



# REPUBLIC of SAN MARINO CIVIL AVIATION AUTHORITY

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## SAFETY NOTICE No. 01/2025 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 2024.

#### Higher Risk Events

Events during 2024 with an ERC score above 50 have been mentioned above, to summarise these were:

Private Helicopter lost altitude and crashed soon after take-off, 2 fatalities	2500
Engine Failure at FL340, fire on ground	2500
MRO found fuse deliberately bypassed	2500
NLG existing damage found during maintenance	2500
Airport vehicle struck aircraft wing, caused damage	2500



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Mid-cabin door/plug inspection	502
Flight not authorised, documented, or airworthy	502
Light aircraft, low altitude flight over persons	502
Light aircraft, flight with overdue maintenance	500
MRO noticed a fuse been bypassed - fire hazard	500
Flight not authorised, no Flight Plan, no W&B, etc	500
Flap fairing damage after landing	500
Maintenance found both thrust reversers locked	500
Compartment handheld fire extinguishers missing	500
<b>GPS Spoofing x 8 separate reports (one with GPWS Alert)</b>	102
<b>GPS Jamming or Loss x 3</b>	102
TCAS RA	102
Altitude Bust	102
Air Turnback due to Fuel Imbalance	102
Crossed Runway, No Clearance, Call Sign Confusion	102
Passenger escape slide failed to deploy	101
Stick shaker after cleaning up	101



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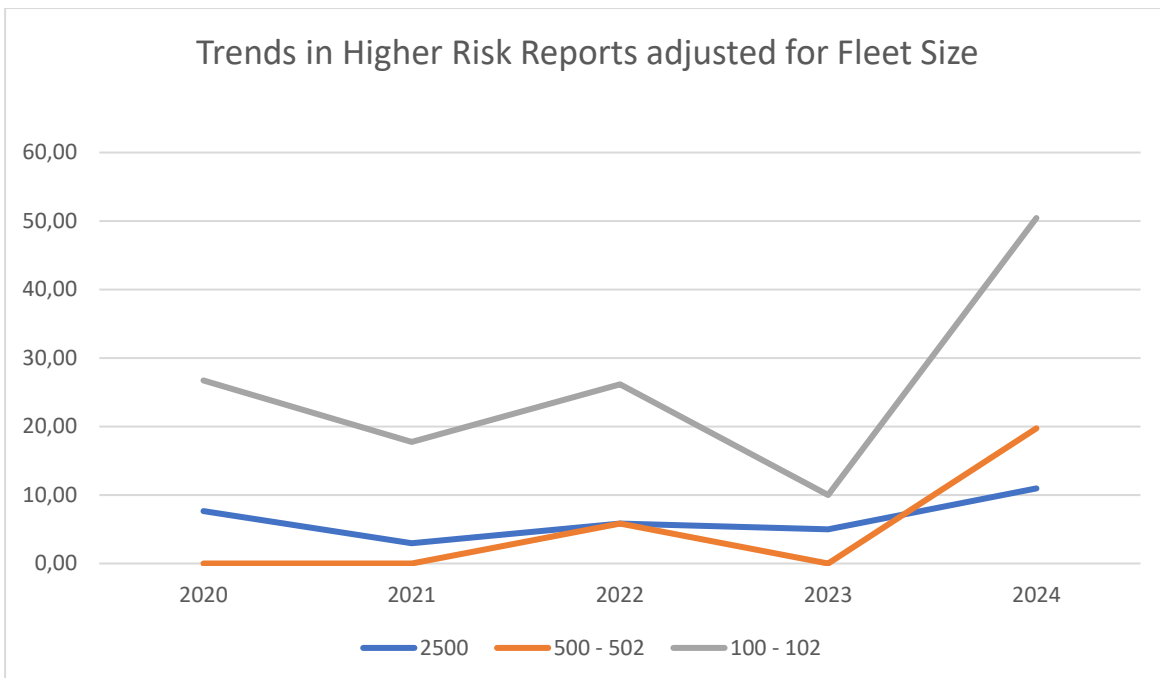
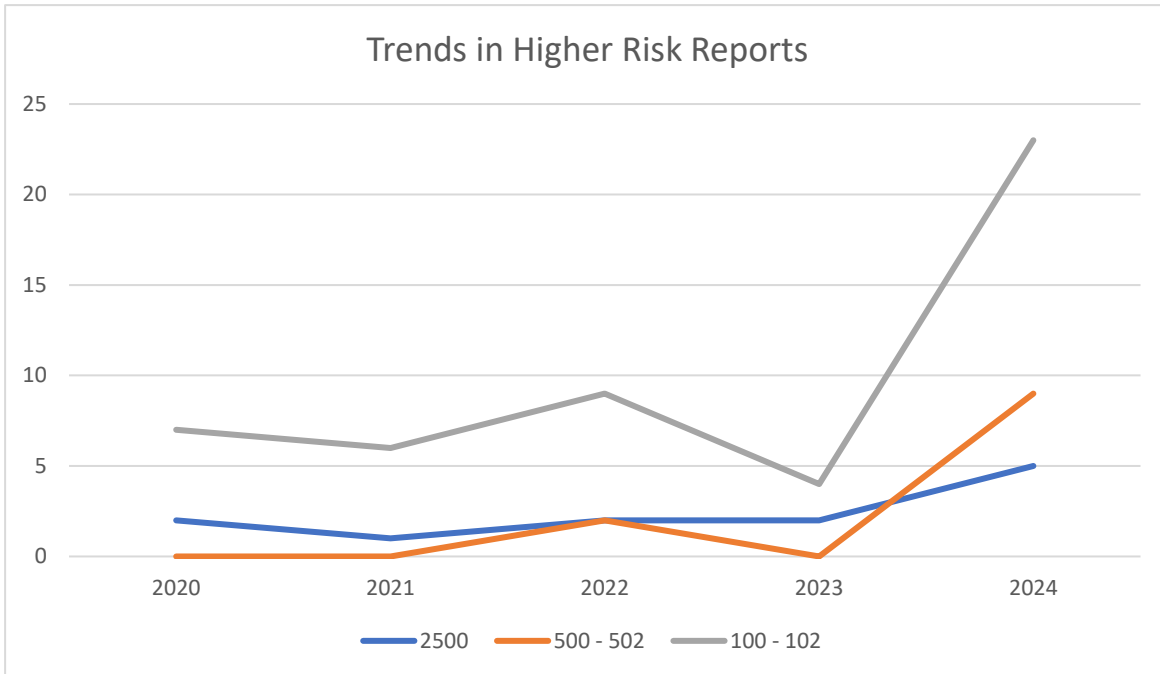
SID deviation, autopilot turned opposite way	101
Permit to Fly permitted Flight level breached	101
Brake pressure switch part number not effective	101
Broken runway light damaged tyres, bleed plug	101
Electrical power outlet EWIS unsafe practices	101
Component installed incorrectly, found by chance	101
<b>GPS Spoofing x 3</b> (includes one with Erroneous EGPWS Warning)	50
<b>GPS Jamming x 3</b> (two of these occasions were on one report)	50
<b>TCAS RA x 2</b> (one was Low Level during Visual Approach)	50
SID Deviation	50
Pressurization failure post take-off	50

Notably, 2024 has more events with an ERC score of 50 or above.

ERC Score	2020	2021	2022	2023	2024	Total
2500	2	1	2	2	5	12
500 - 502	0	0	2	0	9	11
100 - 102	7	6	9	4	23	49
50	5	6	8	6	9	34
Total	14	13	21	12	45	105



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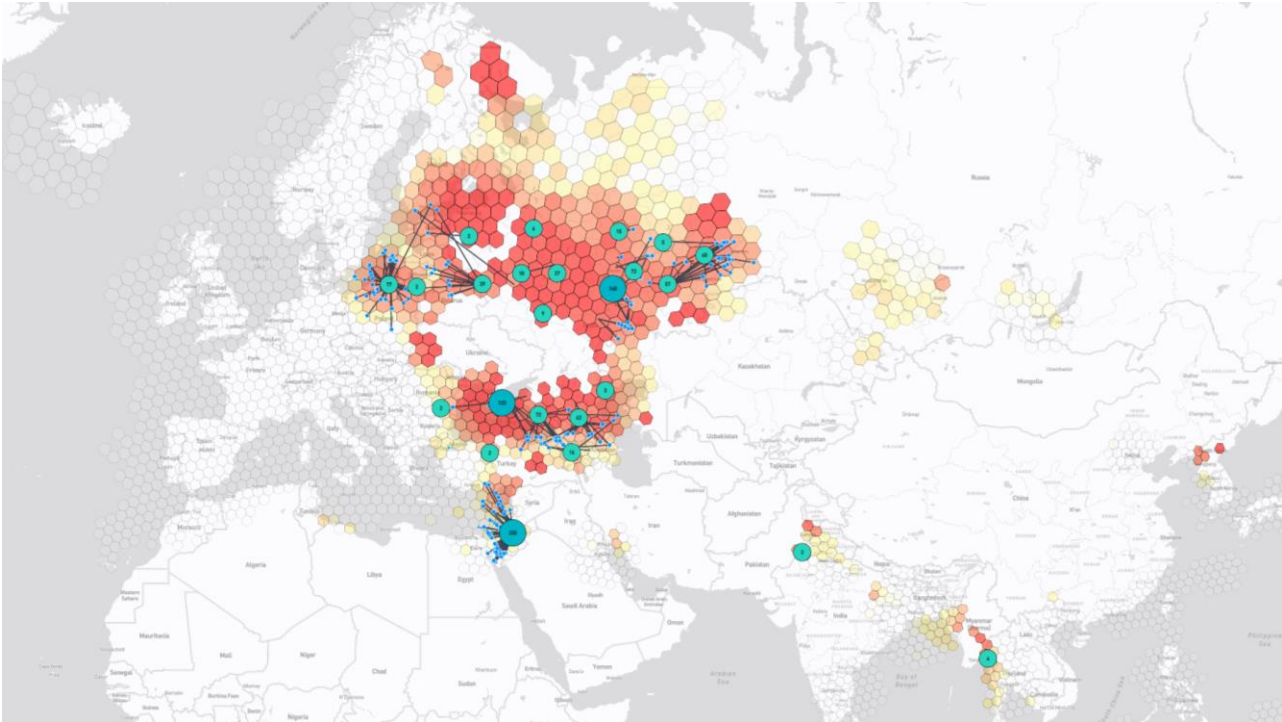
The two charts above show a) the trends in higher risk reports and b) the same data adjusted for fleet growth (number of events / number of aircraft on the Register (each multiplied by 1000 due to very small numbers)). Although the second chart moderates the slope of the increase slightly, the message remains similar: higher risk events have risen this year.



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### Hot Topics

#### GPS Signal Disruption



Map of recent spoofing events reproduced from <https://spoofing.skai-data-services.com/> on 22/01/25

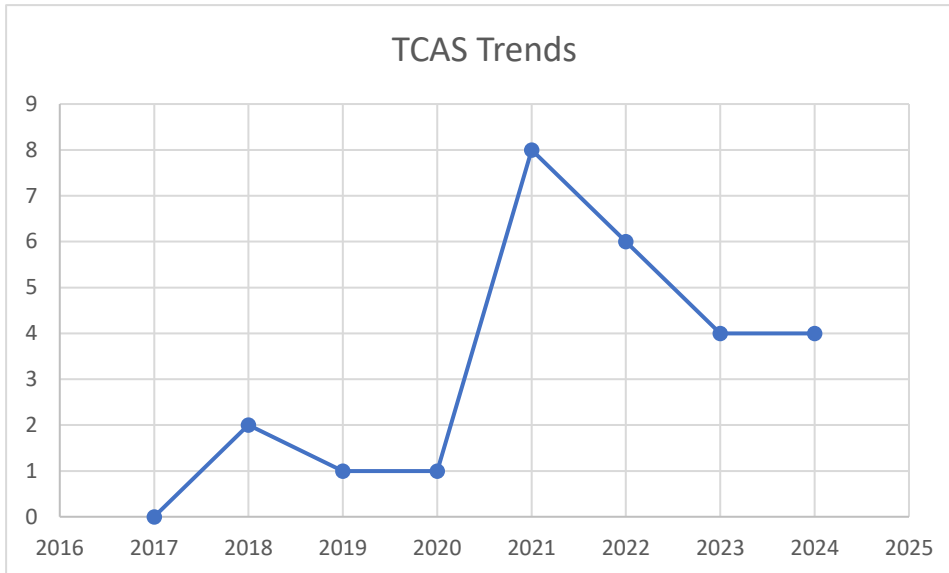
GPS disruption or incorrect GPS data to San Marino Registered Aircraft was reported 17 times in 2024 (4 in 2022 and 2 in 2023), the majority were 'spoofing' events. This shows a sharply rising trend, and in 2024 may now be under-reported. Increasing frequency has led to some crew seeing the event as 'routine' and failing to file a report. There is useful information available to support Operators, please see San Marino Safety Notice No. 02/2024 Issue 02 for a list of resources and suggested safety practices. A concerning aspect of GPS disruption becoming more frequent has been instances of pilots ignoring EGPWS terrain alerts, even at altitudes where they could be genuine.

#### TCAS RA

TCAS RAs seem finally to have returned to pre-COVID rates (the slight increase in numbers is likely due to substantial growth of fleet and / or some random variation).



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### Aircraft Maintenance Finds

Some reports identified issues found during maintenance, e.g.:

- Two separate instances of fuses deliberately bypassed, creating a fire hazard
- Incorrectly installed component, found during an inspection for a different purpose
- Nose Landing Gear damage
- Both engines thrust reversers were inhibited (Quick release pins were not removed)
- Electrical power outlet EWIS unsafe practices, see inset below

*“While performing a maintenance C of A pre- inspection, .... it was observed by our maintenance team that the XXX volts / XX Hz electrical power out located on the AFT LH Pilot console in the cockpit area was not installed (missing). Further assessment revealed that the missing electric outlet was removed, capped with a plastic bag and hidden behind the Pilot console. After reviewing of the aircraft TL and DDR we could not find any maintenance or deferment actions related to subject item, CAMO Director was informed about this condition. Moreover, after removing the power outlet from the plastic bag, it was noticed that it was broken in pieces and the associated wires were connected to the broken part of the outlets. We have checked the circuit breaker that protect the circuit from arcing and it was found closed. CAMO was notified and corrective action will be carried out.”*



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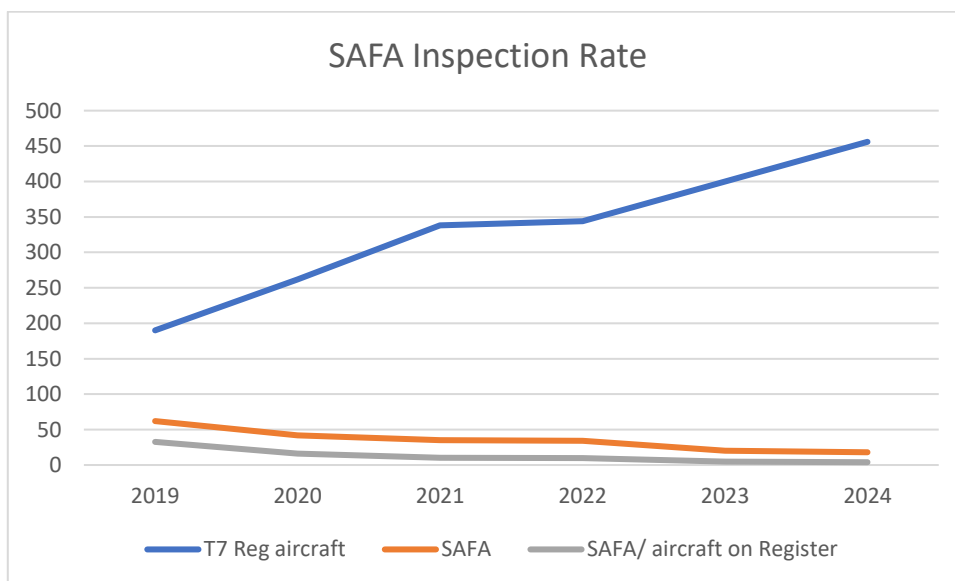
Other reports of technical malfunctions for unspecified reasons included:

- Autopilot created incorrect flight path (turn in wrong direction on SID)
- In flight turnback due fuel imbalance attributed to fuel computer, overweight landing
- Passenger escape slide failed to deploy
- Landing Gear retraction failure (not yet scored for ERC)

### SAFA FINDINGS

The number of SAFA Inspections is lower than ever before, with only 18 Inspections in 2024. This represents a continuous reduction from previous years, despite the continued increase in the number of San Marino Registered Aircraft.

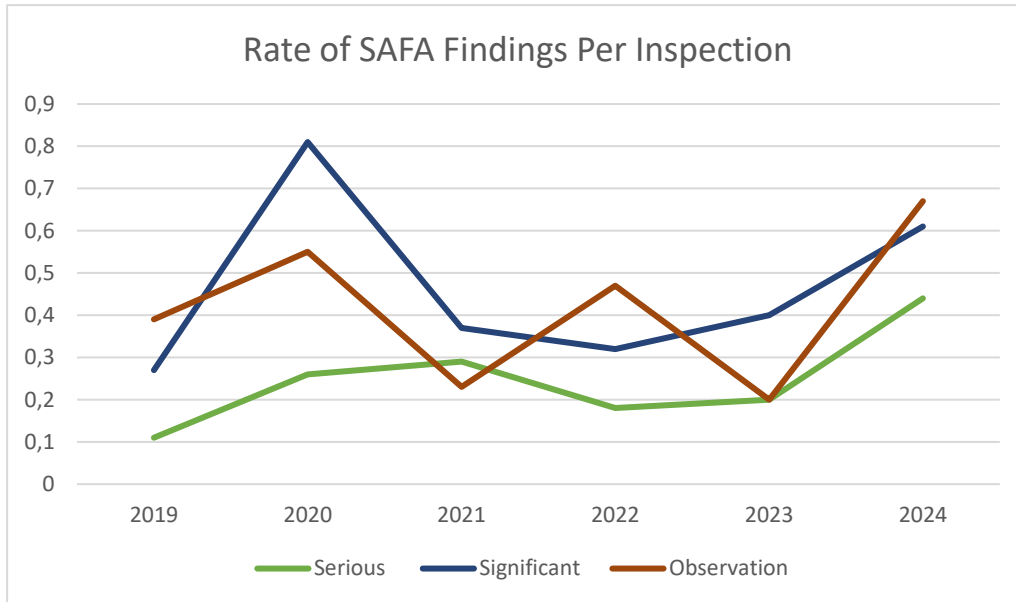
Note: in the chart below, the rate of SAFA Inspections per aircraft is a small number and so has been multiplied by 100 in order to make the trend visible with the scale of the axes.



However, the rate of SAFA Findings has risen this year. This is shown as a rate of Findings per Inspection, which is not affected by the number of aircraft on the Register nor the number of SAFA Inspections performed. There has been an increase in the rate of all levels of SAFA Findings: Serious, Significant and Observations.



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### Serious SAFA Findings in 2024 included:

- Less than required or unsuitable alternate(s) aerodromes selected
- Cabin equipment not properly secured
- Required identification tag missing
- Loose or heavy objects in cabin
- Required maintenance action not performed
- Access to emergency exits impeded by baggage or cargo
- Survival equipment/portable ELT not available or not at indicated location

### Significant SAFA Findings included:

- **Incorrect mass and/or balance calculations (x3)**
- Fuel calculation not in accordance with applicable requirements
- Emergency exit partially blocked
- AFM Temporary changes not integrated in the board AFM
- The captain (single pilot operation) was unable to locate the portable light without external assistance.
- MEL less restrictive than the MMEL
- Known defect not reported/assessed
- Passenger emergency briefing cards with inaccurate information

### Observations included:

- First Aid kit with an old revision
- Placard not completely readable on engine #1
- TDB of GPWS/TAWS with FLTA function not updated to the latest manufacturer version





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

### CAA INSPECTOR'S FINDINGS

#### AIRWORTHINESS

Findings by Airworthiness Inspectors in 2024 on CAT 1 OPS (not including CofA) were as follows (2023 number in brackets):

Serious	3	(0)
Significant	82	(15)
Observations	20	(10)

#### FLIGHT OPERATIONS

Findings by Flight Operations Inspectors in 2024 were as follows (2023 number in brackets):

Serious	9	(0)
Significant	511	(55)
Observations	102	(28)

Serious Findings included subjects such as:

- 26 findings control sheet for physical aircraft inspection
- PBE entry not compliant with Policy letter
- Obsolete entries, number required/installed, non-conform items
- FDM System – no policy, procedures, gatekeeper, trained person, could not download FDM
- There is no evidence of the operator complying with the Airfield Categorisation process
- ERP Repeat Finding - An ERP exercise has still not been completed
- Knowledge on location and handling of emergency equipment on T7-XXX and T7-XXX



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Significant Findings included subjects such as:

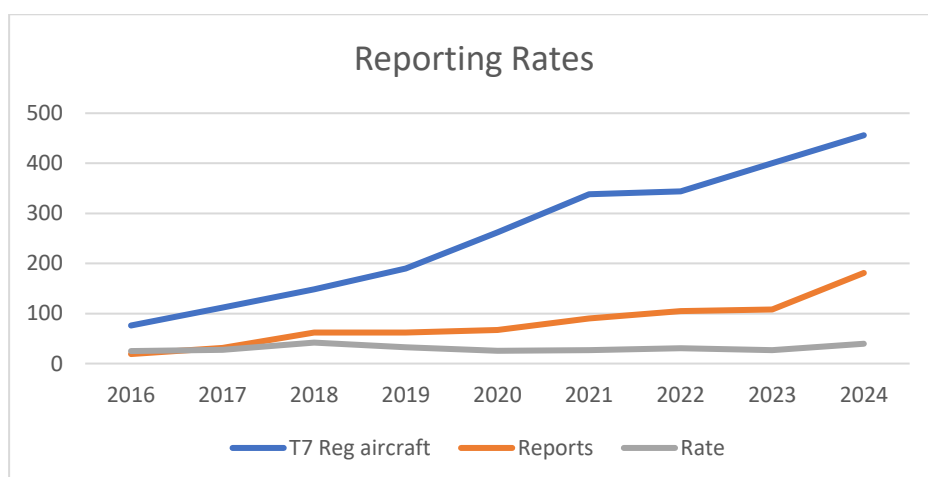
- Independent inspection of Vital Points
- Safety Performance Target selection
- MEL amendments and timescales
- Carriage of Dangerous Goods: inoperative therapeutic oxygen bottle

Observations included subjects such as:

- EFB Manual Reference
- SRB Meeting frequency
- Safety Briefing card

### SAFETY REPORTING RATES

The number of safety reports has risen this year, although that is partly attributable to the increase in the number of aircraft on the San Marino Register. It is sometimes difficult to discriminate between an improved reporting culture and a genuine increase in the number of events. One approach is to assume that higher risk events will be reported irrespective of culture, so the measure of changes in reporting rates would be the number of lower-level reports. In this case we have an increase in both categories, perhaps signifying that there has been some improvement in reporting culture but may also indicate some increase in safety risk.



### INTERNATIONAL PUBLICATIONS



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San Marino is a small State and so it is useful to refer to international publications based on substantial data volumes for additional insight into the most prevalent safety issues. ICAO lists five High Risk Categories and the most common of these are Runway Excursions, Loss of Control in Flight and Controlled Flight into Terrain (CFIT), the latter being mainly in smaller aircraft that are not equipped with TAWS. There is extensive material available on the websites of Skybrary, ICAO, EASA, UK CAA, FAA, CASA, EBAA, NBAA, FSF, IATA, OPSGROUP, ECCSA (European Centre for Cyber Security in Aviation) and others, such as:

EASA publishes the European Plan for Aviation Safety issued 21 January 2025; this outlines current data driven safety priorities and other additional resources:

<https://www.easa.europa.eu/en/document-library/general-publications/european-plan-aviation-safety-epas-2025>

<https://www.easa.europa.eu/community/topics/icing-flight>

<https://www.easa.europa.eu/community/topics/sunny-swift-avoiding-mid-air-collisions>

OPSGROUP Report to support operations on GPS Spoofing published 6 September 2024:

<https://ops.group/blog/gps-spoofing-final-report/>

FAA website on SMS last updated 2 August 2024:

<https://www.faa.gov/about/initiatives/sms/explained>

IATA on Cyber Security 14 December 2024:

<https://tinyurl.com/IATA-on-Cyber>

Skybrary.aero contains information on a wide range of aviation topics, most recently:

[ATS Unit Call Signs](#)

Updated on: January 15, 2025 in: [Air Ground Communication](#)

[Missed Approach Point \(MAPt\)](#)

Updated on: January 6, 2025 in: [General](#), [Controlled Flight Into Terrain](#)

[Cabin Crew Workload](#)

Updated on: December 10, 2024 in: [Human Behaviour](#)

[Use of Selected Altitude by ATC](#)

Updated on: December 3, 2024 in: [General](#), [Loss of Separation](#), [Level Bust](#), [Safety Nets](#)

[Magnetic Chip Detector \(MCD\)](#)

Updated on: November 8, 2024 in: [General](#), [Helicopter Safety](#), [Airworthiness](#)

[Mandatory Occurrence Reporting](#)

Updated on: October 15, 2024 in: [Safety Management](#), [Safety Management System](#), [Accident Investigation](#), [Monitoring & Oversight](#), [ICAO ADREP](#)



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### **CONCLUSIONS**

San Marino has enjoyed another year of growth in the fleet and predominantly safe operations, although we always regret to have an accident, with one fatal accident in a helicopter in 2024. The investigation continues. A second event resulted in a fire on the ground and some injuries, also regrettable. We always examine such events carefully to ensure that if there are lessons to be learned, we will do so, to ensure not to repeat the situation in the future.

The most notable new risk has been the rise in GPS spoofing and jamming to the East of Europe / Middle East areas. This increase has led to more polished responses, as pilots become well practiced in working with these situations, but there remain many who have not yet encountered it and will also meet it for the first time in the coming months. As it has become a known issue, it has also resulted in some pilots seeing it as a routine situation and not reporting it every time. In some cases, it has been found that pilots have not responded to EGPWS Terrain Alerts, even at plausible altitudes, because it is assumed to be a spurious alert. Operators should be vigilant on these trends because it seems that the spoofing issue will be present for some time to come. Please do ensure pilots are well prepared, report all occurrences and are clear to respond to Terrain Alerts at appropriate altitudes.

TCAS RAs have returned to pre-COVID rates, which is reassuring, and the very small increase corresponds with increasing fleet size.

It is also of interest that the number of Findings made by San Marino Inspectors, and by SAFA Inspectors, has risen markedly, disproportionate with the growth of the fleet. Some of this may be due to AOC Applicants being prepared for meeting AOC standards but there may also be a genuine rise in non-compliances found.

The number of safety reports has also risen. This type of data is always difficult to interpret. Last year we promoted the reporting of all occurrences, and safety reports have risen, so we are hoping that the reason for the increased reports is a rising reporting culture; if so, well done. However, the increase is not only in the lower risk reports but is also reflected in the medium and higher risk categories, and this is a trend that we will monitor closely.

In Flight Operations, there were some gaps in the management of safety and two cases of breakdown in authorisation and preparation to fly. Compliance is essential in these areas and we encourage all Operators to ensure that this receives the attention it deserves.

In Airworthiness, there have been some reports of issues that were found during maintenance that could have been known previously, but had been overlooked. In two cases fuses were deliberately bypassed, an entirely unacceptable practice that creates a risk of fire in an aircraft. It is fundamental that our aircraft are flying with the best standards of safety and so I do encourage all operators to promote careful checks and strong responses if anything is found. And, please do not bypass fuses – ever!

We hope that all our operators will continue with their care and consideration of safety related issues. Past success cannot allow complacency to creep in. We have achieved an excellent safety record – but of course,



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safety is not a one-time achievement, it is an ongoing quest for continuous improvement and adapting to new challenges as they arise. We hope that the information we provide will support those efforts.

Finally, we would like to thank everyone who attended our first live Safety Conference in San Marino last year. We enjoyed it tremendously, and we hope that you found it beneficial, in terms of both the information that was presented and the networking opportunities of the social occasions.

To all who are involved in San Marino aviation, may we take the opportunity to wish you a safe and prosperous year in 2025.

Eng. Marco Conti  
Director General