



**Cuestión 2 del
Orden del Día:**

**Análisis de los indicadores de performance y métricas asociadas para la
implantación de las mejoras de la eficiencia y capacidad de navegación aérea
y de la seguridad operacional**

SEGURIDAD OPERACIONAL

(Preparado por la Secretaría)

Resumen	
Esta nota de estudio (NE) presenta un análisis de los indicadores de rendimiento y las propuestas de metas y mejoras en las siguientes áreas de seguridad operacional de la Región SAM:	
<ul style="list-style-type: none">✓ vigilancia de la seguridad operacional;✓ accidentes;✓ excursiones e incursiones de pista;✓ certificación de aeródromos; e✓ implementación del programa estatal de seguridad operacional (SSP) y del sistema de gestión de la seguridad operacional (SMS).	
Referencias	
<ul style="list-style-type: none">• Reunión mundial de coordinación (GCM) de los Grupos Regionales de Planificación y Ejecución (PIRG) y los Grupos Regionales de Seguridad Operacional de la Aviación (RASG) (Montreal 19 marzo 2013)• Primera edición de la versión revisada del Plan global para la seguridad operacional de la aviación (GASP) de la OACI (Doc 10004, 2013)• Resolución A38-XX – Planificación mundial OACI para la seguridad operacional y la navegación aérea	
Objetivos estratégicos de la OACI:	<i>A – Seguridad operacional</i>

1. Introducción

1.1 La Reunión mundial de coordinación (GCM) de los Grupos Regionales de Planificación y Ejecución (PIRG) y los Grupos Regionales de Seguridad Operacional de la Aviación (RASG) (Montreal, Canadá, 19 de marzo de 2013), bajo la dirección del presidente del Consejo de la OACI, convino en la necesidad de medir las mejoras en la performance, respaldar el registro regional de performance y determinar un conjunto de indicadores y métricas.

1.2 Teniendo en cuenta los acuerdos que alcanzó la Reunión mundial de coordinación de los PIRG y RASG y el principio de transparencia y uso compartido de la información, la OACI está liderando la creación del *cuadro de performance de seguridad operacional* en las páginas *Web* de cada portal público de sus Oficinas Regionales para la medición del rendimiento de las siguientes áreas de seguridad operacional:

- ✓ vigilancia de la seguridad operacional;
- ✓ accidentes;
- ✓ excursiones e incursiones de pista;
- ✓ certificación de aeródromos; e
- ✓ implementación del Programa estatal de seguridad operacional (SSP) y del sistema de gestión de la seguridad operacional (SMS).

1.3 El *cuadro de performance de seguridad operacional* permitirá a los Estados y a la Región SAM gestionar la seguridad operacional en base a mediciones. El fundamento de este enfoque se basa en los siguientes principios fundamentales:

- ✓ trabajo por resultados; y
- ✓ medir para poder gestionar.

1.4 En este mismo sentido, la Primera edición de la versión revisada del Plan global para la seguridad operacional de la aviación (GASP) de la OACI (Doc 10004, 2013), establece que el *mejoramiento continuo* de la seguridad operacional de la aviación mundial es fundamental para garantizar que el transporte aéreo siga desempeñando una función importante en impulsar el desarrollo económico y social sostenible en todo el mundo.

1.5 Esta versión revisada del GASP también establece los objetivos mundiales de seguridad operacional de la navegación aérea, así como *los hitos y prioridades* específicas que deben considerar los Estados y los planificadores regionales en la mejora de la seguridad operacional de la aviación.

2. Indicadores de rendimiento, metas y mejoras de seguridad operacional

Para la planificación de la seguridad operacional de la Región SAM, se han considerado indicadores de rendimiento, metas y mejoras de seguridad operacional.

3. Plazos para la implantación eficaz de las metas y mejoras de seguridad operacional

3.1 Para la aplicación eficaz de las metas y mejoras de seguridad operacional de la Región SAM se han considerado varios plazos.

4. Análisis de los indicadores de rendimiento y de las propuestas de metas y mejoras de seguridad operacional

4.1 Vigilancia de la seguridad operacional

4.1.1 Los indicadores de rendimiento de esta área han sido definidos en base a los resultados [aplicación eficaz (EI)] obtenidos por cada Estado de la Región SAM en su última actividad del enfoque de la observación continua (CMA) del Programa universal de auditoría de la vigilancia de la seguridad operacional (USOAP) de la OACI, ya sea, en una auditoría según el enfoque sistémico global (CSA) o en una misión de validación coordinada de la OACI (ICVM).

4.1.2 Durante el período 2011-2013, se llevaron a cabo cinco ICVMs a los Estados de Colombia, Ecuador, Surinam, Argentina y Venezuela. Los resultados de estas cinco ICVM permitieron mejorar la aplicación eficaz (EI) de la Región SAM en un **4.37%**. Con este porcentaje de mejora, la Región SAM podría alcanzar una EI de 80% en los próximos 3 años (2014-2016), siempre y cuando reciba por lo menos 4 actividades CMA cada año.

4.1.3 En el *Apéndice A* de esta NE se presenta un análisis de los indicadores y de las propuestas de metas y mejoras de seguridad operacional.

4.2 *Accidentes*

4.2.1 Los indicadores de rendimiento de esta área fueron obtenidos mediante la evaluación de la información disponible en el sitio web de OACI denominado: Ocurrencias – Tabla dinámica sobre estadísticas de accidentes de iSTARS. La información tomada para las muestras está limitada a transporte aéreo comercial regular con aeronaves sobre **2250 kg** y se refiere al **período 2005-2012**.

4.2.2 De la información obtenida de la *tabla arriba mencionada* se pudo apreciar que la Región SAM, desde el año 2005, fue reduciendo gradualmente los accidentes, excepto en el año 2008, en que la tasa de accidentes aumentó bruscamente. También se pudo evidenciar que el índice de accidentes para finales del 2011, a pesar que estuvo por encima del índice mundial, no fue superior al doble de dicho índice y por tanto la Región SAM cumplió el Tercer objetivo del GASP de 2007.

4.2.3 De la misma manera se utilizó la información proporcionada por el Equipo de Seguridad Operacional de la Aviación Comercial (CAST), de la industria de aviación del gobierno de Estados Unidos, que analizó los accidentes ocurridos en la Región SAM durante el período 2002-2012, correspondientes a explotadores LAR 121 o equivalentes. En este estudio, el CAST utilizó un valor del 50% de aplicación de nueve (9) mejoras de la seguridad operacional (SE).

4.2.4 Para establecer las propuestas de metas de rendimiento de esta área, se utilizó el siguiente método:

4.2.4.1 **Método basado en un proceso de análisis de riesgos retrospectivo que utiliza mejoras de seguridad operacional.**- Este método se fundamenta en la información proporcionada por el Equipo de Seguridad Operacional de la Aviación Comercial (CAST) de la industria de aviación del gobierno de los Estados Unidos, que realizó un análisis de riesgos de los accidentes ocurridos en la Región SAM durante el período 2002-2012, en el que aplicó las siguientes nueve (9) mejoras de seguridad operacional (SE) del Grupo Regional de Seguridad Operacional de la Aviación – Pan América (RASG-PA): *RE/04, RE/09, CFIT/02, CFIT/04, LOC-I/06, LOC-I/07, LOC-I/9, RE/8 y RE/11*. Basado en este análisis, el CAST obtuvo el porcentaje de accidentes que pudieron haber sido evitados durante el período 2002-2012 en el evento de haberse aplicado dichas mejoras antes de los accidentes. En base al resultado de este estudio se propone como meta de rendimiento de seguridad operacional una tasa de **3.72** accidentes anuales por cada millón de salidas para el período 2014-2018.

4.2.5 En el *Apéndice B* de esta NE se presenta un análisis de los indicadores y de las propuestas de metas y mejoras de seguridad operacional.

4.3 *Excursiones e incursiones de pista*

4.3.1 Los indicadores de rendimiento de excursiones de pista fueron obtenidos del Sistema de reporte de accidentes e incidentes (ADREP) de la OACI. Esta información está limitada a transporte aéreo comercial regular y no regular con aeronaves sobre **5 700 kg** y corresponde al período 2005-2012.

4.3.2 Al analizar la información se puede observar que durante los años 2007, 2008, 2009 y 2011 hubo un aumento brusco en las tasas de accidentes por excursiones de pista, no obstante, en los años siguientes 2010 y 2012, la tasa se redujo, llegando a cero accidentes en el año 2012.

4.3.3 Para establecer las metas de rendimiento de esta área y las mejoras de seguridad operacional complementarias se tomó en cuenta como indicador de rendimiento de seguridad operacional, la tasa promedio de la Región SAM por excursiones de pista ocurridas en el período 2005-2012, que corresponde a **1.56 accidentes por millón de salidas**. No se establecieron metas y mejoras de seguridad operacional para incursiones de pista en virtud que no se registraron o reportaron accidentes por esta causa en la Región SAM.

4.3.4 Para los próximos tres años (2014-2016), se ha considerado como propuesta de meta de rendimiento de la Región SAM para excursiones de pista, una tasa no mayor al promedio de la Región en el período 2005-2012 que equivale a **1.56**

4.3.5 En el *Apéndice C* de esta NE se presenta un análisis de los indicadores y de las propuestas de metas y mejoras de seguridad operacional para esta categoría de accidentes.

4.4 *Certificación de aeródromos*

4.4.1 Información sobre esta área se presenta en la NE/05.

4.5 *Implantación del SMS/SSP*

4.5.1 Información sobre esta área se presenta en la NE/12.

5. **Acciones sugeridas**

Se invita a la reunión de Directores de seguridad operacional a:

- a) tomar conocimiento de la información presentada en esta nota de estudio y apéndices; y
- b) analizar y comentar sobre:
 - ✓ los indicadores de rendimiento de seguridad operacional; y
 - ✓ las propuestas de metas y mejoras de seguridad operacional.

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Apéndice A

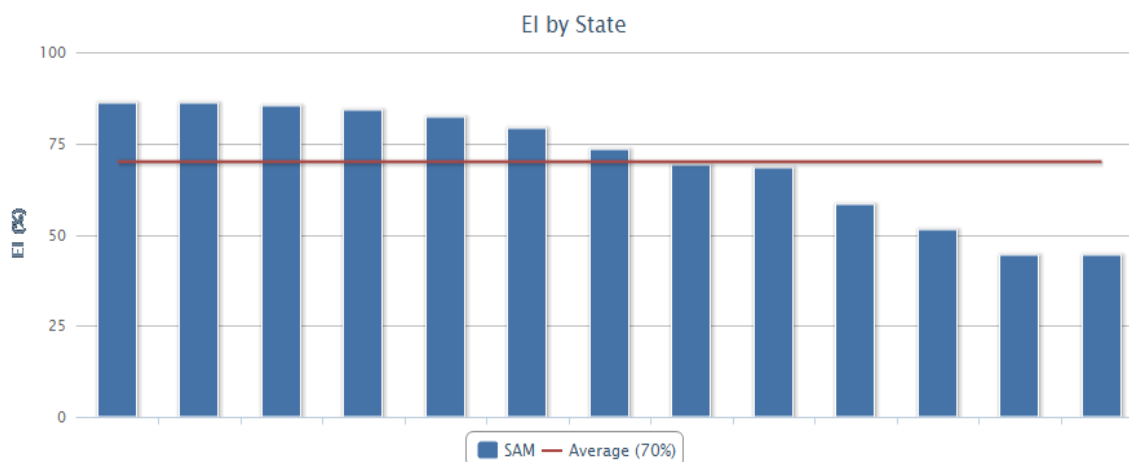
Vigilancia de la seguridad operacional

1. Indicadores de rendimiento de seguridad operacional

1.1 La Región SAM alcanzó una aplicación eficaz (EI) promedio del 70%, una vez que los Estados de Colombia, Ecuador, Surinam, Argentina y Venezuela, recibieron una misión de validación coordinada de la OACI (ICVM) en el período 2011 a 2013.

1.2 De acuerdo con la Tabla A-1 – Aplicación eficaz promedio por Estado, siete (7) Estados (Brasil, Panamá, Argentina, Chile, Venezuela, Colombia y Bolivia) están por encima del promedio de la Región, dos (2) Estados (Perú y Ecuador) están muy cerca de alcanzar el promedio y cuatro (4) Estados (Surinam, Paraguay, Guyana y Uruguay) están por debajo del promedio referido.

Tabla A-1 – Aplicación eficaz (EI) promedio por Estado



1.3 Como resultado de las cinco ICVMs, la aplicación eficaz (EI) promedio de la Región SAM aumentó de 66.31% a **70.68%**, es decir un **4.37%**, lo cual representa un promedio de mejora por Estado de aproximadamente **0.87%**.

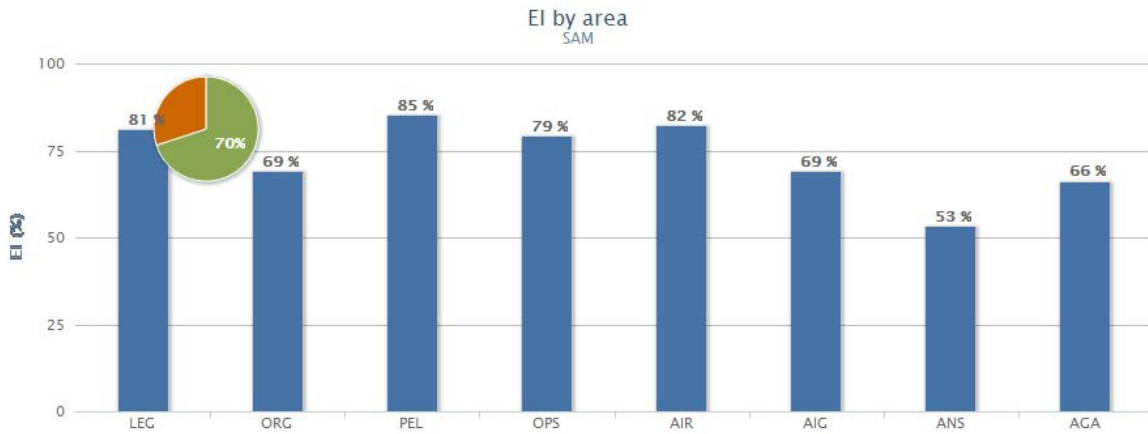
1.4 Después de las ICVM, los Estados SAM mejoraron su EI de la siguiente manera: Argentina mejoró en un **9.1%**, Colombia en un **16%**, Ecuador en un **12.4%**, Surinam en **9.6%** y Venezuela en **10.9%**.

1.5 Para mejorar el promedio de aplicación eficaz (EI) general de la Región SAM, se requeriría que Perú, Ecuador, Surinam, Paraguay, Guyana y Uruguay avancen en la solución de las constataciones dejadas en las últimas actividades del enfoque de observación continua (CMA) del Programa universal de auditoría de la vigilancia de la seguridad operacional (USOAP) de la OACI o en el último ciclo de auditorías según el enfoque sistémico global (CSA). La Oficina Regional continuará apoyando a los Estados con asesoría directa y continua en la preparación de sus CAP para enfrentar las actividades del CMA del USOAP.

1.6 En la Tabla A-2 – Aplicación eficaz (EI) promedio por área de auditoría, se puede observar que las áreas de LEG, PEL, OPS y AIR están por encima del promedio de la Región, ORG y AIG están ligeramente por debajo del promedio y ANS y AGA se encuentran por debajo del promedio.

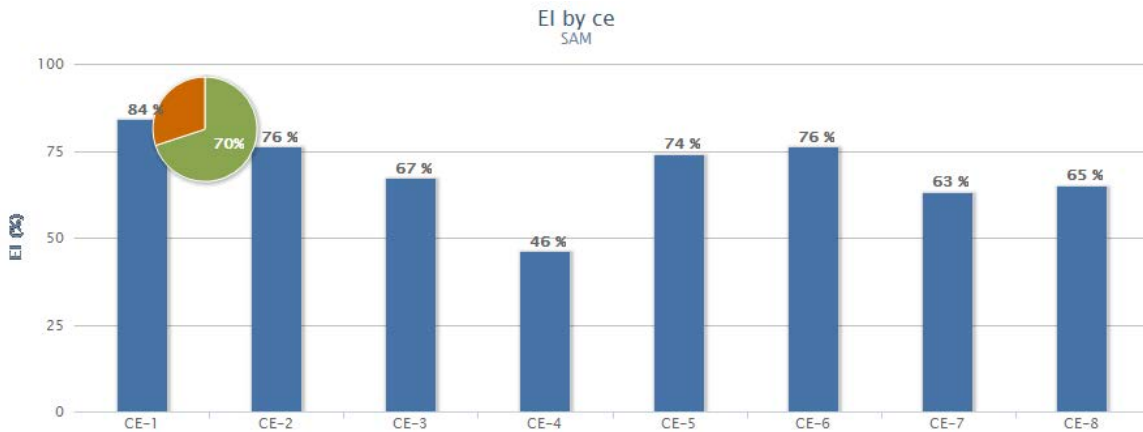
1.7 Para mejorar la aplicación eficaz de la región SAM por áreas de auditoría es necesario poner especial atención en las áreas ANS (53%), AGA (66%), AIG (69%) y ORG (69%) en la mayoría de los Estados.

Tabla A-2 – Aplicación eficaz (EI) promedio por área de auditoría



1.8 En la Tabla A-3 - Aplicación eficaz (EI) promedio por elemento crítico (CE), se puede visualizar que los CE 1, 2, 5 y 6 se encuentran por encima del promedio, mientras que los CE 3, 4, 7 y 8 están por debajo del promedio, siendo el CE-4 - Cualificación e instrucción del personal técnico el que debe ser mejorado en mayor grado. Este CE-4 tiene una EI de 46%.

Tabla A-3 – Aplicación eficaz (EI) promedio por elemento crítico



1.9 Para lograr mejorar el CE-4, los Estados deberían implantar sistemas efectivos de **definición y control de competencias**. La definición de competencias involucra temas como la existencia de un manual de descripción de puestos que incluya el perfil de cada puesto de inspector de seguridad operacional, también para cada tarea que desempeñan los inspectores se necesita establecer los requisitos de **conocimiento, experiencia y habilidades** para que puedan desempeñar de forma efectiva sus tareas. Un inspector de seguridad operacional no debería asignársele ninguna tarea sin supervisión si no se tiene evidencia documentada que muestre su capacidad para desempeñar la tarea, ya sea, de certificación o vigilancia.

2. Propuestas de metas de rendimiento de seguridad operacional

2.1 Las metas de rendimiento traducidas a porcentaje serán parámetros que la Región SAM deberá alcanzar en los siguientes períodos de 3 años:

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Igual o superior a **80%**
- ✓ Mediano plazo (enero 2017- diciembre 2019):
 - La meta de este período será determinada en base al rendimiento del período anterior
- ✓ Largo plazo (enero 2020 – diciembre 2022)
 - La meta de este período será determinada en base al rendimiento del período anterior

3. Propuestas de mejoras de seguridad operacional

3.1 Mejora en la aplicación eficaz (EI) promedio de la Región SAM

3.1.1 La Oficina Regional Sudamericana impulsará la aplicación eficaz (EI) de las SARPs en sus Estados, en especial en aquellos Estados que estén por debajo de las metas establecidas. El objetivo de esta acción es que cada Estado mejore su EI para que la Región SAM pueda alcanzar las metas acordadas por la reunión, por lo que se alienta a los Estados SAM a comprometerse a mantener actualizados y mejorar sus planes de medidas correctivas (CAPs).

3.1.2 Además de la mejora de los CAPs, se propone las siguientes mejoras de seguridad operacional específicas para los Estados SAM y para los Estados del Sistema Regional de Cooperación para la Vigilancia de la Seguridad Operacional (SRVSOP), durante el período de corto plazo (enero 2014 - diciembre 2016):

3.1.3.1 Para los Estados del SRVSOP

- ✓ armonización de las reglamentaciones;
- ✓ armonización del material guía para los inspectores;
- ✓ armonización del material guía para los proveedores de servicios, por ejemplo, circulares de asesoramiento (CA), métodos aceptables de cumplimiento (MAC) y material explicativo e interpretativo (MEI)
- ✓ asistencia a los Estados que lo requieran en las siguientes áreas:
 - capacitación;

- certificación; y
- aprobaciones
- ✓ Implantación eficaz de los siguientes sistemas de vigilancia para explotadores de servicios aéreos:
 - Programa de intercambio de datos de inspecciones de seguridad en rampa (IDISR); y
 - Programa de vigilancia coordinada de mercancías peligrosas (VCMP) (miembros del SRVSOP).

3.1.3.2 Para los Estados que no son del SRVSOP

- ✓ Registro del certificado de explotador de servicios aéreos (AOC)

3.2 Mejora en la aplicación eficaz (EI) por área de auditoría

3.2.1 ANS

- ✓ Corto plazo (enero 2014 - diciembre 2017):
 - Desarrollo de los LAR ANS.
 - Desarrollo de material de orientación LAR ANS.
 - Armonización de la reglamentación ANS entre los Estados SAM.
 - Implantación eficaz de los requisitos y procedimientos ANS.
 - Implantación del SMS en los proveedores ANS.

3.2.2 AGA (Véase NE/05)

3.3 Mejora en la aplicación eficaz (EI) por elemento crítico

3.3.1 CE- 4 - Cualificación e instrucción del personal técnico

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Estandarización de los programas de instrucción de los inspectores de los Estados SAM.
 - Apoyo del SRVSOP con cursos de capacitación para los Estados que lo soliciten.
- ✓ Medio plazo (enero 2017- diciembre 2019):
 - Desarrollo y aplicación eficaz de un sistema de capacitación multinacional con aplicaciones a través de la página Web de la Oficina Regional Sudamericana de la OACI y del SRVSOP.

Apéndice B

Accidentes

1. Indicadores de rendimiento de seguridad operacional

1.1 Los objetivos de la seguridad operacional que la OACI fijó para el período 2008-2011 en la edición del GASP de 2007 fueron los siguientes:

Objetivos 2008-2011	
Primer objetivo	Reducir el número de accidentes mortales y la tasa mundial de mortalidad por causa de los mismos, independientemente del volumen de tráfico aéreo.
Segundo objetivo	Lograr una disminución significativa de los índices de accidentes, particularmente en las regiones donde siguen siendo elevados.
Tercer objetivo	Ninguna región de la OACI tendrá un índice de accidentes* superior al doble del índice mundial para finales de 2011.

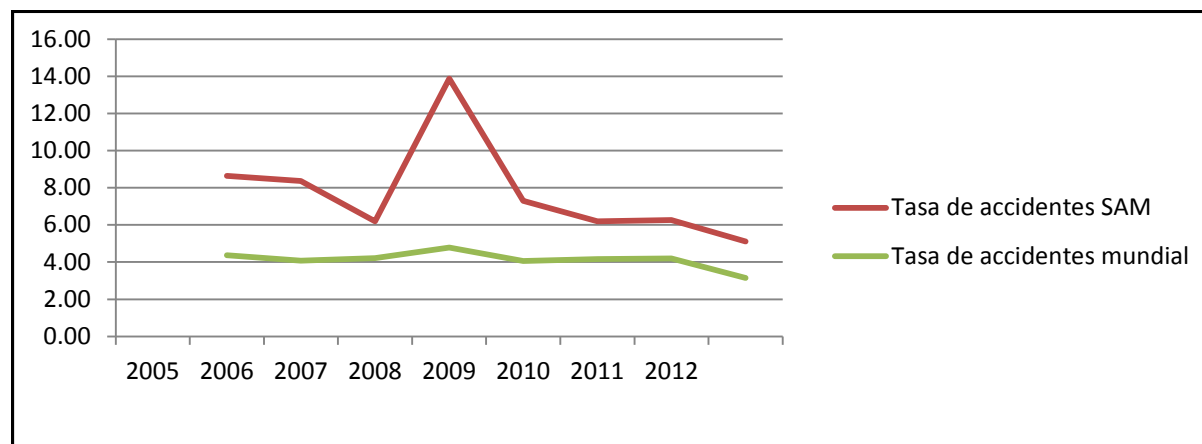
* Basado en un promedio móvil de cinco años

1.2 En las tablas de abajo se puede apreciar que la Región SAM, desde el año 2005, fue reduciendo gradualmente los accidentes, excepto en el año 2008, en que la tasa de accidentes aumentó bruscamente. De acuerdo con el Tercer objetivo del GASP de 2007, el índice de accidentes para finales del 2012, a pesar que estuvo por encima del índice mundial, no fue superior al doble de dicho índice.

Tabla B-1a – Número y tasa de accidentes en la Región SAM

Año	Accidentes no mortales	Accidentes mortales	Accidentes totales	Salidas	Tasa acc. SAM	Tasa acc. mundial	Mortalidad
2005	8	2	10	1,156,272	8.64	4.36	53
2006	6	4	10	1,195,107	8.36	4.07	166
2007	6	2	8	1,289,860	6.20	4.22	202
2008	12	7	19	1,369,691	13.87	4.78	94
2009	11	0	11	1,507,869	7.29	4.05	0
2010	7	4	11	1,777,672	6.18	4.16	29
2011	9	3	12	1,918,423	6.25	4.19	46
2012	9	1	10	1,953,982	5.11	3.15	2
Total	68	23	91	12,168,876	7.74	4.12	592

Tabla B-1b – Proyección de la tasa de accidentes en la Región SAM



1.3 Método para el cálculo de las metas de rendimiento de seguridad operacional.

1.3.1 Método basado en un proceso de análisis de riesgos retrospectivo que utiliza mejoras de seguridad operacional

1.3.1.1 Este método se basa en un proceso de análisis de riesgos retrospectivo que evalúa la efectividad de las mejoras propuestas para cada evento o condición seleccionada. Esto se logra mediante la evaluación de la oportunidad que habría tenido la mejora para prevenir el evento si ésta habría sido aplicada hipotéticamente antes que se produzca ese evento.

1.3.1.2 Al respecto, el Equipo de Seguridad Operacional de la Aviación Comercial (CAST), una asociación de la industria de la aviación del gobierno de los Estados Unidos, dedicada a reducir la tasa de mortalidad de la aviación comercial en su país y en el mundo, llevó a cabo un análisis de riesgos de los accidentes ocurridos en la Región SAM durante el período 2002-2012 (*Véase el Adjunto 1 de este apéndice*), en el que aplicó las siguientes nueve (9) mejoras de seguridad operacional (SE) del Grupo Regional de Seguridad Operacional de la Aviación – Pan América (RASG-PA): *RE/04, RE/09, CFIT/02, CFIT/04, LOC-I/06, LOC-I/07, LOC-I/9, RE/8 y RE/11* (*Véase las mejoras de seguridad operacional del RASG-PA en el Adjunto 2 a este apéndice*).

1.3.1.3 Mediante este análisis y la aplicación de factores de ponderación tanto a los riesgos como a la severidad de los eventos, el CAST determinó que se pudo haber eliminado un **18.9%** del total de los accidentes ocurridos en el período 2002-2012 en la región SAM.

1.3.1.4 Utilizando el dato de 18.9%, es posible determinar el número de accidentes que pudieron haber sido evitados en el período 2002 – 2012 en el evento de haber aplicado las 9 SE, para esto, se aplica el 20% (18.9%) al promedio de 10 (10.7) accidentes ocurridos en los últimos 11 años (2002-2012), obteniéndose un resultado de 2 accidentes menos.

1.3.1.5 En el evento que todos los Estados SAM aplicarían uniformemente las 9 SE, se podría prever una disminución de 2 accidentes de los 10 accidentes promedio actuales, quedando 8 accidentes para el período 2014-2018. Con respecto al número de salidas, se estima que para el año 2016 (año intermedio del período 2014-2018) habrán 2,150.000 salidas en operaciones regulares en base a un crecimiento anual del 3.1%. Con estos datos se obtiene una tasa de **3.72** accidentes anuales por cada millón de salidas [$8 \times 1,000.000 \div 2,150.000 = 3.72$] que sería la meta de rendimiento propuesta hasta el año 2018.

2. Propuestas de metas de rendimiento de seguridad operacional

2.1 En el período 2014-2018, la meta no será mayor a la tasa de:

✓ **3.72** accidentes por un millón de salidas

3. Desglose de los accidentes en la Región SAM

3.1 Accidentes por categoría de riesgos

3.1.1 Un total de **91** accidentes ocurrieron en la Región SAM durante el período 2005-2012 de los cuales, el **49.45%** fue por accidentes relacionados con seguridad operacional de pista (RS); el **13.18%** por falla o malfuncionamiento del sistema/componente (SCF); el **12.08%** por otras causas (OTH); el **6.59%** por cada una de las siguientes categorías: encuentro con turbulencia (TURB), pérdida de control en vuelo (LOC-I) y por causa desconocida o no determinada (UNK); el **5.49%** por impacto contra el suelo sin pérdida de control (CFIT) y el 0% por Incendio/humo (sin

impacto) (F-NI). La Categoría RS agrupa los accidentes por: aeródromo, impacto con pájaros, incursiones de pista, excursiones de pista, contacto no normal con la pista y colisión en tierra.

Tabla B-2a – Accidentes por categorías de riesgos

Año	F-NI	TURB	LOC-I	RS	OTH	CFIT	UNK	SCF	Total
2005	0	0	0	6	2	1	0	1	10
2006	0	0	0	4	2	2	0	2	10
2007	0	1	0	4	2	0	1	0	8
2008	0	0	3	9	1	2	1	3	19
2009	0	3	0	6	2	0	0	0	11
2010	0	0	1	7	0	0	2	1	11
2011	0	0	2	7	0	0	1	2	12
2012	0	2	0	2	2	0	1	3	10
Total	0	6	6	45	11	5	6	12	91
%	0	6.59	6.59	49.45	12.08	5.49	6.59	13.18	

3.2 Accidentes por fase de vuelo

3.2.1 Por fase de vuelo, los accidentes se produjeron en el siguiente orden: en el aterrizaje con **45.97%**, en ruta con **18.39%**, en aproximación con **16.09%**, durante el despegue con **12.64%**, en rodaje con **5.74%** y en aeronave estacionada con **1.14%**.

Tabla B-2b – Accidentes por fase de vuelo

Año	Post imp.	UNK	Maniobra	Estac.	Rodaje	En ruta	Apch	Desp.	Aterr.	Total
2005	0	0	0	0	0	0	1	4	4	9
2006	0	0	0	1	0	4	2	0	2	9
2007	0	0	0	0	0	2	0	2	4	8
2008	0	0	0	0	4	4	5	2	4	19
2009	0	0	0	0	1	2	3	0	4	10
2010	0	0	0	0	0	0	2	0	9	11
2011	0	0	0	0	0	1	1	1	9	12
2012	0	0	0	0	0	3	0	2	4	9
Total	0	0	0	1	5	16	14	11	40	87
%	0	0	0	1.14	5.74	18.39	16.09	12.64	45.97	

4. Principales categorías de accidentes mortales en la Región SAM

4.1 Las siguientes son las tres categorías principales de accidentes mortales durante el período 2002-2011:

- ✓ pérdida de control en vuelo (LOC-I);
- ✓ excursiones de pista (RE); e
- ✓ impacto contra el suelo sin pérdida de control (CFIT).

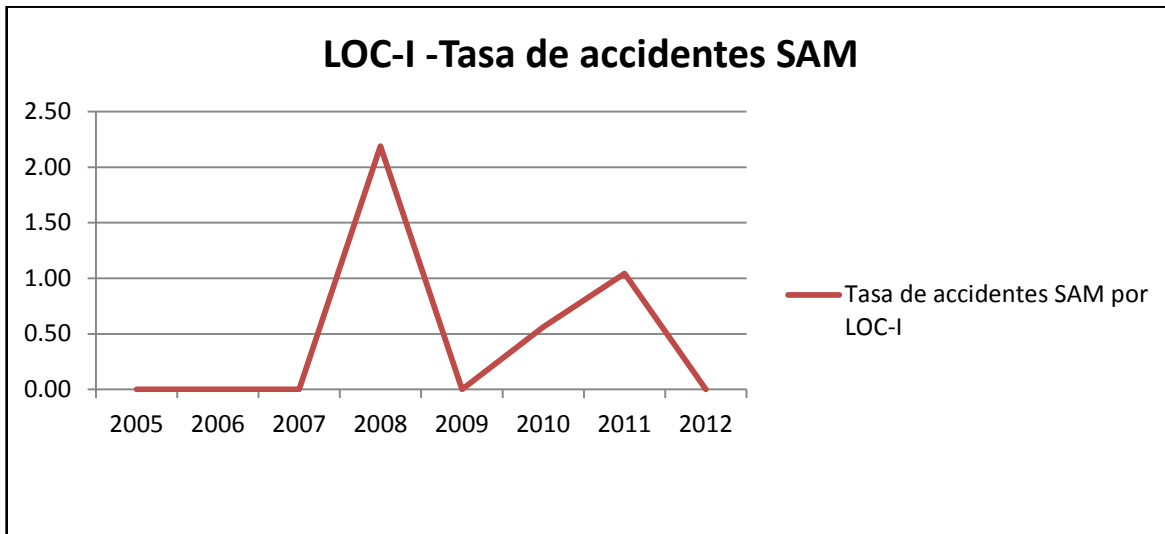
4.2 Pérdida de control en vuelo (LOC-I)

4.2.1 Las tablas de abajo muestran que en la Región SAM se produjeron 4 accidentes debido a pérdida de control en vuelo en un período de 8 años (2005-2012) y que no existe una proyección lineal sino más bien son accidentes aislados. A pesar que estos accidentes son raros, éstos producen la mayor cantidad de mortalidad.

Tabla B-3a – Número y tasa de accidentes por LOC-I

Pérdida de control de vuelo (LOC-I) - Tasa de accidentes en la Región SAM			
Año	Total accidentes	Salidas SAM	Tasa de accidentes SAM
2005		1,156,272	0.00
2006		1,195,107	0.00
2007		1,289,860	0.00
2008	3	1,369,691	2.19
2009		1,507,869	0.00
2010	1	1,777,672	0.56
2011	2	1,918,423	1.04
2012		1,953,982	0.00

Tabla B-3b – Proyección de la tasa de accidentes por LOC-I



4.3 **Excursiones de pista (RE)** (Véase Apéndice C de esta nota de estudio)

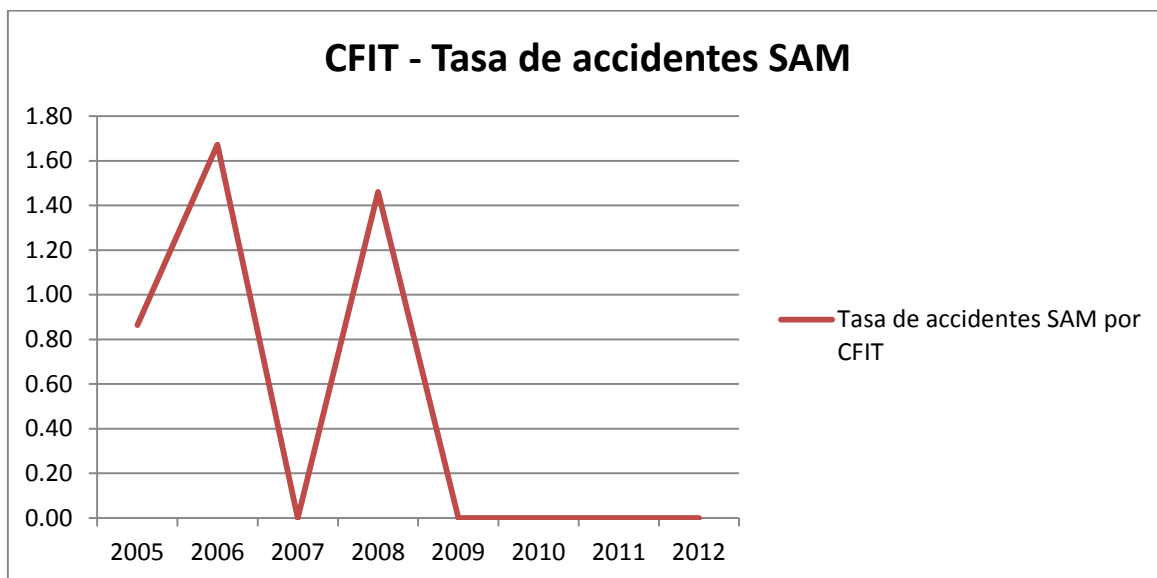
4.4 **Impacto contra el suelo sin pérdida de control (CFIT)**

4.4.1 En las siguientes tablas podemos observar que en la Región SAM se produjeron 5 accidentes debido a CFIT entre los años 2005 a 2008, sin embargo a partir del año 2009 hasta el 2012, no se han producido ningún accidente por esta categoría, por lo que en los actuales momentos no constituye una amenaza a la seguridad operacional, no obstante se recomienda seguir implantando las mejoras de seguridad operacional para que no vuelvan a ocurrir accidentes por esta causa.

Tabla B-4a – Número y tasa de accidentes por CFIT

Impacto contra el suelo sin pérdida de control (CFIT)			
Tasa de accidentes en la Región SAM			
Año	Total accidentes	Salidas SAM	Tasa de accidentes SAM
2005	1	1,156,272	0.86
2006	2	1,195,107	1.67
2007	0	1,289,860	0.00
2008	2	1,369,691	1.46
2009	0	1,507,869	0.00
2010	0	1,777,672	0.00
2011	0	1,918,423	0.00
2012	0	1,953,982	0.00

Tabla B-4b – Proyección de la tasa de accidentes por CFIT



5. Propuestas de mejoras de seguridad operacional

5.1 Para las siguientes tres categorías de accidentes mortales: pérdida de control en vuelo (LOC-I), excursiones de pista (RE) e impacto contra el suelo sin pérdida de control (CFIT), se proponen las mejoras de seguridad operacional que se detallan a continuación:

5.1.1 Pérdida de control en vuelo (LOC-I)

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Implantación eficaz en todos los Estados SAM de los requisitos relativos a la instrucción para la prevención y recuperación del control de la aeronave (UPRT). Estos requisitos permitirán mitigar los sucesos relacionados con la pérdida de control de la aeronave. Se prevé que las propuestas de enmienda del Anexo 1, Anexo 6, Parte I, y los PANS-TRG se apliquen a partir del 13 de noviembre de 2014. Se prevé también que los requisitos UPRT de los Reglamentos Aeronáuticos Latinoamericanos (LAR) se apliquen a partir de la misma fecha.
 - Implantación eficaz de sistemas reactivos y proactivos de recopilación de datos, identificación de peligros y gestión de los riesgos relacionados con LOC-I.
 - Implantación eficaz del programa de cualificación avanzada (AQP) o de la instrucción basada en la evidencia (EBT) de OACI (escenarios de pérdida de control en vuelo).
- ✓ Medio plazo (enero 2017- diciembre 2019):
 - Implantación eficaz de sistemas predictivos de recopilación de datos, identificación de peligros y gestión de los riesgos relacionados con LOC-I.
- ✓ Largo plazo (enero 2020 – diciembre 2022)
 - Implantación de un sistema avanzado de supervisión que incluya los procesos reactivo, proactivo y predictivo orientados a LOC-I.

5.1.2 **Excursiones de pista (RE).**- Los indicadores y metas de rendimiento de esta categoría de accidentes mortales, así como sus mejoras de seguridad operacional se detallan en el Apéndice C de esta NE.

5.1.3 **Impacto contra el suelo sin pérdida de control (CFIT)**

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Continuar con la implantación eficaz en todos los Estados SAM de la ayuda de instrucción CFIT que contiene el conjunto de material didáctico (tool kit) ALAR de la Fundación para la seguridad operacional de los vuelos (FSF).
 - Implantación eficaz de sistemas reactivos y proactivos de recopilación de datos, identificación de peligros y gestión de los riesgos relacionados con CFIT.
 - Implantación eficaz del programa de cualificación avanzada (AQP) o de la instrucción basada en la evidencia (EBT) de OACI (escenarios CFIT).
- ✓ Medio plazo (enero 2017- diciembre 2019):
 - Implantación eficaz de sistemas predictivos de recopilación de datos, identificación de peligros y gestión de los riesgos relacionados con CFIT.
- ✓ Largo plazo (enero 2020 – diciembre 2022)
 - Implantación de un sistema avanzado de supervisión que incluya los procesos reactivo, proactivo y predictivo orientados al CFIT.

5.2 **Mejoras de seguridad operacional del RASG-PA**

5.2.1 Las mejoras de seguridad operacional del RASG-PA se encuentran en el Adjunto 2 de este apéndice.

6. Otras categorías a tener en cuenta para la planificación de las metas y mejoras de seguridad operacional

6.1 De acuerdo con la *Tabla B-2a – Accidentes por categoría de riesgos*, se debe prestar atención a las siguientes categorías para la planificación de la seguridad operacional en virtud que tienen una tasa igual o más alta que las categorías de LOC-I y CFIT:

- ✓ falla o malfuncionamiento del sistema/componente (SCF) (13.18%);
- ✓ otras causas (OTH) (12.08%);
- ✓ encuentro con turbulencia (TURB) (6.59%) y
- ✓ causa desconocida o no determinada (UNK) (6.59%).

CAST Spreadsheet Tool

Panamanian and South American Operator Accidents

RASG-PA Safety Enhancements

RE/04, RE/09, CFIT/02, CFIT/04, LOC-I/06, LOC-I/07, LOC-I/9, RE/8, RE/11

Accident Set Used For Evaluation

2002-2012 Hull Loss and Fatal Accidents (46) - (Panamanian and South American Domicile Operators With Operations Similar to Part 121)

Notes:

Preliminary Assessment (SE Effectiveness Values) performed by FAA AVP-200;

A Preliminary SE Implementation Value of 50% was used for all 9 SEs
(Portion of Fleet or Risk Population with SE Implemented)

Date	Airplane	Jet/Turbo Prop	Airline	Location	Portion of Event Eliminated	Safety Enhancement								
						RE/04	RE/09	CFIT/02	CFIT/04	LOC-I/06	LOC-I/07	LOC-I/9	RE/8	RE/11
						Implementation Value				Implementation Value				
						.500	.500	.500	.500	.500	.500	.500	.500	.500
Safety Enhancement Effectiveness (%/100)						Safety Enhancement Effectiveness (%/100)								
1/28/2002	B727-100	Jet	TAME	(near) Ipiales	.420	.150	.100	.375	.150	.050	.000	.200	.000	.000
3/18/2002	B727	Jet	VARIG	Belo Horizonte, BR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
6/14/2002	DC-9	Jet	Inter (Colombia)	Neiva, CO	.487	.300	.300	.000	.200	.250	.150	.050	.000	.000
8/30/2002	Fokker 100	Jet	TAM Linhas Aereas	Birigui, BR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
8/30/2002	EMB-120 Brasilia	TP-Small	RICO Linhas Aereas	(near) Rio Branco,	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
9/14/2002	ATR 42	TP-Large	Total Linhas Aereas	(near) Paranapané	.220	.000	.050	.000	.000	.000	.400	.000	.000	.000
1/9/2003	Fokker F.28	Jet	TANS	(near) Chachapoyá	.462	.300	.100	.150	.400	.000	.000	.200	.000	.000
1/26/2003	B737 (JT8D)	Jet	VASP	Rio Branco, BR	.306	.000	.050	.150	.000	.200	.200	.100	.000	.000
10/20/2003	Fokker F.27	TP-Large	TAVAJ	Tarauaca, BR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
10/26/2003	Fairchild FH-227	TP-Large	CATA Linea Aerea SA	(near) Buenos Aires	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
12/13/2003	B737 (JT8D)	Jet	Nuevo Continente	Lima, PE	.522	.500	.300	.000	.000	.000	.000	.500	.000	.000
12/18/2003	DC-9	Jet	Lineas Aereas Suram	(near) Mtu, CO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5/14/2004	EMB-120	TP-Small	RICO Linhas Aereas	(near) Manaus, BR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
10/23/2004	B707	Jet	Beta Cargo	Manaus, BR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
11/18/2004	Jetstream 31	TP-Small	Venezolana	Caracas, VE	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1/8/2005	MD-80	Jet	AeroRepublica Colomb	Cali, CO	.469	.500	.200	.000	.300	.100	.000	.050	.000	.000
2/22/2005	Convair 580	TP-Large	TAM - Transporte Aer	Trinidad, BO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
4/7/2005	Fokker F.28	Jet	ICARO Air	Coca, EC	.213	.300	.000	.000	.000	.000	.000	.050	.100	.000
8/16/2005	MD-80	Jet	West Caribbean Airw	(near) Machiques,	.536	.000	.000	.000	.050	.300	.600	.400	.000	.000
8/23/2005	B737 (JT8D)	Jet	TANS	(near) Pucallpa, PE	.563	.500	.100	.150	.400	.000	.300	.050	.000	.000
4/16/2006	Fokker F.27	TP-Large	TAM - Transporte Aer	Guayaramerín, BO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
6/1/2006	Jetstream 31	TP-Small	Air Panama	Bocas de Toro, PA	.166	.200	.000	.000	.000	.000	.000	.050	.100	.000
8/17/2006	B727	Jet	Aerosucre Colombia	Bogota, CO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
9/29/2006	B737 (NG)	Jet	GOL Linhas Aereas	(near) Peixote Aze	.145	.000	.000	.000	.100	.000	.000	.200	.000	.000
11/17/2006	DC-10	Jet	Cielos Airlines	Barranquilla, CO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
11/18/2006	B727	Jet	Aerosucre Colombia	(near) Leticia, CO	.541	.400	.100	.150	.550	.000	.000	.200	.000	.000
2/4/2007	DC-8-71F	Jet	Tampa Cargo	MIAMI	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
7/17/2007	Airbus A320	Jet	TAM Linhas Aereas	Sao Paulo, BR	.248	.200	.000	.000	.100	.100	.000	.050	.100	.000
7/17/2007	EMB 190	Jet	AeroRepublica Colomb	Santa Marta, CO	.707	.500	.125	.150	.400	.500	.000	.500	.000	.000
10/31/2007	Fokker F.27	TP-Large	Air Panama	Panama City, PA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1/28/2008	Dash 8-200	TP-Large	Aires Colombia	Bogota, CO	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2/1/2008	B727-200	Jet	LAB	Near Trinidad	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2/21/2008	ATR-42-300	TP-Large	Santa Barbara Airlines	(near) Merida, VE	.575	.050	.000	.400	.500	.200	.300	.100	.000	.000
7/23/2008	F.27-400	TP-Large	TAM - Transporte Aer	70nm from Guayara	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
9/22/2008	F-28-4000	Jet	ICARO	QUITO	.231	.200	.000	.000	.200	.000	.000	.000	.100	.000
10/16/2008	B737-200	Jet	Rutaca	CARACAS	.188	.200	.000	.000	.100	.000	.000	.000	.100	.000
5/17/2009	DHC-6-300	TP-Small	Aeroperlas	Carti, PA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5/5/2010	ERJ-145LR	Jet	SATENA	Mtu-Fabio, Colomb	.373	.500	.100	.000	.100	.100	.000	.050	.000	.000
8/16/2010	B737-73V (WL)	Jet	AIRES Colombia	San Andres, Colomb	.375	.500	.100	.000	.200	.000	.000	.050	.000	.000
9/13/2010	ATR-42-320	TP-Large	Conviasa	Puerto Ordaz, Vene	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1/25/2010	Embraer 110C Ban	TP-Small	Piquiatuba Táxi Aéreo	near Senador José	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5/18/2011	SF34A (26)	TP-Large	SOL Lineas Aéreas	Prahuaniyeu, Arge	.123	.000	.000	.000	.200	.000	.050	.000	.000	.000
9/6/2011	SA-227BC Metro III	TP-Small	Aerocon	Trinidad, Bolivia	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
9/16/2011	EMB 190(5)	Jet	TAME	Quito, Ecuador	.390	.500	.100	.150	.000	.000	.000	.050	.100	.000
9/26/2011	DC-9(35)	Jet	Aerpostal	Puerto Ordaz, Vene	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
8/24/2012	Boeing (McDonnell	Jet	Aserca Airlines	Mayor Buenaventu	.451	.500	.100	.150	.200	.100	.000	.050	.000	.000

										1	2	3	4	5	6	7	8	9
Category Definition	Number of Events by Category	Sum total of severity by category	% Severity by category	% Events by category	% of Category Severity Eliminated	Total Events Eliminated by Category	Total Severity Eliminated by Category	% Total Fatality Risk Eliminated	% Total Events Eliminated	Safety Enhancement								
										RE/04	RE/09	CFIT/02	CFIT/04	LOC-I/06	LOC-I/07	LOC-I/9	RE/8	RE/11
										Implementation Value								
										Severity eliminated by SE								
CFIT	8.00	6.06	42.1%	17.4%	36.8%	2.87	2.23	15.5%	6.2%	0.55	0.17	0.57	0.88	0.13	0.21	0.36	0.00	0.00
LOC-I	6.00	5.33	37.1%	13.0%	16.5%	0.88	0.88	6.1%	1.9%	0.00	0.03	0.00	0.13	0.15	0.53	0.20	0.00	0.00
RE-Landin	13.00	1.22	8.5%	28.3%	20.3%	3.01	0.25	1.7%	6.5%	0.10	0.00	0.00	0.05	0.05	0.00	0.03	0.05	0.00
SCF-PP	2.00	0.03	0.2%	4.3%	0.0%	0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCF-NP	5.00	0.00	0.0%	10.9%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Midair	1.00	1.00	7.0%	2.2%	14.5%	0.15	0.15	1.0%	0.3%	0.00	0.00	0.00	0.05	0.00	0.00	0.10	0.00	0.00
FUEL	2.00	0.00	0.0%	4.3%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE-Takeof	2.00	0.00	0.0%	4.3%		0.23	0.00	0.0%	0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNK	1.00	0.52	3.6%	2.2%	0.0%	0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WSTRW	0.00	0.00	0.0%	0.0%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USOS	3.00	0.22	1.5%	6.5%	2.7%	0.59	0.01	0.0%	1.3%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ADRM	0.00	0.00	0.0%	0.0%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ARC	3.00	0.00	0.0%	6.5%		0.99	0.00	0.0%	2.2%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIRE-NI	0.00	0.00	0.0%	0.0%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ramp	0.00	0.00	0.0%	0.0%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.0%	0.0%		0.00	0.00	0.0%	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	46	14.39				8.7	3.5	24.4%	18.9%	.7	.2	.6	1.1	.3	.7	.7	.1	.0

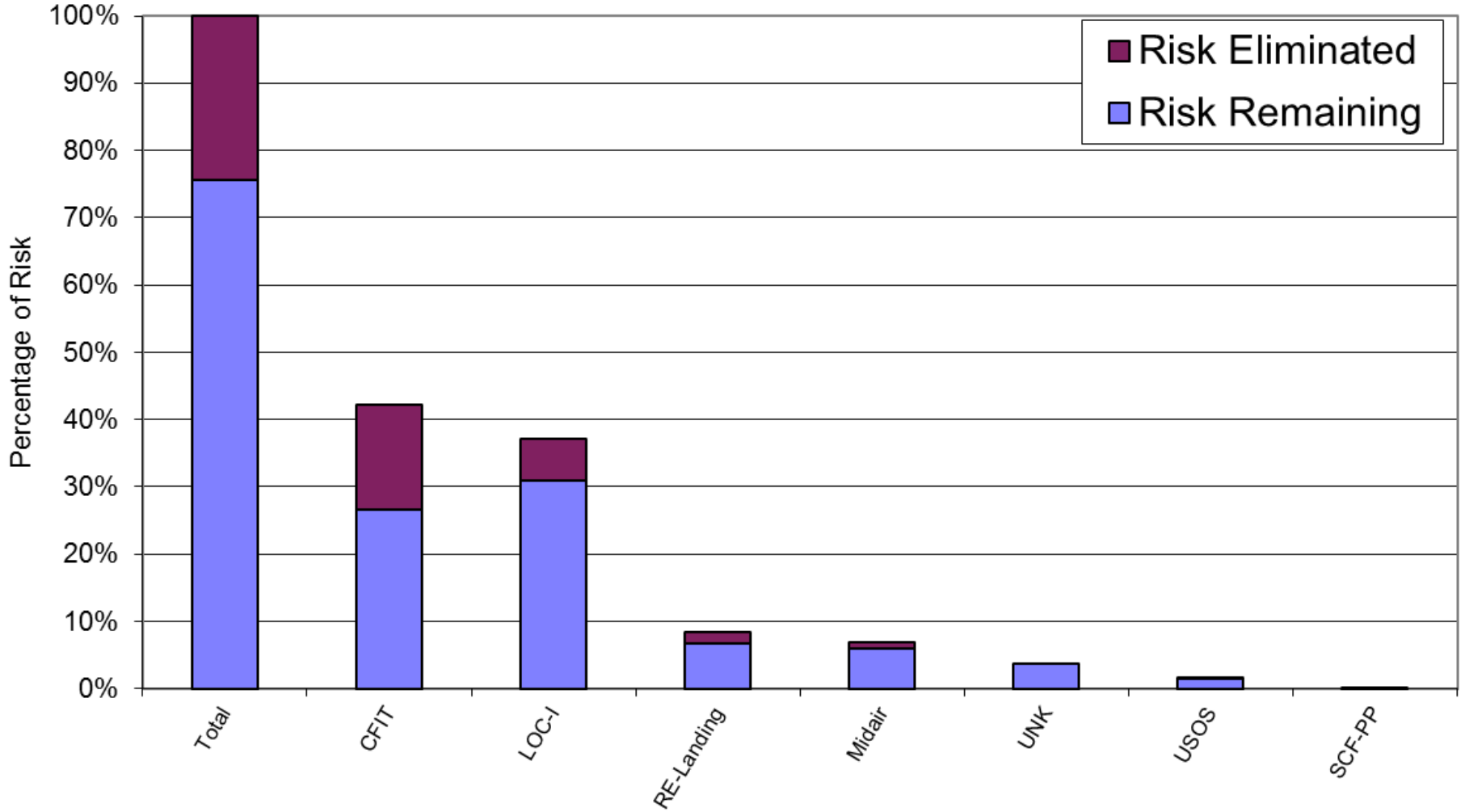
Events Total Severity

JIMDAT Score (Percentage of Risk and Accidents Eliminated by SE Acting on its Own)

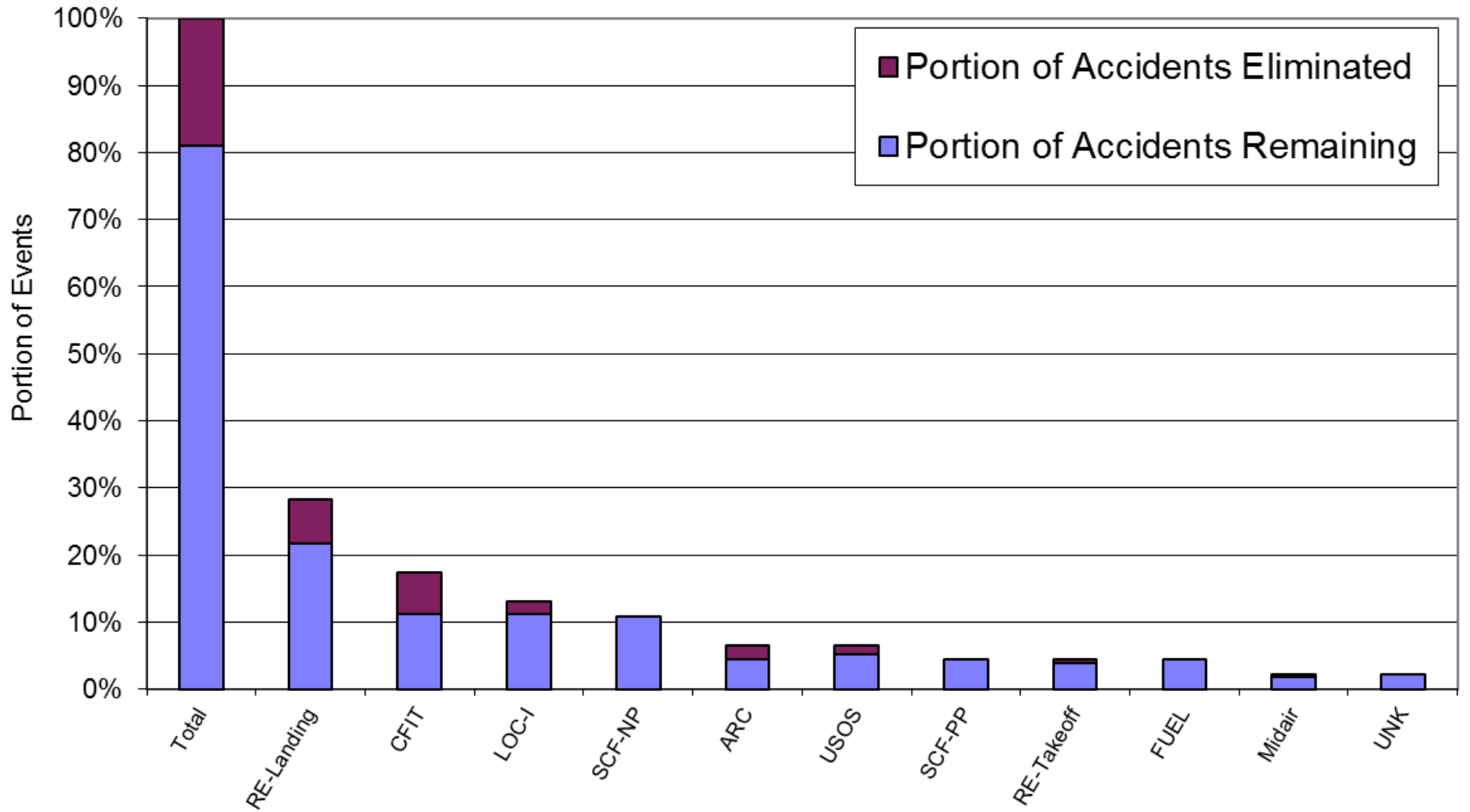
Color Coding	
	Data Entry Field
	Linked Field
	Calculation/Output Field
	Calculation/Output Field
	Summary Output

										1	2	3	4	5	6	7	8	9
										RE/04	RE/09	CFIT/02	CFIT/04	LOC-I/06	LOC-I/07	LOC-I/9	RE/8	RE/11
% Fatality Risk Eliminated									24.4%	4.6%	1.4%	3.9%	7.7%	2.3%	5.1%	4.8%	0.3%	0.0%
% Total Event Eliminated									18.9%	6.8%	2.0%	2.0%	4.5%	2.1%	2.2%	3.2%	0.7%	0.0%

Portion of Fatality Risk Mitigated by Proposed Safety Enhancements

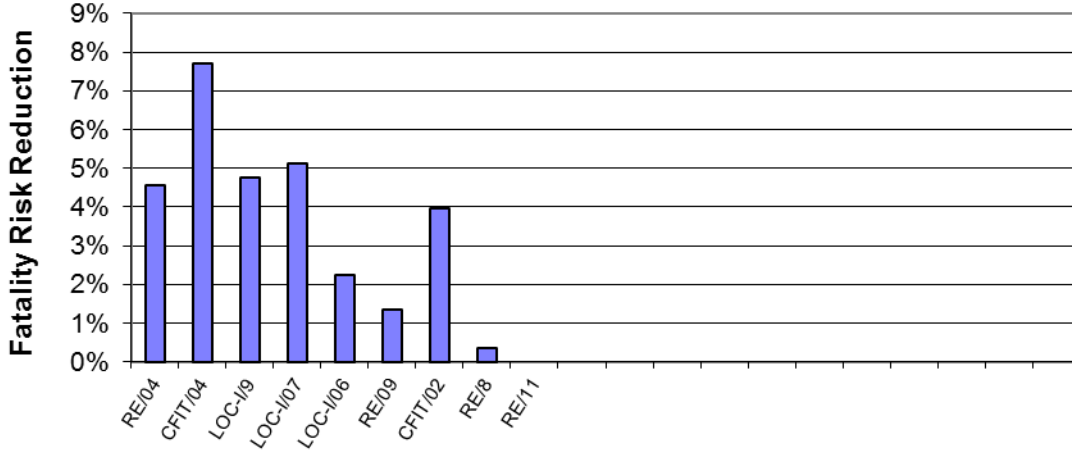


Portion of Accidents Mitigated by Proposed Safety Enhancements

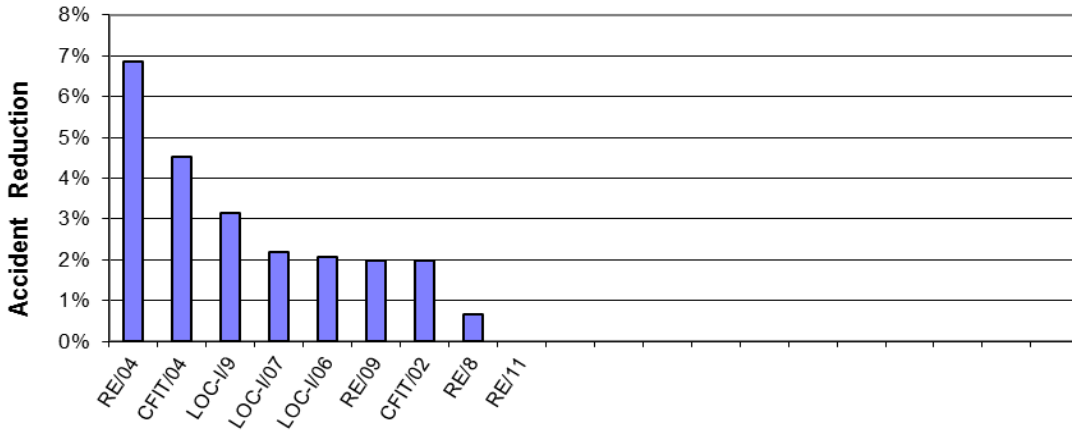


Assumes Each Safety Enhancement is Acting on Its Own

Percentage of the Fatality Risk Eliminated by the Proposed Enhancements



Percentage of the Accidents Eliminated by the Proposed Enhancements



Unmitigated Fatality Risk From High to Low

Category	Date	Airplane	Jet/Turbo Prop	Airline	Location	Remaining Severity
LOC-I	10/26/2003	Fairchild FH-227	TP-Large	CATA Linea Aerea SA	(near) Buenos Aires, AR	1.000
LOC-I	12/18/2003	DC-9	Jet	Lineas Aereas Surame	(near) Mitu, CO	1.000
CFIT	9/6/2011	SA-227BC Metro	TP-Small	Aerocon	Trinidad, Bolivia	0.889
LOC-I	5/18/2011	SF34A (26)	TP-Large	SOL Líneas Aéreas	Prahuanियeu, Argentina	0.878
MIDAIR	9/29/2006	B737 (NG)	Jet	GOL Linhas Aereas	(near) Peixote Azevedo, BR	0.855
LOC-I	9/14/2002	ATR 42	TP-Large	Total Linhas Aereas	(near) Paranapanema, BR	0.780
CFIT	8/30/2002	EMB-120 Brasilia	TP-Small	RICO Linhas Aereas	(near) Rio Branco, BR	0.767
RE-Landin	7/17/2007	Airbus A320	Jet	TAM Linhas Aereas	Sao Paulo, BR	0.752
CFIT	1/28/2002	B727-100	Jet	TAME	(near) Ipiales	0.580
CFIT	1/9/2003	Fokker F.28	Jet	TANS	(near) Chachapoyas, PE	0.538
UNK	5/14/2004	EMB-120	TP-Small	RICO Linhas Aereas	(near) Manaus, BR	0.524
LOC-I	8/16/2005	MD-80	Jet	West Caribbean Airway	(near) Machiques, VE	0.464
CFIT	11/18/2006	B727	Jet	Aerosucre Colombia	(near) Leticia, CO	0.459
CFIT	2/21/2008	ATR-42-300	TP-Large	Santa Barbara Airlines	(near) Merida, VE	0.425
LOC-I	9/13/2010	ATR-42-320	TP-Large	Conviasa	Puerto Ordaz, Venezuela	0.333
USOS	1/25/2010	Embraer 110C Ba	TP-Small	Piquiatuba Táxi Aéreo	near Senador José Porfirio, Bra	0.200
RE-Landin	11/18/2004	Jetstream 31	TP-Small	Venezolana	Caracas, VE	0.190
CFIT	8/23/2005	B737 (JT8D)	Jet	TANS	(near) Pucallpa, PE	0.178
RE-Landin	4/16/2006	Fokker F.27	TP-Large	TAM - Transporte Aere	Guayaramerin, BO	0.032
SCF-PP	7/23/2008	F.27-400	TP-Large	TAM - Transporte Aere	70nm from Guayaramerin, BO	0.028
USOS	8/16/2010	B737-73V (WL)	Jet	AIRES Colombia	San Andres, Colombia	0.010

ATTACHMENT 2 TO APPENDIX B / ADJUNTO 2 AL APENDICE B

	A	B	C	D	E	F	G	H
26	7	LOC-I/9	Loc Training - Pilot monitoring policies and procedure for the operator and training program for crews	IFALPA	1) Listing of training materials available from industry, operators and other resources.	20/02/11	Completed	
27					2) Raise awareness of availability and need of Pilot Monitoring Training.	20/03/11	Completed	
28					3) Pilot Monitoring Training material provided to all operators.	20/03/11	Completed	
29					4) Pilot Monitoring Training provided by operators to all their pilots.	20/09/12	Completed	
30	8	RE/8	Guidance in maintaining runway in accordance with Annex 14	ACI-LAC	1) Create a guide that collects best practices for runway maintenance	18/04/12	Completed	
32					2) Promote and encourage the use of the guide		In process	ESC requested ACI-LAC to provide enhanced Manual for approval and dissemination.
33					3) Airports implement their maintenance plans according to the runway maintenance guide.		In process	
34	9	RE/11	Develop guidance material and training programs to create action plans for runway safety teams	DGAC Mexico	1) Gather and publish in the RASG-PA website available material that may be used in to mitigate hazards related to runway safety.		Completed	
35					2) Electronic checklist development.		In process	Updated: 6 December 2012. Mexico DGAC is developing the Toolkit to be presented to the PA-RAST for approval. Considering that the electronic checklist will be part of the Toolkit they requested that Output 2 be removed from the DIP.
36					3) Establishment of a regional Runway Safety Database.	25/02/12	In process	Updated: 6 December 2012. Mexico DGAC considered that the Output 3 would not be feasible and request to be removed from the DIP.
37								To be reviewed with the Champion
38					4) Develop a roll out plan.	25/08/12	In process	Updated: 6 December 2012. Mexico DGAC considered that the Output 4 must be coordinated with PA-RAST due to the need of resources for delivering the workshops.
39					X) Launch of the RST Toolkit			Updated: 6 December 2012. Mexico DGAC suggested to include the new Output X for launching the Toolkit
40					5) Review and update of the Runway Safety Teams.		In process	Updated: 6 December 2012. Mexico DGAC considered that the Output 5 is monitored by the ICAO NACC and SAM and RASG-PA, and the material is updated by ICAO HQ. Therefore, they requested to be removed from the DIP.
41								
42								
43								

GSI #	Description	Champion	Output	Deadline	Status	Comments
3	Protection of Safety Information	COCESNA				
12	Sharing of Information Safety Data	RASG-PA	ASIAS/RASG-PA data sharing			
		IATA/ALTA	IATA/ALTA Trend Sharing Program			
		DGAC CR	PASO			
		ANAC	BRAZIL			
4	Accident/Incident Regional Board	COCESNA				
	Business case for thechnology to mitigate runway excursions	ICAO LIM				
	Spanish Standard Phraseology	ALTA				Using PANS-ATM (DOC 4444) Chapter 12
	Bird Strike Risk Reduction Program	IATA/ALTA	PTY	Aug-13	To start Jun 2012	Biologist apointed, gathering pre-assessment requierements
GYE			Aug-13	To start Jun 2012		

ESC Approved Detailed Implementation Plans (DIPs)

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/RE/04	Promote pilot adherence to Standard Operating Procedures (SOPs) for approach procedures including go-around decision making process.		9	High	Easy	P1	1	Short
Safety Enhancement Action (expanded):	Promoting pilot adherence to Standard Operating Procedures (SOPs) which would include stabilized approach criteria and go/no go take-off decision making procedures is key to preventing and reducing the risk of runway excursions. Reviewing existing operational policies, procedures and programs is also part of an overall strategy in mitigating runway excursion risk.							
Statement of Work:	Runway Excursion has been identified as the highest safety risk area in Pan America. In order to proactively reduce this risk, RASG-PA chartered the Regional Aviation Safety Team (RAST) to review runway excursion information and develop mitigation strategies to reduce this risk.							
Champion Organization:	ALTA							
Human Resource:	ICAO (NACC, SAM, HQ), IATA, ALTA, ACSA, FSF, CANSO, aircraft manufacturers, ALPA, IFALPA, IFATCA, CAA's, and other stakeholders.							
Financial Resource:	10000							
Relation Current Aviation Community Initiative:	IATA Runway Excursion Risk Reduction toolkit/FSF: ALAR toolkit (version June 2010) Colegio de Pilotos Aviadores de México: Aeronautical Decision Management Training							
Performance Goal Indicators:	<p>Goal 1: target audience(s): Latin America and Caribbean, will value the information provided</p> <p>(1) Objective: educate the target audience(s)</p> <p>(2) Indicator: to reach 80% of the airlines pilots in the Region</p> <p>(3) Indicator: to reach 80% of other stakeholders as determined by the research.</p> <p>Goal 2: increase the awareness on runway excursions</p> <p>(1) Objective: reduce the number of events</p> <p>(2) Indicator: reduction of 80% of the events in the region</p>							
Key Milestones:	<ul style="list-style-type: none"> • Authorization by IATA to upload copyright material from RERR Toolkit in RASG-PA website: pending • Release of State letters from RASG-PA Secretariat recommending establishment of SOPs: SCA+02 • RAST – PA Report from metrics regarding RE/04: Upon completion of Output 2 +03 							
Potential Blockers:	<p>a)Strategic Challenges</p> <p>i)Incorporate new audience in addition to airline's pilots</p> <p>ii)Distribution of training material to airlines</p> <p>iii)Distribution of training material to non-airline pilots</p> <p>iv)Establish and maintain communication with the Pan American pilots and other stakeholders</p> <p>v)Operators to include recommendations into their Manual of Operations</p> <p>vi)Operators to include recommendations into their training programmes</p> <p>vii)Get feedback</p> <p>viii)Metrics to determine penetration of this programme</p>							
DIP Notes:	<p>1. Research to determine the target audience(s) Determine the specific groups of pilots to be reached in order to achieve our objective Determine other stakeholders that would benefit.</p> <p>2. Communication and distribution options: Letter from RASG-PA Secretary to recommend that all operators establish SOP's that include stabilized approach criteria for pilots and a no fault go-around policy for unstable approaches, mentioning the FSF/IATA Runway Excursion Risk Reduction Tool Kit. Letter from RASG-PA Secretary to States recommending that all operators establish SOP's that include stabilized approach criteria for pilots and a no fault go-around policy for unstable approaches, mentioning the FSF/IATA Runway Excursion Risk Reduction Tool Kit.</p> <p>3. Press releases from ALTA, IATA, IFALPA. 4. RASG-PA website news release, uploading of training material and E-mails to target audience</p> <p><i>Keep in mind that there is no contradiction with the pressure for pilots in the subsequent flight analysis.</i></p>							

RAST-PA/RE/04 Output 1

Description: Distribution

Resources:

.....

Resource Notes: Cost of the material and distribution to the operators.

Time Line: SCA+ 5 months

Actions: 1. RAST/RE recommends that all operators establish SOP's that include stabilized approach criteria for pilots and a no fault go-around policy for unstable approaches. 2. In coordination with FSF and IATA, RAST/RE should develop an awareness campaign to promote the adherence to SOP's for approach procedures including the go-around decision making process. The campaign will distribute the FSF/IATA Runway Excursion Risk Reduction Tool Kit, the Colegio de Pilotos Aviadores de Mexico Aeronautical Decision Management training, and any other available material. 3. Time to train trainers

Target Completion Date: 12

RAST-PA/RE/04 Output 2

Description: Training

Resources:

Resource Notes: Variable costs depending on the operator.

Time Line: SCA+ 15 months

Actions: Operators to include material in training programs.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/RE/08	Guidance in maintaining runway in accordance with Annex 14 (put this point next to 6)	Annex 14, Doc 9137 ICAO	1	High	Easy	P1	3	Short

Safety Enhancement Action (expanded): To reduce runway condition/maintenance related accidents and incidents at airports by following a runway maintenance guide in accordance with ICAO Annex 14.

Statement of Work: Establish a team who will compile and develop, if necessary, runway maintenance guidance for airports in the Panamerican region.

Champion Organization: ACI-LAC

Human Resource: CAAs, ICAO, ACI, IATA, ALACPA, Airport Operators, Maintenance staff and providers.

Financial Resource: To be determined, in-kind support to develop the guidance material.

Relation Current Aviation Community Initiative: ACI Airside Safety Handbook
Annex 14
ICAO Doc 9137 Airport Services Manual Par 2 – Pavement Surface Conditions
ICAO Doc 9157 Part 4 Visual Aids
Runway excursion risk reduction toolkit

Performance Goal Indicators:

Goal 1: Create a guide that collects best practices for runway maintenance.
Indicator: Online availability of the guide.

Goal 2: Promote and encourage the use of the guide.
Indicator: RASG-PA promotion of the guide.

Goal 3: airports implement their maintenance plans according to this guide.
Indicator: A measurable amount of airports that incorporate the use of the guide into their action plans.

Goal 4: Reduce the occurrence of runway condition related incidents and accidents.
Indicator: A measurable and continued reduction in runway condition related incidents and accidents.

Key Milestones:

DIPESC X	Approval
Output 1 The guide	ESC X Date + 6
Output 2 Promote	Output 1 + 12
Output 3 Implementation of the guide	Output 1 + 18

Potential Blockers:

- Lack of resources to establish the plans correctly
- Differences between CAAs and airport operators
- Weaknesses in regulatory oversight
- Airport operators may not recognize safety enhancement benefits of implementing the plan according to the guidelines
- Data sharing

DIP Notes: RASG-PA, Annual Safety Report Team (ASRT), will review collected data on a yearly basis. This data will be reflected in the annual RASG-PA Safety Report

RAST-PA/RE/08 Output 1

Description: Create a guide that collects best practices for runway maintenance.

Resources:

Resource Notes: ACI

Time Line: 6 months

Actions: Establish a team who will compile and develop, if necessary, runway maintenance guidance for airports in the Pan American region. The team should be composed of at least; an ICAO Annex 14 expert, a representative from aerodromes and Aerodrome cognizant CAA representative. Once available the guidance should be translated into Spanish.

Target Completion Date:

RAST-PA/RE/08 Output 2

Description: Promote and encourage the use of the guide.

Resources:

Resource Notes: RASG-PA

Time Line: 12 months

Actions: Produce information material that may be disseminated at events throughout the Region. Call on RASG-PA Members to disseminate the information.

Target Completion Date:

RAST-PA/RE/08 Output 3

Description: Airports implement their maintenance plans according to the runway maintenance guide.

Resources:

Resource Notes: ACI, RST's

Time Line: 18 months

Actions: Use a data-driven approach to identify aerodromes that could benefit from improved runway maintenance. Encourage RST at Airports to use the runway maintenance guide and track outcomes through their action plans. Track aerodrome action plans to determine the number of aerodromes that are using the guide.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/RE/09	Specific Training for pilots and air traffic controllers to avoid unstabilized approaches		9	High	Easy	P1	2	Short

Safety Enhancement Action (expanded):	Develop safety seminars for pilot and air traffic controllers to mitigate the causes of unstable approaches in Pan America.
Statement of Work:	Runway Excursion has been identified as one of the highest safety risk area in Pan America. In order to proactively reduce this risk, RAST in collaboration with ALTA will develop safety seminars for pilots and controllers that will provide specific training and tools to mitigate the causes of unstable approaches and related actions as required.
Champion Organization:	ALTA
Human Resource:	IATA, ATA, ATAC, ACSA, ICAO, aircraft manufacturers, IFALPA, IFATCA, flight data analysis companies (Sagem, ADI, Airfase, etc.), organizations, CANSO, local pilot and air traffic controller associations, flight academies, training centers and other stakeholders.
Financial Resource:	Costs would be shared by the operators, manufacturers, pilot associations and governments.
Relation Current Aviation Community Initiative:	- Runway Safety Action Teams (RSAT); local equivalent collaborative teams in Pan America.
Performance Goal Indicators:	Goal: reduce occurrence of runway excursion accidents. Indicator: a measurable reduction of runway excursion incidents and accidents.
Key Milestones:	The following milestones are based on the date of SCA approval (months): - Survey & Reports SCA + 6 - Seminars Output 1 + 24
Potential Blockers:	- Insufficient funds to conduct seminars - Inadequate implementation of recommendations from outputs - Participation from industry - Human resources, specialists, facilitators - Language barriers - Obtaining copyright approval for available training material - Political barriers - Data sharing restrictions - Time availability
DIP Notes:	Impact on Aviation Safety in the Region: This project would have a positive impact on aviation by avoiding accidents and incidents related to runway excursion.

RAST-PA/RE/09 Output 1

Description:	ALTA will conduct a survey within its operators regarding the actions taken to mitigate unstable approaches.
Resources:	
Resource Notes:	ALTA members
Time Line:	SCA + 6 months
Actions:	The information obtained will be presented and be used to prepare the content for the safety seminars. The goal will be to identify needs and share best practices to improve training methods.
Target Completion Date:	

RAST-PA/RE/09 Output 2

Description:	Develop a strategy to deliver safety seminars for pilots and controllers in Pan America that targets recognition and avoidance of unstable approaches.
Resources:	
Resource Notes:	Stakeholders as listed above

Time Line:

Output 1 + 24 months

Actions:

Develop a strategy and timeline to deliver safety seminars for pilots and controllers.

At a minimum the following topics should be covered:

- Stabilized Approaches
- Go Around Gates and Missed Approach Criteria
- Approach Procedures and Briefings
- Non Normal Aircraft Conditions
- Transfer of Aircraft Control
- CRM/TRM and human factors
- Weather conditions and information dissemination including tail wind landings

During the safety seminars participant will be asked to provide additional mitigation measures that will be compiled and used as the basis of future safety enhancements for runway excursions.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/RE/11	Develop guidance material and training programs to create action plans for runway safety teams.	Annex 14, ICAO Doc. 9137, IATA, FAA, IFALPA Airport Liaison Program	9	High	Easy	P1	1	Short

Safety Enhancement Action (expanded): To reduce runway related accidents and incidents at airports by identifying airport specific hazards and developing mitigations.

Statement of Work: Establish the framework to create Runway Safety Teams (RST) which will evaluate airports for hazards and implement the appropriate mitigations. Facilitate the sharing of data, training material, mitigations, and workshops.

Champion Organization: Mexico

Human Resource: CAAs, ICAO, Airport Operators, Air Operators, Air Traffic Management/Communication Navigation Surveillance providers, Fixed Base Operators, Pilots.

Financial Resource: Database creation, workshops, RASG-PA resources for material compilation.

Relation Current Aviation Community Initiative: ICAO Global and Regional Runway Safety Initiative, Flight Safety Foundation Runway Safety Initiative, Commercial Aviation Safety Team Safety Enhancement

Material currently available:

- ICAO (<http://www2.icao.int/en/RunwaySafety/Pages/Toolkits.aspx>)
- Flight Safety Foundation (<http://flightsafety.org/current-safety-initiatives/runway-safety-initiative-rsi/>)
- Federal Aviation Administration (http://www.faa.gov/airports/runway_safety/resources/lrsat/)
- EUROCONTROL (http://www.eurocontrol.int/runwaysafety/public/standard_page/keyActions.html)
- IFALPA (<http://ifalpa.org/ifalpa-training/alr/alr.html>)

Performance Goal Indicators:

Goal 1: Establish a runway safety team (RST) at the busiest airport of each contracting State in the Pan American region in terms of operations per year.
Indicator: Twelve teams established per year.

Goal 2: Establish a RST at all international airports of each contracting State in the Pan American region.
Indicator: Twelve teams established per year.

Goal 3: Reduce the occurrence of runway related incidents and accidents.
Indicator: A measurable reduction in runway related incidents and accidents.

Key Milestones:

DIP	ESC X Approval
Output 1 Gather & Publish information	ESC 10 Date + 3
Output 2 Checklist	Output 1 + 6
Output 3 Database	Output 1 + 6
Output 4 Roll out plan	Output 3 + 6
Output 5 Review and update	Output 4 + 6

Potential Blockers:

- Lack of resources to establish RSTs
- Differences between CAAs and airport operators
- Airport operators may not recognize safety enhancement benefits
- Data sharing
- Lack of resources to implement mitigations

DIP Notes: RASG-PA, Annual Safety Report Team (ASRT), will review collected data on a yearly basis. This data will be reflected in the annual RASG-PA Safety Report.

Multidisciplinary runway safety teams are envisaged to work with airport operators to identify areas of opportunity and available resources to enhance runway safety for specific aerodromes.

RAST-PA/RE/11 Output 1

Description: Gather and publish in the RASG-PA website available material that may be used to mitigate hazards related to runway safety.

Resources:

Resource Notes: ICAO

Time Line: 6 months

Actions: Publish or make links available to websites such as FSF, CAST, FAA, EURCONTROL and IFALPA which RST may use to proposed mitigation actions for identified hazards related to runway safety.

Target Completion Date:

RAST-PA/RE/11 Output 2

Description: Electronic checklist development

Resources:

Resource Notes: ICAO, IFATCA, IATA & ACI

Time Line: 6 months

Actions: Develop an electronic checklist based on best practices and threat and error management that RST may use to identify hazards and propose mitigation actions. The checklists should address the following areas:

- ATM/CNS
- Air operators
- Airport
- Before releasing final versions of the checklists, field test in a pilot project
- Translate Checklists into Spanish

Target Completion Date:

RAST-PA/RE/11 Output 3

Description: Establishment of a regional Runway Safety Database

Resources:

Resource Notes: ICAO

Time Line: 6 months

Actions: Create a Regional database that will house the data from the checklists (Output 2) with at least the following considerations:

- Option to de-identify the source of the information
- Where possible responses should be selectable (rather than free text)
- Contain appropriate level(s) of data entry
- Consider the legal aspects of data sharing
- Capture the resulting mitigation actions and their end result
- Before releasing final versions of the checklists/database interface, field test in a pilot project
- Spanish version

Target Completion Date:

RAST-PA/RE/11 Output 4

Description: Develop a roll out plan

Resources:

Resource Notes: RAST-PA / FSTT-PA

Time Line: 6 months

Actions: Organize workshops in Pan America to disseminate the information and train on:

- Establishment of RST
- The use of the DB
- The use of the checklist
- Finding Material related to runway safety.

Target Completion Date:

RAST-PA/RE/11 Output 5

Description: Review and Update of the Runway Safety Teams

Resources:

Resource Notes: RAST-PA

Time Line: 6 months

Actions: Develop a process to review on a two times a year basis the number of RSTs established and ensure that all relevant runway safety material is maintained updated.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/CFIT/02	Specific ALAR/CFIT Training for Pilots	SE-12, ALAR Toolkit, FSF CFIT Training	9	Medium	Moderate	P5	1	Short

Safety Enhancement Action (expanded): Promote specific ALAR/CFIT prevention training and procedures to be included in operators approved training curriculums, emphasizing pilot situational awareness and escape procedures for flight crews to use in the event of a terrain warning indication.

Statement of Work: Controlled Flight Into Terrain (CFIT) has been identified as one of the top three data driven risk areas in Pan-America. CFIT is a significant cause of commercial aviation equipment loss and fatalities, worldwide. CFIT accidents could be substantially reduced if all operators and training centers in Pan America developed CFIT prevention procedures and add them to their approved initial and recurrent training curriculums.

Champion Organization: IATA

Human Resource: CAA's, ICAO, IATA, ATA, ALTA and industry partners.

Financial Resource:

Relation Current Aviation Community Initiative:

- RASG-PA has identified CFIT as the number two flight safety risk area in Pan America.
- Flight Safety Foundation (FSF) has recently updated (April 2010) the ALAR Toolkit that includes CFIT Education and Training.

Performance Goal Indicators:

Goal 1: A reduction of 80% in ten years of CFIT accidents involving operators in Pan America.
Indicator: Operator CFIT accident rate in Pan America is continuously reduced toward the goal.

Goal 2: CFIT training and guidance material will be provided to all operators and training centers not conducting CFIT training.
Indicator: All operators and training centers are conducting CFIT training.

Goal 3: Post CFIT Education and Training Guidance Material on the RASG-PA Website. Indicator: CFIT training material posted on the RASG-PA Website prior to completion of Output 1.

Key Milestones:

- CAA's conduct a review of all operators CFIT training programs SCA + 6 months
- CFIT Education and Training Guidance Material Available on the Web. SCA + 2 months
- Operators and training centers will incorporate CFIT training into their training programs. SCA + 12 months

Potential Blockers:

- Availability of CAA resources.
- Operators may not recognize the safety enhancement benefits

DIP Notes:

RAST-PA/CFIT/02 Output 1

Description: CAA's conduct a review of all operators to ascertain which operators have CFIT prevention training and procedures in their approved training programs.

Resources:

Resource Notes: CAA (Flight Safety Oversight Department)
Estimate of 2 to 4 CAA man-hours per airline to complete operator review
CAA Inspector review checklist

Time Line: SCA+ 6 months

Actions: Through the flight safety oversight departments, CAA's will direct inspectors to conduct a review of their operator and identify which operators provide CFIT prevention training and procedures within their approved training programs.

Target Completion Date:

RAST-PA/CFIT/02 Output 2

Description: If an operator does not have CFIT training, he will be encouraged to incorporate CFIT training into the airline training program.

Resources:

Resource Notes: Operators, CAA's and ICAO
Variable cost depending on the operator and the number of pilots

Time Line: SCA+ 16 months

Actions: Operators will incorporate CFIT prevention training and procedures into their training programs.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/CFIT/04	CRM/Situational Awareness for pilots and air traffic controllers (To include review of actual events when possible)	SE -11, SE-46, SE-47	12	Medium	Moderate	P5	2	Medium

Safety Enhancement Action (expanded): Include specific CRM/situational awareness training and procedures to all pilots and air traffic controller training curriculums, emphasizing pilot and controller situational awareness with respect to CFIT.

Statement of Work: Crew Resource Management/Controller Resource Management (CRM) training, situational awareness and CFIT prevention are closely linked. This project will reduce CFIT accidents by promoting comprehensive pilot and air traffic controller CRM training programs.

Champion Organization: IFALPA/IFATCA

Human Resource: CAA's, ICAO, ANSP's, IFALPA, IFATCA, IATA and industry partners.

Financial Resource:

Relation Current Aviation Community Initiative:

- RASG-PA website (<http://www.mexico.icao.int/RASGPA.html#TrainingRefs>)
- FSF virtual library (<http://flightsafety.org/>)
- ALAR Briefing Note – Crew Resource Management (http://flightsafety.org/files/alar_bn2-2-crm.pdf)
- Airbus (http://www.airbus.com/en/corporate/ethics/safety_lib/)
- Boeing operators (www.myboeing.com)

Performance Goal Indicators: Goal 1: A substantial reduction of CFIT accidents involving air transport operators in Pan America.
Indicator: Operator CFIT accident rate in Pan America decreases by 80%.

Goal 2: CRM/situational awareness training and guidance material provided to all air transport operators and Air Traffic Personnel.
Indicator: Increase in number of operators and Air Traffic Personnel that are conducting CRM/situational awareness training.

Goal 3: Post the CRM/situational awareness guidance material on the RASG-PA Website.
Indicator: CRM/situational awareness guidance material posted on the RASG-PA Website by the time of SCA +2 months.

Key Milestones:

- CRM/situational awareness training and guidance material available on the Web. SCA +2 months
- Operators will incorporate CFIT training into their training program. SCA +18 months
- ANSP will incorporate CFIT training into their training program. SCA+ 24 months

Potential Blockers:

- Availability of CAA/ANSP/State resources.
- Operators, States and ANSP may not recognize the safety benefits

DIP Notes: All communications to States should be conducted through the RASG-PA Secretariat. Guidance on coordinating with ICAO and identifying which operators and ANSPs are providing CFIT prevention training and procedures within their approved training programs may be useful to States.

ATC training in this area has already been developed

RAST-PA/CFIT/04 Output 1

Description: Incorporate and/or update CRM/situational awareness training programs for all flight crew members of air transport operators emphasizing aircraft position with relation to terrain and reviewing past occurrences.

Resources:

Resource Notes: Air transport operators (training departments),
Variable cost depending on the operation

Time Line: SCA+ 18 months

Actions: Reduce the CFIT accident rate by incorporating CFIT prevention in CRM training programs. Situational awareness will be emphasized as an integral part of the CRM training required of flight crewmembers of all air transport operators.

Target Completion Date:

RAST-PA/CFIT/04 Output 2

Description: Incorporate CRM/situational awareness training programs for all air traffic controllers of air navigation service providers (ANSP) emphasizing aircraft position with relation to minimum enroute altitudes.

relation to minimum allowable altitudes.

Resources:

Resource Notes:

ANSP's (training departments),
CRM/situational awareness guidance material posted on the RASG-PA Website
Variable cost depending on the ANSP

Time Line:

SCA+ 24 months

Actions:

Reduce the CFIT accident rate by incorporating CFIT prevention in CRM training programs. Situational awareness will be emphasized as an integral part of the CRM training required of air traffic controllers of all ANSPs.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/LOC-I/06	LOC Training – Human factors and automation	SE 30	9	High	Moderate	P2	3	Short

Safety Enhancement Action (expanded):	To improve the overall performance of flight crews to recognize and prevent loss of control accidents, through effective use of automation.
Statement of Work:	To reduce loss of control accidents, operators will be encouraged to adopt consensus policies and procedures relating to mode awareness and energy state management aspects of flight deck automation, as appropriate to their respective operations.
Champion Organization:	RASG-PA (RAST-PA)
Human Resource:	IATA, Pilot Associations; Safety, Flight Operations and Training managers; ICAO, CAA's, aircraft manufacturers, training centers.
Financial Resource:	The total estimated cost would be X person-years.
Relation Current Aviation Community Initiative:	The following are some of the activities related to this project: <ul style="list-style-type: none"> •Incident data has shown that flight deck automation is a core issue that needs to be addressed. To enhance safety, a CAST working group, including aircraft manufactures, pilot associations, etc. developed a tactical approach and distributed policies and procedures relating to mode awareness and energy state management. The COSCAP's in Asia used this material to develop a generic advisory circular. •CAST Flight Deck Automation Working Group has been formed to recommend and prioritize actions to address, for current and projected operational use, the safety and efficiency of modern flight deck systems for flight path management (including energy state management). •The Human Factors and Pilot Training Group of the ALPA, Air Safety Structure has identified its position regarding CRM and Human Factors with respect to the use of automation. •SAE G10, Aerospace Behavioral Engineering Technology (ABET) Committee, deals with the philosophies, principles and criteria by which designers, engineers, pilots and behavioral scientists structure systems to achieve maximum human workload compatibility for automation efficiency. The committee has several subcommittees with on-going work into human factors and automation
Performance Goal Indicators:	<p>Goal 1: Mitigate the effects of mode confusion and energy state management as contributing factors in loss of control accidents. Indicator: A measurable reduction of loss of control incidents and accidents related to automation.</p> <p>Goal 2: Mode awareness and energy state management aspects of flight deck automation advisory circular is readily available. Indicator: Each ICAO contracting State in the region has issued an advisory circular and distributed it to each operator's in the State. Completion of Output 3.</p> <p>Goal 3: All operators incorporate mode awareness and energy state management aspects of flight deck automation guidance in their approved training programs. Indicator: Mode awareness and energy state management aspects of flight deck automation guidance is provided to all transport airplane pilots Completion of Output 4.</p>
Key Milestones:	<p>The following milestones are based on the date of Steering Committee Approval (SCA) (months):</p> <ul style="list-style-type: none"> •Review Asian advisory circular IATA SCA+6 •Issue generic advisory circular ICAO Output 1 +1 •Issuance of advisory circular by States in the Region. CAAs Output 2 +6 •Operators develop guidance based on the AC and train pilots. Operators Output 3 + 18 •Track Implementation RASG-PA SCA +12 and yearly
Potential Blockers:	<ul style="list-style-type: none"> •Operator might not embrace advisory circular material, •Operators might not accept the potential cost of this training, •Operators may not recognize the safety enhancement benefits, •States may opt not to adopt and issue the advisory circular.
DIP Notes:	<i>To reduce loss of control accidents, air carriers will be encouraged to adopt consensus policies and procedures relating to mode awareness and energy state management, as appropriate to their respective operations.</i>

RAST-PA/LOC-I/06 Output 1

Description: Review and evaluate the advisory circular created by the ICAO COSCAP's in Asia

- ALTA / IFALPA / IATA team to review and evaluate the advisory circular created by the ICAO COSCAP's in Asia related to mode awareness and energy state management of flight deck automation.
- Based on this review create a generic advisory circular for the Region

Resources:

Resource Notes: ALTA, IFALPA, IATA, Pilot Associations, Flight Operations, Safety and Training managers, and Aircraft Manufacturers. The estimated cost of a one day meeting of the appropriate persons.

Time Line: SCA + 6 months

Actions: ALTA / IFALPA / IATA will convene a team to analyze the advisory circular, to verify policies and procedures related to mode awareness and energy state management are appropriate for the Region. The team will develop a generic mode awareness and energy state management aspects of flight deck automation advisory circular for Pan America.

Target Completion Date:

RAST-PA/LOC-I/06 Output 2

Description: •ICAO will distribute a copy of the developed generic advisory circular to each State in the Region.

Resources:

Resource Notes: ICAO

Time Line: Completion of Output 1 + 1 months

Actions: ICAO Regional Offices will prepare a cover letter and disseminate the generic advisory circular to each member State in the Region.

Target Completion Date:

RAST-PA/LOC-I/06 Output 3

Description: •Each State in the region will use the generic advisory circular as a template to prepare a State advisory circular on mode awareness and energy state management aspects of flight deck automation.

Resources:

Resource Notes: State regulatory authorities

Time Line: Completion of output 2 + 9 months

Actions: States in the Region to issue their own advisory circular on mode awareness and energy state management aspects of flight deck automation.

Target Completion Date:

RAST-PA/LOC-I/06 Output 4

Description: Mode awareness and energy state management aspects of flight deck automation guidance is provided by operators to all of their pilots.

Resources:

Resource Notes: Operator's flight operations, standards and training departments.

Time Line: Completion of Output 3 + 18 months

Actions: Each operator should carefully developed procedures and guidelines that support the proper use of mode awareness and energy state management aspects of flight deck automation in their training programs. Each transport airplane pilot should be trained to the flight deck automation procedures and guidelines developed by their organization.

Target Completion Date:

RAST No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/LOC-I/07	LOC Training – Advanced maneuvers	SE 31	9	High	Moderate	P2	1	Short

Safety Enhancement Action (expanded):

Promote LOC Training – Advanced maneuvers
Pilots will be better trained to avoid and recover from excursions from normal flight and loss of control.

Statement of Work:

Advanced Maneuvers Training (AMT) focuses on training to prevent and recover from hazardous flight conditions outside of the normal flight envelope, such as, in-flight upsets, stalls, ground proximity and wind shear escape maneuvers, and inappropriate energy state management conditions. There has been a recent increase in accidents where loss of control was a contributing factor.

The purpose of this project is to collect and provide advanced maneuver training material and to encourage operators to use these materials to implement advanced maneuver ground training and flight training using appropriate flight training equipment. Emphasis should be given to stall onset recognition and recovery, unusual attitudes, upset recoveries, effects of icing, energy awareness and management, and causal factors that can lead to loss of control

Champion Organization:

ALTA

Human Resource:

Airline Associations, Pilot Associations; Safety, Flight Operations, and Training managers, aircraft manufacturers, ICAO, flight simulation device manufacturers, training centers, existing training aids, and new materials developed by manufacturers.

Financial Resource:

The total cost associated with this project would be determined by the number of crew personnel that need to be trained and the amount of training time required. This initiative is considered essential for flight safety, there would be no cost associated with the devel

Relation Current Aviation Community Initiative:

- Voluntary training currently being done – both ground and flight
- Wind shear training required since 1988
- Airplane Upset Recovery Training Aid
- Commercial training products becoming available

Performance Goal Indicators:

Goal 1: Develop and make available AMT material for operators approved training programs
Indicator: Availability of the AMT material within 8 months of SCA.

Goal 2: All operators incorporate AMT in their approved training programs.
Indicator: Operators incorporate AMT material within 36 months of SCA.

Goal 3: Reduce occurrence of LOC accidents.
Indicator: A measurable reduction of loss of control incidents and accidents related to excursion from normal flight.

Key Milestones:

The following milestones are based on the date of Steering Committee Approval (SCA) (months):

- Distribute currently available Training Aids ALTA SCA +8
- Track adoption of AMT ALTA SCA +8
- Track Implementation SCA+8 and on a yearly basis

Potential Blockers:

- Some special interests might discredit AMT simulator training
- Operators might ignore AMT materials
- Operators might not accept the potential cost of this training
- Operators may not recognize the safety enhancement benefits

DIP Notes:

Advanced Maneuvers Training (AMT) refers to training to prevent and recover from hazardous flight conditions outside of the normal flight envelope. Examples include in-flight upsets, stalls, ground proximity and wind shear escape maneuvers, and inappropriate energy state management conditions. This safety enhancement collects and provides advanced maneuver training material and encourages operators to use these materials to implement advanced maneuver ground and flight training using appropriate flight training equipment. Emphasis should be given to stall onset recognition and recovery, unusual attitudes, upset recoveries, effects of icing, energy awareness and management, and causal factors that can lead to loss of control.

RAST-PA/LOC-I/07 Output 1

Description:

Listing of training materials available from regulators, industry, operators, academia and other resources.

Resources:

Resource Notes:

RAST-PA Secretariat (NACC office) will produce a comprehensive list with input from all RAST-PA members.

Resource Notes: RAST PA Secretariat (PAOCS office) will produce a comprehensive list, with input from all RAST PA members. All aircraft manufacturers should provide a list of available training materials and aids. FAA Airplane Upset Recovery Training Aid: is available on its public web site.

Time Line: SCA+ 5 months

Actions: RAST-PA should distribute the Airplane Upset Recovery Training Aid to all appropriate regional stakeholders.

Target Completion Date:

RAST-PA/LOC-I/07 Output 2

Description: Advanced Maneuvers Training provided to all operators.

Resources: 10000

Resource Notes: Estimated distribution costs in USD.
ALTA, IATA

Time Line: Output 1 Complete + 3 months

Actions: ALTA should provide the training materials to each operator in the region. IATA should support ALTA's initiative. ALTA should report the level of commitment by the operator's flight operations and training departments.

Target Completion Date:

RAST-PA/LOC-I/07 Output 3

Description: Advanced Maneuvers Training provided by all operators. The expectation is that this training will be accomplished during initial training and as part of the recurrent training program, via ground and simulator instruction within the certified flight envelope, with emphasis on recognition, prevention and recovery techniques.

Resources:

Resource Notes: Costs may vary from operator to operator and would need to consider;
1) Revising the training program for AMT.
2) Assessing the simulator time allotted on the initial and recurrent syllabuses to accommodate AMT.
3) It is estimated that AMT training would require 30 minutes or less of simulator time.

Time Line: Output 2 Complete + 28 months

Actions: ALTA and IATA should promote a high level of commitment to advanced maneuvers training (AMT) by operator flight operations and training departments. Advanced maneuvers training will be conducted emphasizing energy state management and early recognition and recovery from flight outside the certified aircraft-operating envelope. Flight conditions outside of the certified flight envelope include inflight upsets, stalls, ground proximity and wind shear escape maneuvers, and inappropriate energy state management conditions. The training will be accomplished via ground and simulator instruction within the certified flight envelope, with emphasis on recognition, prevention and recovery techniques. The simulator instruction will be within the limitation of the training device being utilized.

Target Completion Date:

Rast No	Safety Enhancement Action	Reference	GSI	Safety Impact	Changeability	Indicator	Priority	Time Frame
RAST-PA/LOC-1/09	LOC Training – Pilot monitoring policies and procedure for the operator and training program for crews.		9	High	Easy	P1	2	Short

Safety Enhancement Action (expanded):

Promote Pilot Monitoring Techniques and Training. Monitoring performance can be significantly improved by training these skills

Statement of Work:

The purpose of this project is to collect and provide pilot monitoring training material and to encourage operators to use these materials to implement pilot monitoring training and flight procedures.

Inadequate flight crew monitoring has been cited by a number of sources as a problem for aviation safety. A collaborative research effort by NASA-Ames, 21 worldwide airlines and the University of Texas Human Factors Research Program, which observed more than 2,000 airline flights, noted that roughly 62 percent of unintentional errors went undetected by flight crews. In addition, the Flight Safety Foundation, ALAR working group, has established that poor monitoring has been a factor in 63 percent of approach and landing accidents. ICAO has also determined that 50 percent of CFIT accidents had pilot monitoring as a common factor.

The term 'Pilot Monitoring' (PM) should be used as an alternative to 'Pilot Not Flying' (PNF) since it reflects clearly the most important function of a PNF.

Conventionally, when two pilots fly a fixed-wing airplane the aircraft commander occupies the left hand seat, and the co-pilot or first officer occupies the right hand seat. Before the commencement of each flight leg, the aircraft commander decides which pilot will take direct responsibility for flying the aircraft and they become 'Pilot Flying' (PF) for that leg. The other pilot is then 'Pilot Not Flying' (PNF) and carries out supporting duties such as communications and check-list reading. Currently some operators use alternative terms for PF and PNF.

Several major airlines have recently revised their procedures to maximize the monitoring of aircraft trajectory, automation and systems. They have tried to minimize or eliminate concurrent procedures that conflict with crew monitoring.

Champion Organization:

IFALPA

Human Resource:

Pilot Associations, IATA, ALTA, ICAO, Flight Operations, and Training managers, training centers, existing training aids.

The total cost associated with this project would be determined by the number of flight crews that need to be trained and the amount of time required. This initiative is considered essential for flight safety.

Estimated 2 meetings of RAST representatives to implement Output 1.

Financial Resource:

Relation Current Aviation Community Initiative:

- Aligns with major findings by ICAO, FSF, NTSB.
- Aligns with components of CRM

Performance Goal Indicators:

Goal 1:Reduce occurrence of LOC accidents.

Indicator: A measurable reduction of loss of control incidents and accidents related to deviations from normal flight.

Goal 2: Pilot Monitoring Training material is readily available.

Indicator: Availability of the Pilot Monitoring Training material in each operator's organization within 2 months of Output 3.

Goal 3: All operators incorporate Pilot Monitoring Training in their approved training programs.

Indicator: Pilot Monitoring Training is provided to all transport airplane pilots. Within 18 months of Output 4.

Key Milestones:

The following milestones are based on the date of Steering Committee Approval (SCA) (months):

- Distribute currently available Training Aids ALTA SCA+5
- Track adoption of Pilot Monitoring Training ALTA SCA+12

Potential Blockers:

- Operators might not accept the potential cost of this training
- Operators may not recognize the safety enhancement benefits

DIP Notes:

Pilot Monitoring policies and procedure for the operator and training program for crews.

RAST-PA/LOC-1/09 Output 1

Production of Pilot Monitoring Training Material for Industry Operators and Airlines

Description: •Listing of training materials available from industry, operators, and other resources.

Resources:

Resource Notes: RASG-PA Secretariat (NACC office) will produce a comprehensive list.

Time Line: SCA + 5 months

Actions: RASG-PA should distribute the Pilot Monitoring Training Aid to all appropriate regional stakeholders (IATA, ALTA, CAA, etc.).

Target Completion Date:

RAST-PA/LOC-I/09 Output 2

Description: •Raise awareness of availability and need of Pilot Monitoring Training.

Resources:

Resource Notes: IFALPA, Local Pilot Associations

Time Line: Completion of Output 1 + 1 months

Actions: IFALPA, ALTA and local pilot associations should market and promote ongoing activities that develop a higher level of commitment to Pilot Monitoring Training by operator's flight operations, standards and training departments.

Target Completion Date:

RAST-PA/LOC-I/09 Output 3

Description: •Pilot Monitoring Training material provided to all operators.

Resources:

Resource Notes: ALTA, IATA, CAA's

Time Line: Completion of Output 1 + 2 months

Actions: ALTA should provide the training materials to each operator in the region. IATA should support ALTA's initiative. ALTA should report to RASG-PA the level of commitment by the operator's flight operations and training departments.

Target Completion Date:

RAST-PA/LOC-I/09 Output 4

Description: •Pilot Monitoring Training provided by operators to all of their pilots.

Resources:

Resource Notes: Operator's flight operations, standards and training departments, pilot associations.

Time Line: Completion of Output 3 + 18 months

Actions: Each operator should carefully developed procedures and guidelines that support pilot monitoring in their training programs. Each transport airplane pilot should be trained to the Pilot Monitoring procedures and guidelines developed by their organization.

Target Completion Date:

Apéndice C

Excursiones e incursiones de pista

1. Indicadores de rendimiento de seguridad operacional

1.1 Para obtener los indicadores de rendimiento de las categorías de accidentes referidas como excursiones e incursiones de pista, se consideraron los accidentes en operaciones comerciales regulares y no-regulares con aeronaves de más de 5 700 kg, obteniéndose los siguientes resultados en el período 2005 - 2012:

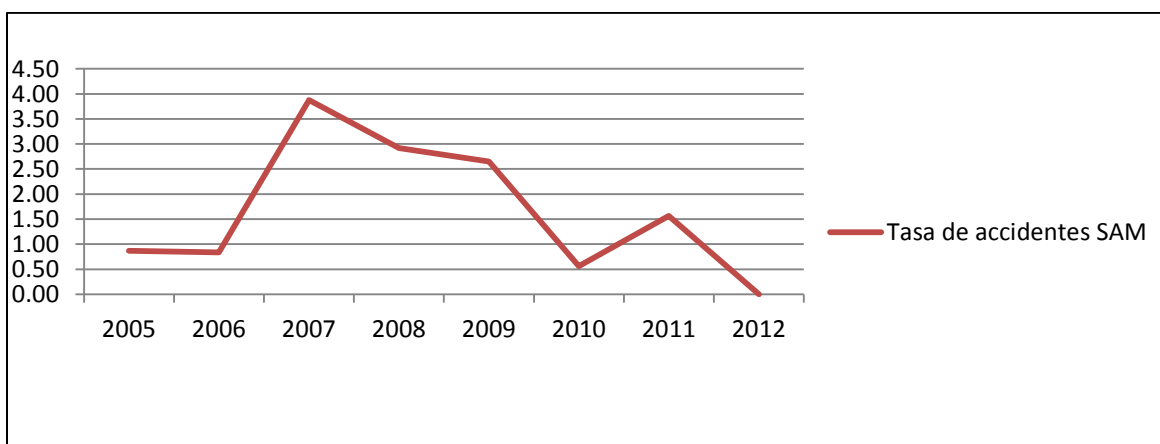
- ✓ los accidentes en que se identificó la categoría excursión de pista ascendieron a 19, y
- ✓ no se identificaron accidentes asociados a "incursiones en pista" en la Región SAM.

1.2 La *Tabla C-1a - Excursiones de pista en la Región SAM*, identifica el año, el total de accidentes por excursiones de pista, las salidas y la tasa de accidentes por millón de salidas, mientras que la *Tabla C-1b* muestra la proyección de la tasa de accidentes por excursiones de pista.

Tabla C-1 – Excursiones de pista en la Región SAM

Tasa de accidentes por excursiones de pista en la Región SAM			
Año	Total de accidentes	Salidas SAM	Tasa de accidentes SAM
2005	1	1,156,272	0.86
2006	1	1,195,107	0.83
2007	5	1,289,860	3.87
2008	4	1,369,691	2.92
2009	4	1,507,869	2.65
2010	1	1,777,672	0.56
2011	3	1,918,423	1.56
2012	0	1,953,982	0.00
Total	19	12,169,876	1.56

Tabla C-2 – proyección de la tasa de accidentes por excursiones de pista



1.3 En los gráficos anteriores se puede observar que durante los años 2007, 2008, 2009 y 2011 hubo un aumento brusco en las tasas de accidentes por excursiones de pista, no obstante, en los años 2010 y 2012, la tasa se redujo, llegando a cero accidentes en el año 2012. Hay que considerar que no todos los accidentes por excursiones de pista han sido reportados por los Estados. En este sentido se alienta a implantar o continuar implantando las mejoras de seguridad operacional para evitar la repetición de esta categoría de accidentes.

2. Propuestas de metas de rendimiento de seguridad operacional

2.1 Las metas traducidas a una tasa de accidentes por excursiones de pista por cada millón de salidas serán parámetros que la Región SAM deberá alcanzar en los siguientes períodos de 3 años:

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Una tasa no mayor al promedio del período 2005-2012: **1.56**
- ✓ Mediano plazo (enero 2017- diciembre 2019):
 - 30% menos de la tasa alcanzada en el período anterior
- ✓ Largo plazo (enero 2020 – diciembre 2022)
 - 50% menos de la tasa alcanzada en el período anterior.

3. Propuestas de mejoras de seguridad operacional para reducir los accidentes por excursiones de pista

3.1 Se propone las siguientes mejoras de seguridad operacional para reducir la tasa de accidentes por excursiones de pista:

- ✓ Corto plazo (enero 2014 - diciembre 2016):
 - Implantación del conjunto de material didáctico (tool kit) sobre seguridad operacional en la pista de la OACI.
 - Implantación eficaz de los equipos de seguridad operacional de pista (RST) en los aeródromos internacionales.
 - Implantación eficaz de los procesos reactivos, proactivos y predictivos (FDA) de seguridad operacional relacionados con excursiones de pista en explotadores de transporte aéreo comercial.
 - Implantación eficaz del programa de cualificación avanzada (AQP) o de la instrucción basada en la evidencia (EBT) de OACI (escenarios de aproximaciones no estabilizadas).
- ✓ Medio plazo (enero 2017- diciembre 2019):
 - Implantación eficaz de los RST en los aeródromos nacionales más importantes.
 - Implantación eficaz de los procesos reactivos, proactivos y predictivos (FDA) de seguridad operacional relacionados con excursiones de pista en explotadores de aviación general.
 - Estudio de factibilidad para la instalación de sistemas de prevención de salidas de pista en las aeronaves
- ✓ Largo plazo (enero 2020 – diciembre 2022)

- Implantación eficaz de un sistema de supervisión avanzado para la vigilancia de los procesos reactivos, proactivos y predictivos destinados al tratamiento de los peligros relacionados con excursiones de pistas