

# Session 11

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## Measuring Safety Performance

# Overview

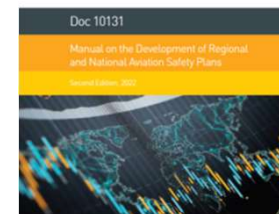
- National safety performance
- Use of GASP indicators for NASP (Doc 10162)
- GASP indicator guidance + selection & validation
- SPM: from planning to measuring
- Role of NASP development team in SPM

# National Safety Performance

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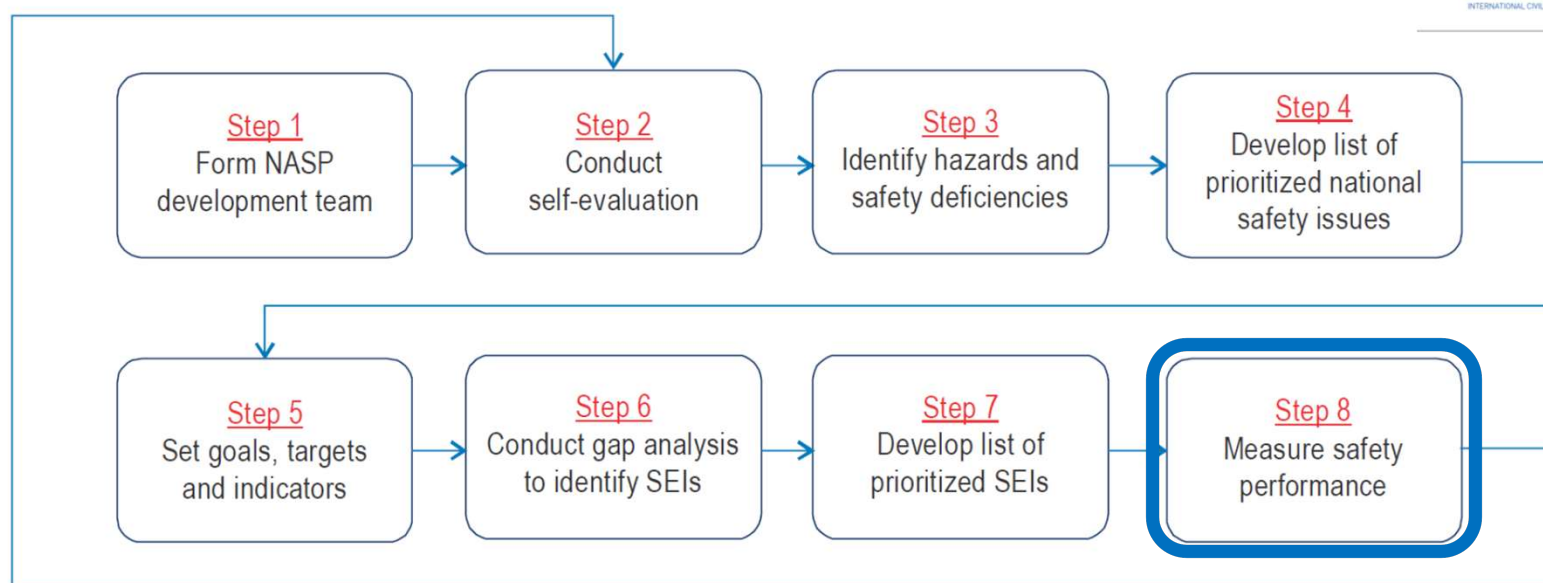
- Through NASP, State sets national goals & targets
  - and determines series of SEIs to achieve them
- State also uses NASP indicators related to targets
  - to measure if SEIs attain their desired outcomes





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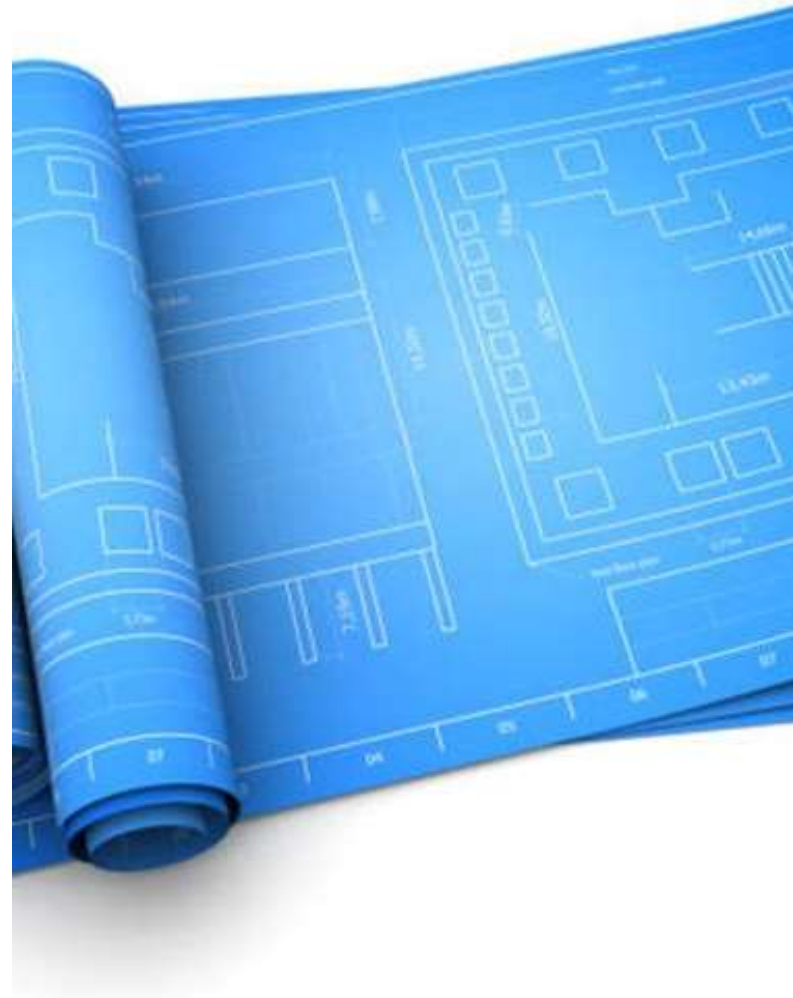
# NASP Development Process



# Measuring Safety Performance (Step 8)

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- Defining process to monitor (planning)
  - NASP implementation
  - NASP effectiveness
- Actually measuring safety performance (doing)
  - has safety improved nationally?



# Use of GASP Indicators for NASP

- GASP indicators are only examples
- When GASP is adapted at national level
  - team may use examples of indicators
  - to develop NASP indicators
- Not all indicators presented in GASP
  - need to be duplicated in NASP



# GASP

## Indicator Guidance

- Doc 10162 provide guidance on data sources
  - for indicators to measure achievement of NASP goals
- Guidance addresses
  - how to measure indicators
  - how to gather data
- GASP Indicator Form was developed for each indicator
  - to provide clear guidance & definitions
  - to ensure consistent & reliable data collection
    - support monitoring of NASP implementation



Doc 10162

Manual on Monitoring Implementation of  
Regional and National Aviation Safety Plans

First Edition, 2023



Approved by and published under the authority of the Secretary General

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| <i>Rationale</i>           | How indicator connects to a target<br>What measurement and monitoring it supports                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <i>Limitations</i>         | Scope of what indicator measures                                                                                      |
| <i>Definition of terms</i> | Definition of terminology used in naming or defining indicator                                                        |
| <i>Calculation method</i>  | Specific or technical formula available for calculation of indicator value                                            |
| <i>Data set(s)</i>         | Data needed for measuring indicator                                                                                   |
| <i>Availability</i>        | Listed datasets may have different levels of availability<br>Varying from 1 (unavailable) data to 3 (fully available) |
| <i>Provider</i>            | Provider where data comes from                                                                                        |



# Example of GASP-I Form

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>GASP-I.1.1.01</i> | <i>Accident rate (number of accidents per million departures)</i>                                                                                                                                                                                                                                                                                                                                                                      |
| Rationale            | <p>Related to Global Aviation Safety Plan (GASP) Target 1.1: By 2028, States, regions and industry to decrease the accident rate, globally and within each ICAO region.</p> <p>This indicator has been widely used by ICAO since 2008. It can be found in the <a href="#">ICAO Annual Safety Report</a>. It is the most common indicator measuring safety levels and is connected to risk exposure (number of million departures).</p> |

# Example of GASP-I Form (2)

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limitations | <ul style="list-style-type: none"><li>– The State of Occurrence shall forward a notification of an accident to ICAO when the aircraft involved is of a maximum mass of over 2 250 kg or is a turbojet-powered aeroplane, as required by Annex 13 – <i>Aircraft Accident and Incident Investigation</i>, paragraph. 4.1.</li><li>– The State conducting the investigation shall send reports via the Accident/Incident Data Reporting (ADREP) system to ICAO for accidents to aircraft over 2 250 kg, as required by Annex 13, Chapter 7.</li><li>– ICAO maintains an ADREP database with the notifications and ADREP reports it receives, as well as additional reports provided by the ICAO Occurrence Validation Study Group (OVSG).</li><li>– A validation of the ADREP reports is performed annually by a group of experts (the OVSG), focusing primarily on accidents and serious incidents involving commercial air transport of aircraft of a maximum mass of over 2 250 kg. This validation does not include, as of February 2026, helicopter accidents or aircraft between 2 250 kg and 5 700 kg.</li><li>– Validated ADREP data for year <math>n</math> is made available in March of year <math>n+1</math>.</li><li>– The Official Airline Guide (OAG) makes available to ICAO traffic data for scheduled operations with aircraft &gt; 5 700 kg.</li><li>– Validated OAG traffic data for year <math>n</math> is made available in March of year <math>n+1</math>.</li></ul> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# Example of GASP-I Form (3)

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Definition of terms | The term “accident” is defined in Annex 13, Chapter 1. Definitions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Calculation method  | <p>Indicator = <math>N/D</math>, where:</p> <p>a) <math>N</math> is the number of accidents involving scheduled commercial operations for which:</p> <ol style="list-style-type: none"> <li>1) the date of occurrence is between 1 January and 31 December of the year in question;</li> <li>2) a notification and/or an ADREP report was forwarded to and received by ICAO or added by the OVSG;</li> <li>3) the circumstances of the occurrence match those defined for “accident” in Annex 13; and</li> <li>4) the aircraft involved in the occurrence is of maximum mass of over 5 700 kg; and</li> </ol> <p>b) <math>D</math> is the number of scheduled commercial departures, divided by 1 000 000.</p> <p>– The decrease in the accident rate (as per Target 1.1 which this indicator connects to) is measured using a five-year rolling average and the year 2025 as a baseline. A five-year rolling average is the average calculated every year based on the data of the previous five years. It gives a more realistic picture by reducing the impact of outliers in the data, smoothing the trend curve. It helps identify trends otherwise hard to detect. For example, in 2026, the 2025 baseline five-year rolling average is calculated with data from 2021, 2022, 2023, 2024 and 2025. The following year, the 2026 rolling average will use 2022, 2023, 2024, 2025 and 2026 data.</p> |

# Example of GASP-I Form (4)

|                       |                                                                                                                                                                           |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data sets             | <ul style="list-style-type: none"><li>– Notifications and ADREP reports submitted by States to ICAO under Annex 13 obligations.</li><li>– OAG dataset for ICAO.</li></ul> |
| Availability<br>(1-3) | 3: Accident notification and ADREP reports are already available in the ICAO ADREP database.                                                                              |
| Provider              | ICAO (ADREP database)                                                                                                                                                     |

# Indicator Selection: Validation Process

- Vet each indicator before publication
  - by populating fields from Doc 10162
  - to ensure indicators are realistic
- Specify for each NASP indicator
  1. rationale
  2. limitations
  3. definition of terms
  4. calculation method
  5. data set(s)
  6. availability
  7. provider



# From Planning to Measuring

- Targets in NASP are achieved by action plan(s)
  - contain set of SEIs
  - each SEI should identify responsible entity
- Once NASP development is complete
  - responsible entities lead implementation
- At this stage team measures safety performance
  - to monitor NASP implementation
  - assess effectiveness in terms of improving safety



## N-HRC 2: LOC-I

**Goal 1: Achieve continuous reduction of operational safety risks**  
**Target 1.1: By 2028, State and its industry to decrease national accident rate**

| <i>SEI</i>                                                              | <i>Action</i>                                                                                                                 | <i>Timeline</i>    | <i>Responsible entity</i> | <i>Stakeholders</i>                                                                                                                                                                              | <i>Metrics</i>                                                                                                                                                                                                                                                                         | <i>Priority</i> | <i>Monitoring activity</i>                         |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------|
| <b>Mitigate contributing factors to LOC-I accidents &amp; incidents</b> | Require upset prevention and recovery training in all full flight simulator type conversion and recurrent training programmes | Q1 2026 to Q4 2028 | CAA                       | <ul style="list-style-type: none"> <li>• Operators</li> <li>• ATO</li> <li>• Flight simulator product and service providers</li> <li>• Pilots' associations</li> <li>• CAA inspectors</li> </ul> | <ul style="list-style-type: none"> <li>• Training programmes updated with UPRT</li> <li>• Number of pilots completing UPRT</li> <li>• Upset occurrence rates in voluntary reporting</li> <li>• Stick-shaker activation events in FDA data</li> <li>• LOC-I occurrence rates</li> </ul> | High            | Surveillance of operator & ATO training activities |



# Role of Team in SPM

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- Periodically monitor SEIs implementation
  - ensure actions are being accomplished
  - they are effective
  - address difficulties in implementation
- This ensures NASP is implemented
  - by sum of SEIs in action plan





# Points to Remember

- NASP should include indicators related to its targets
- Need to define specifics for NASP indicators
- Use of guidance in Doc 10162 for adapting GASP indicators nationally
- Use of action plan to measure NASP implementation
- Importance of defining responsibility & metrics for SEIs



# Facilitated Exercise IV

## — Define Safety Performance Measurement

# Your Tasks

- Based on national goals, targets and indicators (Ex II)
  - select 1 indicator (associated with a target)
  - complete form in Appendix A
- Based on prioritized list of SEIs (Ex III)
  - select 1 SEI related to ops safety risks (such as N-HRC)
  - select 1 SEI related to ORG challenges
  - complete the forms in Appendix B
- Time allocated: 2h00

| <i>Rationale</i>           | How indicator connects to a target<br>What measurement and monitoring it supports                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------|
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| N-HRC x: [name of N-HRC]                                                     |                      |                                    |                    |                     |                |                     |                                                    |
|------------------------------------------------------------------------------|----------------------|------------------------------------|--------------------|---------------------|----------------|---------------------|----------------------------------------------------|
| Goal x: [name]                                                               |                      |                                    |                    |                     |                |                     |                                                    |
| Target x.x: [description ]                                                   |                      |                                    |                    |                     |                |                     |                                                    |
| Safety enhancement initiative                                                | Action               | Timeline                           | Responsible entity | Stakeholders        | Metrics        | Priority            | Monitoring activity                                |
| [name of SEI and ICAO SEI number, as well as RASP SEI number, if applicable] | [describe action(s)] | [insert time frame for completion] | [name]             | [list stakeholders] | [list metrics] | [Low/ Medium/ High] | [list mechanisms for verifying SEI implementation] |
|                                                                              |                      |                                    |                    |                     |                |                     |                                                    |