



REPUBLIC of SAN MARINO

CIVIL AVIATION AUTHORITY

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SAFETY NOTICE No. 01/2024 Issue 01

ANALYSIS OF SAFETY DATA

At the end of the year, San Marino CAA conducts an analysis of Safety Data. As San Marino is a small State, the data sample size is relatively small and we recognise that this can be subject to some random variation or 'statistical noise'. Scores from the European Risk Classification (ERC) are shown as a guide to the safety risk assessment.

There are three sources of information provided:

- 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 100 or above in 2023.

HIGHER RISK EVENTS

Events during 2023 with an ERC score above 50 were:

- | | |
|--|----------|
| • Helicopter (Bell 206B Jet Ranger III) accident, fatal to the 2 occupants | ERC 2500 |
| • Light Aircraft Landed with gear not locked, no injuries, aircraft damage | ERC 2500 |
| • Severe Defect not entered in the ATL | ERC 102 |
| • Erroneous GPS Data (GPS Spoofing) | ERC 101 |
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| • Prohibited Part found installed | ERC 100 |
| • TCAS RA | ERC 50 |
| • TCAS RA | ERC 50 |
| • TCAS RA | ERC 50 |
| • TCAS RA | ERC 50 |
| • EGPWS Alert | ERC 50 |
| • Aircraft Configuration CAS alert during take-off roll | ERC 50 |



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COMMENTS

GPS Signal Disruption

GPS disruption or incorrect GPS data was reported twice in 2023, in the location of Turkey / Bulgaria. Operators are advised to remain vigilant as GPS spoofing is high on the international agenda. For example, EASA has recently issued a Safety Information Bulletin on this subject SIB No.: 2022-02R2 Issued: 06 November 2023 Title: Global Navigation Satellite System Outage and Alterations Leading to Navigation / Surveillance Degradation. In addition, the EBAA Annual Safety Summit November 2023 highlighted this subject by holding the expert panel on “Cybersecurity: Spotlight on GPS Spoofing”.

Example text from a GPS Spoofing Report

Aircraft T7-XXX encountered total loss of position information for about 45 minutes over northwestern Turkish and south-eastern Bulgarian airspace.

There is no checklist for the given fault.

Deselection of GPS sensor did not help.

Flight in HDG and on conventional VOR navigation performed like in the old days and ATC was informed.

GPS 1 restored after 3 times CB resets of GPS 1 and a rest period of 10min.

Same successful procedure performed with GPS 2

Normal operation after 45 min conventional flight and a drift of 2NM to the right of Airway.

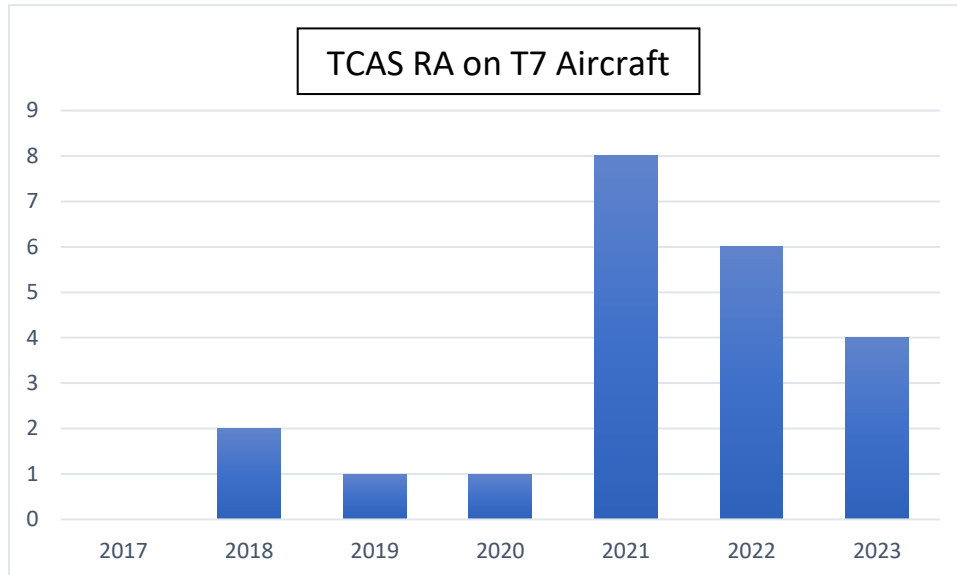
Affected Airspace LTAA and LBSR Safety Report Event Date 25/11/23

TCAS RA

TCAS RAs have not quite returned to pre-COVID levels but have reduced since the peak in 2021/2022. These are small numbers and subject to random variation, but the peak in 2021 occurred when in April 2021, the rate of TCAS RA jumped suddenly from an average of one per year to one per month, and this continued into the spring of 2022, gradually reducing until the present time. Most of the events in 2021 were in the USA but subsequent events have been distributed geographically with no obvious pattern. This peak was interpreted as possibly related to disruption from COVID and return from COVID.



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Aircraft Maintenance not Completed as Required

This was raised an issue in 2021 and some actions taken, but it was not prominent in the data last year. This year there are three reports reflecting significant non-compliance with required maintenance procedure.

- AMO investigating issues on an aircraft 'found evidence of incomplete maintenance actions in aircon, APU and water system *'...looked behind an access panel [and] Found duct disconnected, clamps disconnected, electrical loom/wiring ripped off sensors, duct damaged. Loose items left inside of access panel cavity. Insulation tape around ends of the wires and around the switches...'*
- Prohibited Part found installed, despite part having been 'purged' by OEM.
- Severe Defect not entered in the ATL by the crew, non-functional MFDs and PFD found and replaced from another aircraft by an unlicensed person, all with no ATL entry.

Other reports of technical malfunctions for unspecified reasons included:

- Flight performed after maintenance. On take off, autopilot 2 disconnected aggressively to pitch up of 25 degrees up. Crew flew manually to 6000 feet, during which autopilot 1 was selected; at approach autopilot disconnected by itself.
- Low speed RTO due engine 'no dispatch' CAS, returned to maintenance but no fault found, fault appeared again at next attempted take-off, returned to for further maintenance.
- Engine vibration.
- Engine squib disconnected.
- Landing gear malfunction during runway vacate.
- Fuel leak.
- Loss of communications in flight.



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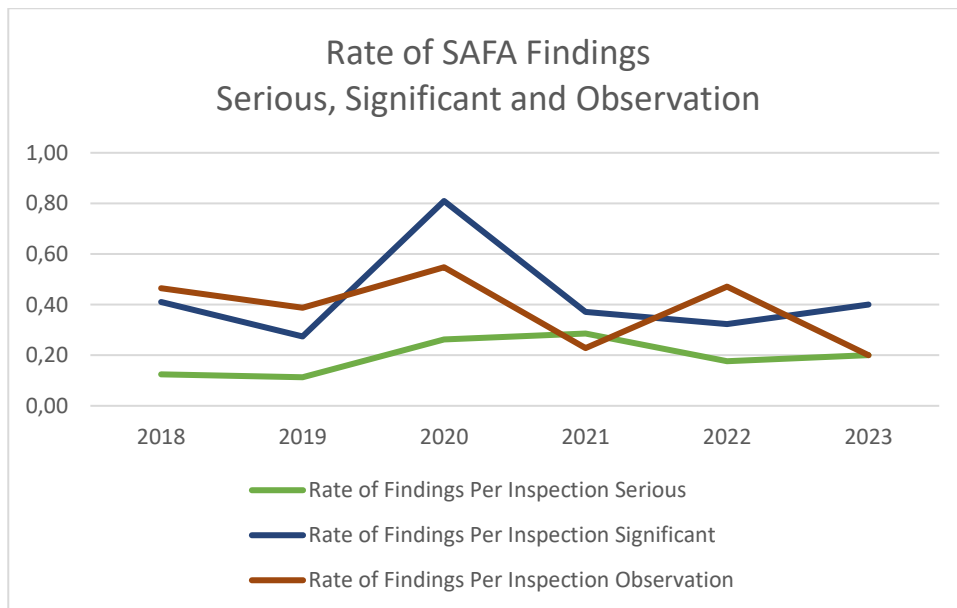
- Air turnback due landing gear malfunction.
- Incorrect P/N I/B Nose Rollers installed on both flaps.
- Flap failure during configuration on final approach.

Flaps

Technical issues with Flaps have been reported 8 times in 2022 but only two events in 2023, as above.

SAFA FINDINGS

SAFA Findings this year remain relatively steady as a rate per Inspection, which is not affected by the number of SAFA Inspections performed. However, the number of Inspections is lower than ever before, with only 20 Inspections in 2023 compared with the previous low of 34 in 2022, despite the continued increase in the number of San Marino registered aircraft.



Serious SAFA Findings in 2023 included:

- Flight crew member without appropriate/valid licence/rating.
- Medical certificate invalid for the privileges being exercised.
- Interior equipment and/or other object(s) not correctly secured or stowed during flight.
- PIC flash light not serviceable.



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Significant SAFA Findings included:

- Incorrect mass and/or balance calculations.
- MEL not reflecting aircraft configuration or the specific approvals.
- Passenger emergency briefing cards contain inaccurate information.
- Previous repair in poor condition (*finding subsequently queried by SMCAA engineering*).
- Fuel calculation not in accordance with applicable requirements.
- MMEL instead of MEL.
- Incorrect Operational Flight Plan.
- Door operation instructions missing or unreadable.

Observations included:

- No entry permission issued for commercial flight.
- Markings and/or placards missing or unreadable (x 2).
- Safety cards not correct.

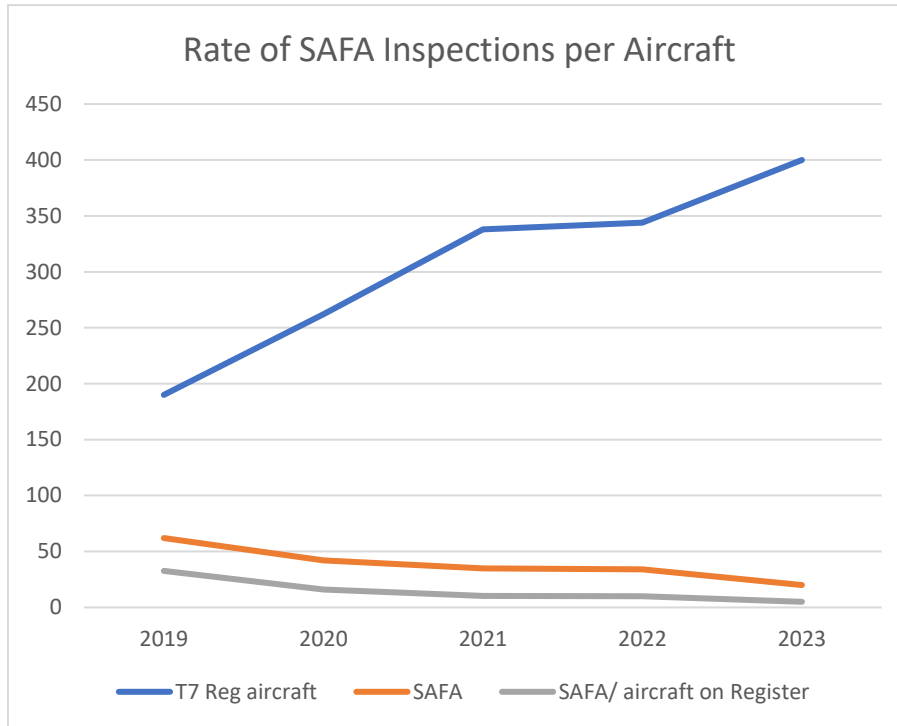
Year	SAFAs	Number of Findings				Rate of Findings Per Inspection		
		Serious	Significant	Observation	Total	Serious	Significant	Observation
2019	62	7	17	24	48	0.11	0.27	0.39
2020	42	11	34	23	68	0.26	0.81	0.55
2021	35	10	13	8	31	0.29	0.37	0.23
2022	34	6	11	16	33	0.18	0.32	0.47
2023	20	4	8	4	16	0.20	0.40	0.20

The number of T7 aircraft is increasing and the number of SAFA Inspections is falling. Therefore, the rate of SAFA Inspections performed per aircraft is falling even faster. This is shown in the chart below.

Note: in the chart below, the rate of SAFA 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.



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CAA INSPECTOR'S FINDINGS

A full list of Findings for both Flight Operations and Airworthiness are included at Attachment 1.

FLIGHT OPERATIONS

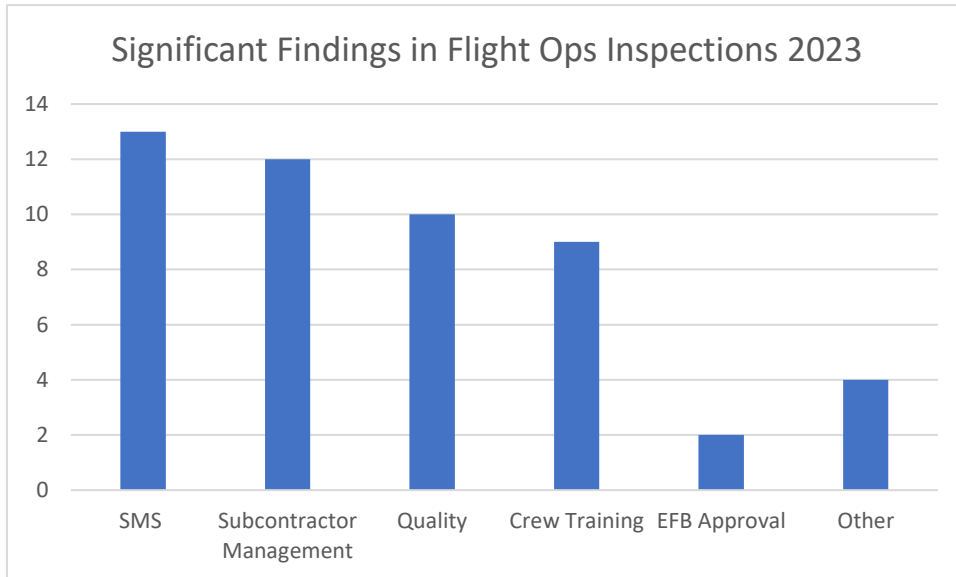
Findings by Flight Operations Inspectors in 2023 were:

- Serious 0
- Significant 55
- Observations 28

Significant Findings included subjects such as: SMS, Subcontractor Management, QA, Crew Training, EFB Approvals and Other subjects.



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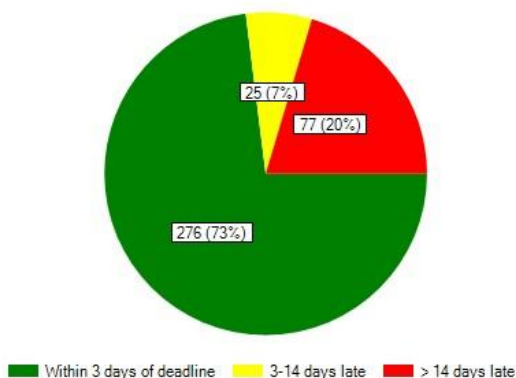


Finding Closure Timeliness

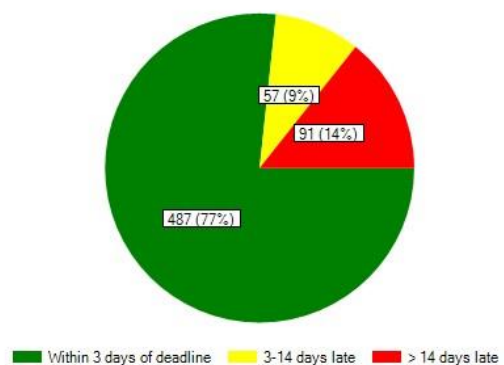
Flight Operations Inspector Findings are assigned a target date for completion of Closure actions.

The charts below show that the majority were closed within 3 days of the target date, some overran by up to 14 days, and a few were closed later than 14 days after the target.

Closures for Findings in 2022 and 2023 shown below. This shows that Closure timeliness is improving and we hope to improve further in the coming year.



Flight Ops Findings Closures 2022



Flight Ops Findings Closures 2023



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AIRWORTHINESS

Findings by Airworthiness Inspectors in 2023 on CAT 1 OPS (not including CofA) were:

- Serious 0
- Significant 15
- Observations 1

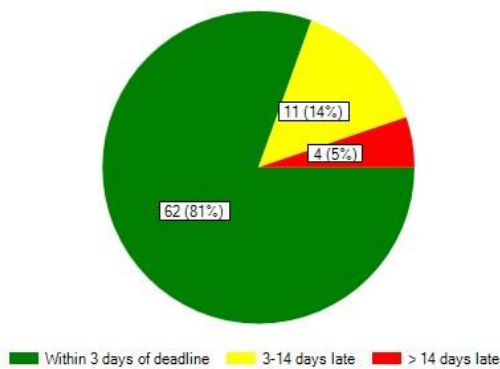
Significant Findings included 4 relating to definition of responsibilities and 11 relating to maintenance task documentation.

Finding Closure Timeliness

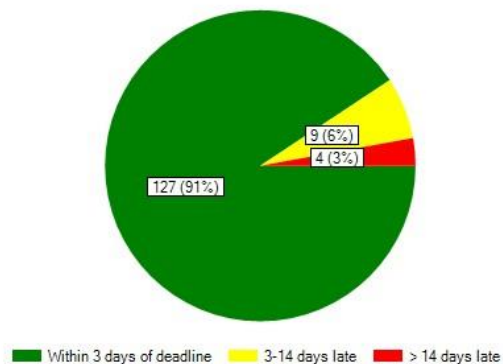
Airworthiness Inspector Findings are assigned a target date for completion of Closure actions.

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Airworthiness Findings Closures 2022



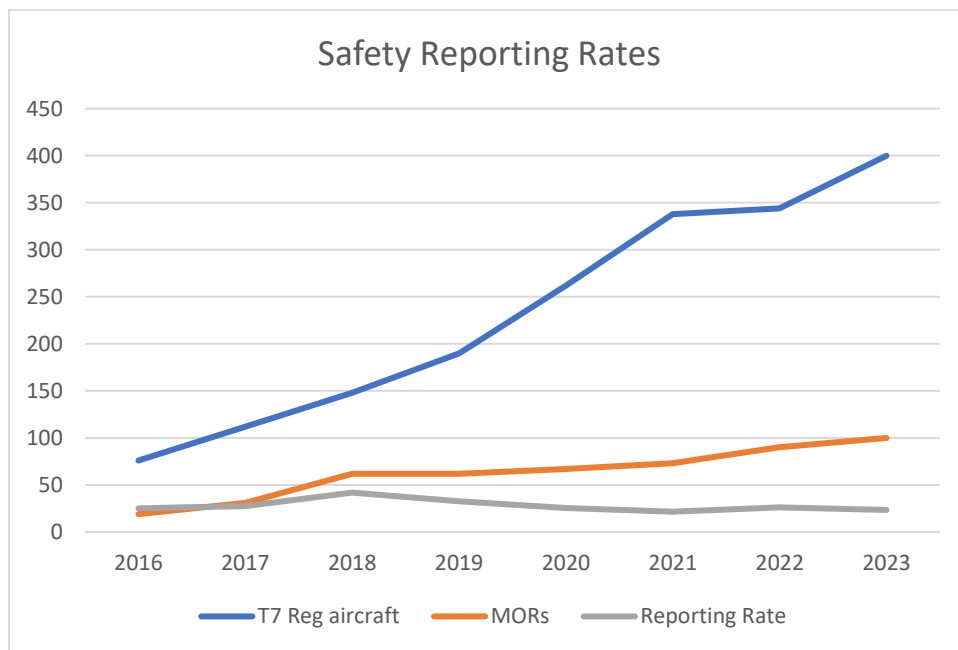
Airworthiness Findings Closures 2023



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SAFETY REPORTING RATES

The number of safety reports received continues to grow, but not in proportion to the number of aircraft on the T7 Register. The chart below shows the increase in the number of reports (amber line) has not kept pace with the increase in the number of aircraft (blue line). The reporting rate (reports per 100 T7 aircraft, grey line) has levelled out following a peak in 2018. There is approximately one report per four aircraft on the Register per year. Of these, two thirds are low scoring (below 20 ERC) events.



INTERNATIONAL PUBLICATIONS

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.

ICAO Safety Report https://www.icao.int/safety/Documents/ICAO_SR_2023_20230823.pdf

The National Business Aviation Association (NBAA) has recently highlighted the importance of Runway Excursions as the most common form of accident to business aviation and has issued guidance on reducing risk in this area, published November 2023.

<https://nbaa.org/aircraft-operations/safety/in-flight-safety/runway-safety/reducing-runway-excursions-business-aviation/>



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Upset Prevention and Recovery Training (UPRT) - Updated Perspectives: Updated on: November 3, 2023 in:
<https://skybrary.aero/operational-issues/loss-control>

Missed Approach: Updated on: November 3, 2023 in:

<https://skybrary.aero/operational-issues/controlled-flight-terrain>

There are many other articles on Skybrary that may be helpful, including those published in November 2023 listed on SkyBrary including:

Volcanic Ash: Updated on: December 4, 2023 in: Weather, Volcanic Ash

Sleep Inertia: Updated on: December 4, 2023 in: Aeromedical

The current European Plan for Aviation Safety (EPAS) is found here:

<https://www.easa.europa.eu/en/domains/safety-management/european-plan-aviation-safety>

Many issues are highlighted in the EPAS but some examples include:

Systemic

- Changes during COVID period leading to reduced adherence to procedures; reduced focus on safety; degradation of resilience in organisations and individuals
- Cyber attack affecting aircraft
- Fatigue / wellbeing issues affecting aviation personnel

Commercial aeroplanes

- Adverse convective weather (e.g. turbulence, hail)
- Approach path management
- Carriage of lithium batteries

Small aeroplanes

- Approach path management on GA aeroplanes
- Poor preflight planning and preparation; general competence levels in flight
- Inadvertent flight into IMC

Rotorcraft

- Inadequate obstacle clearance during low altitude operations
- Inadequate preflight planning and preparation
- Maintenance related issues



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CONCLUSIONS

The past three years have each included accidents and this is a matter of concern. Two of these accidents, included the helicopter crash in 2023, have included fatalities and we continue to extend our deepest sympathy to those involved and their families. We make every effort to learn lessons from the accident investigations and we will use them in our efforts to continuous improvement. It is noted that in some of the events we have seen these past years, one factor that is sometime apparent is the decision to continue with flights despite challenging weather conditions such as gusting wind or poor visibility. In other cases, the operation itself, or the manoeuvre being attempted, was very challenging.

We would remind all aviators of the demanding nature of aviation and the hazards that can arise, both from weather conditions and from ambitious decisions. When we fly successfully and often, the level of risks arising from such hazards might occasionally fade from our minds. We encourage all aviation professionals to ensure that hazards are identified, and risks are carefully assessed, for enjoyable and safe aviation in 2024.

TCAS RAs and GPS spoofing events continue to occur occasionally. These are small numbers and subject to some random variation, and we may just have been lucky in avoiding additional spoofing attacks. We would urge operators to remain vigilant, particularly in the GPS spoofing case. It is more difficult to detect than jamming and has raised concerns more widely outside the San Marino system.

The number of SAFA Inspections of San Marino aircraft has continued to fall despite the increasing number of aircraft on the Register. We hope that this reduced frequency of inspections is a reflection of the growing international confidence in the San Marino registration. It is also noted that there have been no Inspectors Findings in the Serious category this year, although the rigorous surveillance programme continues to report Findings in the lower-level Significant category. Finding Closures are mainly on time, and Closure timeliness continues to improve. The reporting rate continues to hold steady although it has not grown in proportion to the fleet; please do report any relevant events to support safety improvement.

There is also included some International Publications information. San Marino is small country, and it is useful to consider the risks highlighted by international data that is based on larger numbers of operations. Clearly the ICAO high risk categories are prominent. We should consider these as risks that are relevant to us all and make best use of the guidance available (links provided).

I hope that the information in this Safety Notice will be of interest to the operational community and Inspectors alike. It provides an overview of the main issues being raised and may support operational teams in their own internal checking procedures.

Eng. Marco Conti
Director General



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Attachment 1: List of Subjects of Significant Findings

In Flight Operations:

- EFB approvals documentation too generic
- Safety and Quality, including audit schedule not achieved, post holder not attending SAGs, no hazard log etc
- Contracted AMO not listed in audit schedule
- Use of incorrect audit checklists
- Content of Risk Register
- Source and selection of appropriate Safety Performance Indicators (SPIs)
- Missing analysis of FDM data
- EFB Manual
- OM-D Amendment required
- Returned Flight Documentation
- Audit Plan not achieved
- Pilots not meeting proficiency check currency requirements
- Maintenance not being performed IAW the maintenance contract
- Training & Competency of Auditor
- Subcontractor Audit Missing
- Subcontractor Training & Competency
- ERP follow up
- Development towards SMS phase 2
- Sub-contractor monitoring
- Use of non-type rated line LTC to conduct line checks from the jumpseat, needs approval
- Simulator Exercises Required to be Completed - Far exceed the Simulator time available (OPC)
- Crew not provided with Company Issued EFBs for Simulator Training and Checking Sessions
- Audits Not Performed
- Training & Competency of Auditor
- Subcontractor Audit Missing
- Subcontractor Training & Competency
- ERP follow up
- Development towards SMS phase 2
- Sub-contractor monitoring
- Use of non-type rated line LTC to conduct line checks from the jumpseat
- Audit did not demonstrate that maintenance is being performed IAW the maintenance contract
- Audit Not Performed
- Training & Competency of Auditor
- Subcontractor Audit Missing
- Subcontractor Training & Competency
- ERP follow up



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- Development towards SMS phase 2
- Sub-contractor monitoring
- Safety Equipment - Not appropriately secured
- Master Warning Panel/Annunciators - Replacement of Annunciator Block Lights required
- OPC session delivered according to FSI Recurrent Training Standard Option B
- Phased Training Simulator Syllabus indicates training should be delivered iaw
- MORs not submitted as required
- The contracted provider is not able to analyse FDM files
- Audit plan achievement
- Examiner not listed in OMD
- No evidence that he had participated in a standardisation event
- Operator Risk Assessment procedures
- Operator Safety Performance Indicators for Airworthiness
- Many closure actions had already missed their deadline or were going to do so

In Airworthiness:

- Deputy Post Holder CAW was audit contact but is not assigned in the CAME
- Structural Maintenance documentation incomplete
- MP Check Periods documentation incomplete
- FDR/CVR Inspections documentation incomplete
- Ageing Aircraft Requirements documentation incomplete
- ICA's documentation incomplete
- Document confirming no requirement for CDCCL programme not found
- AMP does not currently contain a full breakdown/list of required inspections and tests
- No evidence of life limitations for critical parts listed
- Reliability System documentation incomplete
- Mandatory Tasks documentation incomplete
- AMP Tasks documentation incomplete
- Ops Approvals documentation incomplete
- Operator Statement incomplete
- QMS documentation and contractual documents for aircraft maintenance incomplete