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# Runway Safety Programme – Global Runway Safety Action Plan



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2<sup>nd</sup> Global Runway Safety Symposium  
Lima, Peru, 20 - 22 November 2017

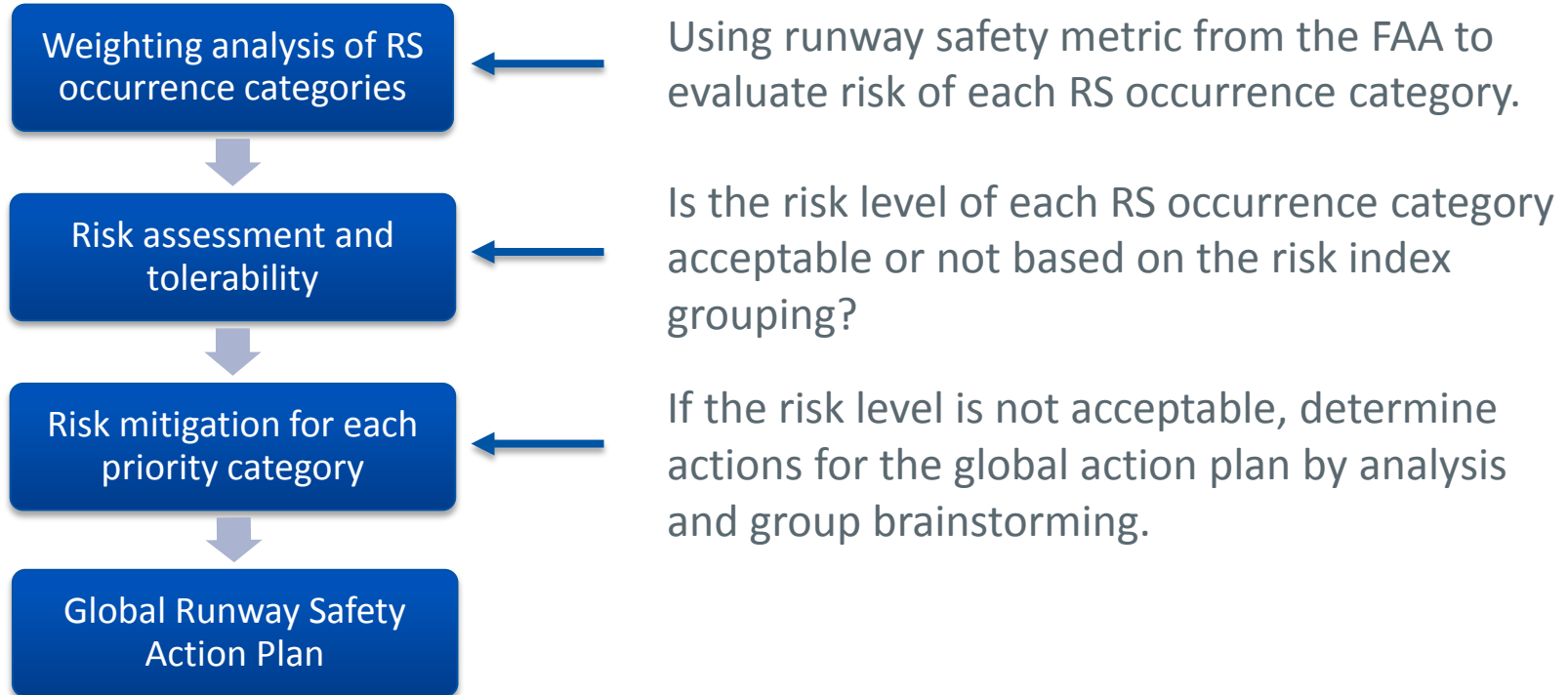
# Runway Safety Action Plan Working Group (RSAP-WG)

- Established February 2017
- Comprised of experts nominated by Runway Safety Programme partners
- Objectives:
  - 1) Review runway related accident and serious incident data;
  - 2) Conduct a safety risk assessment of runway safety accident occurrence categories;
  - 3) Identify the runway safety risk priorities and high risk accident categories;
  - 4) Identify appropriate global mitigation actions; and
  - 5) **Develop a Global Runway Safety Action Plan.**



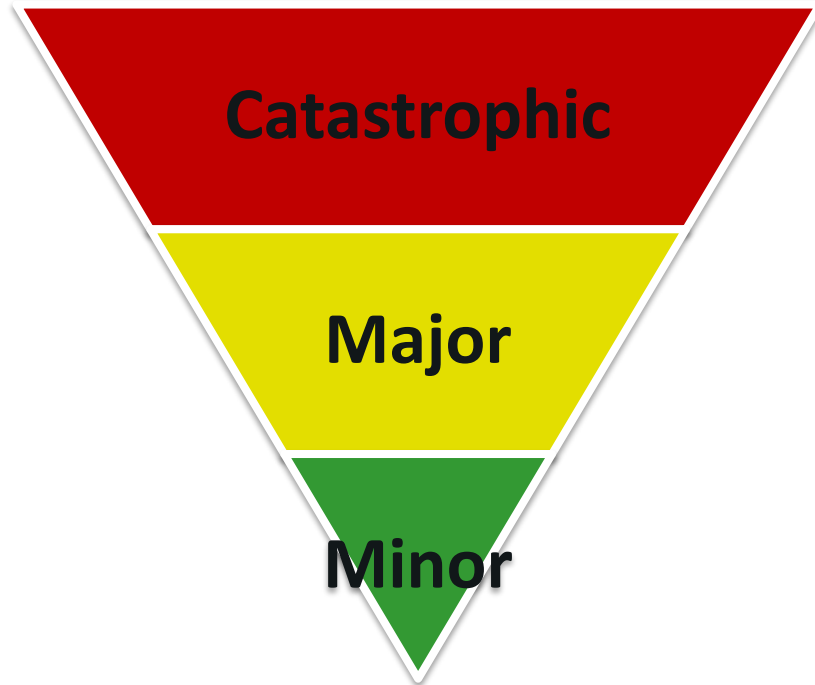


# RSAP-WG Risk Analysis Process





# Safety Risk Tolerability



Action
Risk priority. Identify actions to include in the Global Action Plan.
Continue with existing mitigation safety programmes.
Acceptable. Monitor.



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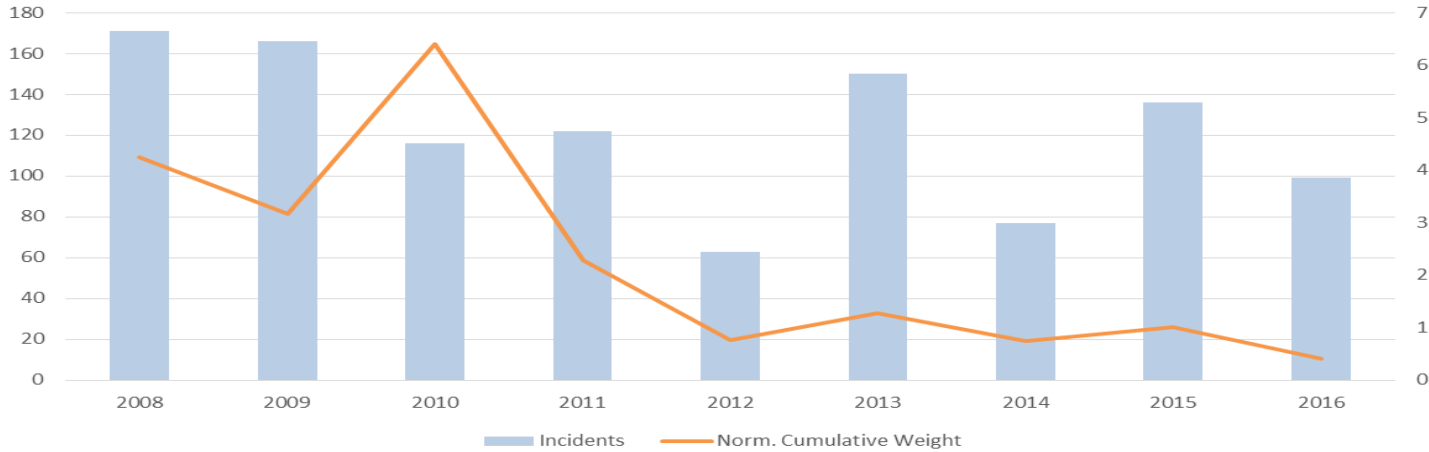
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# Runway Safety Risk Index

- Developed by the FAA
- Use modeling to assign risk weights to all kinds of outcomes.
  - Weighted outcomes include fatalities, injuries, damage, and each type of runway occurrence
  - Weights are based on outcomes’ “proximities” to fatality and are ordered based on SME input [*Injury* → *Damage* → *Incident*]
  - For accidents, weighting gives some credit for saving lives and minimally-damaged aircraft

Normalized Cumulative Weight and Number of Incidents Over Time



- Data normalized with traffic data
- 1100 occurrences
- 44 events with fatalities
- 446 fatalities

Incident Type	Red	Yellow	Green	Total Risk Weight	Average Risk Weight
RE: Runway excursion	48	288	70	390.6605123	0.962218011
GCOL: Ground Collision	10	118	23	64.68188334	0.428356843
ARC: Abnormal runway contact	20	274	22	60.65670508	0.191951598
USOS: Undershoot/overshoot	13	32	6	57.6776441	1.130934198
CTOL: Collision with obstacle(s) during take-off and landing	6	16	0	32.92302258	1.496501026
LOC-G: Loss of control - ground	6	57	15	9.812887685	0.125806252
RI: Runway incursion - vehicle, aircraft or person	1	7	78	0.867738317	0.01008998

## Coordination with the GASP-SG



- Current edition of the Global Aviation Safety Plan identifies **runway safety** as a **global priority**
- GASP and ICAO Annual Safety Report defines runway safety into the following occurrence categories:
  - Abnormal Runway Contact
  - Bird Strike
  - Ground Collision
  - Ground Handling
  - Runway Excursion
  - Runway Incursion
  - Loss of Control on the Ground
  - Collision with Obstacle(s)
  - Undershoot / Overshoot
  - Aerodrome



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# Recommendations

- Is Runway Safety still a global priority?
- If so, what category(ies)?

Yes

## Runway Excursion

- Highest total risk weight
- Highest number of events
- Harmonized with international organizations (e.g IATA)

## Runway Incursion

- High number of incidents
- 1 incident report per day
- High fatality risk





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**Runway Safety Programme – Global Runway Safety Action Plan**  
November 2017



Global Runway Safety Action Plan

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# Top Contributing Factors – Runway Excursion

Contributing Factor	Description / Examples
<b>Latent Conditions – Conditions present in the system before the accident and triggered by various possible factors.</b>	
Flight Operations: Standard Operating Procedures and Checking	Inadequate or absent: <ul style="list-style-type: none"> <li>Standard Operating Procedures (SOPs)</li> <li>Operational instructions and/or policies</li> <li>Company regulations</li> <li>Controls to assess compliance with regulations and SOPs</li> </ul>
Flight Operations: Training systems	Inadequate training of flight crews.
Regulatory Oversight	Inadequate regulatory oversight by the State.
Safety Management	Absent or ineffective: <ul style="list-style-type: none"> <li>Safety policy and objectives</li> <li>Safety risk management (including hazard identification process)</li> <li>Safety assurance (including Quality Management)</li> <li>Safety promotion</li> </ul>
<b>Threats – An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.</b>	
<b>Mismanaged threat: A threat that is linked to or induces a flight crew error.</b>	
Meteorology	Includes thunderstorms, poor visibility/Instrument Meteorological Conditions (IMC), wind, wind shear, gusty wind and icing conditions
Airport Facilities - Contaminated Runway/Taxiway	Poor braking action as a result of contaminated runways/taxiways.

<b>Flight Crew Errors (Active Human Performance) – An observed flight crew deviation from organizational expectations or crew intentions.</b>	
<b>Mismanaged error: An error that is linked to or induces additional error or an undesired aircraft state.</b>	
Failure to go-around after Destabilisation during Approach	Flight crew does not execute a go-around after stabilization requirements are not met.
Manual Handling/Flight Controls	<ul style="list-style-type: none"> <li>Hand flying vertical, lateral, or speed deviations</li> <li>Approach deviations by choice (e.g., flying below the glide slope)</li> <li>Missed runway/taxiway, failure to hold short, taxi above speed limit</li> <li>Incorrect flaps, speed brake, autobrake, thrust reverser or power settings</li> </ul>
Standard Operating Procedures (SOP) Adherence	<ul style="list-style-type: none"> <li>Intentional or unintentional failure to cross-verify (automation) inputs</li> <li>Intentional or unintentional failure to follow SOPs</li> <li>Pilot flying makes own automation changes</li> <li>Sterile cockpit violations</li> </ul>



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# Top Contributing Factors – Runway Incursion

Contributing Factor	Description / Examples
<b>Latent Conditions – Conditions present in the system before the accident and triggered by various possible factors.</b>	
Training	Includes inadequate training for air traffic controllers, pilots or airside vehicle drivers.
Procedures	Inadequate, inappropriate or absent procedures.
Regulatory Oversight	Inadequate regulatory oversight by the State.
Safety Management	Absent or ineffective safety management.
Aerodrome Design	Complex or inadequate aerodrome design such as the complexity of the layout of roads and taxiways adjacent to the runway, intersecting/crossing runways, insufficient spacing between parallel runways, departure taxiways that fail to intersect active runways at right angles, and no end-loop perimeter taxiways to avoid crossings. Inadequate or poorly maintained visual aids (including signs, marking and lighting). Poorly maintained runways (friction etc.).
Workplace Conditions	Covers issues such as the 'sterile cockpit' environment when pilots are taxiing. For air traffic controllers human-machine interface and ergonomics affecting their ability to maintain, as far as practicable, a continuous 'heads up' visual scan of the aerodrome with unimpeded visual 'lines of sight' or the use of surveillance systems such as A-SMGCS.
<b>Threats – An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.</b>	
Meteorology	Includes poor visibility, rain, snow and icing conditions (that may obscure visual aids).

<b>Active Human Performance – Human Performance Limitations (directly related to OSF and CC) including false perceptions; memory lapses; and reduced situational awareness.</b>	
Pilot Factors	Includes inadvertent non-compliance with ATC instructions, in particular take-off or landing without clearance.
Airside Vehicle Driver Factors	May include not obtaining a clearance or non-compliance with ATC instructions.
Air Traffic Controller Factors	May include clearing aircraft to land/depart on an occupied runway, not monitoring aircraft position on approach to intersecting runways and clearing aircraft to cross runway with aircraft on departure/landing roll.
Communication Errors	A breakdown in communications between air traffic controllers and pilots or airside vehicle drivers often related to the read-back/hear-back procedure.



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# Recommended Actions - ICAO

- Enhance Assembly Resolution, SARPs and existing guidance material for **Runway Safety**
- Develop recommended practices for **prevention of runway excursions**
- Develop guidance to States on **State Runway Safety Programmes**
- Enhance ICAO runway safety related **training**
- Deploy the **Global Reporting Format** for assessing and reporting runway surface conditions

<b>Stakeholder</b>	ICAO	
<b>Runway Safety Priority</b>	Runway Excursions, Runway Incursions	
<b>Actions</b>	<b>Action</b>	<b>Related Contributing Factor (if applicable)</b>
	1. Continue to coordinate the Runway Safety Programme.	<b>Latent Conditions</b> Training Regulatory Oversight Safety Management
	2. Update and enhance the Assembly Resolution related to runway safety (A37-6).	
	3. Develop runway safety standards and recommended practices for inclusion in ICAO Annex 14 Vol I.	
	4. Publish the third edition of PANS-Aerodrome to include a dedicated chapter on runway safety.	
	5. Review, enhance and consolidate, as appropriate, ICAO recommended practices related to runway safety, such as the Manual on the Prevention of Runway Incursions (Doc 9870), ICAO Runway Safety Team Handbook, Runway Safety Go-Team Methodology etc. .	
	6. Review and develop, as appropriate, runway safety recommended practices related to runway excursions.	
	7. Review and develop, as appropriate, guidance to States on the implementation of State Runway Safety Programmes.	
	8. Review and develop, as appropriate, ICAO aviation training related to runway safety, including for runway excursion prevention.	
	9. Continue to maintain and enhance the ICAO runway safety website and I-Kit.	
	10. Conduct Regional Safety Management Symposia and workshops to include runway safety.	
	11. Develop tools, as appropriate, for monitoring and sharing runway safety data, such as web applications in the ICAO integrated Safety Trend Analysis and Reporting System (ISTARS).	
	12. Deploy the Global Reporting Format for assessing and reporting runway surface conditions in accordance with Annex 14 Vol I (Applicability date 5 November 2020).	<b>Threats</b> Contaminated runway/taxiway
<b>References</b>	ICAO Annex 14 Vol I ICAO PANS-Aerodromes (Doc 9981) ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO Runway Safety Team Handbook Second Edition Runway Safety IKit ( <a href="http://www.icao.int/safetv/RunwaySafety">www.icao.int/safetv/RunwaySafety</a> )	



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# Recommended Actions – Runway Safety Programme

- Continue to **collaborate** on the **monitoring** of runway safety related **data**, conduct **analysis** and **identify appropriate mitigations**
- Continue to **support** the establishment of **effective Airport RSTs** with RST Go-team missions
- Organize a **global** runway safety event at least every **six years**

<b>Stakeholder</b>	Runway Safety Programme Partners	
<b>Runway Safety Priority</b>	Runway Excursions, Runway Incursions	
<b>Actions</b>	<b>Action</b>	<b>Related Contributing Factor (if applicable)</b>
	1. Continue to convene Runway Safety Programme Partner meetings at least annually to coordinate and collaborate on global runway safety related activities.	<b>General Actions</b>
	2. Continue to collaborate on the monitoring of runway safety related data, conduct analysis and identify appropriate mitigations.	
	3. Promote runway safety best practices and conduct awareness campaigns as appropriate.	
	4. Organize a global runway safety event at least every six years so long as runway safety continues to be identified as a global priority in the ICAO Global Aviation Safety Plan (GASP).	
	5. Actively engage in RASG safety risk management activities related to runway safety.	<b>Latent Conditions Regulatory Oversight</b>
6. Continue to support the establishment of effective Airport Runway Safety Teams (RST) with RST Go-Team Missions.		
<b>References</b>	ICAO PANS-Aerodromes (Doc 9981) ICAO Safety Management Manual (Doc 9859) ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO Runway Safety Team Handbook Second Edition Runway Safety IKit ( <a href="http://www.icao.int/safety/RunwaySafety">www.icao.int/safety/RunwaySafety</a> )	



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# Recommended Actions – Regional Groups

- **Collect and analyze** regional safety data
- **Develop and implement** regional action plans
- **Monitor and manage** regional action plans
- Offer **support** to States that need it

<b>Stakeholder</b>	Regional Safety Oversight Organisations (RSOOs), Regional Aviation Safety Groups (RASGs)								
<b>Runway Safety Priority</b>	Runway Excursions, Runway Incursions								
<b>Actions</b>	<table border="1"> <thead> <tr> <th>Action</th> <th>Related Contributing Factor (if applicable)</th> </tr> </thead> <tbody> <tr> <td>1. Collect and perform analysis of available regional safety data to identify trends, risks and contributing factors. These activities to be reviewed and conducted on a recurring basis to reassess risks.</td> <td rowspan="4">General Actions</td> </tr> <tr> <td>2. Develop and implement regional action plans based on the results of analysis and develop the means to measure implementation/effectiveness. For example RASGs shall develop:           <ul style="list-style-type: none"> <li>a) Safety Enhancement Initiatives (SEIs)</li> <li>b) Detailed Implementation Plans (DIPs)</li> </ul> </td> </tr> <tr> <td>3. Monitor and actively manage regional action plans, including:           <ul style="list-style-type: none"> <li>a) Review resources (expertise, capital, systems) requirements</li> <li>b) Facilitate partnerships between regional stakeholders (States, industry, RSOO/PIRGs)</li> <li>c) Update action plans as necessary</li> </ul> </td> </tr> <tr> <td>4. Identify states that may require support and ensure such support is offered.</td> </tr> </tbody> </table>	Action	Related Contributing Factor (if applicable)	1. Collect and perform analysis of available regional safety data to identify trends, risks and contributing factors. These activities to be reviewed and conducted on a recurring basis to reassess risks.	General Actions	2. Develop and implement regional action plans based on the results of analysis and develop the means to measure implementation/effectiveness. For example RASGs shall develop: <ul style="list-style-type: none"> <li>a) Safety Enhancement Initiatives (SEIs)</li> <li>b) Detailed Implementation Plans (DIPs)</li> </ul>	3. Monitor and actively manage regional action plans, including: <ul style="list-style-type: none"> <li>a) Review resources (expertise, capital, systems) requirements</li> <li>b) Facilitate partnerships between regional stakeholders (States, industry, RSOO/PIRGs)</li> <li>c) Update action plans as necessary</li> </ul>	4. Identify states that may require support and ensure such support is offered.	
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# Recommended Actions – State CAAs and Industry

- **Collect** and **analyze data** and develop/implement **action plans**
- **Participate** in Aerodrome **RST activities**
- **Implement** Safety Management
- **Ensure** runway safety training is part of **initial and recurrent training** for relevant operational staff
- **The GRSAP Includes** recommendations for each stakeholder and each Runway Safety priority

<b>Stakeholder</b>	State Civil Aviation Authorities, Aircraft Operators, Air Navigation Service Providers, Aerodrome Operators, Aircraft Manufacturers	
<b>Runway Safety Priority</b>	Runway Excursions, Runway Incursions	
<b>Actions</b>	<b>Action</b>	<b>Related Contributing Factor (if applicable)</b>
	1. Ensure all infrastructure, radio telephony phraseology, practices and procedures relating to runway operations are in compliance with ICAO, Regional and State provisions.	<b>Latent Conditions</b> Regulatory Oversight
	2. Ensure that information is collected on all runway incidents/accidents and perform analysis and risk assessments to identify risks and contributing factors. These activities to be reviewed and conducted on a recurring basis to reassess risks.	
	3. Develop and implement action plans to mitigate identified risks and monitor the implementation/effectiveness of those action plans.	
	4. Actively participate in aerodrome local runway safety team (RST) activities. Note: Aerodrome Operators shall establish and lead RSTs. Not applicable to Aircraft Manufacturers.	
	5. Ensure that there is in place a mechanism of protection of information and non-punitive environment inside RSTs.	
	6. Implement the elements of Safety Management and ensure the implementation of Safety Management Systems is in accordance with the applicable ICAO provisions.	<b>Latent Conditions</b> Safety Management
	7. Make use of available resources such as the ICAO Safety Management Implementation Website and its safety management tools.	
	8. Ensure appropriate Safety Management training of staff and make use of available training such as the ICAO Safety Management Training Programme (SMTP).	
9. Ensure runway safety training (e.g. runway excursion/incursion prevention) is part of initial and recurrent/refresher training regimes for all relevant operational staff. Joint training sessions between different stakeholders groups (e.g. pilots and controllers) should be encouraged.	<b>Latent Conditions</b> Training	
<b>References</b>	ICAO Annex 14 Vol I - Aerodromes ICAO Annex 19 – Safety Management ICAO PANS-Aerodromes (Doc 9981) ICAO Safety Management Manual (Doc 9859) ICAO Runway Safety Team Handbook Second Edition	





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## What's Next?

- Publish on the ICAO runway safety website and Runway Safety Implementation Kit (I-Kit).
- Promotion by the runway safety programme.
- RASGs to support regional implementation of the plan.
- The Runway Safety Programme to continue to monitor and analyze runway safety data which may result in enhancements and additional revisions.
- The recommendations will be reflected in the GASP 2020-2022 edition.
- Runway Safety Panel at the ICAO Safety and Air Navigation Symposium (SANIS).







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