Measuring Safety Performance

International Business Aviation Council
Safety Performance Indicator

- A data-based safety parameter used for monitoring and assessing safety performance.

Ref: ICAO Doc 9859
Safety Performance Indicators (SPI’s)
- Reduce complexity to a small number of key indicators
- This is the same approach we use in our personal health
  - Blood pressure, Cholesterol levels, Heart rate
- Most Aviation Accidents are caused by human error
  - Suggestion: Measure factors related to human error
AVOID THIS TRAP!!

- Identify everything that is easy to measure and count
- Report the data on everything easy to measure and count
- End up confused and overwhelmed with data
How often are these happening and why?

- Unstable Approaches
- Procedural Errors or Lapses
- Working Fatigued
- Minimum Fuel Events
- TCAS RA Events
- EGPWS or TAWS Alerts/Warnings
- Events related to LOCI, for example:
  - Low speed/stall alert or warning
  - Bank Angle alert or warning
How To Capture Data

- Flight Data Analysis Programs
- Supervisor Observations – LOSA & Maintenance
- Daily Debriefs capturing errors and deviations from SOPs
  - Use online survey – it’s easy
- Voluntary Reporting
Safety Performance Target

- The planned or intended objective for safety performance indicator(s) over a given period.
  - Technique
    - Gather data over a one year period
    - Compute Average
    - Set a reasonable Goal (Target) to improve

Ref: ICAO Doc 9859
Hi-Consequence Indicators

- SPIs pertaining to the monitoring and measurement of high-consequence occurrences, such as accidents or serious incidents.
- High-consequence indicators are sometimes referred to as reactive indicators.

Ref: ICAO Doc 9859
Low–Consequence Indicators

- SPIs pertaining to the monitoring and measurement of lower–consequence occurrences, events or activities such as incidents, non–conformance findings or deviations.

- Lower–consequence indicators are sometimes referred to as proactive/predictive indicators.

Ref: ICAO Doc 9859
SMS addresses the aviation activities of an aviation service provider that are related to the safe operation of aircraft.

This includes:

- Flight Ops
- Mx
- Dispatching

Ref: ICAO Doc 9859
SPI Alert and Target Values

- Safety performance is expressed by SPIs and their corresponding alert and target values.
- Monitor the performance of SPI trends to identify any abnormal changes in safety performance.
- Target and alert settings should take into consideration recent historical performance for a given indicator.
- Targets should be realistic and achievable.

Ref: ICAO Doc 9859
Past performance may be an indicator of future performance

Employ trend analyses to track safety performance over time

Where deficiencies have been found and corrected ensure the effectiveness of corrective actions.

Ref: ICAO Doc 9859
SPI and Performance Monitoring

- Normally depicted in the form of charts or graphs
- Target Example: 5% Better than Last Year Average
- Alerts related to Data Points (DP) & Standard Deviations (SD)

**ALERT:**
- 1 DP > 3 SD
- 2 DP > 2 SD
- 3 DP > 1 SD

Ref: ICAO Doc 9859
Performance Summaries

- Once SPIs and corresponding targets and alert settings have been defined, the performance outcome of each indicator should be updated and monitored on a regular basis.

- A summary of the overall target and alert performance outcome of the complete safety performance indicators package may be aggregated for a given monitoring period.

<table>
<thead>
<tr>
<th>SPI</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA Warning</td>
<td>2.5/100 TO</td>
<td>3.5/100 TO</td>
</tr>
<tr>
<td>Unstable Approach</td>
<td>4.5/100 Ldgs</td>
<td>4.1/100 Ldgs</td>
</tr>
<tr>
<td>EGPWS Warning</td>
<td>1/100 TO</td>
<td>2/100 TO</td>
</tr>
<tr>
<td>Missed Checklist Item</td>
<td>8/100 TO</td>
<td>7/100 TO</td>
</tr>
<tr>
<td>Minimum Fuel Situation</td>
<td>.5/100 TO</td>
<td>.67/100 TO</td>
</tr>
<tr>
<td>Extended Duty Day</td>
<td>2/100 TO</td>
<td>1.3/100 TO</td>
</tr>
</tbody>
</table>

Ref: ICAO Doc 9859
How to Use SPI Results

- SPIs are NOT simply metrics used to get a better score
- SPIs are to be utilized to improve safety performance
- Results include collection, analysis, and interpretation of SPIs
- It is important that these results are used by management for decision and action.
- These results should be presented at regular meetings and communicated to everyone in the organization
- Actions should not focus on certain indicators in isolation, but on optimizing your organization’s overall safety performance.
Evaluate SPIs

Periodically review and evaluate your SPIs to consider:

- the value of experience gained,
- new safety issues identified,
- changes in the nature of risk,
- changes in the safety policy, objectives; and priorities,
- changes in applicable regulations, and
- organizational changes, etc.
Measuring Safety Performance

- SPI’s must be meaningful
- SPI’s must relate to the safe operation of aircraft
  - Flight Operations
  - Maintenance
  - Dispatch