



INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

**REGIONAL AVIATION SAFETY GROUP – PAN AMERICA
(RASG-PA)**

**NINTH PAN AMERICA –
REGIONAL AVIATION SAFETY TEAM MEETING**

PA-RAST/9

SUMMARY OF DISCUSSIONS

BOGOTA, COLOMBIA, 18 JUNE 2012

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List of Contents

Contents	Page
Index	i-1
Historical	ii-1
ii.1 Place and Date of the Meeting.....	ii-1
ii.2 Opening Ceremony.....	ii-1
ii.3 Officers of the Meeting	ii-1
ii.4 Working Languages	ii-1
ii.5 Agenda	ii-1
ii.6 Attendance.....	ii-2
List of Participants	iii-1
Agenda Item 1	1-1
<i>Opening of the Meeting</i>	
1.1 <i>Introduction</i>	
1.2 <i>Administrative Notes</i>	
1.3 <i>Election of Rapporteur</i>	
1.4 <i>Approval of the Agenda</i>	
Agenda Item 2	2-1
<i>Detailed Implementation Plans (DIPs) Update</i>	
2.1 <i>Runway Excursion (RE)</i>	
• <i>ACI-LAC</i>	
• <i>ALTA</i>	
• <i>Mexico DGAC</i>	
2.2 <i>Controlled Flight Into Terrain (CFIT)</i>	
• <i>IATA</i>	
• <i>IFALPA/IFATCA</i>	
2.3 <i>Loss Of Control-Inflight (LOC-I)</i>	
• <i>ALTA</i>	
• <i>IFALPA</i>	
• <i>PA-RAST</i>	
Agenda Item 3	3-1
<i>ASIAS Update</i>	

Contents	Page
Agenda Item 4	4-1
<i>Runway Safety Team (RST) Update</i>	
4.1 <i>ICAO (Ecuador, Jamaica, Mexico)</i>	
4.2 <i>United States FAA</i>	
Agenda Item 5	5-1
<i>Other business</i>	

HISTORICAL

ii.1 Place and Date of the Meeting

The ninth Meeting of the Pan American - Regional Aviation Safety Team (PA-RAST/9) was held in Bogota, Colombia, at the Holiday Inn Bogota Hotel, 18 June 2012.

ii.2 Opening Ceremony

Mrs. Loretta Martin, Regional Director, from the ICAO NACC Regional Office and RASG-PA Secretary, greeted the participants and opened the meeting, highlighting the relevance of RASG-PA activities to enhance aviation safety in the Pan American Region and the role of the PA-RAST to advance Safety Enhancement Initiatives throughout the Pan American Region.

ii.3 Officers of the Meeting

The Boeing Representative was elected to serve as Rapporteur for the meeting. Mr. Eduardo Chacín, Regional Officer, Flight Safety, served as the PA-RAST Secretary, assisted by Mr. Adolfo Zavala, Regional Officer, Air Traffic Management, both from the of the ICAO NACC Regional Office.

ii.4 Working Languages

The working language of the meeting was English.

ii.5 Agenda

Agenda Item 1: Opening of the Meeting

- 1.1 Introduction
- 1.2 Administrative Notes
- 1.3 Election of Rapporteur
- 1.4 Approval of the Agenda

Agenda Item 2: Detailed Implementation Plans (DIPs) Update

- 2.1 Runway Excursion (RE)
 - ACI-LAC
 - ALTA
 - Mexico DGAC
- 2.2 Controlled Flight Into Terrain (CFIT)
 - IATA
 - IFALPA/IFATCA
- 2.3 Loss of Control In-flight (LOC-I)
 - ALTA
 - IFALPA
 - PA-RAST

Agenda Item 3: ASIAS Update

Agenda Item 4: Runway Safety Team (RST) Update

- 4.1 ICAO (Ecuador, Jamaica, Mexico)
- 4.2 United States FAA

Agenda Item 5 Other business

ii.6 Attendance

The Meeting was attended by 17 members of the Pan America – Regional Aviation Safety Team (PA-RAST)

LIST OF PARTICIPANTS

BRAZIL

Carlos Eduardo Magalhães da Silveira
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CASSOS

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COCESNA/ACSA

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PA-RAST/9
List of Participants – Contact Information

iv – 2

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Agenda Item 1: Opening of the Meeting

1.1 Introduction

1.1.1 *See Historical section of this report.*

1.2 Administrative Notes

1.2.1 *See Historical section of this report.*

1.3 Election of Rapporteur

1.3.1 *See Historical section of this report.*

1.4 Approval of the Agenda

1.4.1 Mr. Gerardo Hueto, Boeing representative and elected Rapporteur, presented the draft agenda and asked for approval by the Meeting. The agenda was approved and is included in the historical section of this report.

1.4.2 Based on a proposal from IATA, the Meeting agreed on the importance of electing a permanent rapporteur and decided on an organizational structure similar to the RASG-PA Executive Steering Committee (RASG-PA/ESC).

1.4.3 The Meeting elected an Industry Co-Chair and a State Co-Chair along with two vice-chairs. The Co-Chairs were elected as follows:

- PA-RAST Co-Chairs
 - State: Mexico DGAC
 - Industry: Boeing

- PA-RAST Vice-Chairs
 - State: Brazil ANAC
 - Industry: IATA

1.4.4 The Meeting agreed that the term of the Co-Chairs and Vice-Chairs would be two years.

Agenda Item 2: Detailed Implementation Plans (DIPs) Update

2.0 The DIPs were updated, and the latest version is included as **Appendix A** to this part of the report.

2.1 Runway Excursion (RE)

2.1.1 ACI-LAC

2.1.1.1 The Meeting was informed by the ACI-LAC Representative that according to “*DIP RE/08: Guidance in maintaining runway in accordance with Annex 14*,” ACI-LAC developed the first draft document regarding best practices for runway maintenance titled: *Guidance for Maintaining Runways in Accordance with ICAO’s Annex 14* (See **Appendix B**).

2.1.1.2 The document was presented to the PA-RAST members for review. A deadline of one month was set to receive comments on the draft document.

2.1.1.3 Once the document is approved, it would be considered to be part of the workshop developed by the RASG-PA Aviation Safety Training Team (ASTT) regarding runway safety.

2.1.1.4 The Meeting noted that a SAM Regional Runway Safety Seminar (RRSS) will be held in Quito, Ecuador, 16-20 July 2012, sponsored by ACI-LAC and ICAO, and the advancement of RST implementation at Quito International Airport (SEQU).

2.1.2 ALTA

2.1.2.1 In regard to “*DIP RE/04: Promote Pilot Adherence to Standard Operating Procedures (SOPs) for Approach Procedures including the Go-around Decision-Making Process*,” the ALTA Representative reported the following:

- Output 1: Distribute RERR Toolkit and establish “No Fault Go-around Policies and Unstable Approach SOPs”
 - ALTA’s survey completed (mid 2011)
 - Airlines representing 91% of total LATAM ASK (aviation seat kilometers) comply with “Go-Around” policy in SOPs
 - Pending collection of “Go-Around” policy practices from airlines
 - IATA distributed FSF/IATA/ICAO RERR Toolkit to all airlines
- Output 2: Operators to include material in training programs
 - Airlines will provide feedback from toolkit application and results (proposed new deadline: August 2012)
- Ongoing Tasks
 - IATA/ICAO training program
 - Runway Safety Workshop – Quito, Ecuador, July 2012

2.1.2.2 In regard to “*DIP RE/09: Specific Training for Pilots and Air Traffic Controllers to avoid Unstabilized Approaches,*” IATA Representative informed the following:

- Output 1: Survey operators on Unstable Approach Mitigation
 - Survey operators on Unstable Approach Mitigations (completed 2011)
- Output 2: Develop a strategy to deliver safety seminars on this subject in the region
 - Training for pilots and traffic controllers
 - ALTA with support of IFALPA video development
 - IFALPA working on script with Aeromexico pilots
 - ALTA reviewing FAA training programs for air traffic controller script
 - New deadline for videos: December 2012
- Ongoing Tasks
 - Runway excursions seminars have been held by ICAO
 - ALTA/ IATA with AITSP (ALTA-IATA Trend Sharing Program) will identify risk events to develop specific training programs

2.1.3 Mexico

2.1.3.1 The DGAC of Mexico Representative informed the Meeting about “*DIP RE/11: Develop Guidance Material and Training Programs to create action plans for runway safety teams; Output 5: Review and Update of Runway Safety Teams (RSTs) implementation.*” The Meeting was informed on the implementation progress of the RST at Mexico City International Airport (MMMX) with the support of AICM (*Aeropuerto Internacional de Ciudad de México*), stakeholders, and the ICAO NACC Regional Office.

2.1.3.2 The Meeting noticed that other outputs of the “*DIP RE/11: Develop Guidance Material and Training Programs to Create Action Plans for Runway Safety Teams*” would not be accomplished; therefore, the DGAC of Mexico as champion of the DIP will review and provide an updated version.

2.1.4 Jamaica

2.1.4.1 The DGAC of Jamaica Representative provided an update on the implementation of the RST at Montego Bay Airport in Jamaica.

2.2 Controlled Flight Into Terrain (CFIT)

2.2.1 IATA

2.2.1.1 The IATA Representative informed that the “*DIP CFIT/02: Specific ALAR/CFIT Training for Pilots*” was completed.

2.2.2 IFALPA/IFATCA

2.2.2.1 The IFALPA Representative informed that in reference to the “*DIP CFIT/04 CRM/Situational Awareness for Pilots and Air Traffic Controllers*” they are coordinating with other entities to develop a video for pilots and air traffic controllers regarding Crew Resource Management (CRM).

2.2.2.2 The Meeting acknowledged the lack of participation of IFATCA in the development of the DIP; therefore, the Meeting suggested inviting CANSO to participate in the development of DIP CFIT/04 lead by IFALPA.

2.3 Loss of Control In-flight (LOC-I)

2.3.1 ALTA

2.3.1.1 In regard to “*DIP LOC-I/07 LOC Training – Advanced Manoeuvres*,” the ALTA Representative, informed the following:

- Output 2: Provide Advanced Manoeuvres Manual to all operators
 - Document sent to airlines in 2011
 - Survey conducted: 70% of total LATAM ASKs have found information to be useful
- Output 3: Include training in initial and recurrent ground and simulator training
 - Airlines have scheduled training courses for implementation
 - Pending feedback from Airbus on how to include advanced maneuvers training in simulators

2.3.2 IFALPA

2.3.2.1 The Meeting was informed about the positive image at IFALPA HQ related to the inclusion and dissemination of the Pilot Monitoring Toolkit by means of the RASG-PA Aviation Safety Workshops throughout the Region.

2.3.3 PA-RAST

2.3.3.1 The Secretary informed the Meeting that regarding “*DIP LOC-I/06 Training – Human Factors and Automation; Output 1: Review and Evaluate the Advisory Circular Created by the COSCAPs in Asia*” is completed. Output 2 on the circulation of the advisory circular created by the COSCAPs is pending translation into Spanish language by the SRVSOP (*Sistema Regional de Vigilancia de la Seguridad Operacional*), which is coordinated by the ICAO SAM Regional Office.

2.3.3.2 The Secretary informed the Meeting about the ICAO Loss of Control and Recovery Training (LOCART) initiative and its outcome, such as a new Upset Prevention and Recovery Training Manual that will closely integrate the material currently published in the Airplane Upset Recovery Training Aid – Version 2, an update to Doc 9625 – *Manual of Criteria for the Qualification of Flight Simulators*, a new chapter for the PANS-TRG and proposals for SARPs in Annexes 1 and 6, Part I. Once the review is conducted, the new manual will be finalized and submitted for approval.

#	DIP	Description	Champ	Output	Deadline	Status	Comments
1	RE/04	Promote pilot adherence to Standard Operating Procedures (SOPs) for approach procedures including go-around decision making process	ALTA	1) Distribute RERR Toolkit and establish "no fault go-around policies & Uns. App SOP's"	18/01/11	Completed	
				2) Operators to include material in training programs	08-01-12	In process	Expecting feedback about toolkits application from operators
2	RE/09	Specific Training for pilots and air traffic controllers to avoid unstabilized approaches	ALTA	1) Survey operators on Uns. App. Mitigations	20/02/11	Completed	
				2) Develop a strategy to deliver safety seminars on this subject in the region	12-01-12	In process	Reviewing the information from FAA to prepare script for video (control tower). Invite CANSO to participate.
3	CFIT/02	Specific ALAR/CFIT RAST-PA/CFIT/02 Training for Pilots	IATA	1) Survey operators on CFIT training	20/02/11	Completed	
				2) Incorporate CFIT training in programs	20/12/11	Completed	
4	CFIT/04	CRM/Situational Awareness for pilots and air traffic controllers	IFALPA & IFATCA	1) CRM/situational awareness training programs for all flight crew	20/02/12	In process	Reviewing the information from FAA to prepare script for video (control tower). IFATCA has not participated lately. Invite CANSO to participate.
				2) CRM/situational awareness training programs for all air traffic controllers	20/08/12	In process	
5	LOC-I/6	LOC Training – Human factors and automation	PA-RAST	1) Review and evaluate the advisory circular created by the COSCAP's in Asia	20/02/11	Completed	
				2) Distribute to States	20/03/11	In process	The RASG-PA Safety Recommendation (RSR) was issued to encourage States and Industry to adopt practices to mitigate Mode Awareness and Energy State Management risks. Pending translation into Spanish by the SRVSOP to be distributed by the RASG-PA Secretariat to the Region. Request new date for translation and follow-up
				3) States to send a State Advisory Circular on mode awareness and energy state management.	20/09/11		
				4) Operators to provide guidance to pilots	20/09/12		
6	LOC-I/7	LOC Training – Advanced maneuvers	ALTA	1) Listing of training materials available	18/01/11	Completed	
				2) Advanced Maneuvers Training provided to all operators.	18/04/11	Completed	
				3) Include training in initial and recurrent ground and simulators	18/08/13	In process	Pending feedback from regulators, manufacturers and the outcome of the CAST JSIT
7	LOC-I/9	Pilot monitoring policies and procedure for the operator and training program for crews	IFALPA	1) Listing of training materials	20/02/11	Completed	
				2) Raise awareness of availability and need	20/03/11	Completed	
				3) Training material provided to all operators	20/03/11	In process	It is available in the WEB and being offered through Safety Seminars. Work with ALTA and IATA to send to operators
				4) Training provided to pilots	20/09/12	In process	Through the RASG-PA Aviation Safety Workshops
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	18/07/12	Completed	Guide already reviewed by ACI-LAC's safety committee members, pending review from ICAO. Pending feedback from RASG-PA members
				2) Promote and encourage its use		In process	Coordinate with GREPECAS upon completion for dissemination
				3) Airports implement guide on maintenance program		In process	
9	RE/11	Develop guidance material and training programs to create action plans for runway safety teams	Mexico DGAC	1) Gather and publish related material in RASG-PA's website		Completed	The following link to the ICAO Runway Safety website was included in the RASG-PA website http://www2.icao.int/en/RunwaySafety/Pages/Toolkits.aspx
				2) Electronic checklist development	19/10/12	In process	Develop checklist with IATA assistance
				3) Establishment of a regional Runway Safety Database	19/10/12		Review and revise output
				4) Develop a roll out plan	25/08/12		Review and revise output
				Review and revise output	Review and revise	Review and revise output	Review and revise output

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>							

Keep in mind that there is no contradiction with the pressure for pilots in the subsequent flight analysis.

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. <i>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.</i>

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	GS1	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 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:	<p>The following are some of the activities related to this project:</p> <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:								

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.

RAST-PA/LOC-I/06 Output 1

Description:	Review and evaluate the advisory circular created by the ICAO COSCAP's in Asia <ul style="list-style-type: none"> •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, inflight 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.							
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:	<ul style="list-style-type: none"> •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:	<p>Goal 1: Develop and make available AMT material for operators approved training programs Indicator: Availability of the AMT material within 8 months of SCA.</p> <p>Goal 2: All operators incorporate AMT in their approved training programs. Indicator: Operators incorporate AMT material within 36 months of SCA.</p> <p>Goal 3: Reduce occurrence of LOC accidents. Indicator: A measurable reduction of loss of control incidents and accidents related to excursion from normal flight.</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"> •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:	<ul style="list-style-type: none"> •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:	<p><i>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.</i></p>							

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. 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-I/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:	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>							
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:	<ul style="list-style-type: none"> •Aligns with major findings by ICAO, FSF, NTSB. •Aligns with components of CRM 							
Performance Goal Indicators:	<p>Goal 1:Reduce occurrence of LOC accidents. Indicator: A measurable reduction of loss of control incidents and accidents related to deviations from normal flight.</p> <p>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.</p> <p>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.</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"> •Distribute currently available Training Aids ALTA SCA+5 •Track adoption of Pilot Monitoring Training ALTA SCA+12 							
Potential Blockers:	<ul style="list-style-type: none"> •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-I/09 Output 1

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:	

ACI-LAC SAFETY COMMITTEE

Guidance in maintaining runways in accordance to ICAO's Annex 14.

28/05/2012

This document is intended to give airport administrators a quick guide to follow ICAO SARP's and applying them on a runway maintenance plan, with the objective of reducing runway excursions that are related to poor runway maintenance.

FOREWORD

The aim of the manual is to give the latin-american airport community a convenient, quick guide to runway maintenance according to ICAO's SARP's (Standards and Recommended Practices), specially on the ones indicated on Annex 14, Aerodrome Design and Operations, 5th Edition, July 2009. It also contains "best practices" currently implemented at some airports and references from IATA, ACI, the Flight Safety Foundation, and FAA Advisory Circulars, focused on runway maintenance that may prevent Runway Excursions (RE), which is the most common runway maintenance-related type of incidents.

Therefore, the manual acts as a "signpost" document to the relevant industry practices that cover all matters related specifically to runway maintenance. Future editions of the manual will consider the inclusion of more signposting information, including reparation techniques and others.

The manual was developed by ACI-LAC from material drafted by a task force of ACI-LAC's Safety Team, in coordination with ICAO. The membership of the Safety Team's task force is listed in Appendix 4, and their contribution is acknowledged.



TABLE OF CONTENTS

FOREWORD	2
TABLE OF CONTENTS	3
ACRONYMS AND ABBREVIATIONS	5
Chapter 1.....	6
PAVEMENTS AND STRIPS	6
1.1. INTRODUCTION	6
1.1.1. Purpose and background.....	6
1.2. RUNWAY SURFACE.....	6
1.2.1. References	6
1.2.2. Recommendations for actions to be taken on Flexible pavement failures	7
1.2.3. Recommendations for actions to be taken on Rigid pavement failures	9
1.3. RUNWAY FRICTION AND DRAINAGE.....	11
1.3.1. References	11
1.3.2. Recommended actions	12
1.4. RUNWAY MARKINGS.....	13
1.4.1. References	13
1.4.2. Recommended actions	14
1.4.3. Recommended specifications.....	14
1.4.3.1. Water-borne traffic paint	15
1.4.3.2. Glass beads	15
1.5. RUNWAY END SAFETY AREA (RESA)	15
1.5.1. References	16
1.5.2. Recommended actions	16
1.6. RUNWAYSTRIPS.....	16
1.6.1. References	16
1.6.2. Recommended actions	17
Chapter 2.....	19
VISUAL AIDS.....	19
2.1 INTRODUCTION	19

2.1.1	Purpose and background.....	19
2.2	CAT I VISUAL AIDS	19
2.2.1	References.....	19
2.2.2	Recommended actions.....	20
2.3	WIND DIRECTION INDICATOR.....	20
2.3.1	References.....	20
2.3.2	Recommended actions.....	21
2.4	SIGNS	21
2.4.1	References.....	21
2.4.2	Recommended actions.....	21
2.5	PRECISION APPROACH PATH INDICATOR (PAPI)	22
2.5.1	References.....	22
2.5.2	Recommended actions.....	22
	Appendix 1.....	24
	REFERENCED DOCUMENTS	24
	Appendix 2.....	27
	GLOSSARY OF TERMS.....	27
	Appendix 3.....	30
	EXAMPLE OF MAINTENANCE PLAN.....	30
	Appendix 4.....	34
	ORGANIZATIONS INVOLVED IN THE DRAFTING OF THIS MANUAL	34

ACRONYMS AND ABBREVIATIONS

ACI	Airports Council International
AN14	ICAO's Annex 14
AS	Aerospace Standard
ASTM	ASTM International
FSF	Flight Safety Foundation
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ISO	International Organization for Standardization
JIG	Joint Inspection Group
LAC	Latin America
SMS	Safety Management System
SARPs	Standards and Recommended Practices (ICAO)

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Chapter 1

PAVEMENTS AND STRIPS

1.1. INTRODUCTION

1.1.1. Purpose and background

This chapter will summarize some of the most practical ICAO's AN14 references that every person in charge of the airports pavements should be aware and follow to maintain a correct runway operational status from its civil works infrastructural conditions. It is not aimed to replace the reading of the annex, but to give a quick guide of the SARP's related to pavements.

The information is presented as a table with the ICAO SARP's, next to a series of recommended practices to conform to it.



1.2. RUNWAY SURFACE




1.2.1. References


ICAO REF.	SARP's
10.2.1	<i>The surfaces of all movement areas including pavements (runways, taxiways and aprons) and adjacent areas shall be inspected and their conditions monitored regularly as part of an aerodrome preventive and corrective maintenance programme with the objective of avoiding and eliminating any loose objects/debris that might cause damage to aircraft or impair the operation of aircraft systems.</i>
10.2.2	<i>The surface of a runway shall be maintained in a condition such as to prevent formation of harmful irregularities.</i>
ADJ A6-5.1	<i>In adopting tolerances for runway surface irregularities, the following standard of construction is achievable for short distances of 3 m and conforms to good engineering practice:</i>

Except across the crown of a camber or across drainage channels, the finished surface of the wearing course is to be of such regularity that, when tested with a 3 m straight-edge placed anywhere in any direction on the surface, there is no deviation greater than 3 mm between the bottom of the straight-edge and the surface of the pavement anywhere along the straight-edge.

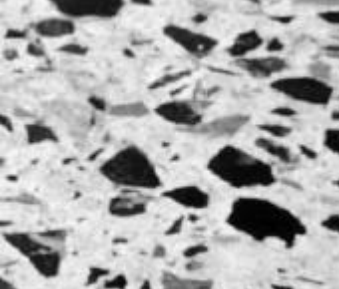
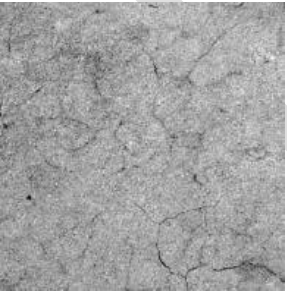
1.2.2. Recommendations for actions to be taken on Flexible pavement failures


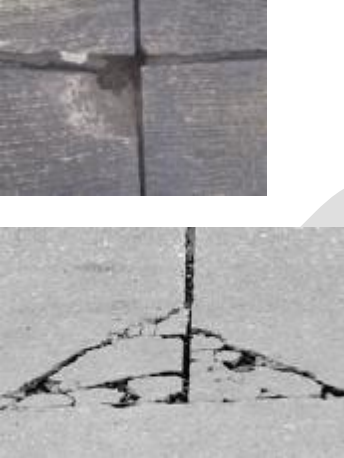

FAILURE	DESCRIPTION	EFFECT	RECOMENDATION
<p>Rutting/Distortion</p> 	<p>Rutting is displacement of material, creating channels in wheelpaths. It is caused by traffic compaction or displacement of unstable material.</p> <p>Distortion can develop when the asphalt mixture is unstable because of poor quality aggregate or improper mix design.</p>	<p>Wheelpaths, ponding</p>	<p>Minor rutting may be solved with overlay or microsurfacing. Severe rutting may require milling the old surface or reconstructing the whole pavement. Base and subbase improvements may be necessary.</p>
<p>Asphalt "rusting"</p> 	<p>It is generated by meteorological conditions.</p>	<p>Lack of contrast with painting.</p> <p>Loss of aggregates.</p> <p>Loss of permeability.</p>	<p>Slurry seal, special surface treatments, thin bituminous overlay, etc.</p>




<p>Polishing</p> 	<p>Traffic wearing off Sharp edges of aggregates.</p>	<p>FOD, lack of skid resistance aggregate.</p>	<p>Repair with surface treatment or thin bituminous overlay using skid-resistant aggregate.</p>
<p>Cracking</p> 	<p>It can be produced by reflexion of inferior layers, by poor compactation, movement of the underlying pavement due to temperature.</p>	<p>Can create FOD. May become an obstacle for aircrafts depending on the size. Can filter water to underlying layers.</p>	<p>Depending on the width and size, the crack can be sealed with special product or asphalt. If the crack has differential settlement, then further studies should be done or consider repaving.</p>
<p>Torsion/slippage cracks</p> 	<p>Normally occurs where aircrafts start and stop or where they turn (for example on a runway threshold).</p>	<p>They can generate dangerous FOD near takeoff areas. Uneven surfaces.</p>	<p>Repair by removing top surface and resurfacing. In areas where this is common, consider using Portland Cement Concrete instead of asphalt.</p>
<p>“Alligator” cracks</p>	<p>Interconnected cracks forming small pieces ranging in size from about 1” to</p>	<p>Generate FOD.</p>	<p>Repair by excavating and replacing failed subgrade base and surface. Large areas require reconstruction.</p>

	<p>6".</p> <p>It's caused by failure of the entire pavement due to traffic loading (fatigue) and usually due to inadequate base or subgrade support.</p>		<p>Improvements in drainage may often be required.</p>
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1.2.3. Recommendations for actions to be taken on Rigid pavement failures

FAILURE	DESCRIPTION	EFFECT	RECOMENDATION
<p>Polishing</p> 	<p>Traffic wearing off Sharp edges of aggregates.</p>	<p>Lack of skid resistance aggregate.</p>	<p>An asphalt overlay or grinding the concrete surface can restore skid resistance.</p>
<p>MAP Cracking</p> 	<p>Normally is because improper cure or overworking the surface during finishing.</p>	<p>It can generate FOD.</p>	<p>In severe conditions, overlay or depth patching may be required.</p>
<p>Slab Cracks</p>	<p>Slab cracks divide the slab into 2 or more pieces.</p>	<p>If not treated on time, can develop spalls or further</p>	<p>Depending on the cause, it may be an spot repair or need the</p>

	<p>They can be caused by thermal stresses, poor subgrade support, or heavy loadings. They are sometimes related to slabs with joints spaced too widely. Slabs with a length-to-width ratio greater than 1.25 are more likely to develop mid-slab cracks.</p>	<p>deterioration. Can lead to slab failure.</p>	<p>total replace of the slab.</p>
<p>Corner Cracks</p> 	<p>This diagonal cracks may develop because of lack of subbase support or concentrated stress due to temperature changes.</p>	<p>It may generate a failure sector or broken section may become loose and generate FOD.</p>	<p>Total reparation of the corner or the whole slab depending on the size of the crack.</p>
<p>Longitudinal or transversal crack.</p> 	<p>Generated under constant heavy loads, lack of subbase support, or tension gradients generated by temperature changes.</p>	<p>Slab failure</p>	<p>Small cracks can be sealed, deep or too wide cracks may be necessary to replace the slab. Drainage has to be improved.</p>
<p>Pavement Settling</p>	<p>Unstable or poorly drained subgrade soils may cause</p>	<p>Slab failure</p>	<p>Improved drainage and stabilization of subgrade soils is</p>

	<p>pavements to settle after construction.</p>		<p>usually necessary, along with pavement reconstruction.</p>
<p>Blowups</p> 	<p>Concrete slabs may push up or be crushed at a joint.</p>	<p>Uneven surface</p>	<p>Pressure relief joints can be installed and blowup areas must be patched or reconstructed.</p>
<p>Joint Seal Damage</p> 	<p>Over time, joint seal material loses its flexibility and may turn rigid, or the joint itself may grow bigger, allowing water to enter lower layers or debris to accumulate on joint.</p>	<p>May cause FOD. Debris accumulated on joint may not allow normal joint movement. Water intrusion may affect lower layers and generate failure.</p>	<p>Include joint inspection and cleaning/replacing as needed.</p>

1.3. RUNWAY FRICTION AND DRAINAGE

1.3.1. References

<p>ICAO Ref.</p>	<p>SARP's</p>
<p>10.2.3</p>	<p><i>Measurements of the friction characteristics of a runway surface shall be made periodically with a continuous friction measuring device using self-</i></p>

	<i>wetting features.</i>
10.2.4	<i>Corrective maintenance action shall be taken when the friction characteristics for either the entire runway or a portion thereof are below a minimum friction level specified by the State.</i>
10.2.5R	<i>Corrective maintenance action should be considered when the friction characteristics for either the entire runway or a portion thereof are below a maintenance planning level specified by the State.</i>
10.2.6R	<i>When there is reason to believe that the drainage characteristics of a runway, or portions thereof, are poor due to slopes or depressions, then the runway friction characteristics should be assessed under natural or simulated conditions that are representative of local rain, and corrective maintenance action should be taken as necessary.</i>
10.2.8	<i>The surface of a paved runway shall be maintained in a condition so as to provide good friction characteristics and low rolling resistance. Snow, slush, ice, standing water, mud, dust, sand, oil, rubber deposits and other contaminants shall be removed as rapidly and completely as possible to minimize accumulation.</i>

1.3.2. Recommended actions

Regarding runway friction condition, the Airport's Maintenance department is recommended to:

Make runway friction surveys every 6 months or depending on the number of operations, pilot reports, or if visual inspections determine that the rubber accumulation will result on major risk.

There are several rubber removal methods, waterblasting is a best practice, but there are other methods like shotblasting, chemical, grinders among others. Care should be practice when using shotblasting on grooved runways.

In case that it is necessary to do an overlay or repaving Project, Airport Authorities should consider grooving as it help to increase runway friction and drainage.

Annex's 14 table A-1 is used to determine runway friction levels

Table A-1. Friction levels for new and existing runway surfaces

Test equipment	Test tire		Test speed (km/h)	Test water depth (mm)	Design objective for new surface	Maintenance planning level	Minimum friction level
	Type	Pressure (kPa)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Mu-meter Trailer	A	70	65	1.0	0.72	0.52	0.42
	A	70	95	1.0	0.66	0.38	0.26
Skiddometer Trailer	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.47	0.34
Surface Friction Tester Vehicle	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.47	0.34
Runway Friction Tester Vehicle	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.54	0.41
TATRA Friction Tester Vehicle	B	210	65	1.0	0.76	0.57	0.48
	B	210	95	1.0	0.67	0.52	0.42
GripTester Trailer	C	140	65	1.0	0.74	0.53	0.43
	C	140	95	1.0	0.64	0.36	0.24

1.4. RUNWAY MARKINGS

1.4.1. References

Ref. OACI	Norma
5.2.1.4	<p><i>Runway markings shall be white.</i></p> <p><i>Note 1.— It has been found that, on runway surfaces of light color, the conspicuity of white markings can be improved by outlining them in black.</i></p> <p><i>Note 2.— It is preferable that the risk of uneven friction characteristics on markings be reduced in so far as practicable by the use of a suitable kind of paint.</i></p> <p><i>Note 3.— Markings may consist of solid areas or a series of longitudinal stripes providing an effect equivalent to the solid areas.</i></p>
5.2.1.7R	<p><i>At aerodromes where operations take place at night, pavement markings should be made with reflective materials designed to enhance the visibility of the markings.</i></p>

1.4.2. Recommended actions

To keep runway markings on optimal conditions, Airport Authority need to evaluate markings to determine if remarking is needed or only maintenance is required. Some criteria, as recommended by *REPORT IPRF 01-G-002-05-1 AIRFIELD MARKING HANDBOOK*¹ are:

1. Faded colors or appearance.
2. Poor nighttime visibility or retro-reflectivity.
3. Existing markings are worn 50 percent or more.
4. Existing markings are covered with contaminants.
5. Markings are not representing properly its meaning anymore (i. e., the information is wrong because its deterioration)

Also, before beginning the project, it is recommended to evaluate existing markings for the following condition:

- a. Layers of paint from older markings, figure 2-1.
- b. Rust discoloration.
- c. Algae growth.
- d. UV-damage.
- e. Positions and dimension of existing markings (tolerances).
- f. Alignment.
- g. Material compatibility.

A best practice is to prepare the surface eliminating any contaminants, old paintings, oil, dirt, curing components (on new pavements), mold, rubber deposits, algae, or other substances that avoids proper bonding.

The available practices for surface preparation or paint removal are waterblasting, shot blasting, drilling and chemical removing.

1.4.3. Recommended specifications

As a best practice, most airports use Water-borne paint (TT-P-1952, type I, II or III) and glass beads (TT-B-1325 type I, III or IV).

¹ *REPORT IPRF 01-G-002-05-1, "AIRFIELD MARKING HANDBOOK"*, Innovative Pavement Research Foundation, USA, September 2008

1.4.3.1. Water-borne traffic paint

Water-borne traffic paint is the coating of choice for airports, because it has good environmental characteristics, has a fast dry time, is easy to clean up and does not generate hazardous waste.

Benefits of using water-borne paints include ease of use and clean up. Water is sufficient for all clean up, and no toxic chemicals are needed. Because the material is nonhazardous, it is safe to handle the material, and empty containers can be crushed and disposed of at a landfill. Fast-dry water-borne paints can be installed quickly and new markings can be driven over soon after installation.

Limitations of using water-borne paints are weather related. TT-P-1952, Type I dries slowly when the humidity is high; it may take up to 30 to 45 minutes to dry. Type II is a faster drying material, and under humid conditions, drying can take up to 20-30 minutes. Type III, a high-build acrylic and a more durable product, is comparable to the Type II formulation; it contains special fast-dry polymer binders that hasten the drying process.

For optimal bead embedment, a 15 mils of wet binding material leads to good bead retention. Applying less than 15 mils of binding material leads to poor retention, while applying more than 15 mils leads to complete submersion of the beads into the binder. In both cases, reflectivity is diminished.

1.4.3.2. Glass beads

Three types of glass beads are the basic on the TT-B-1325 specs: Type I, Type III and IV. Type I and IV have the same IOR (index of refraction) and both are made from recycled glass (or the direct melt process). Type III glass beads are made from virgin materials and have a higher IOR.

Type I and III glass beads are suited to any paint material, while Type IV is best suited for thicker material because of its size and the need to properly embed in the wet binder.

Although Type III glass beads are the more expensive ones, they are recommended when long-term performance is desirable. Their higher retro-reflectivity (IOR 1.9 vs IOR 1.5 from types I and IV) directs more light to the pilot's field of vision.

1.5. RUNWAY END SAFETY AREA (RESA)

1.5.1. References

ICAO Ref.	SARP
3.5.6R	<i>An object situated on a runway end safety area which may endanger aeroplanes should be regarded as an obstacle and should, as far as practicable, be removed.</i>
3.5.7R	<i>A runway end safety area should provide a cleared and graded area for aeroplanes which the runway is intended to serve in the event of an aeroplane undershooting or overrunning the runway.</i> <i>Note.— The surface of the ground in the runway end safety area does not need to be prepared to the same quality as the runway strip. See, however, 3.5.11.</i>
3.5.11R	<i>A runway end safety area should be so prepared or constructed as to reduce the risk of damage to an aeroplane undershooting or overrunning the runway, enhance aeroplane deceleration and facilitate the movement of rescue and fire fighting vehicles as required in 9.2.30 to 9.2.32.</i>

1.5.2. Recommended actions

Maintain proper grass and surface maintenance to permit proper drainage.

Eliminate any non-frangible obstacle on RESA.

1.6. RUNWAYSTRIPS

1.6.1. References

ICAO Ref.	SARP
3.4.7	<i>No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirement in Chapter 5, shall be permitted on a runway strip:</i>

	<p>a) <i>within 77.5 m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or</i></p> <p>b) <i>within 60 m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or</i></p> <p>c) <i>within 45 m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.</i></p> <p><i>No mobile object shall be permitted on this part of the runway strip during the use of the runway for landing or take-off.</i></p>
3.4.8R	<p><i>That portion of a strip of an instrument runway within a distance of at least:</i></p> <ul style="list-style-type: none"> <i>— 75 m where the code number is 3 or 4; and</i> <i>— 40 m where the code number is 1 or 2;</i> <p><i>from the centre line of the runway and its extended centre line should provide a graded area for aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.</i></p>
3.4.10	<p><i>The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.</i></p>
3.4.16R	<p><i>That portion of a strip of an instrument runway within a distance of at least:</i></p> <ul style="list-style-type: none"> <i>— 75 m where the code number is 3 or 4; and</i> <i>— 40 m where the code number is 1 or 2;</i> <p><i>from the centre line of the runway and its extended centre line should be so prepared or constructed as to minimize hazards arising from differences in load-bearing capacity to aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.</i></p>

1.6.2. Recommended actions

Runway strips are meant to be object free and resistance so that an aircraft that overruns or veers off can have space to stop without hitting any non-frangible obstacle that can damage the aircraft.

Recommended practices include maintaining proper grass and surface maintenance to permit proper drainage, also, eliminate any non-frangible obstacle on runway strip.

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Chapter 2

VISUAL AIDS

2.1 INTRODUCTION

2.1.1 Purpose and background

This chapter will summarize some of the most practical ICAO's AN14 references that every person in charge of the airports visual aids should be aware and follow to maintain a correct runway operational status from its visual aids infrastructural conditions. It is not aimed to replace the reading of the annex, but to give a quick guide of the SARP's related to visual aids.

The information is presented as a table with the ICAO SARP's, next to a series of recommended practices to conform to it.

For recommended maintenance plans for visual aids, we recommend the plans exposed at FAA's Advisory Circular 150/5340-26A, but care should be taken because every airport has different conditions (weather, configurations, etc.).

2.2 CAT I VISUAL AIDS

2.2.1 References

ICAO Ref.	SARP
10.4.1	<i>A light shall be deemed to be unserviceable when the main beam average intensity is less than 50 per cent of the value specified in the appropriate figure in Appendix 2 (AN 14). For light units where the designed main beam average intensity is above the value shown in Appendix 2, the 50 per cent value shall be related to that design value.</i>
10.4.2	<i>A system of preventive maintenance of visual aids shall be employed to ensure lighting and marking system reliability.</i>
10.4.10	<i>The system of preventive maintenance employed for a precision approach runway category I shall have as its objective that, during any period of category I operations, all approach and runway lights are serviceable and that, in any event, at least 85 per cent of the lights are serviceable in each</i>

	<p><i>of the following:</i></p> <p><i>a) precision approach category I lighting system;</i></p> <p><i>b) runway threshold lights;</i></p> <p><i>c) runway edge lights; and</i></p> <p><i>d) runway end lights.</i></p> <p><i>In order to provide continuity of guidance an unserviceable light shall not be permitted adjacent to another unserviceable light unless the light spacing is significantly less than that specified.</i></p>
10.4.12	<p><i>The system of preventive maintenance employed for a runway meant for take-off in runway visual range conditions of a value of 550 m or greater shall have as its objective that, during any period of operations, all runway lights are serviceable and that, in any event, at least 85 per cent of the lights are serviceable in the runway edge lights and runway end lights. In order to provide continuity of guidance, an unserviceable light shall not be permitted adjacent to another unserviceable light.</i></p>

2.2.2 Recommended actions

Maintain equipment according on the manufacturers recommendations. In appendix 3 there are some recommendations on preventive maintenance plan for these visual aids.

Make regular day and nighttime inspections to detect broken bulbs, low intensity lights, etc., and proceed with replacement.

Is a best practice to have enough spare parts to replace inoperational lights as soon as possible to maintain standard level.

2.3 WIND DIRECTION INDICATOR

2.3.1 References

ICAO Ref.	SARP
5.1.1.2	<i>A wind direction indicator shall be located so as to be visible from</i>

	<i>aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects.</i>
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2.3.2 Recommended actions

The Airport's Maintenance personnel should keep the wind direction indicator as visible as possible, cutting regularly grass around the indicator's location (if applicable), and changing the truncated cone when it reduces its color intensity.

The movement mechanism should be maintained according to manufacturers recommendations, always inspecting the frangible connection which tends to suffer because of cone's movement. Daily night checks for the wind direction indicator illumination.

2.4 SIGNS

2.4.1 References

ICAO Ref.	SARP
5.4.1.7	<p><i>Signs shall be illuminated in accordance with the provisions of Appendix 4 (AN 14) when intended for use:</i></p> <ul style="list-style-type: none"> <i>a) in runway visual range conditions less than a value of 800 m; or</i> <i>b) at night in association with instrument runways; or</i> <i>c) at night in association with non-instrument runways where the code number is 3 or 4.</i>

2.4.2 Recommended actions

On the maintenance perspective, personnel should constantly check the signs for corrosion spots, discoloration or introduction of water.

Special care should be taken to change lamps, specially where night time operations are permitted.

Signs screens tend to lose color upon time (discoloration). Depending on weather conditions this could increase the frequency this screens should be changed.

As recommended by the manufacturer, also transformers, connections and regulators should be checked as part of the visual aids maintenance plan.

2.5 PRECISION APPROACH PATH INDICATOR (PAPI)

2.5.1 References

ICAO Ref.	SARP
5.3.5.25	<p><i>The wing bar of a PAPI shall be constructed and arranged in such a manner that a pilot making an approach will:</i></p> <p><i>a) when on or close to the approach slope, see the two units nearest the runway as red and the two units farthest from the runway as white;</i></p> <p><i>b) when above the approach slope, see the one unit nearest the runway as red and the three units farthest from the runway as white; and when further above the approach slope, see all the units as white; and</i></p> <p><i>c) when below the approach slope, see the three units nearest the runway as red and the unit farthest from the runway as white; and when further below the approach slope, see all the units as red.</i></p>
5.3.5.34	<p><i>The light units shall be so designed that deposits of condensation, snow, ice, dirt, etc., on optically transmitting or reflecting surfaces shall interfere to the least possible extent with the light signals and shall not affect the contrast between the red and white signals and the elevation of the transition sector.</i></p>

2.5.2 Recommended actions

Confirm that all lamps are burning and are of equal brightness. Lamps should be replaced immediately if they burn out or become darkened.

Personnel should constantly check the cases for corrosion spots, discoloration or introduction of water. Special care should be taken on sealing to prevent water into the case.

Where the PAPI is placed over grass, special care should be taken to constantly cut grass around the visual aid so that visibility is not affected by growing grass. Also, check for erosion around its bases.

PAPI should be checked so that it's leveled according to initial installation.

As recommended by the manufacturer, lamps, transformers, connections and regulators should be checked as part of the visual aids maintenance plan.

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Appendix 1

REFERENCED DOCUMENTS

International Civil Aviation Organization (ICAO):

Standards and Recommended Practices

Annex 14 to the Convention on International Civil Aviation

Volume 1, Aerodrome Design and Operations

Fifth Edition, July 2009.

Civil Aviation Authority (UK):

Civil Aviation Authority

Safety Regulation Group

GAP 683

The Assessment of runway Surface friction Characteristics

Fourth Edition December 2008

Sitio Web: www.ca.co.uk (página de inicio)

Administración Federal de la Aviación (FAA):

Federal Aviation Administration

U.S. Department of Transportation

Advisory Circular 150/5340-26A.

Date: 04/04/05

Subject: Maintenance of airport visual aids facilities

Website: www.faa.gov/

International Air Transport Association (IATA):

International Air Transport Association

Safety, Operation and Infrastructure

2004-2009 Analysis Report

2nd Edition

Website: www.iata.org

Federal Aviation Administration (FAA):

Federal Aviation Administration

U.S. Department of Transportation

Advisory Circular

Date: 07/12/04

Subject: Airfield Pavement Surface Evaluation and Rating Manuals

Website: <http://www.faa.gov/arp/150acs.cfm>

Federal Aviation Administration (FAA):

Federal Aviation Administration

U.S. Department of Transportation

Advisory Circular

Date: September 28, 2007

Subject: Guidelines and Procedures for maintenance of airport pavements

Website: www.faa.gov

International Civil Aviation Organization (ICAO):

Runway Surface condition Assessment measurement and reporting

SAFETY

Circular 329

Website: www.icao.int

International Civil Aviation Organization (ICAO):

Aerodrome Best Practice

Runway Excursion Risk Reduction

RERR 2nd edition-Issued 2011

Website: www.icao.int

International Civil Aviation Organization (ICAO):

Airport Self – Audit Checklist

Runway Excursion Risk Reduction

RERR 2nd edition-Issued 2011

Website: www.icao.int

Innovative Pavement Research Foundation (IPRF)

Airfield Marking Handbook

Report IPRF 01-G-002-05-1

September 2011

Appendix 2

GLOSSARY OF TERMS

Term	Definition
Aerodrome	A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
Fixed light	A light having constant luminous intensity when observed from a fixed point.
Frangible object	An object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft.

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Instrument runway	<p>One of the following types of runways intended for the operation of aircraft using instrument approach procedures:</p> <p>a) <i>Non-precision approach runway</i>. An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.</p> <p>b) <i>Precision approach runway, category I</i>. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60 m (200 ft) and either a visibility not less than 800 m or a runway visual range not less than 550 m.</p> <p>c) <i>Precision approach runway, category II</i>. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m.</p> <p>d) <i>Precision approach runway, category III</i>. An instrument runway served by ILS and/or MLS to and along the surface of the runway and:</p> <p>A — intended for operations with a decision height lower than 30 m (100 ft), or no decision height and a runway visual range not less than 175 m.</p> <p>B — intended for operations with a decision height lower than 15 m (50 ft), or no decision height and a runway visual range less than 175 m but not less than 50 m.</p> <p>C — intended for operations with no decision height and no runway visual range limitations.</p>
Landing Area	That part of a movement area intended for the landing or take-off of aircraft.
Marking	A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.
Non-instrument runway	A runway intended for the operation of aircraft using visual approach procedures.

Obstacle	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Runway end safety area (RESA)	An area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.
Runway strip	A defined area including the runway and stopway, if provided, intended: a) to reduce the risk of damage to aircraft running off a runway; and b) to protect aircraft flying over it during take-off or landing operations.
Sign	a) <i>Fixed message sign</i> . A sign presenting only one message. b) <i>Variable message sign</i> . A sign capable of presenting several predetermined messages or no message, as applicable.
Threshold	The beginning of that portion of the runway usable for landing.
Touchdown zone	The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

Appendix 3

EXAMPLE OF MAINTENANCE PLAN

ACTIVITIES	FREQUENCY							
	DAILY	WEEKLY	MONTHLY	BI-MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	UNSCCHEDULE
Wind Direction Indicator								
Check lamps and photocell operation	X							
Check moving parts of wind cone frame	X							
Check wind cone fabric			X					
Check lamp age for schedule replacement			X					
Check glassware				X				
Check paint on segmented circle				X				
Clean and grease bearings						X		
Read insulation resistance						X		
Check mounting bolts							X	
Check wiring at hinge							X	
Check grounding system resistance							X	
Check paint on wind cone structure							X	
Remove vegetation and check condition at foundation								X
Precision Approach Path Indicator (PAPI)								
Check lamps for operation	X							
Check operations of controls			X					
Check lamps and filters			X					
Check mechanical parts for damage			X					

ACTIVITIES	FREQUENCY							
	DAILY	WEEKLY	MONTHLY	BI-MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	UNSCHEDULE
Check lightning arresters			X					
Check for water damage and insect/rodents infestation			X					
Check alignment and aiming of light boxes			X					
Check leveling and operation of tilt switch			X					
Check integrity of obstacle free approach plane					X			
Check insulation resistance of underground cables						X		
Remove growing grass, clean lights foundation		X						X
Check resistance of grounding system						X		
Vertical Signs								
Check lamps for operation		X						
Check the interior of lamps for dust, dirt and water intrusion			X					
Check for rodent presence inside signs			X					
Check frangible coupling and sign alignment			X					
Remove growing grass, clean lights foundation		X						X
Runway edge lights								
Check for outages, broken lights or non-operational lamps	X							
Check cleanliness of the lenses	X							
Check orientation of the lenses			X					
Tighten, level and re-align edge lights out of alignment			X					X
Check lamp fittings and clean contacts							X	
Check light elevation						X		
Check for moisture in lights						X		
Check gaskets							X	

ACTIVITIES	FREQUENCY							
	DAILY	WEEKLY	MONTHLY	BI-MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	UNSCHEDULE
Remove growing grass, clean lights foundation		X						X
Runway approach lights								
Check and replace burned-out lamps	X							
Check and replace non-operational transformers			X					
Check system's 5 step operation		X						
Remove vegetation obstructing the lights		X						X
Check structures for integrity						X		
Check electrical distribution equipment and cable plugs						X		
Check angle of elevation lights			X					
Check electrical distribution equipment							X	
Check insulation resistance of the cable							X	
Runway Pavement								
Verify pavement condition for cracks or other FOD generating failure	X							
Check for ponding or inadequate drainage	X							
Joint Sealing							X	X
Sweeping		X						
Friction testing						X		
Crack sealing								X
Runway Drainage								
Sub-drainage cleaning			X					
Cleaning (grass cut) of open channel			X					
Conformation of open channel							X	
Inlets/drainage cleaning						X		

ACTIVITIES	FREQUENCY							
	DAILY	WEEKLY	MONTHLY	BI-MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	UNSCHEDULE
Runway Markings								
Centre line marking						X		
Aiming point						X		
Threshold, side strip, touchdown marks, others							X	
Runway Strips and RESA								
Keep growing grass low			X					X
Clean drainage			X					
Check for ground resistance							X	

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Appendix 4

ORGANIZATIONS INVOLVED IN THE DRAFTING OF THIS MANUAL

ACI-LAC

Javier Martinez, Director General

ACI-LAC Safety workgroup

Jurgen Benschop, Aruba (Chairman)

Fabio Salvatierra, Tocumen International Airport, Panama

Javier Ferrari, TAGSA

Maritza Sierra, ECASA

Rodolfo Bazan, ADP

Iñaki Ascacibar, GAP

Raúl Berroeta, Aerodom

Juan Manuel Manriquez, Aerodom

Juan Manuel Perez Gil, Airpartners, Spain.

Milagros Jimenez, Airpartners, Spain.

Other contributions

Maria Cristina Rios – Tocumen International Airport

Ricardo Wong – Tocumen International Airport

Demetrio Galindez Lopez – ASA (Mexico)

Ing. Agustin Minorini, Gte. Corporativo de Mantenimiento, AA2000

Ing. Enrique Catalano, Gte. Corporativo de Seguridad Operacional, AA2000

Agenda Item 3: ASIAS

3.1 The FAA/CAST Representative provided the Meeting with a presentation on the Aviation Safety Information Analysis and Sharing (ASIAS) system, which included system capabilities.

3.2 The Meeting was informed that a MITRE Corporation Representative will participate in the RASG-PA/ESC/9.

3.3 The Meeting discussed the establishment of an Issue Analysis Team (IAT) to conduct direct studies and provide reports as required for the ASIAS initiative and other RASG-PA programs.

3.4 The Meeting agreed that the IAT will meet and report to PA-RAST as required.

3.5 The IAT met in Bogota, Colombia, on 19 June 2012. The initial meeting was composed of representatives from ACI-LAC, Airbus, ALTA, Boeing, Brazil ANAC, CASSOS, IATA, ICAO and Mexico DGAC.

3.6 The IAT considered that there is a need to determine their Terms of Reference (TORs), membership, champions, methodology, reporting process, etc. Therefore, due to time constraints, discussion on these issues was deferred to the PA-RAST/10 Meeting that will be held in Seattle, United States, from 13 to 14 August 2012.

Agenda Item 4: Runway Safety Team (RST) Update

4.1 ICAO (Ecuador, Jamaica, Mexico)

4.1.1 *See Agenda Item 2 of this report.*

4.2 United State FAA

4.2.1 The discussion regarding the FAA RST activities was moved to the PA-RAST/10 Meeting that will be held in Seattle, United States, from 13 to 14 August 2012.

Agenda Item 5: Other business

5.1 The PA-RAST developed an outline for Terms of Reference for the group. A draft TOR document will be developed and distributed for comment. The Meeting agreed to prepare a final draft for submission to the ESC during the RASG-PA/ESC/14 Meeting in Seattle, United States, 15-16 August for approval.

5.2 The initial outline developed is the following:

- Rules of participation
 - Expectation of commitment
- Transparency
 - Post documents on available medium
- Co-Chairs and Vice-Chairs
 - Elections
 - Terms
 - Roles and responsibilities
 - Secretariat role/participation
- DIP Champions (roles/requirements)
 - Commitment to tasks and for participation
 - Accountability
- Language
 - Meetings in English, documents translated as required and as approved by PA-RAST
- Meetings
 - Quarterly meetings in conjunction with ESC meetings, monthly teleconferences, and other meetings as required
 - Teleconferences focused on status
- Host website
 - Use of annual safety report for data
- Governance
- Administrative (separate the what from the how)

5.3 The Meeting noted the importance of continuing to complete tasks that had been previously developed by the PA-RAST and approved by the ESC. The Meeting also noted that the level of deliverables and accomplishments that had been completed to date had increased in addition to an increase in stakeholder participation. To maintain this level of accomplishment, the Meeting agreed that team members needed to commit to attending meetings and, if possible, provide additional financial, in-kind, or personnel resources to accomplish PA-RAST objectives.

5.4 The Meeting also acknowledged the relevance of promoting and communicating RAS-PA accomplishments, success stories, as well as on-going activities of RASG-PA and its Teams. Therefore, the Meeting decided to make a list to inform the RASG-PA/ESC and the audience of the Third Pan American Aviation Safety Summit as follows:

- RASG-PA accomplishments:
 - Distributed RERR Toolkit version 2 to operators and States
 - Conducted surveys on go-around policies and unstable approach mitigation
 - Provided advanced maneuvers manual to all operators
 - Developed RASG-PA Aviation Safety Workshops (3 delivered, 4 more planned) averaging 100 participants
 - Developed and delivered Pilot Monitoring Toolkit through RASG-PA Aviation Safety Workshops
 - Developed first draft of Guidance for Runway Maintenance in accordance with ICAO Annex 14
 - Compiled and published aviation training material available on the RASG-PA website (www.RASG-PA.org)
 - Standardized CFIT training across operators in the region
 - Developed RASG-PA Safety Advisory (RSA) process
 - Developed and submitted a RSA on Mode Awareness and Energy State Management Risks for dissemination
 - Implemented the Runway Safety Team in Mexico City, Mexico
- Success stories:
 - Identified 30 Safety Enhancement Initiatives (top 3 aviation safety risk areas in Pan American Region)
 - 9 DIPs in the process, 1 closed
 - 27 Outputs developed, 11 closed
 - Developed MOU between RASG-PA and CAST to use ASIAs information
- On-going activities:
 - Working on 21 Safety Enhancement Initiatives (SEIs)

5.5 Summary of RASG-PA Executive Steering Committee (RASG-PA/ESC) recommended actions are:

The ESC is invited to note the progress of PA-RAST activities as detailed in the summary of discussions of this Meeting and:

- a) Approve the new PA-RAST organizational structure as detailed in this summary
- b) Approve the creation of the Issue Analysis Team (IAT)
- c) Promote the participation of PA-RAST members in upcoming meetings
- d) Promote and disseminate the accomplishments of PA-RAST
- e) Provide additional resources for the accomplishment of PA-RAST activities