NATIONAL AVIATION SAFETY PLAN 2024-28

DIRECTORATE GENERAL OF CIVIL AVIATION-INDIA

Contents

Foreword

India adopted the process of risk based management of aviation safety in the year 2010 when the first edition of State Safety Programme (SSP) was issued. SSP provided a focused approach to DGCA and the aviation industry in India. Based upon the activities defined in the first edition of SSP-India, the process for monitoring and measurement of safety performance was developed and issued in the form of State Safety Plan 2015-17. This helped in identification of operational safety risk at the aggregate level and their reduction.

The second edition of National Aviation Safety Plan 2018-22 built upon the achievements and identified more areas where a risk based approach could be adopted and covered under emerging safety issues.

These plans included the guidance provided in ICAO Global Aviation Safety Plan (GASP). During the year 2020-22, the world experienced onset of COVID-19 pandemic. India's emphasis on Safety Risk Management principles helped to mitigate hazards on account of COVID-19 and assisted the aviation industry to reboot, which was hit hard due to COVID-19 and had seen a complete shutdown.

This edition of National Aviation Safety Plan 2024-28 is an outcome of our endeavor to learn, evaluate, adapt and update our Safety Management Systems to meet new challenges. The continuous evaluation of National Aviation Safety Plan helped in the process. This plan has been developed in accordance with the guidance provided in ICAO Doc 10131, ICAO GASP 2023-25 and Asia Pacific-Regional Aviation Safety Plan 2023-25.

Further, taking into account, the future disruptive events which would potentially have a bearing on aviation, NASP 2024-2028 stresses upon building resilience in the Indian aviation system.

NASP recognizes that it is important for all stakeholders in aviation to work closely in a collaborative manner to identify safety risks and ensure that the most appropriate practices and technologies are adopted to address, reduce and mitigate these risks. All stakeholders are encouraged to support and implement the NASP as a concert strategy for continuous improvement of aviation safety.

I commend the dedicated and unwavering efforts of the DGCA Safety Team in managing the State Safety Programme with the avowed objective of reducing aviation safety risk.

(Vikram Dev Dutt)
Director General of Civil Aviation

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Executive summary

The National Aviation Safety Plan (NASP) 2024-2028 is an outcome of some of the activities described in the second edition of State Safety Programme-India. It provides strategic direction for the management of aviation safety in India. As mentioned in the State Safety Programme (SSP) -India, DGCA is responsible for the development, implementation and monitoring of the NASP. It has been developed in partnership with the stakeholders including aviation service providers.

The NASP 2024-2028 contains the five National Goals consistent with the Acceptable Level of Safety Performance defined in SSP India and ICAO Global Aviation Safety Plan 2023-2025 for enhancing the aviation safety, as below:

- Goal 1: To achieve a continuous reduction of operational safety risks,
- Goal 2: To strengthen safety oversight capabilities
- Goal 3: Implementation of effective State Safety Programme.
- Goal 4: Increase collaboration at international level
- Goal 5: Expand the use of industry programme and safety information sharing network by service providers

Goal 6 of GASP 2023-2025 focuses on the need for appropriate infrastructure to support safe operations and is related to Global Air Navigation Plan. In Indian Aviation context it is linked to National Air Navigation Plan which is being dealt separately.

The Goal 1 is linked to National High Risk Categories (N-HRCs) of occurrences consistent with Global High Risk Categories (G-HRCs) of occurrences contained in the ICAO Global Aviation Safety Plan (GASP) 2023-2025 and Regional HRCs contained in the Asia Pacific-Regional Aviation Safety Plan (AP-RASP) 2023-2025. For drill down approach these N-HRCs are linked to Safety Performance Indicators, Safety performance Targets and Safety Objectives. The NASP includes several actions to address specific safety issues and recommended SEIs set out in the GASP and AP-RASP which support the improvement of safety at wider regional and international level.

Further, in developing the NASP 2024-2028, other National Plans/National Policies related to aviation have been reviewed for consistency and incorporation of relevant elements. This includes National Civil Aviation Policy 2016, National Unmanned Aircraft System Traffic Management (UTM) Policy 2021; work plan of NITI Aayog, a national level planning organization on "Infrastructure-Connectivity".

DGCA website hosts the details of extent of aviation activity in India. It provides the information related to air operator certificate holder and air operator permit holders, Approved flying training organizations, aviation data and statistics, details of licensed public aerodromes and licensed private aerodromes.

ATS airspace in India is classified and designated into five classes viz. C, D, E, F & G. Classification of Airspace within Restricted areas applies only to those portions of airspace controlled by civil ATC under Flexible Use of Airspace.

The Unmanned Aircraft System (UAS) operations adds to the complexity to the management of airspace. At present, UAS operations are in segregated airspace using lower airspace which is categorized in three zones viz. Red, Yellow & Green as stipulated in Drone Rules, 2021. Unmanned Aircraft System Traffic Management (UTM) would enable the real time segregation and coordination with Air Traffic Management (ATM). Urban Air Mobility (UAM) which is likely to be reality in near future, will further increase the complexity of aviation infrastructure.

National Aviation Safety Plan (NASP) 2024-2028 consists of seven chapters. In addition to the executive summary, this NASP covers an introduction, state's strategic direction for the management of aviation safety, the national operational safety risks identified for the 2024–2028, addressing organizational challenges, description of how the implementation of the safety enhancement initiatives (SEIs) listed in the NASP is going to be monitored and emerging safety issues.

Goal 1 is linked to the following eight National High Risk Categories (N-HRCs) of occurrences:

- Mid Air Collision
- Controlled Flight into Terrain
- Runway Excursions
- Wildlife (Bird/Animal) Strikes
- Loss of Control in-flight
- Runway Incursion
- Ramp Safety
- Deficient Maintenance

Goal 2 is linked with the following:
- Enhancement of Safety Oversight capability to achieve at least 90 % effective implementation
- Comply with international safety standards

Goal 3 is linked to with the following:
- Effective implementation of Safety Management System by applicable service providers
- Effective Promotion of Positive safety culture
- Effective monitoring of weak areas identified through analysis of safety information derived from Safety oversight programme

Goal 4 is linked with the following:
- Collaboration with the other states on the safety issues (Air Navigation services, Exchange of safety information regarding MOR and investigations, trainings and assistance)
- Increase participation in ICAO meetings, panels and working groups- to ensure the Indian views are deliberated

Goal 5 is linked with the following:
- Percentage of service providers participating in corresponding ICAO recognized industry assessment programme
- Percentage of service providers contributing to SDCPS

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Chapter 1

Introduction

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1. Safety Context

1.1 State Safety Programme

The Indian State Safety Programme (SSP) was initially published in November 2010. To capture the changes in Civil Aviation System in India, primary aviation legislation, specific operating regulations, SARPs contained in ICAO Annex 19 Second Edition and Global Aviation Safety Plan (GASP) 2020-22, the Indian State Safety Programme (SSP), Second Edition was published in June 2021. The SSP is an integrated set of regulations and activities describing as to how India manages and seeks the continuous improvement in aviation safety. The SSP recognises that States as well as service providers have safety responsibilities and provides a framework for all stakeholders to work together.

In compliance with the State Safety Programme, State Safety Plan 2015-2016 was developed, which extended for the year 2017. Second edition of National Aviation Safety Plan 2018-2022 provided details of National-HRCs, safety performance indicators along with their targets. The performance of each of the N-HRCs of occurrences is analysed and captured in Annual Safety Review annually. This has provided inputs for developing the National Aviation Safety Plan 2024-2028.

1.2 Safety Management System

Safety management principles provide a platform for parallel development of the SSP by the State and the SMS by its service providers. In developing the State Safety Legislative Framework, India has promulgated SMS requirements requiring that service providers implement their safety management capabilities allowing for the effective identification of systemic safety deficiencies and the resolution of safety concerns.

SMS is largely a performance-based system requiring the appropriate exchange of safety information with internal and external stakeholders. The State, through its SSP functions, provides both the oversight functions and facilitates implementation of appropriate data aggregation and information sharing initiatives.

1.3 Safety Performance Indicators and Safety Performance Targets

Safety Performance Indicators (SPIs) are tactical monitoring and measurement tools of the State's safety performance. As defined in SSP-India, an approach consisting of using a combination of quantitative and qualitative SPIs has been adopted along with system assessment outcomes (such as effective implementation of ICAO SARPs).

Safety Performance Targets (SPTs) define short-term and medium-term safety performance management desired achievements. They act as "milestones" that provide confidence that the organization is on track to achieving its safety objectives and provide a measurable way of verifying the effectiveness of safety performance management activities.

Safety Performance Indicators are being monitored using basic quantitative data, safety studies, trending tools that generate graphs or charts in terms of safety performance targets.

1.4 Monitoring Effectiveness of Safety Risk Controls

In addition to focusing on National High Risk Categories of occurrences, it is important that the effectiveness of State Safety risk controls is measured and continuously improved. The focus for the years 2024 to 2028 will be on ensuring the following:-

- *Effective State safety oversight;*
- *Implementation of service providers' Safety Management System;*
- *Implementation of recommendations emanating from accidents, serious incidents, incidents and Airprox events;*
- *Progressive adoption of Positive safety culture;*
- *Safe operations of Unmanned Aircraft System (UAS)*
- *Building resilience in the aviation system*

1.5 National Aviation Safety Plan 2024-2028

The National Aviation Safety Plan 2024-2028 is an outcome of some of the activities described in the State Safety Programme (SSP), experience gained in the implementation of State Safety Plan 2018-2022, evaluation of the performance of the safety priorities and the work undertaken by stakeholders in implementation and maintenance of their Safety Management System (SMS).

SARPs as contained in ICAO Annex 19, Edition II requires that the States shall establish the acceptable level of safety performance to be achieved through their SSP. It further provides guidance that –

> *"An Acceptable Level of Safety Performance (ALoSP) for the State can be achieved through the implementation and maintenance of the SSP as well as Safety Performance Indicators (SPIs) and Safety Performance Targets (SPTs) showing that safety is effectively managed and built on the foundation of implementation of existing safety-related SARPs."*

1.6 India's Acceptable Level of Safety Performance

The Acceptable Level of Safety Performance (ALoSP) of India as defined in State Safety Programme is illustrated in figure 1.

No fatal accidents in Commercial Aircraft Operation

Effective Implementation of SPIs and achievement of SPTs

Enhancement of Safety Oversight capability to achieve at least 90 % effective implementation

Figure 1

1.7 Establishing Safety Performance Targets

The desired safety outcome is to reduce number of reported events/rate defined for each SPI by 3% every year as applicable, taking into consideration the performance of previous year.

2. Presentation of National Aviation Safety Plan Goal 1 – N-HRCs-SPIs

National High Risk Categories	Safety Performance Indicators
Mid Air Collision	• Risk bearing Airprox • TCAS RA leading to breach of separation • Aircraft not or incorrectly complying with ATC Instructions • Airprox due to ATC/system failure • Communication errors
Controlled Flight into Terrain	• GPWS/EGPWS warning • Precautionary landing of helicopter VFR flights due to degraded weather
Runway Excursions	• Unstabilised approach that continue to land • Unstabilised approach while precision approach • Unstabilised approach while non-precision approach • Unstabilised approach while visual approach • Near runway excursion • Runway excursion • Aerodromes using instruments for runway surface condition reporting • Reports on difference between ATS reported winds and aircraft system reported winds
Wildlife and Bird Strikes	• Bird strike • Wildlife strike • Runway incursion by animal • Bird strikes in particular height bands • Airports using risk based approach
Loss of Control in Flight	• Loss of control precursor events • Laser interference
Runway Incursion	• Runway incursion by aircraft • Runway incursion by vehicle • Runway incursion by person • Runway incursion involving Loss of situational awareness
Ramp Safety	• Ramp Incidents • Ramp collisions involving aircraft due to non-adherence of SOP • Ramp collision involving aircraft due to supervisory lapse • Airports having Apron safety team
Deficient Maintenance	• Component/system failure • Maintenance errors

State Safety Policy and Objectives

Targets (2024- 2028)

Safety Action Plan

Figure 2

3. State Safety Objectives & Safety Risk Controls

Safety Objective (s)	
SO 2.1	Reduce the risk of Mid-Air collision
SO 2.2	Reduce the risk of CFIT events
SO 2.3	Reduce the number of Runway Excursions
SO 2.4	Reduce the number of wildlife (Bird/Animal) strikes
SO 2.5	Reduce the number of loss of control precursor events
SO 2.6	Reduce the number of Runway Incursions
SO 2.7	Reduce the number of Ramp incidents/Ground collision
SO 2.8	Enhance the airworthiness of Indian Scheduled registered aircraft
SO 3.1	Establish and maintain appropriate regulatory framework and approach to ensure at least 90% of effective implementation.
SO 3.2	Comply with international safety standards
SO 3.3	Ensuring qualified and trained technical personnel
SO 3.4	Prepare for the transition to a risk-based approach for regulatory oversight
SO 4.1	Effective implementation of Safety Management System by all applicable service providers (as a percent of the total number)
SO 4.2	Development and adoption of positive safety culture by the service provider
SO 4.3	To assess and measure safety culture maturity of the service provider
SO 4.4	Improvement in Regulatory Compliances related to Procedure and Documentation
SO 5.1	Collaboration with the other states on the safety issues
SO 5.2	Increase participation in ICAO meetings, panels and working groups
SO 6.1	Expand the use of industry programme and safety information sharing network

4. Summary of SPIs and SPTs

(a) Goal 1-SPIs and SPTs

SPI	Indicator	SPT 2024	SPT 2025	SPT 2026
N-HRC 1. Mid Air Collision				
2.1.1	Number of risk bearing Airprox per 10,00,000 flights over Indian airspace	1.89	1.83	1.78
2.1.2	Number of TCAS RA in controlled airspace leading to breach of separation per 10,00,000 flight over Indian airspace	24.58	23.84	23.12
2.1.3	Number of aircraft not or incorrectly complying with ATC instructions (including level bust) per 10,00,000 flights over Indian airspace	6.30	6.11	5.93
2.1.4	Number of Airprox attributable to ATC/ system failure per 10,00,000 flights over Indian airspace	18.90	18.34	17.79
2.1.5	Communication Errors	*	*	*
N-HRC 2. Controlled Flight into Terrain				
2.2.1	Number of GPWS/EGPWS warnings per 10,000 departures	0.12	0.11	0.11
2.2.2	Number of helicopter VFR flights that make precautionary landing due to degraded visual environment per 10,000 departures	0.45	0.43	0.42
N-HRC 3. Runway Excursions				
2.3.1	Number of unstabilised approaches that continue to land per 10,000 approaches	5.00	4.85	4.70
2.3.2	Number of unstabilised approaches when performing a precision approach per 10,000 approaches	5.23	5.07	4.92
2.3.3	Number of unstabilised approaches when performing a non-precision approach (no vertical guidance) per 10,000 approaches	2.69	2.61	2.54
2.3.4	Number of unstabilised approaches when performing a visual approach per 10,000 approaches	1.59	1.55	1.50
2.3.5	Number of 'near' runway excursions per 10,000 approaches	*	*	*
2.3.6	Number of runway excursions per 10,000 approaches	0.01	0.01	0.01
2.3.7	Percentage of aerodromes using instruments for runway surface condition reporting	#	#	#
2.3.8	Number of reports pertaining to difference between ATS/MET reported winds and aircraft system reported winds	#	#	#

SPI	Indicator	SPT 2024	SPT 2025	SPT 2026
N-HRC 4. Wildlife (Bird/Animal) Strikes				
2.4.1	Number of reported bird strikes at all Indian airports per 10,000 movements	9.86	9.57	9.28
2.4.2	Number of reported wildlife strikes at all Indian airports per 10,000 movements	9.98	9.68	9.39
2.4.3	Number of runway incursions by animal at all Indian airports per 10,000 movements	0.27	0.26	0.25
2.4.4	Number of reported bird strikes at all Indian airport per 10,000 movements in following height bands a. 0-100ft (within airport boundary)	5.84	5.66	5.49
	b. 101ft-2500ft (within 13km from ARP)	2.00	1.94	1.88
2.4.5	Number of airports using risk based approach for wildlife hazard management under their SMS	#	#	#
N-HRC 5. Loss of Control in-flight				
2.5.1	Loss of control precursor events per 10,000 departures: • Actual stick-shaker/alpha floor • Low speed during approach events • Low speed during cruise events • Bank angle exceeding (maximum permitted) as per AFM for aircraft type • Windshear below 100 feet	0.87	0.84	0.82
2.5.2	Number of Laser interferences per 10,000 movements	*	*	*
N-HRC 6. Runway Incursion				
2.6.1	Number of runway incursions (aircraft) per 10,00,000 movements	9.78	9.49	9.21
2.6.2	Number of runway incursions (vehicle) per 10,00,000 movements	3.14	3.05	2.96
2.6.3	Number of runway incursions (person) per 10,00,000 movements	1.05	1.02	0.99
2.6.4	Number of runway incursion incidents involving loss of situational awareness by pilots, non-familiarization with aerodrome layout, distraction per 10,00,000 movements	4.54	4.41	4.27

2.7.1	Number of ramp incidents that result in damage to aircraft, vehicles or loss of life/ serious injury to personnel per 10,00,000 movements	31.10	30.17	29.26

N-HRC 7. Ramp Safety

2.7.1	Number of ramp incidents that result in damage to aircraft, vehicles or loss of life/ serious injury to personnel per 10,00,000 movements	31.10	30.17	29.26
2.7.2	Number of ramp collisions involving aircraft due to non-adherence to SOPs per 10,00,000 movements	10.13	9.83	9.53
2.7.3	Number of ramp collision involving aircraft due to supervisory lapse per 10,00,000 movements	#	#	#
2.7.4	Number of airports having apron safety team	#	#	#

N-HRC 8. Deficient Maintenance

2.8.1	Incident involving component/system failure per 10,000 flight hours	1.91	1.85	1.80
2.8.2	Number of maintenance errors per 10,000 flight hours	0.40	0.39	0.38

(b)   Goal 3-SPIs and SPTs

SPI	Indicator	SPT 2024	SPT 2025	SPT 2026
State Safety Priority- Aviation Procedures & Documentation				
4.4.1	Regulatory audit findings related to procedures (measured in terms of percentage of total findings)	31.51	30.56	29.64
4.4.2	Regulatory audit findings related to workplace Manual (measured in terms of percentage of total findings)	14.25	13.82	13.41
4.4.3	Regulatory audit findings related to documentation (measured in terms of percentage of total findings)	13.28	12.88	12.49

Note:

1. * Trends would be monitored

2. # Based on the study, the SPIs have been defined, however due to non-availability of sufficient data, targets have not been set at this stage. These SPIs give guidance for future collection of data and would eventually lead to setting of the targets.

3. SSP Circular 02 of 2020 on "Safety Data Collection and Processing System (SDCPS)" provides guidance to service provider for collection and maintenance of safety data and safety information.

Chapter- 2

Goal 1

To achieve a continuous reduction of operational safety risks

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2.1. Goal 1 - To achieve a continuous reduction of operational safety risks

Goal 1 is linked to eight National High Risk Categories (N-HRCs) of occurrences. They have been identified on the basis of analysis of state safety data. These eight N-HRCs includes the five Global High Risk Categories (G-HRCs) of occurrences contained in the ICAO Global Aviation Safety Plan (GASP) 2023-2025 and three Regional HRCs contained in the Regional Aviation Safety Plan –Asia Pacific 2023-2025.

National High Risk Categories are as follows:
- Mid Air Collision
- Controlled Flight into Terrain
- Runway Excursions
- Wildlife (Bird/Animal) Strikes
- Loss of Control in-flight
- Runway Incursion
- Ramp Safety
- Deficient Maintenance

These will provide a focus for the DGCA and the wider-aviation community for the year 2024 to 2028.

For each N-HRC of occurrences, safety objectives, safety action plan containing SEIs, Safety Performance Indicators (SPIs) and Safety Performance Targets have been developed.

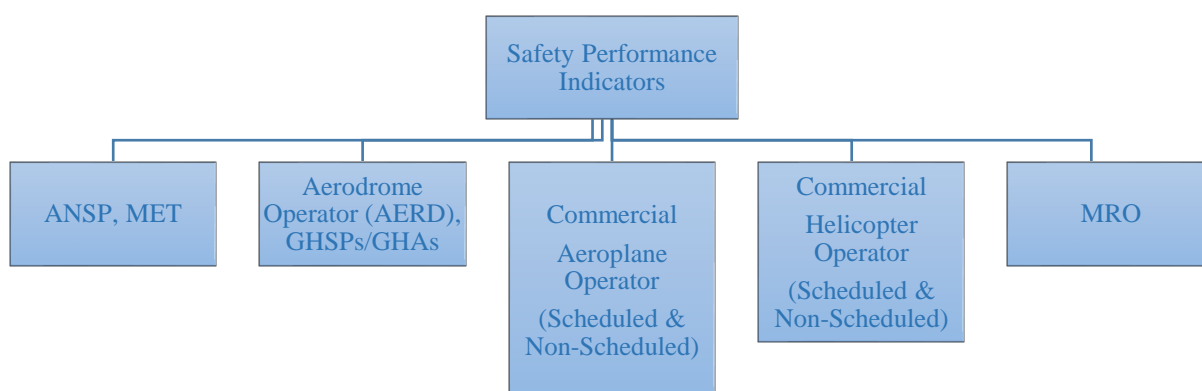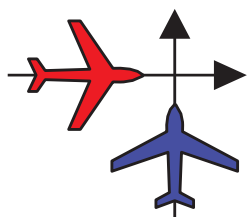*The SPIs have been identified as per the applicable stakeholder as illustrated in figure 3:*

Figure 3

2.2. National High Risk Categories

N-HRC 1: Mid Air Collision

Whilst technology has helped reduce the number of actual airborne collisions, even a single accident can cause huge loss of life. This undermines confidence in Indian Aviation and, in turn, will impact the Indian economy as a whole.

The **safety objective** (SO 2.1) is to reduce the risk of mid air collision through tracking and actively managing events that can lead to a collision.

Table 2.1- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR Section 2, Series I, Part VIII	Installation of Airborne Collision Avoidance System - ACAS is mandatory for all operators operating air transport services to, through within and over flying Indian airspace
CAR Section 7 Series I Part VII	Criteria for approval of Ground Instructors/Subject Matter Experts (SMEs)
CAR Section 8 Series F Part VIII	Flight Crew Training and Qualification Requirements for Scheduled Commuter and Non-Scheduled Operators having Aeroplanes with AUW Exceeding 5700 Kgs
AIC 02 of 2017	Guidelines on Avoiding Confusing/Similar Call-Signs by Airline Operators
AIC 16 of 2021	Voluntary Safety Reporting System
Operations Circular 07 of 2010	Operational Procedures and Training Requirements Of Airborne Collision Avoidance System (ACAS) Equipment
Operations Circular 05 of 2011	Pilot Controller Communication
ASC 05 of 2009	Classification of Aircraft Proximity

Table 2.2-Safety Action Plan

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Ensure adherence to ACAS warning procedures	GASP 2023-25	Operations Circular 07 of 2010	CAO
B. Promote the improvement of communications systems and procedures, such as controller-pilot datalink	GASP 2023-25	• CAR Section 9 Series D Part • CAR Section 9 Series D Part III • ANSS Advisory Circular No. 01 of 2017	ANSP

C. All air operators shall provide training to relevant staff that includes: i. Detailed classroom sessions on TCAS including limitations of RA for the pilots and ATCOs ii. CRM training for pilots with specific emphasis on situational awareness with respect to traffic iii. Ensuring understanding of the guidelines issued for ACAS command during recurrent training of pilots. iv. Procedure to be reviewed for critical airspace wherein the maximum number of TCAS-RA are being reported v. Follow standard departure, arrival and route procedures	DGCA SEI	• CAR Section 8 Series F Part VIII • CAR Section 7 Series I Part VII • Operations Circular 07 of 2010 • AIC 02 of 2017	CAO
D. Regular proficiency check and structured refreshers for ATCOs	DGCA SEI	• CAR Section 9 Series L Part IV • CAR Section 9 Series L Part IV	ANSP
E. Capturing of Communication errors through voluntary reporting system	DGCA SEI	• Operations Circular 05 of 2011 • AIC 16 of 2021	CAO, ANSP

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.3-Safety Performance Indicators

SPI	Metrics	Stakeholder
2.1.1	Number of risk bearing Airprox per 10,00,000 flights over Indian airspace	ANSP & CAO
2.1.2	Number of TCAS RA in controlled airspace leading to breach of separation per 10,00,000 flights over Indian airspace	ANSP & CAO
2.1.3	Number of aircraft not or incorrectly complying with ATC instructions (including level bust) per 10,00,000 flights over Indian airspace	ANSP
2.1.4	Number of Airprox attributable to ATC/system failure per 10,00,000 flights over Indian airspace	ANSP
2.1.5	Communication Errors	CAO & ANSP

Note: Risk Bearing Airprox: Category A & B as per Air Safety Circular 05 of 2009.

N-HRC 2: Controlled Flight into Terrain

Controlled Flight into Terrain (CFIT) events are one of the most common causes of accidents. Whilst technology has made certain amount of intervention, however, this is still a key area of concern for scheduled, non-scheduled fixed-wing and helicopter operations.

CFIT accidents are caused due to lack of flight crew vertical/horizontal position awareness in relation to ground, water or obstacle. More than two-thirds of all CFIT accidents have occurred due to the result of altitude error or lack of vertical situational awareness. The CFIT accidents also occur during reduced visibility associated with instrument meteorological conditions, darkness or a combination of both the conditions.

MSAWS alerts the air traffic controller with both visual and aural alarms when an airplane penetrates, or is predicted to penetrate, a predetermined MSA in the protected terminal area. The GPWS warning is normally the flight crew's last opportunity to avoid CFIT. Incidents and accidents have occurred because flight crew have failed to take timely corrective action in response to the GPWS warnings.

The **safety objective** (SO 2.2) is to further reduce the risk of CFIT events through tracking and actively managing events that can lead to a collision.

Table 2.4- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR Section 2 Series I Part VII	Implementation of ICAO Standards for installation of GPWS equipment
CAR Section 5 Series F Part I	Flight Safety Awareness and Accident/Incident Prevention Programme
CAR Section 5 Series F Part II	Flight Data Analysis Programme (FDAP)
CAR Section 8 Series C Part I	All Weather Operations (AWO)
CAR Section 8 Series F Part II	Flight Crew Training And Qualification Requirements For Scheduled Operators Having Aeroplanes With AUW Exceeding 5700 Kgs
CAR Section 8 Series O Part II	Operation of Commercial Air Transport - Aeroplanes
Air Safety Circular 09 of 2013	Non-punitive policy towards helicopter pilots who decided to abort the mission and carryout precautionary landing due to deteriorating weather conditions
Operations Circular 01 of 2010	Mode Awareness and Energy State Management Aspects of Flight Deck Automation
Operations Circular 02 of 2010	Pilot's Spatial Disorientation
Operations Circular 05 of 2010	Issuance Of Safety Alert / Warning
Operations Circular 08 of 2010	Safety Oversight - TAWS/ EGPWS Equipment - Role of Position Inputs from GNSS equipment.
Operations Circular 02 of 2014	Continuous Descent Final Approach (CDFA)

|	
Operations Circular 02 of 2017	Guidance on training programme on use of GPWS
Operations Circular 09 of 2017	Approach and Landing Accidents Reduction (ALAR) and Controlled flight into terrain (CFIT) reduction tool kit
Operations Circular 06 of 2022	Standard Operating Procedure – Aircraft Operations
Air Safety Circular 02 of 2013	Flight Safety Documentations System

Table 2.5-Safety Action Plan

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Promote the wider use of TAWS beyond the requirements of Annex 6	GASP 2023-25	Operations Circular 09 of 2017.	CAO
B. Issue a Safety Advisory to increase adherence to TAWS warning procedures	GASP 2023-25	• Operations Circular 09 of 2017 • Operations Circular 06 of 2022	CAO
C. Promote greater awareness of approach risks	GASP 2023-25	• Operations Circular 09 of 2017 • Operations Circular 06 of 2022	CAO
D. Consider the implementation of continuous descent final approaches (CDFA)	GASP 2023-25	• Operations Circular 02 of 2014 • CAR Section 8 Series C Part I.	CAO
E. Consider the implementation of minimum safe altitude warning (MSAW) systems	GASP 2023-25	• CAR Section 9 Series R Part I • CAR Section 9 Series E Part I	ANSP
F. Ensure the timeliness of updates and accuracy of Electronic Terrain and Obstacle Data (eTOD)	GASP 2023-25	Ongoing	CAO
G. Promote the use of GPS-derived position data to feed TAWS	GASP 2023-25	Operations Circular 08 of 2010	CAO
H. Air Operators Standard Operating Procedures for Flight Deck Crew members	RASP 2023-25	Operations Circular 01 of 2010	CAO
I. Model Regulation on Ground Proximity Warning System (GPWS)	RASP 2023-25	Operations Circular 02 of 2017	CAO
J. Guidance for Operators to Ensure Effectiveness of GPWS Equipment	RASP 2023-25	Operations Circular 02 of 2010	CAO
K. Guidance for Operators on Training Programme on the use of GPWS	RASP 2023-25	Operations Circular 02 of 2017	CAO

L. Instrument Approach Procedures Using Continuous Descent Final Approach Techniques	RASP 2023-25	Operations Circular 02 of 2014	CAO
M. Guidance on the Establishment of a Flight Data analysis Programme (FDAP)	RASP 2023-25	CAR Section 5 Series F Part II	CAO
N. Crew Resource Management Training Programme (CRM)	RASP 2023-25	CAR Section 8, Series F Part II	CAO
O. Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR) Training Programme	RASP 2023-25	Operations Circular 04 of 2010	CAO
P. Guidance for Air Operators in Establishing a Flight Safety Documents System	RASP 2023-25	• CAR Section 5 Series F Part I • Air Safety Circular 02 of 2013	CAO
Q. Issuance of Terrain or Obstacle Alert Warning	RASP 2023-25	CAR Section 2 Series I Part VII	CAO
R. Emphasize, monitor and enforce pilots to carry out instrument approaches, follow all stabilized approach criteria and SOPs for approach and landing	DGCA SEI	• Operations Circular 02 of 2017 • Operations Circular 09 of 2017	CAO
S. Training modules covering situational awareness mainly on changeover from auto flight to manual flight, standard phraseology, adherence to checklists, altimeter settings and availability of serviceable landing aids, terrain specific warnings e.g. EGPWS/GPWS	DGCA SEI	• CAR Section 2, Series I Part VII • Operations Circular 02 of 2017	CAO
T. Analysis and follow-up of EGPWS events	DGCA SEI	CAR Section 5, Series F Part II	CAO
U. Assessments during Line checks	DGCA SEI	• CAR Section 8, Series F Part II • CAR Section 8, Series C Part I	CAO
V. Strict monitoring and enforcement of MET minima	DGCA SEI	• CAR Section 8, Series C Part I • CAR Section 8, Series O Part II	CAO

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.6- Safety Performance Indicators

SPI	Metrics	Stakeholder
2.2.1	Number of GPWS/EGPWS warnings per 10,000 departures	CAO
2.2.2	Number of helicopter VFR flights that make precautionary landing due to degraded visual environment per 10,000 departures	CHO
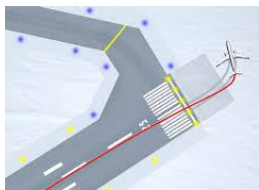
N-HRC 3: Runway Excursions

Globally, runway excursions are the cause of more accidents and serious incidents than any other single cause. It remains a focused area of concern in India, particularly during the monsoon season.

The **safety objective** (SO 2.3) is to reduce number of Runway Excursions at all Indian airports and at all times of the year.

Table 2.7- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR Section 2 Series I Part VII	Implementation of ICAO Standards for installation of GPWS equipment
CAR Section 4 Series B Part I	Guidance on RESA has been included
CAR Section 4 Series X Part I	Runway Safety Programme and formation of Runway Safety Teams.
CAR Section 5 Series F Part II	Flight Data Analysis Programme (FDAP)
CAR Section 8 Series C Part I	All Weather Operations
CAR Section 8 Series O Part II	Operation of Commercial Air Transport - Aeroplanes
Operations Circular 07 of 2010	Operational Procedures And Training Requirements Of Airborne Collision Avoidance System (ACAS) Equipment
Operations Circular 01 of 2013	Non-punitive policy towards pilots who decide to go around
Operations Circular 03 of 2014	Guidance on all-weather operations training programme
Operations Circular 02 of 2014	Continuous Descent Final Approach (CDFA)
Operations Circular 09 of 2017	Approach and Landing Accidents Reduction (ALAR) and Controlled flight into terrain (CFIT) reduction tool kit
Operations Circular 01 of 2019	Guidelines for Operation to/from Airports with Performance Limiting Conditions.
Air Safety Circular 02 of 2017	Guidance on procedures to be followed during non-availability of RESA
Air Safety Circular 03 of 2017	Adverse Weather Operations
AD AC 01 of 2021	Runway Surface Condition Reporting Format using Standard Runway Condition Report (RCR).
Operations Circular 06 of 2022	Standard Operating Procedure-Aircraft Operations
Air Safety Circular 02 of 2024	Mitigation strategies for Runway Incursion Risk

Table 2.8 -Safety Action Plan:

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Promote equipage of runway overrun awareness and alerting systems on aircraft	GASP 2023-25	CAR Section 8 Series O Part II	CAO
B. Guidance material on Unstabilised Approach	RASP 2023-25	Operations Circular 06 of 2022	CAO
C. Guidance material and training program for runway pavement, maintenance and operations from aerodrome operator's perspective	RASP 2023-25	• CAR Section 4 Series B Part I • AD AC 02 of 2017	AERD
D. Reporting of Runway Surface Condition using Standard Runway Condition Report (RCR)	DGCA SEI	AD AC 01 OF 2021	AERD, ANSP
E. Pilot to report runway braking action via AIREPs to the ATC for action by the Aerodrome Operator and documentation	DGCA SEI	• AD AC 01 OF 2021 • Air Safety Circular 02 of 2024	Aircraft Operators, ANSP, AERD
F. All air operators shall provide a training module to includes: i. CRM class: • Increased emphasis on coordination between two pilots with respect to traffic clearances given by ATC ii. Flight Safety Class: • Causes of runway excursions • Increased emphasis on situational awareness with respect to traffic on approach/ departures / taxiing on runways iii. Simulator training: • On performance limited airfields • Stabilized approaches • Training on cross-wind landings to a level required for operations	DGCA SEI	• Air Safety Circular 02 of 2024 • Operations Circular 07 of 2010 • Operations Circular 01 of 2019 • Operations Circular 06 of 2022	CAO

G.	Continuous periodic monitoring through route/ in-flight checks	DGCA SEI		CAO
H.	FOQA monitoring of landings made beyond the touchdown zone of the runway (Extended/long flare).	DGCA SEI	CAR Section 5 Series F Part II	CAO
I.	In case of non-precision approach, the operators are encouraged to carryout Continuous Descent Final Approach Technique (CDFA)	DGCA SEI	Operations Circular 02 of 2014	CAO
J.	Specialized ALAR Tool Kit training on visual illusion faced while transitioning to visual segment of approach	DGCA SEI	Operations Circular 09 of 2017	CAO

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.9- Safety Performance Indicators

SPI	Metrics	Stakeholder
2.3.1	Number of unstabilised approaches that continue to land per 10,000 approaches	CAO
2.3.2	Number of unstabilised approaches when performing a precision approach per 10,000 approaches	CAO
2.3.3	Number of unstabilised approaches when performing a non-precision approach (no vertical guidance) per 10,000 approaches	CAO
2.3.4	Number of unstabilised approaches when performing a visual approach per 10,000 approaches	CAO
2.3.5	Number of 'near' runway excursions per 10,000 approaches	AERD, CAO, ANSP
2.3.6	Number of runway excursions per 10,000 approaches	AERD, CAO, ANSP
2.3.7	Percentage of aerodromes using instruments for runway surface condition reporting	AERD
2.3.8	Number of reports pertaining to difference between ATS/MET reported winds and aircraft system reported winds	AERD, CAO, ANSP, MET

Note:
'Near' Runway Excursion is an occurrence where aircraft is not able to maintain the directional stability on the runway which may result in damage to the runway edge/end lights. However, aircraft continues to remain on the paved surface.

N-HRC 4: Wildlife (Bird/Animal) Strikes

Wildlife (Bird/Animal) strikes pose a significant threat to flight safety and have caused a number of accidents, including incidents in India. Most incidents occur at the critical phase of flight resulting into structural damage, as well as damage to aircraft systems. As such, both animal and bird strikes remain a major focus for the DGCA.

The **safety objective** (SO 2.4) is to reduce the number of animal and bird strike events at Indian airports.

Table 2.10- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
a. Order No. AV-15023/1/2009-AS (NBCC) dated 02.12.2013 b. Revised order dated 20.04.2017	National Bird Control Committee
Ministry of Home Affairs Letter No. 53/1/80-Public dated 07.05.1980	Airfield Environment Management Committees
Rule 91, Aircraft Rules 1937	Primary legislation (Aircraft Rules) preventing dumping of garbage and de-skinning of animals within a 10 km radius around airport
Recommendation of NBCC	Education and outreach programmes
Recommendation of NBCC	Extensive audits and inspections
Air Safety Circular 02 of 2011	Comprehensive data collection activities
Aerodrome Circular 06 of 2017	Guidance on Wildlife Hazard Management
Aerodrome Circular 01 of 2022	Management of Potential Wildlife Hazards at Licensed Aerodromes

Table 2.11 - Safety Action Plan

| Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Reiterate generation of pilot reports on wildlife sighting	DGCA SEI	Air Safety Circular 02 of 2011	CAO
B. Awareness campaign in localities and schools regarding wildlife hazards	DGCA SEI	AD AC 06 of 2017	AERD
C. Dedicated team managed by trained staff to ensure implementation of wildlife strike control measures	DGCA SEI	• AD AC 06 of 2017 • AD AC 01 of 2022	AERD

D. Review of existing mitigation action and identify the areas of improvement with airport management	DGCA SEI	• AD AC 06 of 2017 • AD AC 01 of 2022	AERD
E. Appraise administration of all the State Government, through communication to the Chief Secretaries of the States on the importance of compliance of Rule 91 of the Aircraft Rules 1937	DGCA SEI		DGCA
F. Instruct management of all airports to take effective steps for mitigation of wildlife hazard	DGCA SEI	• AD AC 06 of 2017 • AD AC 01 of 2022	DGCA
G. Detailed study of the wildlife species around the airport	DGCA SEI	• AD AC 06 of 2017 • AD AC 01 of 2022	AERD
H. Adoption of Habitat Management Strategies	DGCA SEI	• AD AC 06 of 2017 • AD AC 01 of 2022	AERD

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.12- Safety Performance Indicators

SPI	Metrics	Stakeholders
2.4.1	Number of reported bird strikes at all Indian airports per 10,000 movements	ANSP, AERD, CAO, CHO
2.4.2	Number of reported wildlife strikes at all Indian airports per 10,000 movements	ANSP, AERD, CAO, CHO
2.4.3	Number of runway incursions by animal at all Indian airport per 10,000 movements	ANSP, AERD, CAO, CHO
2.4.4	Number of reported bird strikes at all Indian airport per 10,000 movements in following height bands a. 0-100ft (within airport boundary) b. 101ft-2500ft (within 13km from ARP*)	ANSP, AERD, CAO, CHO
2.4.5	Number of airports using risk based approach for wildlife hazard management under their SMS	AERD

Note: The effective control for animal/bird activity for aerodrome operator is limited to 13km from Aerodrome Reference Point (ARP)
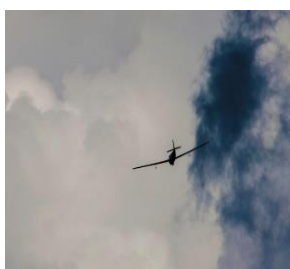
N-HRC 5: Loss of Control in Flight

Loss of control can be caused by many events, such as system or component failure, aircraft damage or even severe weather. However, the most significant secondary cause of accidents resulting from a loss of control relates to 'control upset' either induced by the pilot and/or when operating at low altitude, such as final approach and landing.

The **safety objective** (SO 2.5) is to reduce the number of loss of control precursor events

Table 2.13- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR Section 5 Series F Part II	100% Flight Data Monitoring by the operators
CAR Section 8 Series H Part II	Flight Crew Training and Qualification Requirements for Commercial Helicopter Operations
CAR Section 8 Series O Part II	Operation of Commercial Air Transport - Aeroplanes
Operations Circular 01 of 2010	Mode Awareness and Energy State Management Aspects of Flight Deck Automation
Operations Circular 03 of 2011	Guidance material for training of pilots in high altitude and high speed flights
Operations Circular 09 of 2017	Approach and Landing Accident Reduction (ALAR) and Control Flight into Terrain (CFIT) reduction tool kit
Operations Circular 06 of 2018	Upset Prevention and Recovery Training (UPRT)

Table 2.14 - Safety Action Plan

| Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholders
A. Require upset prevention and recovery training in all full flight simulator type conversion and recurrent training programmes	GASP 2023-25	• CAR Section 8 Series O Part II • Operations Circular 06 of 2018.	CAO
B. Require more time devoted to training for the pilot monitoring role	GASP 2023-25	Operations Circular 06 of 2018.	CAO
C. Guidance Material on Flight Crew Proficiency	RASP 2023-25		CAO
D. Mode Awareness and Energy State Management Aspects of Flight Deck Automation	RASP 2023-25	Operations Circular 01 of 2010	CAO
E. Guidance material on Upset Prevention and Recovery Training (UPRT)	RASP 2023-25	Operations Circular 06 of 2018	CAO
F. All air operators shall provide a training module (i.e. initial and	DGCA SEI	Operations Circular 06 of 2018	CAO

recurrent) to include: i. Upset recovery and preventive training ii. Assessment/ detection of wind shear iii. Practice of stall recovery in landing configuration during approach with emphasis on speed control and thrust management (simulator training) iv. Training for high altitude operation including speed management, knowledge of buffet margins, high altitude stall recovery			
G. Emphasis on stabilized approaches	DGCA SEI	Operations Circular 06 of 2022	CAO
H. Laying down max. bank angle limits, monitoring of EGPWS call-outs in SSFDR and subsequent analysis of bank angle exceedances	DGCA SEI	CAR Section 5 Series F Part II	CAO
I. SOP to deal with windshear during take-off and landing	DGCA SEI	Operations Circular 09 of 2017	CAO
J. Training of helicopter pilots on condition leading to IMC, immediate actions on encountering IMC and subsequent action for its safe recovery	DGCA SEI	CAR Section 8 Series H Part II	CHO
K. Helicopter operators are required to follow SOPs/ limitation of RFM specially operating when engaged in off-shore/hill operations	DGCA SEI		CHO

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.15- Safety Performance Indicators

SPI	Metrics	Stakeholder
2.5.1	Loss of control precursor events per 10,000 departures: • Actual stick-shaker and alpha floor • Low speed during approach events • Low speed during cruise events • Bank angle exceeding (maximum permitted) as per AFM for aircraft type • Windshear below 100 feet	CAO
2.5.2	Number of Laser interference per 10,000 departures	CAO, CHO, ANSP

Note: Low speed during approach event: V_{App} – 5 knots at 100 feet
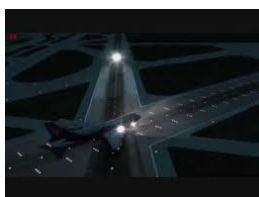
N-HRC 6: Runway Incursion

Runway incursion can occur due to incorrect entry of an aircraft, vehicle or person on the protected area of runway. This increases the potential risk of collision for aircraft on ground.

The **safety objective** (SO 2.6) is to reduce the number of runway incursions.

Table 2.16- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR Section 4 Series X Part I	Runway safety Programme and formation of Runway Safety Team
CAR Section 4 Series B Part I	Aerodrome Design and Operations- Guidance on installation of Stop Bars
CAR Section 8 series C Part I	All Weather Operations (AWO)
AIC 6 of 2006	Runway Incursions
ASC 2 of 2024	Mitigation strategies for Runway Incursion Risk

Table 2.17 - Safety Action Plan

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholders
A. Ensure the establishment and implementation of a State runway safety programme and runway safety teams	GASP 2023-25	CAR Section 4 Series X Part I	AERD
B. Promote the establishment of policy, procedures and training that supports situational awareness for controllers, pilots and airside vehicle drivers	GASP 2023-25	• CAR Section 4 Series B Part I • AD AC 04 of 2017 • CAR Section 9 Series E Part I • CAR Section 9 Series L Part V	CAO, AERD, ANSP, ATC
C. Ensure effective implementation of suitable technologies to assist the improvement of situational awareness, such as improved resolution airport moving maps (AMM), electronic flight bags (EFBs), enhanced vision systems (EVS) and head-up displays (HUD), advanced-surface movement guidance and control systems (A-SMGCS), stop bars, and runway incursion warning systems (ARIWS)	GASP 2023-25	• AD AC 02 of 2022 • AD AC 04 of 2017 • CAR Section 9 Series E Part I	CAO, AERD, ANSP

D. Certify aerodrome in accordance with ICAO Annex 14, Volume I as well as Doc 9981, PANS-Aerodrome	GASP 2023-25	• CAR Section 4 Series F Part 1 • CAR Section 4 Series F Part V	DGCA
E. Ensure the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. Doc 9432, Manual of Radiotelephony)	GASP 2023-25	• CAR Section 9 Series D Part III	CAO, AERD, ANSP
F. Ensure the identification and publication in the aeronautical information publication (AIP) of hot spots at aerodromes	GASP 2023-25	• CAR Section 4 Series B Part I • CAR Section 4 Series X Part I • AD AC 01 of 2006	ANSP, AERD
G. Ensure that suitable strategies to remove hazards or mitigate risks associated with identified hot spots are developed and executed	GASP 2023-25	AD AC 08 of 2017	ANSP, AERD
H. Use of Runway Safety Maturity Checklist	RASP 2023-25	AD AC 01 of 2006	CAO, ANSP, AERD, DGCA
I. Runway Incursion (RI) Prevention and Pilot Training	RASP 2023-25	• CAR Section 8 series C Part I • AIC 6 of 2006	CAO
J. ANSP/Airport operators shall introduce and ensure the effective utilization of ATC ground surveillance at all high density airports	DGCA SEI	• CAR Section 4 Series B Part I • AD AC 04 of 2022 • CAR Section 9 Series E Part I	ANSP, AERD
K. Introduction of training to ATCOs on prevention of runway incursions	DGCA SEI		ANSP
L. Improved signage in accordance with ICAO SARPs	DGCA SEI	• CAR Section 4 Series B Part I • AD AC 02 of 2022	AERD
M. All air operators shall develop training program to include: • Understanding the importance of signages, marking and lighting • Familiarization with operating aerodrome layout and taxi procedures specific to the aerodromes • Increased alertness levels amongst crew while taxiing • Following correct taxiways and speed limits • Clear and unambiguous RT between aircraft and ATC • Meticulous adherence to ground markings and awareness of works in progress at an airfield	DGCA SEI	ASC 02 of 2024	CAO

N. Intermediate holding position marking and lights at all high density airports	DGCA SEI	CAR Section 4 Series B Part 1	ANSP, AERD
O. All airport operators shall develop and introduce procedures to significantly reduce vehicular movements on the maneuvering area during LVP/bad weather	DGCA SEI	• AD AC 04 of 2022 • AD AC 01 of 2006 • CAR Section 9 Series E Part I	ANSP, AERD
P. ATC should ensure stop bars are switched on to signal a stop and switched off to indicate traffic may proceed. In no case, Aircraft or vehicles be instructed to cross illuminated red stop bars.	DGCA SEI	CAR Section 4 Series B Part 1	ANSP, AERD, CAO
Q. Aerodrome, ATC and airlines should implement contingency measures to cater to unserviceable stop bars.	DGCA SEI	CAR Section 4 Series B Part 1	ANSP, AERD, CAO

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.18- Safety Performance Indicators

SPI	Metrics	Stakeholders
2.6.1	Number of runway incursions (aircraft) per 10,00,000 movements	ANSP, AERD, CAO, CHO
2.6.2	Number of runway incursions (vehicle) per 10,00,000 movements	ANSP, AERD
2.6.3	Number of runway incursions (person) per 10,00,000 movements	ANSP, AERD
2.6.4	Number of runway incursion incidents involving loss of situational awareness by pilots, non-familiarization with aerodrome layout, distraction per 10,00,000 movements	CAO, CHO

N-HRC 7 Ramp Safety

The ground collisions in the apron/ramp area of an airport can have serious consequences. Taking into consideration the safety consequences and randomness of ground collisions, the apron/ramp safety has been identified as one of the N-HRCs.

The **safety objective** (SO 2.7) is to reduce the number of ground collisions between aircraft, ground collisions between vehicles and aircraft, the number of fatalities and serious injuries occurring on the apron/ramp.

Table 2.19- Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
Air Safety Circular 04 of 2007	Guidance material issued for safety on the apron
Aerodrome Advisory Circular 04 of 2017	Guidance on establishment of Apron Management Service at an aerodrome
CAR Section 4 Series X Part II	Requirements for issue of Safety Clearance to Ground Handling Service Provider (GHSP).
SSP Circular 02 of 2024	SMS implementation by GHSPs
CAR Section 5 Series F Part IV	Procedure for breath-analyser examination of the personnel engaged in Aircraft maintenance, Air traffic control services, Aerodrome operations, Ground handling services for detecting consumption of Alcohol

Table 2.20 - Safety Action Plan

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Airlines and airport operators shall ensure training of vehicle drivers to follow speed control and know the sensitive areas B. Airport operators shall introduce and ensure the effective utilization of ATC ground surveillance at all high density airports C. Organization/Aerodrome operators shall carry out Breathe Analyzer tests for personal involved in safety sensitive duties randomly beyond the regulatory requirements. D. Operators shall review existing taxing and towing procedures and update them to include: • Adherence to SOPs on ramp • Adherence to SOPs for towing/taxiing	DGCA SEI	• CAR Section 4 Series B Part I • CAR Section 5 Series F Part IV • AD AC 02 of 2019 • AD AC 04 of 2017 • AD AC 01 of 2006	CAO, AERD, ANSP, GHSP

• Utilization of wing walkers during pushback/taxi in/out			
E. Implementation of Safety Management System by Ground Handling Agencies	DGCA SEI	SSP Circular 02 of 2024	GHSP
F. Establish safety communication mechanism at aerodromes	DGCA SEI	• CAR Section 1 Series C Part I • AD AC 01 of 2006	AERD

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.21 - Safety Performance Indicators

SPI	Metrics	Stakeholders
2.7.1	Number of ramp incidents that result in damage to aircraft, vehicles or loss of life/ serious injury to personnel per 10,00,000 movements	CAO, CHO, AERD, GHSP
2.7.2	Number of ramp collisions involving aircraft due to non-adherence to SOPs per 10,00,000 movements	CAO, CHO, AERD, GHSP
2.7.3	Number of ramp collision involving aircraft due to supervisory lapse per 10,00,000 movements	CAO, CHO, AERD, GHSP
2.7.4	Number of airports having apron safety team	AERD, GHSP

N-HRC 8: Deficient Maintenance

There are currently a large proportion of incidents that occur as a result of system component failure. Taking into consideration the safety consequences of component failure, Deficient Maintenance has been identified as one of the N-HRCs.

The **safety objective** (SO 2.8) is to enhance the airworthiness of Indian Scheduled registered aircraft.

Table 2.22 - Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
CAR M & CAR 145	Component failure
	Maintenance errors
CAR 66	Licensing of Aircraft Maintenance Engineers

Table 2.23 - Safety Action Plan

Safety Enhancement Initiative (SEI)	SEI Reference	Status	Stakeholder(s)
A. Review of qualifying requirements for licensing of technical personnel due to advancement of technology B. DGCA, with the support of relevant service providers, shall develop programmes to encourage voluntary reporting in technical work through a non-punitive approach C. Integration of avionic system training along with other airframe/ engine system D. Improve the qualifying requirement of senior technicians	DGCA SEI	• CAR M • CAR 145 • CAR 66	1. DGCA 2. CAO

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 2.24- Safety Performance Indicators

SPI	Metrics	Stakeholder
2.8.1	Incident involving component/system failure per 10,000 flight hours	CAO and CHO
2.8.2	Number of Maintenance errors per 10,000 flight hours	CAO, CHO MRO

Note: The maintenance errors may include the following:
   i. Failure to follow published technical data or local instructions
   ii. Using unauthorized procedure not referenced in technical data
   iii. Supervisors accepting non-use of technical data or failure to follow maintenance instructions
   iv. Failure to document maintenance properly in maintenance records, work package
   v. Inadequate/unrecognised maintenance
   vi. Incorrectly installed hardware on an aircraft/engine
   vii. Performing an unauthorized modification to the aircraft
   viii. Failure to conduct a tool inventory after completion of the task
   ix. Personnel not trained or certified to perform the task
   x. Ground support equipment improperly positioned for the task

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Chapter- 3

Goal 2

Strengthen Safety Oversight Capabilities

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3.1. Enhancement of Safety Oversight Capabilities

Indian aviation is in a state of continuous change and will become increasingly automated and far more complex. Safety oversight will be based on predictive and proactive methodologies.

A key focus for the DGCA during the period of this NASP will continue to be on ensuring that it remains fit-for-purpose and continues to provide an appropriate and effective level of regulatory and safety oversight that balances needs of the industry, travelling public and the international community.

The **safety objectives** (SO 3.1 to 3.4) and proposed safety action plans are summarized below:

Table 3.1-Safety Action Plan

Safety objective(s)	Safety Enhancement Initiative	Stakeholder (s)	Target date
SO3.1: Establish and maintain appropriate regulatory framework and approach to ensure at least 90% of effective implementation.	DGCA shall conduct periodic reviews of all regulations to ensure applicability and compliance with best practice	DGCA	On-going
	DGCA shall develop new regulations in consultation with relevant service providers	1. DGCA 2. Service providers	On-going
	DGCA shall increase the level of compliance with ICAO SARPs and the EI of the CEs at the National Level	DGCA	On-going
SO3.2: Comply with international safety standards	DGCA shall routinely assess itself against ICAO and other requirements to ensure ongoing compliance	DGCA	On-going
	Timely closure of ICAO audit findings	DGCA	On-going
SO3.3: Ensuring qualified and technical personnel	DGCA shall recruit, train and maintain a competent workforce to support regulatory oversight	DGCA	On-going
	DGCA shall identify the training requirements to implement the necessary oversight mandate	DGCA	On-going
SO3.4: Prepare for transition for a risk based approach for regulatory oversight	DGCA shall establish necessary processes to ensure availability and quality of data to enable it to progressively transition to risk based approach for regulatory oversight	1. DGCA 2. Service providers	On-going

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Chapter- 4

Goal 3

Implementation of effective State Safety Programme

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4.1. Effective implementation of Safety Management System

Rule 29D of the Aircraft Rules 1937 & CAR Section 1, Series C, Part 1 requires implementation of Safety Management System by the applicable service provider. Further, service providers are required to develop SPIs, associated SPTs and alert levels by analysing the safety data captured under SDCPS. In addition, service provider shall also monitor and measure their safety performance w.r.t. SPIs and SPTs identified in National Aviation Safety Plan.

The **safety objective** (SO4.1) and safety action plan are summarized below:

Table 4.1-Safety Action Plan

Safety objective	Safety Enhancement Initiative	Stakeholder(s)	Target date
SO4.1: Effective implementation of Safety Management System by all applicable service providers (as a percent of the total number)	a. DGCA assesses the progress of each service providers' SMS as part of Annual Surveillance Programme and provide continuous guidance in order to enable continuous improvement of the overall performance of the Service provider's SMS. b. Based on assessment Aircraft & engine Design and Manufacturing Organizations have been identified as focused area for implementation of effective SMS.	1. DGCA 2. Service providers 3. Aircraft & engine Design Organization	On-going

4.2. Progressive Adoption of Positive Safety Culture

DGCA has adopted positive safety culture, which has encouraged reporting and helped in reduce risk across the aviation sector which continues to be a major challenge.

Therefore, the safety objectives in this area (SO4.2 and 4.3), are aimed at progressing the development of a positive safety culture amongst all service providers' staff, initially evidenced by increased reporting and a willingness to share more safety related information, and to develop a means of measuring the safety culture of an organization.

The **safety objectives** (SO4.2 and 4.3) and safety action plan are summarized below:

Table 4.2-Safety Action Plan

Safety Objective(s)	Safety Enhancement Initiative	Stakeholder(s)	Target date
SO4.2: Development and adoption of positive safety culture by the service provider	DGCA shall provide guidance to all service providers	DGCA	On-going
	Accountable Executives of Service providers to promote a positive safety culture for fostering effective Safety Management	Applicable Service Providers	On-going
SO4.3: To asses and measure safety culture maturity of the service provider	a. DGCA, while working with other stakeholders shall develop a means to measure and assess safety culture maturity b. Service provided shall carry out surveys to access and measure safety culture maturity	DGCA Service Providers	a. December, 2024 b. On-going (every 03 years)

4.3. Aviation Procedures & Documentation

DGCA prepares Annual Surveillance Programme (ASP) based on experience gained during the past years comprising of safety oversight plan of all Directorates. The respective directorate carry out the audits and the surveillance activities as per plan. Regulatory audits of various air operators revealed the major deficiencies in the area of procedures, documentation and workplace manuals. Based on the data analysed, DGCA India has identified Aviation Procedures & Documentation as one of the State safety priority.

Table 4.3 - Safety Measures Already in Place

DGCA References	Safety Measures Already in Place
Civil Aviation requirements and Circulars	Regulations and guidance related to development and establishment of procedures, manual, documentation related to aviation are elaborately given in relevant CARs, Circulars, etc.

The **safety objective** (SO4.4) is improvement in regulatory compliances related to Procedures and Documentation amongst aviation service providers for ensuring safe operations.

Table 4.4- Safety Action Plan

Safety objective(s)	Safety Enhancement Initiative	Stakeholder(s)
SO 4.4: Improvement in regulatory compliances	1. Monitoring on Regulatory Documents on related websites to be current with new updates 2. Proper dissemination of information gathered to the concerned departments and affected personnel	Air Operators

related to Procedures and Documentation	3. Proper maintenance of data and records 4. Conduct internal surveys to check on the effectiveness of the above action points	

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 4.5 – Safety Performance Indicators

SPI	Metrics	Stakeholder
4.4.1	Regulatory audit findings related to Procedures (measured in terms of percentage of total findings)	DGCA
4.4.2	Regulatory audit findings related to Workplace Manual (measured in terms of percentage of total findings)	
4.4.3	Regulatory audit findings related to Documentation (measured in terms of percentage of total findings)	

Note: Description of the events involved in the above mentioned factors are as follows:
1. **Procedure:** Non-compliance of agreed/ approved procedure by responsible person/ organization, system not established as per requirement, etc.
2. **Workplace manual:** Includes all manuals, procedure/SOPs/Manuals/ documents out of date/obsolete, procedure poorly defined, manual/ documents not easily available, etc.
3. **Documentation:** Lack of training records, safety surveys, etc.

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Chapter- 5

Goal 4

Increase collaboration at International level

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5.1. Increase collaboration at International level

For the effective implementation of SSP, DGCA encourages the establishment of safety information sharing or exchange networks among the aviation community at international level. DGCA shares the relevant occurrence data with the other states and outcome of investigation relevant for the improvement of safety. The safety system and procedures developed are also shared during the multilateral meetings with other states.

The **safety objectives** (SO5.1 and 5.2) and safety action plan are summarized below:

Table 5.1- Safety Action Plan

Safety Objective(s)	Safety Enhancement Initiative	Stakeholder(s)	Target date
SO5.1: Collaboration with the other states on the safety issues	Sharing of relevant Occurrence data	DGCA	On-going
	Sharing of Investigation report and its recommendation	DGCA	On-going
SO5.2: Increase participation in ICAO meetings, panels and working groups	Promote participation of DGCA officers at various international platforms and their working groups to ensure the views of DGCA are considered	DGCA	On-going

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Chapter- 6

Goal 5

Expand the use of industry programme and safety information sharing network by service providers

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6.1 Expand the use of industry programme and safety information sharing network by service providers

Goal 5 requires industry to maintain an increasing trend in its contribution in safety information sharing networks to States and regions.

The **safety objective** (SO6.1) and safety action plan are summarized below:

Table 6.1- Safety Action Plan

Safety Objective	Safety Enhancement Initiative	Stakeholder(s)	Target date
SO6.1: Expand the use of industry programme and safety information sharing network	• Service providers are encouraged to participate in the corresponding ICAO-recognized industry assessment programmes • Establishment of effective SDCPS to capture, store, aggregate, and analysis of safety data and safety information to support safety performance management activities.	• Service Providers • DGCA	On going

To achieve the safety objective and to evaluate the effectiveness of the safety action plan, the following Safety Performance Indicators (SPIs) will be monitored:

Table 6.2 – Safety Performance Indicators

SPI	Metrics	Stakeholder
6.1.1	Percentage of service providers participating in corresponding ICAO recognized industry assessment programme	Service Providers
6.1.2	Percentage of service providers contributing to SDCPS	

Note:

i. GASP Reference: ICAO-recognized industry assessment programmes include the following:
   a) Airports Council International (ACI) Airport Excellence (APEX) in Safety programme;
   b) Civil Air Navigation Services Organisation (CANSO) and European Organisation for the Safety of Air Navigation (EUROCONTROL) maturity assessment within the Standard of Excellence in Safety Management Systems;
   c) Flight Safety Foundation (FSF) Basic Aviation Risk Standard (BARS);
   d) International Air Transport Association (IATA) Operational Safety Audit (IOSA);
   e) IATA Safety Audit for Ground Operations (ISAGO); and
   f) International Business Aviation Council (IBAC) International Standard for Business Aircraft Operations (IS-BAO).
ii. AP-RASP Reference: A.II.3 — Encourage IATA IOSA and ISAGO registrations.

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Chapter- 7

Emerging Safety Issues

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This chapter addresses emerging safety issues as well as issues that could potentially emerge in the immediate or near future. The safety issues detailed are driven from operations or regulations that have not been fully deployed, and it provides a future platform for National Aviation Safety Plan.

7.1 Drones/ Advanced Air Mobility/ Innovative Air Mobility

Current Status

The Ministry of Civil Aviation has published the Drone Rules, 2021, UTM Policy Framework, the Certification Scheme for UAS and Production Link Incentives etc. for development and promotion of Drones in the Country. Accordingly, DGCA has also issued various circulars and procedures for implementing the Drone Rules.

Advanced Air Mobility, or AAM, is a concept that is set to revolutionize our transportation systems. It leverages cutting-edge technology to create a new dimension of mobility that is both efficient and sustainable giving a boost to economy with seamless and rapid connectivity in rural and urban areas. All this, however, is not possible without the public's confidence in their safety. Safety has always been a top consideration for DGCA and it works in collaborative manner with aviation industry to constantly improve the safety levels even with the introduction of new technologies like AAM, without hindering the innovators.

In near future, Indian would see the high growth in Advanced Air Mobility. Use cases such as agriculture, mapping, surveying of roads, railway, mining, aerial filming and surveillance, forest and environment study, etc. would be stimulated to a great extent.

Web based platform for type certification, registration/ transfer/ de-registration of UIN, authorization of Remote Pilot Training Organisation, Remote Pilot Certification and operation is available. The Platform is also being upgraded in phased manner to cater to future requirements.

To navigate into new frontier, it's crucial to have a robust regulatory framework in place. The DGCA is actively working closely with International Civil Aviation organization and other leading civil aviation regulators to study the challenges, opportunities and incorporate latest changes in the regulatory framework to integrate the technologies in our national airspace, and converge with other nations. The following safety risks are to be addressed collectively:

1. Unauthorized use / operation of drones
2. Separation and de-confliction of drones/UAM from other objects
3. Integration with conventional air traffic management system
4. Environmental impact

Way Forward

1. Effective monitoring of published regulations in respect of UAS and their updation.
2. Ministry of Civil Aviation & DGCA to enable operation of above 500 kg Drones.
3. Developments of standards for associated infrastructure.
4. Monitor the low level airspace by establishing an UTM and work towards integration of UTM to ATM.
5. Harmonized standards for critical components of UAS

6. Harmonized standards for remote identification and tracking requirements for enabling BVLOS operations of UAS
7. Effective engagement with new stakeholders for coordination/ compliance & future development/ improvement.

7.2 Laser Interferences

Laser interference during critical phases of flight poses a significant hazard and can jeopardize the safety of the aircraft. It can cause distractions, temporary blindness, and startling effects for the pilot. A total of 144 cases of laser interferences were reported in India for the year 2023 during landing and take-off in India.

Current Status

Para 2.19.5 & para 2.19.6 of Civil Aviation Requirement Section 9 Series E Part I outlines the strategies to prevent emission of laser beams from adversely affecting flight operations.

Way Forward

- Aiming a laser at an aircraft, especially during approach and landing, may blind the flight crew and lead to a loss of control during a critical phase of flight, potentially causing a serious incident/accident. Public awareness is essential for preventing the occurrence of such incidents.
- For further development of safety risk control in this aspect, it is required to monitor the emerging seriousness of this issue. All aerodrome operators need to maintain and report the data of such laser interferences.
- In accordance to the CAR, SOPs are being prepared at each ATS station in co-ordination with internal (Aerodrome operator, CISF etc.) and external (municipal authorities, police etc.) stakeholders to prevent LASER beam interference occurrences.

7.3 Application of safety management principles to the medical assessment process

7.3.1   In-flight Crew Incapacitation

Crew incapacitation in critical phase of flight poses a potential hazard. There could be total incapacitation or partial incapacitation. Collection of epidemiological data will facilitate in development of proactive strategies through predictive analysis of this data.

Current Status

DGCA through its CAR Section 5 Series C Part I and CAR Section 7 Series C Part I mandates reporting of in-flight crew incapacitation to DGCA by the service provider. All such cases are investigated and crew are subjected to detailed medical assessment.

Way Forward

Establishment of database for predictive analysis

7.3.2 Medical risk identification

a) Continuous re-evaluation of the medical assessments issued by DGCA for the license holders will be carried out to identify areas of increased medical risk.

b) In addition, there are certain medical conditions that might pose flight safety hazard. Therefore, such licence holders who suffer from these conditions are assessed as TMU (Temporary Medically Unfit). This data will be continually analysed to identify and determine any particular medical condition that has a significantly higher prevalence amongst the licence holders.

Way Forward

Establishment of database and decide on corrective action plan along with the stakeholders through the health promotion activities

7.3.3 Over-The-Counter (OTC) drugs and self-medication

It has been established that prescription drugs medicines/ can affect the psychomotor as well as cognitive flying performance of flight crew. Therefore, only few medicines are permitted for the flight crew while on flying duties and that too under medical supervision. However, the use of Over-the-Counter (OTC) drugs or self-medication by the flight crew (which is consumed without medical supervision) may cause impairment in the pilot's flying performance and pose a significant threat to air safety. **The objective is to ensure that flight crew does not consume OTC drugs without medical supervision**. The fear of being rendered medically unfit for flying duties or not satisfying the medical requirements for their license is a major factor contributing to the prevalence of self-medication with OTC drugs to treat themselves. This barrier has to be eliminated through periodic education of flight crew, inculcating self-discipline, adequate supervision and a thorough pre-flight medical checks.

An organization may use following as measuring matrix:

a. Educate flight crew against self-medication and encourage their flight crew to consult their company doctors or medical examiners if they are sick or feel ill.

b. To capture the reasons and circumstances leading to consumption of OTC drugs without medical supervision, an organization should establish voluntary safety reporting/confidential reporting system.

Way Forward

The confidential reports/feedback collected by the organization should be analyzed to determine ailments and OTC drugs being used and precipitating circumstances.

Establish database for commonly available OTC drugs for ailments the flight crew have/might engage in self-medication and develop effective preventive strategies.

7.4 Disruption events and Resilience in Aviation

Disruption events are not typically aviation-centric but have significant impact on aviation activities. Disruption events affect States, including safety and security authorities, as well as aircraft operators, operators of aerodromes, ATS providers, and industries dependent on aviation. States should develop measures to respond effectively to disruption events to maintain a safe, resilient and sustainable level of operations.

Building resilience in the Aviation system needs development of mechanisms for communication, collaboration and coordination with the relevant stakeholders with in a state, internationally among various states and with ICAO. These mechanisms will facilitate the transparent flow of the information for sharing and exchange, with resultant benefit of development of awareness about the root cause of the stressors, building systems, processes, capacities and resources to cope up with the emergent risks, stresses and safe resumption of operations following a disruption event.

Another aspect of building resilience is learning from the disruption events or disasters and enhancing the infrastructure and processes. These in turn leads to improvement of the risk management and the crisis preparedness in response to the unforeseen circumstances.

The emphasis should be to have in place robust process for management of change and positive safety culture. The policies, processes and mechanisms implemented for the SSP should support the management of disruption events and changes should be applied to the safety plans in accordance with risk analyses. Further, the ICAO CART report recommends "States should strive for long-term sustainability, consistent with the United Nations 2030 Sustainable Development Goals". The United Nations 2030 sustainable Goals which are significant from the aviation standpoint for building resilience are:

a. Taking Measures in terms of State's policy towards Gender Equality as this would make available tremendous human potential.

b. Taking actions to combat climate change and its impacts in terms of shift towards the sustainable aviation fuel and other alternate renewable energy sources.

c. Sustainable and resilient aviation infrastructure to take care of disruptions, environmental impact and building skill of aviation personnel

d. Focus on mental health of the aviation personnel to build the personal resilience of an individual.

Keeping in view the present and future disruptions or challenges there is urgent need for National Aviation Safety Plan to make resilience in the aviation system as the corner stone of the safety policy.

The nature of disruption events, such as the COVID-19 pandemic, volcanic eruption, war etc., can vary in complexity, scope, and duration and may affect the identification of hazards and management of safety risks. Recovery from a disruption event may also affect the operational safety risks. In case of any such event, States may adopt the following practices:

a) States should identify hazards that may develop into disruption events.

b) States should also establish a mechanism and means to share, communicate and collaborate on effective mitigation measures and efforts to support operational continuity and safe resumption of operations during and following a disruption event.

c) States may also consider applying changes to safety plans/regulations and procedures in accordance with risk analyses. The policies, processes and mechanisms implemented for the SSP should support the management of disruption events.

d) States may also enhance monitoring of aviation activities in their region to ensure proper capturing of hazards.

7.5 Inflight Turbulence

Turbulence is unstable air movement that is caused by changes in wind speed and direction, such as jet streams, thunderstorms, and cold or warm weather fronts. Turbulence may result into loss of control of the aircraft, jet upset, injuries/fatalities to crew & passengers, and can lead to structural damage to the aircraft.

Globally, in the recent past, a number of aircraft accidents have occurred due to turbulence globally wherein passengers and cabin crew received injuries or required medical assistance. Analysis of the global scheduled aircraft accident (above 5700kgs) data from 2018 to 2022 reveals that the aircraft accidents attributed to turbulence have increased from 14% to 38% of the total aircraft accidents. During the same period, four aircraft accidents involving Indian scheduled airlines occurred due to turbulence. These accidents resulted in injuries to both passengers and crew. Tragically, one passenger lost his life after sustaining injuries during a flight that encountered severe turbulence in 2022.

This trend warrants close attention and further enhancement of aviation safety measures.

Way Forward

- Training program of Pilots and Cabin Crew should include elements that equips them to manage and mitigate the risks associated with turbulence.

- Airline operators may explore onboard detection systems which in conjunction with weather data helps in predicting areas of anticipated turbulence with greater accuracy.

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Glossary

Acronym	Definition
AAM	Advanced Air Mobility
ACAS	Airborne Collision Avoidance System
AERD	Aerodrome Operators
AFM	Airplane Flight Manual
AIRPROX	Air Proximity incident
ALAR	Approach and Landing Accidents Reduction
ALoSP	Accepted Level of Safety Performance
ANSP	Air Navigation Service Provider
AP-RASP	Asia Pacific- Regional Aviation Safety Plan-
ATC	Air Traffic Control
ATCO	Air Traffic Control Officers
ATM	Air Traffic Management
ATS	Air Traffic Services
CAO	Commercial Aeroplane Operators
CAR	Civil Aviation Requirement
CBT	Computer Based Training
CE	Critical Element
CFIT	Controlled Flight Into Terrain
CHO	Commercial Helicopter Operators
CRM	Crew Resource Management
DGCA	Directorate General of Civil Aviation
EGPWS	Enhanced Ground Proximity Warning System
EI	Effective Implementation
GASP	Global Aviation Safety Plan (ICAO)
GSE	Ground Support Equipment
ICAO	International Civil Aviation Organization
ICAO CART	ICAO Council Aviation Recovery Taskforce

Acronym	Definition
LVP	Low Visibility Procedure
MET	Meteorology
MSRS	Mandatory Safety Reporting System
MRO	Maintenance Repair and Overhaul
MSA	Minimum Safe Altitude
MSAWS	Minimum Safe Altitude Warning System
NASP	National Aviation Safety Plan
NHRCs	National High Risk Categories of Occurrences
OTC	Over-the-Counter
RA	Resolution Advisory
RFM	Rotary Flight Manual
RPAS	Remotely Piloted Aircraft System
RT	Radio Telephony
SARPs	ICAO Standards and Recommended Practices
SDCPS	Safety Data Collection and Processing System
SEIs	Safety Enhancement Initiatives
SMS	Safety Management System
SO	Safety Objective
SOPs	Standard Operating Procedures
SPIs	Safety Performance Indicators
SPTs	Safety Performance Targets
SSFDR	Solid State Flight Data Recorder
SSP	State Safety Programme
TCAS	Traffic Collision Avoidance System
UAS	Unmanned Aircraft System
UIN	Unique Identification Number
UTM	Unmanned Aircraft System Traffic Management (UTM)
VFR	Visual Flight Rules

List of Figures