



REPUBLIC of SAN MARINO CIVIL AVIATION AUTHORITY

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SAFETY NOTICE No. 02/2026 Issue 01

ANALYSIS OF SAFETY DATA

At the end of the year, San Marino CAA conducts an analysis of Safety Data. San Marino is a small State, so the data sample size is relatively small. This allows us to show some detail but can also create some random variation or 'statistical noise'. For this reason, we also provide links to international publications based on large data samples.

There are three sources of information analysed for this Safety Notice:

- Safety Reports
- SAFA Inspection Findings
- CAA Inspector Findings

SAFETY REPORTS

Safety Reports are graded by CAA according to the European Risk Classification (ERC) method. This combines the severity of the outcome or potential outcome combined with the number and effectiveness of barriers remaining to prevent that outcome. This produces a numerical ERC score and may fall into the Low (green) Medium (yellow) or high (red) zones. Below are listed the events that have been scored at an ERC of 50 (Medium) or above in 2025.

Higher Risk Events

Events during 2025 with an ERC score above 50 have been mentioned above, to summarise these were:

Landing	Precautionary or off-runway landing at a General Aviation aerodrome.	500
Ramp	Ferry Flight after visible damage of insulation material (animal damage).	500
Hangar	Elevator and Rudder control cables Turnbuckle safety clip not installed properly due Procedure not adhered to.	102
Hangar	Incorrect installation of the (Fwd, O/B) bi-directional suspension cross bar block pin.	102



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Ramp	Damage to parked aircraft windshields from APU exhaust efflux due Procedure not adhered to.	101
Landing	LandingCommunication issue - Landing without being on the correct frequency (TIBA/AFIS/TWR).	101
Take-off	Unintentional deviation from intended or assigned track during take-off.	101
Take-off	Engine Failure due Component/system failure.	101
Hangar	RH MLG O/B Axle badly damaged due to incorrect fit	101
Hangar	A towel was found inside the wing tank due to poor maintenance practice	100
Hangar	FOD found inside wing fuel tank due poor maintenance practice	100

Notably, events with an ERC score of 50 or above were higher in 2024 but in 2025 have returned to a more typical pattern. It has been a good year in terms of safety events, for the first time there are no events at 2500, and also none in the 50 category.

ERC Score	2020	2021	2022	2023	2024	2025	Total
2500	2	1	2	2	5	0	12
500 - 502	0	0	2	0	9	2	13
100 - 102	7	6	9	4	23	10	59
50	5	6	8	6	9	0	34
Total	14	13	21	12	46	12	118



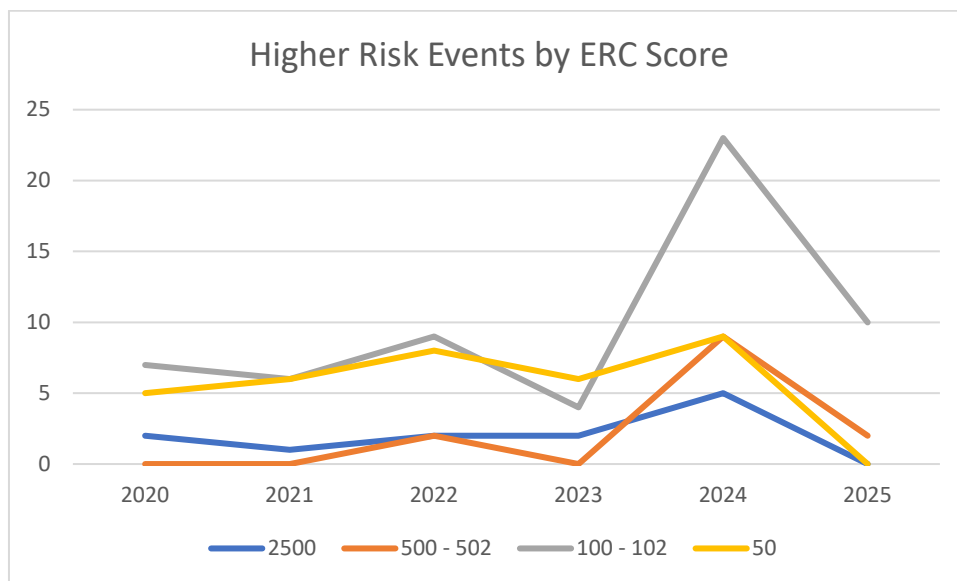
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The chart above shows the trends in higher risk (ERC score 50+) reports. Following a peak in 2024, 2025 returned to a more typical and lower rate of higher risk events.

Specific Items

GPS Signal Disruption

During 2025, 32 cases of spoofing or jamming of GPS signals were reported, (17 times in 2024, 2 in 2023 and 4 in 2022). Although this is a sharp increase, it is believed that events are now under-reported because some pilots have come to regard it as 'normal' and feel that reporting is no longer worthwhile. This is definitely not the case. We encourage pilots to report all instances of spoofing or jamming to help form the general picture of the frequency and location trends. Operators now seem better prepared for these events and so while the frequency has clearly increased, the immediate risk is being managed in most cases. As shown in the image below, the events occur in clusters at well-defined geographical locations.

However, the risk is more complex than may first appear. Disruption of GPS signals affect many aircraft systems. EGPWS is becoming less trusted, as False Alerts become more common and may even occur a considerable time after the spoofing event, causing some crews to inhibit the system. This is an issue because EGPWS is the system that has long prevented CFITs – once the most common form of fatal accident to large aircraft. It is also causing more Go – arounds, either due to false EGPWS alerts or other disturbances including autopilot behaviour, unusual glideslope/localizer indications, and indicated wind on the Navigation display.



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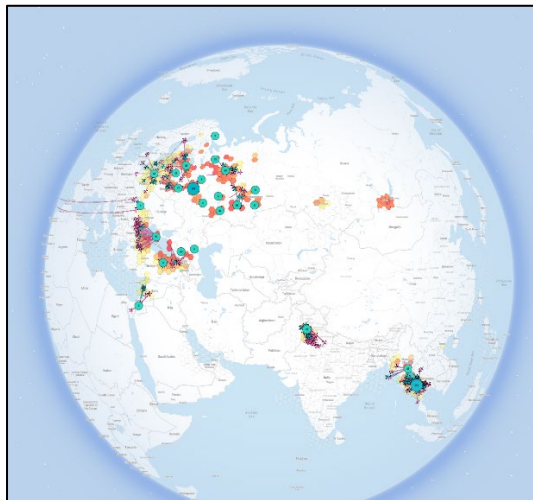
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TCAS, ADS-B, HUD guidance, transponders and the aircraft clock (then affecting use of CPDLC) can all be impacted by a spoofing encounter. In areas where there is on-board responsibility for navigation accuracy, it may also affect capability.

An international GPS Spoofing Workgroup has been formed to address the problem, but until it is resolved, it is important to remain aware of the potential effects of a spoofing event and ensure crews are aware and well prepared.



Map of recent spoofing events reproduced from gpswise.aero/map on 22/01/26

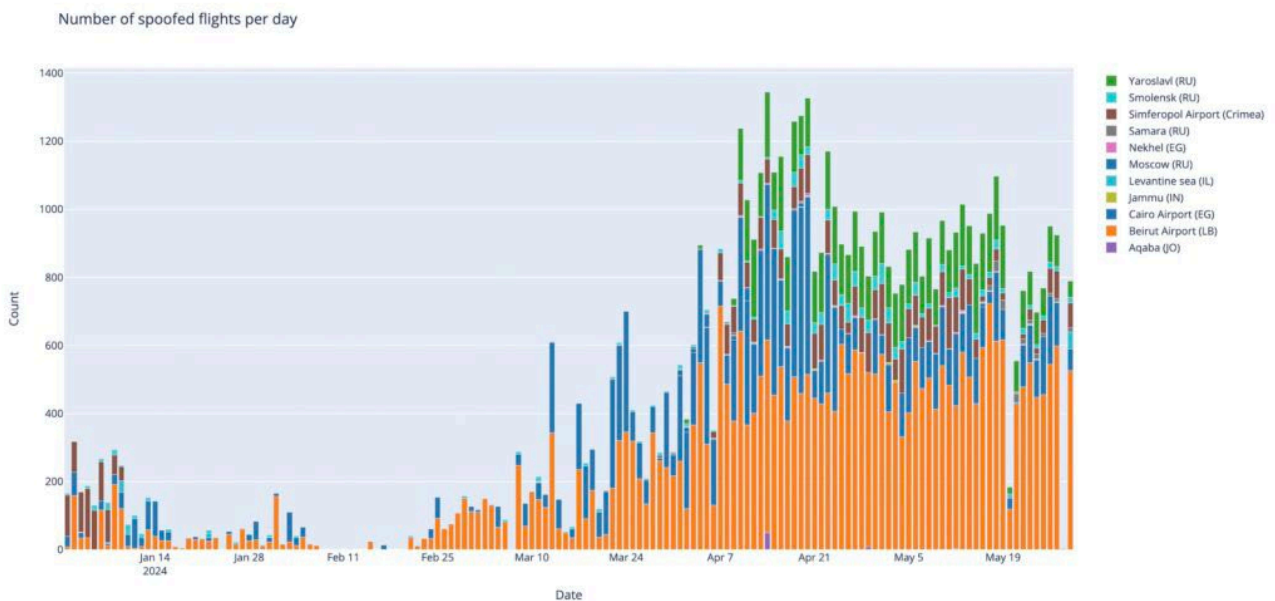


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Graph shows number of flights affected by spoofing, by location. Data from Zurich University of Applied Sciences & SkAI Data Services.

TCAS RA

TCAS RAs seem finally to have returned to pre-COVID rates with only 3 reported in 2025, 2 in the USA and one in Germany, all were relatively low risk with ERC scores of 10 or below.



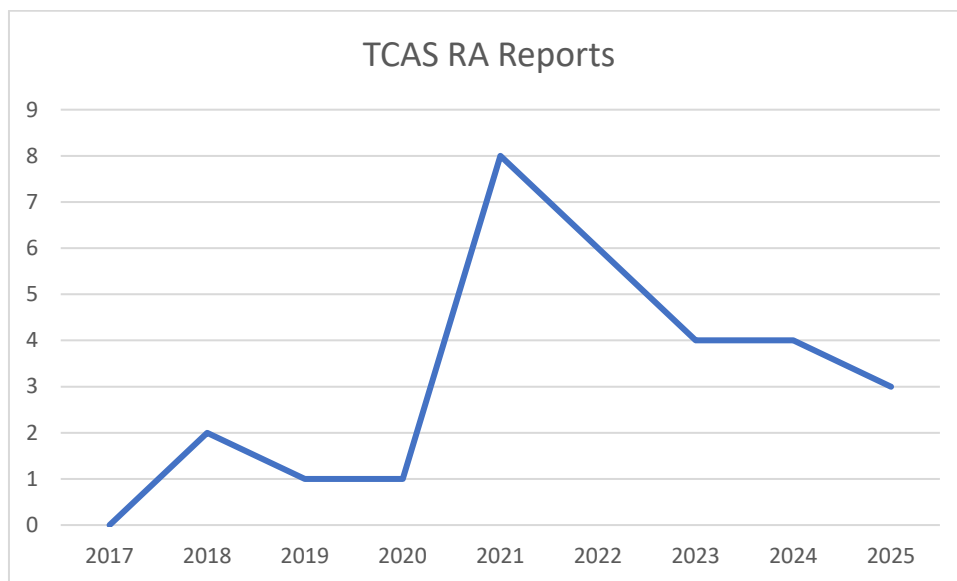
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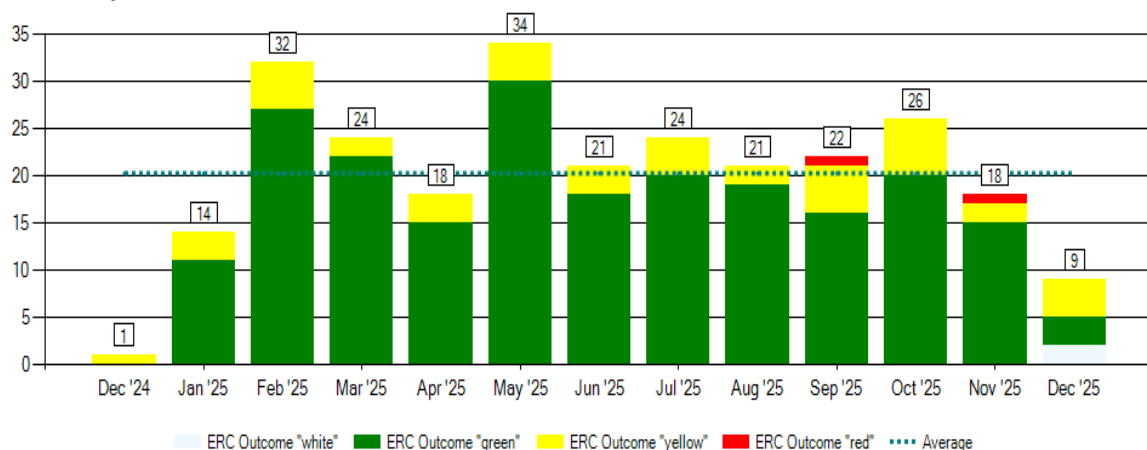
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General Statistics

Occurrences by Month



This chart shows that the volume of occurrence reports is mainly composed of relatively low risk events and that 'red' events with higher ERC scores are infrequent.

Phase of Flight



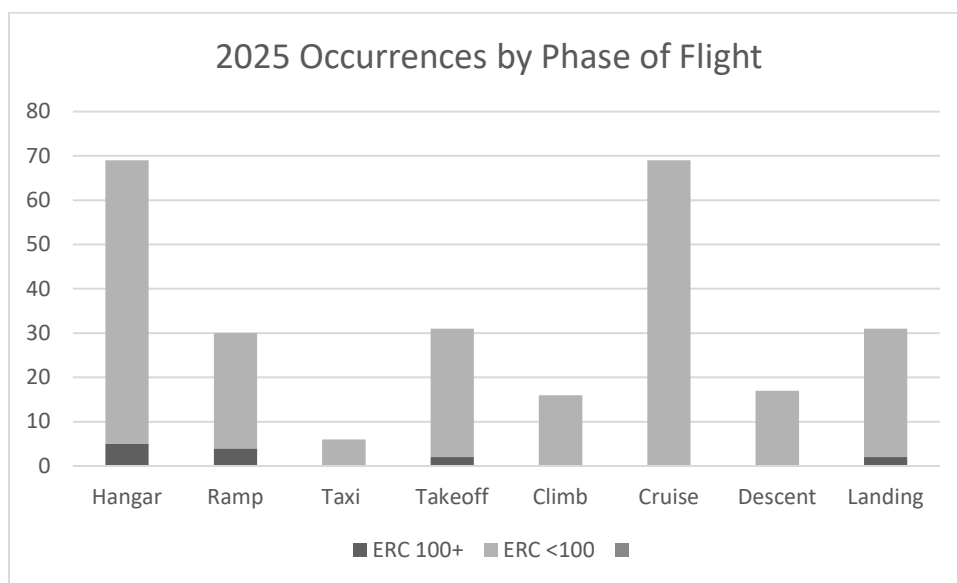
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It is interesting to note that the majority of events with an ERC of 100 or more are in the Hangar or Ramp phases of flight.

SAFA FINDINGS

The number of SAFA Inspections has risen this year, with 46 Inspections in 2025. This is slightly more than the rise that might be expected from the continued increase in the number of San Marino Registered Aircraft, although it is not beyond random variation.

Note: in the chart below, the rate of SAFA Inspections per aircraft is a small number and so has been multiplied by 1000 in order to make the trend visible with the scale of the axes.



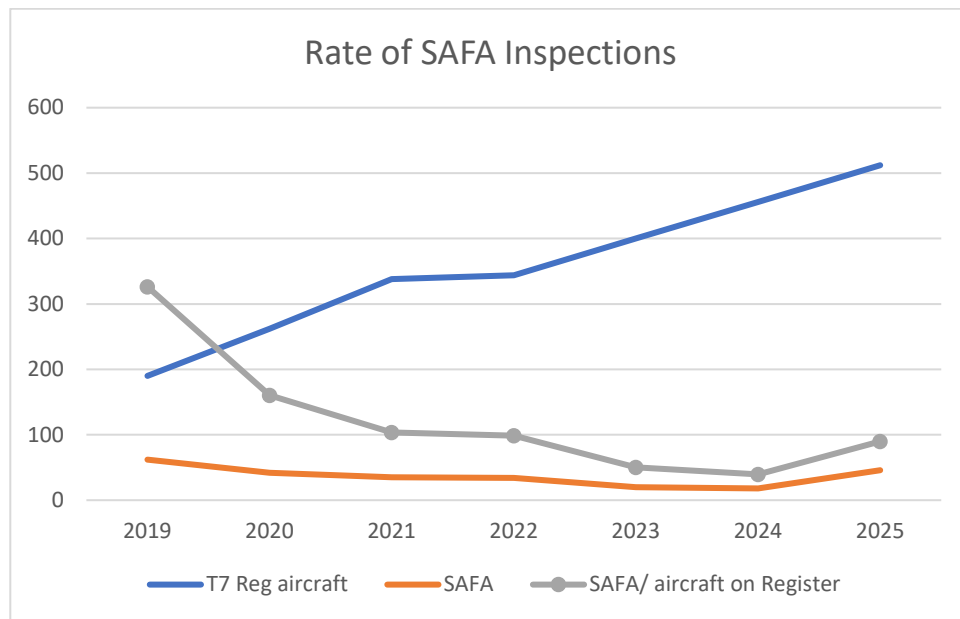
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This year the rate of SAFA Findings per Inspection is an improvement from last year, in all three categories. The rate of Findings has returned to a more typical profile.



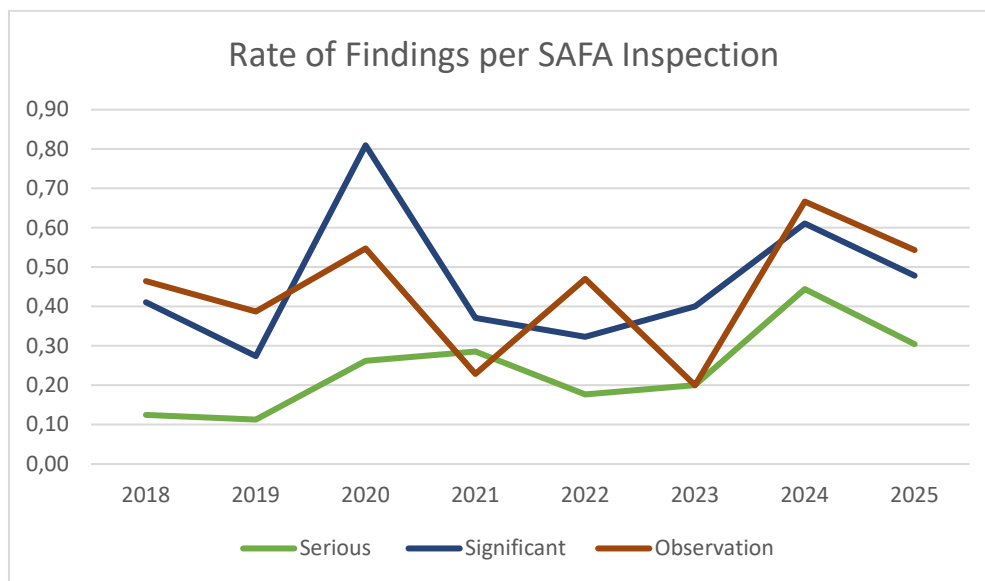
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Serious SAFA Findings in 2025 included items such as:

- Leaking hydraulic braking system (outside dispatch limits/conditions)
- MEL Items not fully customised (no procedure available for crew)
- Cabin crew seat(s) unserviceable (outside dispatch limits/conditions)
- Return to Seat sign(s) in lavatory unserviceable (outside dispatch limits/conditions)
- Cabin equipment not properly secured (and across Emergency Exit)
- Less than required or unsuitable alternate(s) aerodromes selected
- Navigation database out of date x2
- Dangerous goods not correctly loaded and/or secured
- Cargo not correctly secured and restrained in all directions x2
- Loose or heavy objects in the cabin/galleys.
- Hand fire extinguisher not correctly secured
- Insufficient number of life jackets/flotation devices available and required for the type of flight

Significant SAFA Findings included items such as:



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- No evidence of identification nor monitoring of significant defect
- Oxygen equipment not readily accessible or not at indicated location
- Fasten seat belt sign(s) unserviceable
- Spare correcting spectacles not available (x2)
- Different versions of QRH on EFB and on paper backup (x2)
- Some MEL items not fully customised
- Maintenance action not properly recorded
- Fuel/energy calculation not in accordance with applicable requirements
- No proper (Licence) validation issued by the State of Registry
- Bonding wires broken or missing with significant influence on flight safety
- No evidence of identification nor monitoring of significant defect
- A leakage with fresh oil was found on the lower part of the fuselage, starting from a purge up to the tail cone.

Observations included items such as:

- RH wing tip position light with one green bulb inoperative
- MLG wheel tire#4 worn out with two areas showing reinforced layer
- Captain lateral window with bubbles / First Officer windshield with delamination
- Cargo not correctly secured and restrained
- Required VFR charts out of date
- ATS flight plan incorrectly filled in
- All life jackets with next inspection due date stickers expired
- Flashlight inoperative during day light operation
- No valid and appropriate flight crew licence and/or medical certificate carried on board at the time of the inspection
- LH side navigation light consisting of a white and red light instead of two red lights
- MEL not updated to the latest manufacturer revision
- Direct route written on OFP between destination and alternate airport, excluding any navigational procedures and associated fuel requirements

Year	SAFAs	Number of Findings				Rate of Findings Per Inspection		
		Serious	Significant	Observation	Total	Serious	Significant	Observation
2018	56	7	23	26	56	0.13	0.41	0.46
2019	62	7	17	24	48	0.11	0.27	0.39
2020	42	11	34	23	68	0.26	0.81	0.55



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2021	35	10	13	8	31	0.29	0.37	0.23
2022	34	6	11	16	33	0.18	0.32	0.47
2023	20	4	8	4	16	0.20	0.40	0.20
2024	18	8	11	12	31	0.44	0.61	0.67
2025	46	14	22	25	107	0.30	0.48	0.54

CAA INSPECTOR'S FINDINGS

AIRWORTHINESS

Airworthiness Inspectors performed 18 Audits in 2025 (of which 4 remain open).

224 Findings by Airworthiness Inspectors in 2025:

Findings	2025
Serious	2
Significant	193
Observations	29
Total	224

Serious Findings included subjects such as:

- AD Review and Compliance
- AMP to be revised to the latest OEM change

Significant Findings included subjects such as:

- Flight & Maintenance Log errors / omissions



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- Maintenance Programme Approval Checklist not at latest OEM revision
- Maintenance Management Exposition errors / omissions
- Quality system does not cover all aircraft types operated by the organisation
- MEL errors / omissions (e.g. less restrictive than MMEL)
- Subcontractor management
- Maintenance responsibilities unclear / undocumented

Observations included subjects such as:

- Some LLP items did not have a part number and/or serial number identified
- Independence issue - SMEA auditor of Maintenance contracts is also the assigned auditor for [organisation] who are the line maintenance contractor
- Consider more focus on Operational Safety Hazards associated with Airworthiness Management
- No inventory of Archive cupboard





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FLIGHT OPERATIONS

Flight Operations Inspectors performed 74 Inspections in 2025 (of which 15 remain open).

Findings by Flight Operations Inspectors in 2025:

Findings	2025
Serious	4
Significant	445
Observations	131
Total	580

Serious Findings included subjects such as:

- Quality system (multiple, systemic weaknesses)
- Technical reporting culture (pervasive attitude allows omitting to record smaller issues)
- Safety Cards in Cabin missing/ unusable
- Departure briefing was held for runway XX, but given clearance was for runway YY

Significant Findings included subjects such as:

- Emergency equipment location chart
- Risk Register – risks not recorded or updated
- Responsibilities not clearly documented e.g. subcontractor interface; authority to release a flight
- MEL Review - Ops Specs, Dispatch Conditions.
- Fatigue Risk Management Training (not apparent)

Observations included subjects such as:

- Subcontractor onsite audits (presently only local sub-contractors for Ground Handling)



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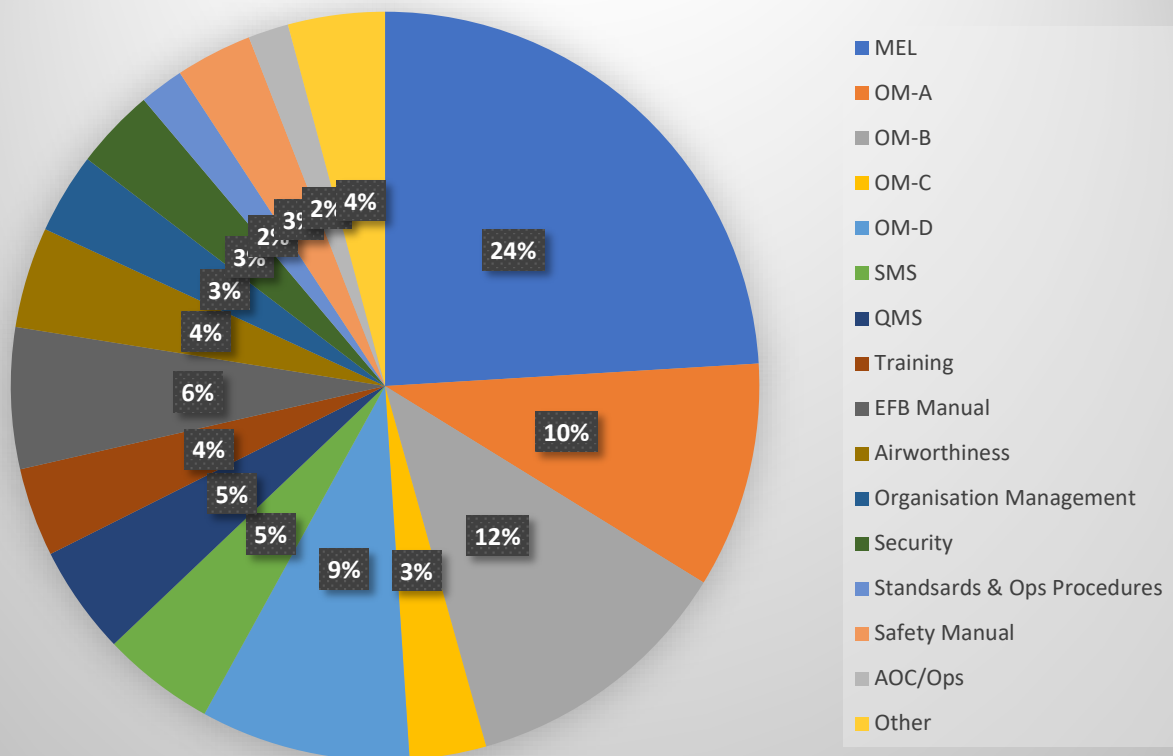
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- Inadequate number of LTCs
- SPI require a review
- Consider a review of OMB Ch. 3.8.2.5 for an update how to treat explosive devices

Flight Operations Inspection Findings



SAFETY REPORTING RATES



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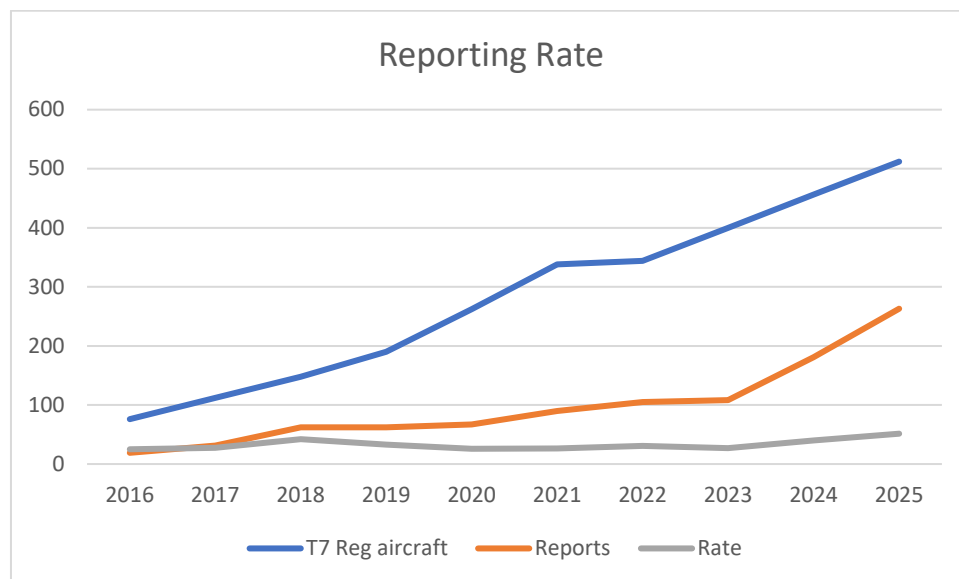
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The number of safety reports has risen again this year, beyond the proportionate increase in fleet size. This indicates continued improvement in reporting culture amongst our San Marino organisations, as confidence grows in the responsible treatment of reported events.



INTERNATIONAL PUBLICATIONS OF INTEREST

For convenience, the list below highlights some international safety publications that may be of interest:

- ICAO – State of Global Aviation Safety (2025 edition) <https://www.icao.int>: ICAO_SR_2025.pdf Global safety analysis showing accident rate increased compared with 2023. Identifies region-specific risk priorities (e.g. runway excursions, mid-air collision risk, infrastructure gaps).
- IATA Annual Safety Report <https://www.iata.org> Provides industry risk prioritisation (runway excursions, MAC, LOC-I etc.) for commercial airline accident categories and trends.
- EASA Annual Safety Review 2025 <https://www.easa.europa.eu> European accident and serious incident trends supporting European regulatory priorities and EPAS actions.
- European Plan for Aviation Safety (EPAS) 2026 – Volume II. Strategic safety actions and regulatory priorities for Europe. <https://www.easa.europa.eu> European Plan for Aviation Safety (EPAS) 2026 – Volume II (PDF). Themes include:



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- Runway safety
- ATM/ANS resilience
- Human Factors & fatigue
- Digitalisation risks
- Sustainability & new entrants (UAS/AAM)
- Aviation Supply Chain Integrity Coalition <https://aviationsupplychainintegrity.com> exploring the issue of unapproved parts
- Aviation Cyber Security <https://www.icao.int/aviation-cybersecurity/guidance-material>
- Aviation risk from GPS Signal Disruption guidance for crews <https://ops.group/blog/crew-guidance-published-by-gps-spoofing-workgroup/>

CONCLUSIONS

San Marino has enjoyed another year of growth in the fleet and safe operations with no Accidents or Serious Incidents. Most of our indicators show an improvement since the previous year.

Last year, the majority of indicators were higher and in some cases were much higher than is normal for San Marino. Our Safety Review Board (SRB) spent time reviewing the data, and exploring why this increase in indicators had occurred. In most cases, there were reasons that were not related to an elevated safety risk. For example, many of the increased number of Findings were found to have been raised on AOC Applicants in connection with issues associated with their Applications. For some organisations this had worked best as a mechanism to progress corrective actions. This created a large apparent increase in the number of Audit Findings, although they were not failings in San Marino Operators. Instead, they were driving improvements to raise the Applicant to the necessary standard to become a San Marino Operator. However, not every increase in the 2024 data could be explained by procedural change, so it was heartening to see that the data for 2025 has returned to more typical values.

The GPS signal disruption has increased significantly. Whilst there is clearly the potential for a direct effect on navigation, the less obvious effects on other systems may also generate risk. It is important to ensure that Operators prepare their crew for such situations and take steps to prevent inevitable 'human' reactions such as turning off alerting systems (such as EGPWS).

TCAS RAs have returned to pre-COVID rates, which is reassuring, and is no longer considered a high rate for the fleet size.

SAFA Findings have also returned to more typical levels, although the number of SAFA Inspections (adjusted for number of aircraft in the fleet) has started to rise again.



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The number of Safety Reports raised by organisations has also increased and appears to provide evidence of an improved reporting culture.

In Flight Operations, MELs were the most common subject for Inspection Findings, accounting for 24%, almost a quarter of the total. The elements of the Operations Manual summed up to take a further 34%, thus combining to represent 58% of Findings. In Airworthiness, the Maintenance Management Exposition and the Maintenance Programme General Requirements together accounted for 70% of Findings during audits. However, in both Flight Operations and Airworthiness, Findings that were rated as Serious were a very small proportion of the total.

Overall, it has been another successful year for safety in our organisations. To all who are involved in San Marino aviation, may we take the opportunity to wish you a safe and prosperous year in 2026.

Eng. Marco Conti
Director General