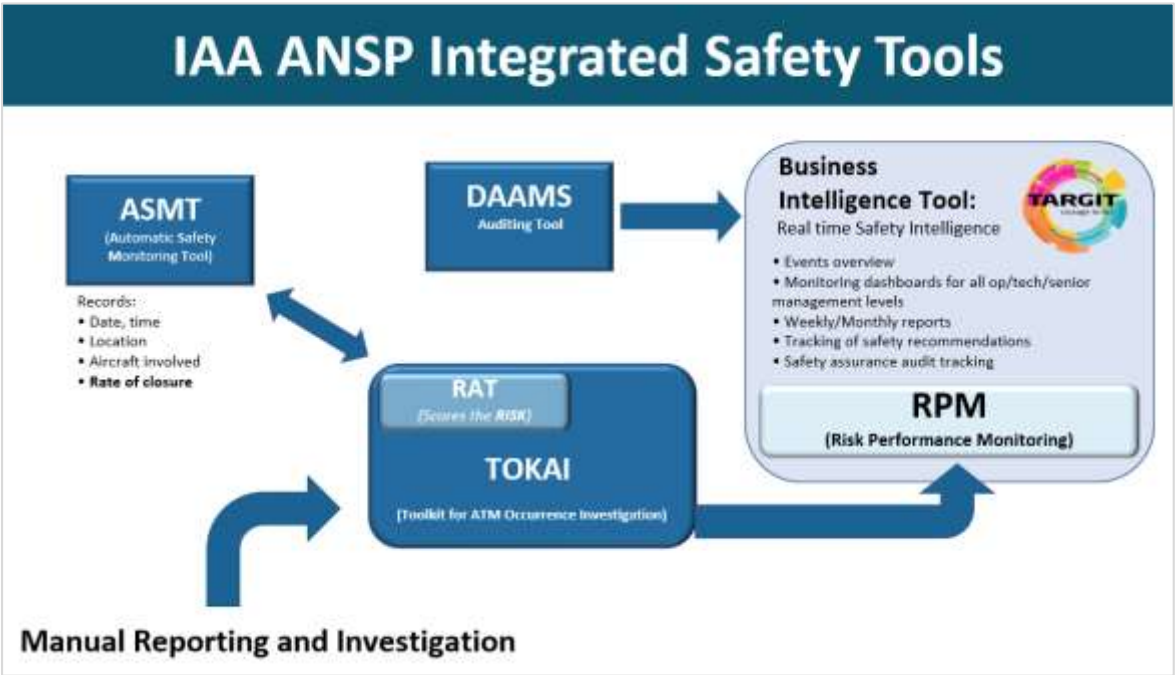

Figure 1: Safety Performance Monitoring Integrated Safety Tools

There are 5 Safety Performance Indicators (SPIs) that are subjected to continuous safety performance monitoring by the IAA ANSP, i.e.:

- Separation Minima Infringements
- Runway Incursions
- Airspace Infringements
- Deviations from ATC Clearance
- Level Bust

The IAA ANSP monitors the status of the SPIs with emphasis on trend performance and analysis at the unit level. The regulator monitors all units SPIs performance reports provided to them by the SMU, monthly, quarterly and annually.

In 2018, the ANSP undertook a review and further development of the Aerospace Performance Factor (APF) in the light of the implementation of TOKAI and the integration of the Business Intelligence Tool. The APF workshop review was facilitated by Eurocontrol, the output of which resulted in an updated National mindmap and new Terminal and En-route service unit specific mindmaps. These mindmaps are now also used by Eurocontrol for APF development in PowerBI.

The APF provides standard deviation information graphically displayed and colour coded. The Performance Bands in the APF graph allows the IAA ANSP to see a level of performance relative to the "maximum" or "minimum", or the "Best" and the "Worst" levels of IAA's own past performance

in the Baseline period (**Green**, **Yellow**, **Red**). *(ICAO Doc 9859: Appendix 4 to Chapter 4: "The alert level setting is based on basic safety metrics standard deviation criteria, i.e. 1 SD, SD and 3 SD".)*

Starting with Q2 2018, the IAA ANSP uses the TARGIT Business Intelligence (BI) Tool directly linked to TOKAI for providing 'real time' safety performance information.
The mechanism consists of a Data Warehouse (DW) to store all data that is extracted from TOKAI, and a BI tool to present that data through reports designed to provide varying levels of detail depending on the audience. Data is made available to the DW cube for use by the Business Intelligence software. The BI software is populated with the data and refreshed twice per day. This allows presenting the data in a standard, comprehensive and intuitive framework that allows high-performance data access.
The design and further development of Safety Performance dashboards is an ongoing process. Most of the recurrent reports have been replaced by the monitoring dashboards for all operational, technical and senior management levels, including User specific dashboards and reports available for direct access.

To fully complete the safety intelligence integrated picture, a dashboard depicting RPM (Risk Monitoring Tool) has been developed in BI. The RPM depicts weighted risk that was derived utilising AHP.
In addition to the above, query functionality has been developed which allows for the provision of Safety Occurrence data to be provided to all Operational and Technical Managers, and Investigators. This data is utilised for local safety initiatives including LRSTs, Runway Performance groups, Airport Operational Groups and various North Atlantic Safety fora.

In 2022, an RPM simulation analysis was done to assess the impact of the significant low traffic during 2020 (in the context of COVID-19) on the standard deviation lines and the Baseline Average, as there was a new Max RPM score recorded in November 2020 (caused mainly by only one Separation Minima Infringement event that occurred during low traffic).
The simulation excluded 2020 data from the calculation of the Baseline Average and the standard deviations, in order to compare it with the existing result. The conclusion of the simulation was that the SD lines shifted upwards significantly with the new 2020 Max RPM score (see Figure 2 below), and therefore, might not represent the risk accurately in the future.

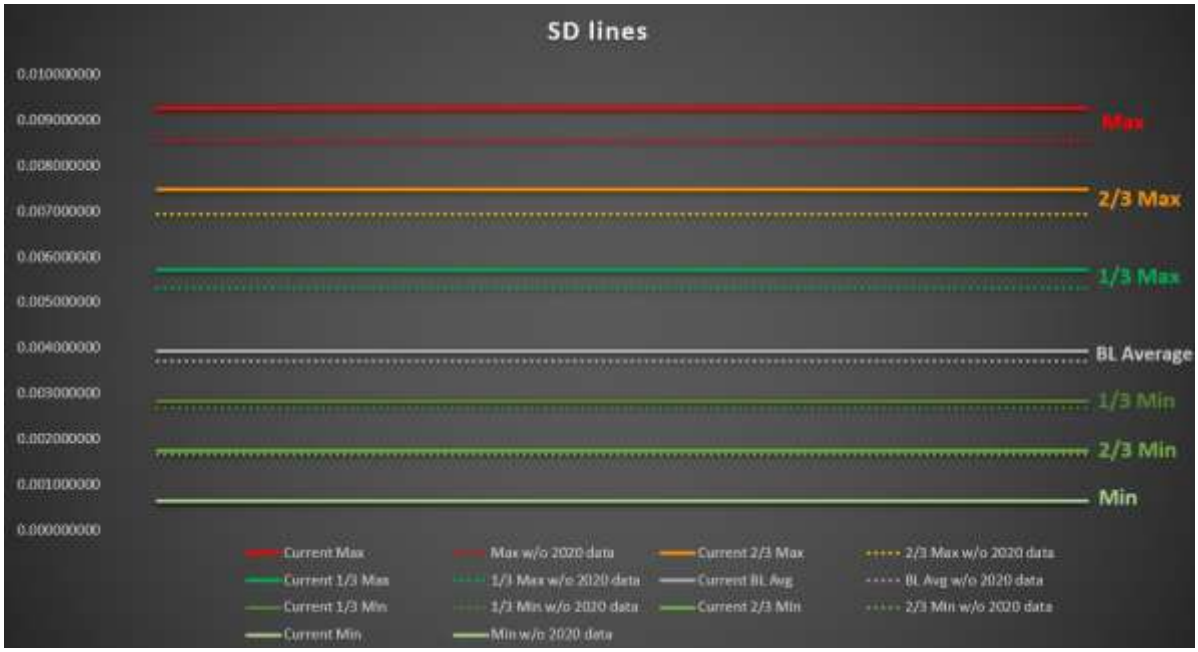

Figure 2: RPM simulation – SD lines comparison

The simulation also highlighted a number of RPM scores that should have been in the yellow and red area (deemed to be the risk tolerance levels, that when reached, associated actions must be taken

and documented to show how these are being addressed), however, with the upward shift of the standard deviation lines, these were displayed in the green area (acceptable).
To mitigate this, it was decided to exclude the 2020 data from the Max, SD and Baseline average calculations, however, to still display the 2020 RPM scores in the chart (although the tip of the Max point in November 2020 is presented outside of the chart).

Figure 3 below is a snapshot of the CEO Safety Management Dashboard, showing how the Risk Performance Monitoring is used in combination with the SPI trends, the top 5 events with ATM contribution and the Causal factors, to identify accurately the risks. All of the 'buttons' included in the dashboards are links to the specific dashboards containing detailed analysis. For example, the 'Runway Incursions' dashboard provides details on the rate of events, the trend on the total number and the events with ATM Contribution and associated explanatory factors analysis.

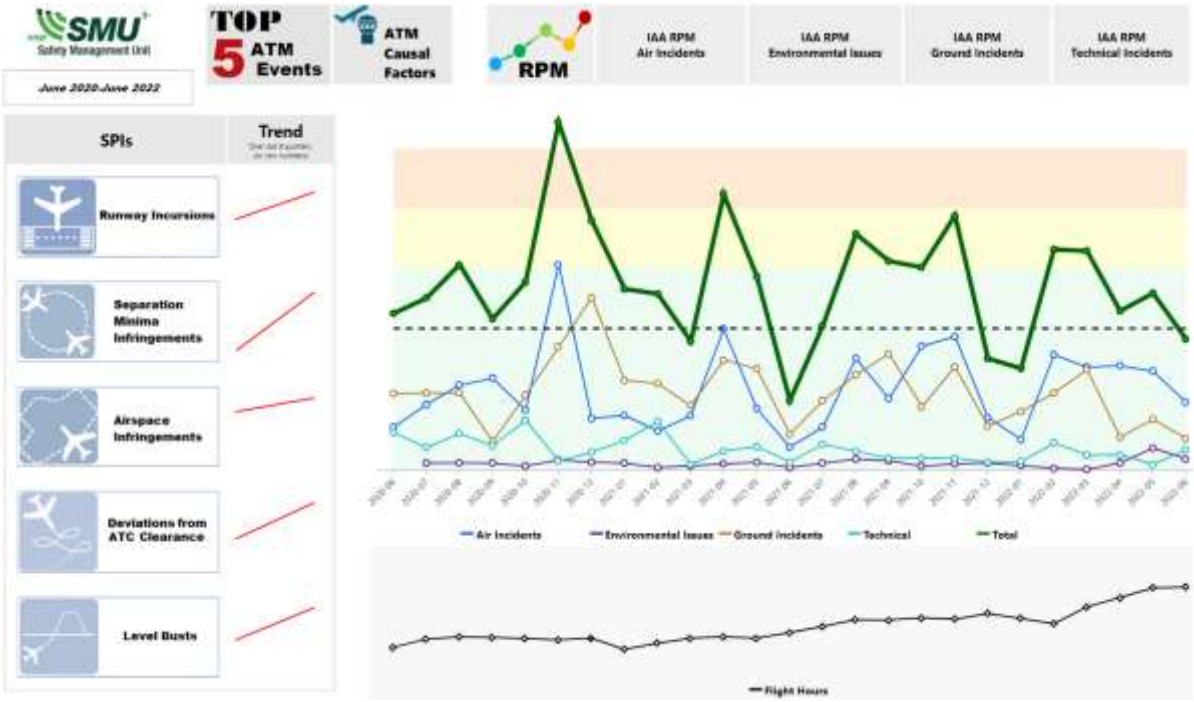

Figure 3: CEO Safety Management dashboard snapshot

Weekly reports are sent automatically by the Business Intelligence Tool to the relevant manager(s), in advance of the Certificate Holders senior management weekly meeting. This is a replacement for the manual compilation process.
The Dashboards and BI outputs are also used during the quarterly Unit Safety Management Committees to quickly obtain relevant information about a specific trend or report.
Overall, the progress achieved has enabled the production of several bespoke management performance monitoring dashboards, including weekly, monthly and quarterly dashboards that enable advanced ANSP Safety Performance and Risk Monitoring and Management activities.

2021
The decrease in traffic in the context of COVID-19 has had a strong influence on the trend on the rate of events, as the IAA ANSP has a small number of Safety Performance Indicators events per month. To compensate for this, in 2021, in addition to the standard methods utilised and described above, the IAA ANSP started monitoring these SPIs in relation to the alert levels (Standard Deviation) based on the ICAO performance monitoring criteria *(ICAO Doc 9859: Appendix 4 to Chapter 4)* and calculated using 2020's data (similar traffic).
There have been several dashboards created in the BI tool:
-unit specific dashboards, presenting for each SPI, two trending charts, one on the total number of events and one on the events with ATM contribution
-national dashboard, presenting for each SPI, two trending charts, one on the total number of events and one on the events with ATM contribution.

In 2022, the SPIs continue to be monitored in relation to the alert levels (Standard Deviation). As the traffic increased close to pre-pandemic levels, the standard deviation lines (**Avg+ 1SD**, **Avg+ 2SD** and **Avg+ 3SD)** are now calculated based on 2019's performance.

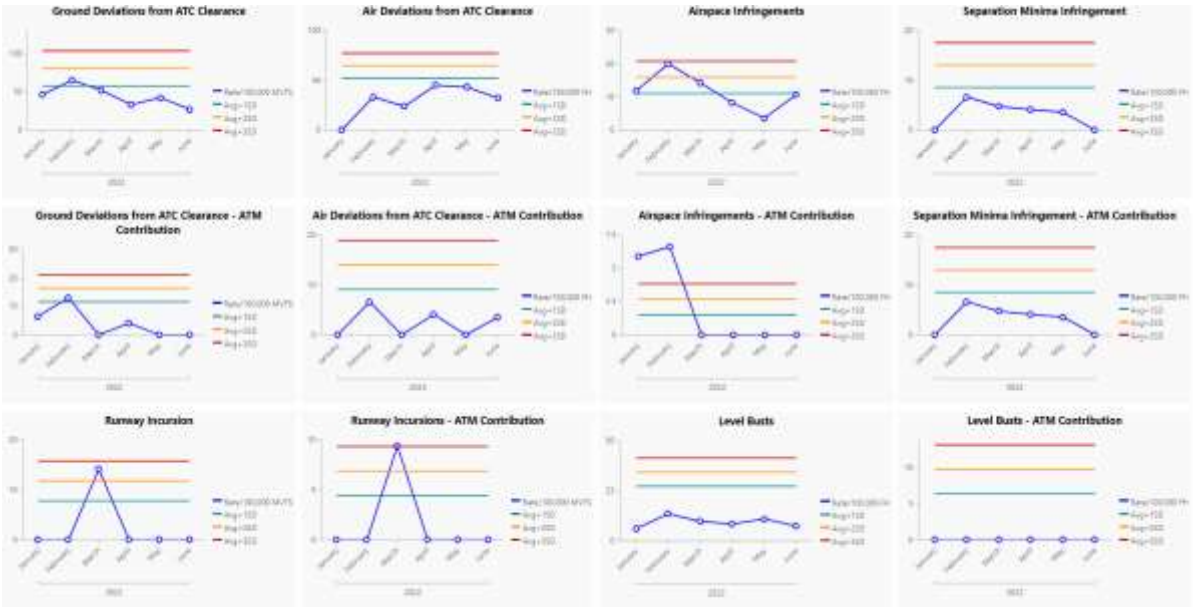

Figure 4: Trending charts dashboard snapshot

An alert (abnormal trend) is triggered if there is **one single point (rate of events) above Avg+ 3SD** line, **two or more consecutive points above Avg+ 2SD line**, or **three or more consecutive points above AVG+1SD** line. The alerts are recorded and analysed in the quarterly Safety Performance Reports in the specific SPI section (in the national report and in the unit specific annexes), including the necessary measures to address the identified issue (if applicable). Moreover, the trending charts are available at any time to the managers through the BI tool.

This additional method of analysis allows for a safety performance measurement in similar traffic and operational environments, improving the understanding of the SPIs' performance within the organisation, both at a national and at unit level, enabling the decision makers to make informed safety decisions, and thus improve the safety performance.

By submitting this document, your organisation is willing for the proposed Optimised or Good Practice to be shared with other ANSPs.

For Optimised Practices, this document should be sent together with the SoE in SMS questionnaire, to: soe_2021@eurocontrol.int **by 31st July 2021 at the latest**.

Submissions for consideration as Good Practices may be sent by the above date. They may also be identified during the survey interview sessions with the survey team, following which a Good Practice submission document will be requested.