INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

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

TWENTIETH SECOND PAN AMERICA – REGIONAL AVIATION SAFETY TEAM MEETING

PA-RAST/22

SUMMARY OF DISCUSSIONS

LONG BEACH, UNITED STATES, 7 TO 9 DECEMBER 2015

Twentieth Second Pan America — Regional Aviation Safety Team Meeting (PA-RAST/22)

Provisional Summary of Discussions

Date	7 to 9 December 2015
Location	Long Beach, United States, Boeing Facilities
Meeting Opening	The Meeting was attended by 17 participants from 4 States/Territories, and 5 International Organizations and industry. See **Appendix A**. Mr. Gerardo Hueto, Chief Aviation System Safety, Boeing, welcomed participants to the Meeting, and Mr. Eduardo Chacin, Regional Officer, Acting Deputy Regional Director, ICAO NACC Regional Office, and Secretary of the Meeting, extended appreciation to Boeing on behalf of the RASG-PA Secretariat for hosting the event. Messrs. Franklin Hoyer, Regional Director; and Oscar Quesada, Deputy Regional Director, both from the ICAO South American (SAM) Regional Office; and Mr. Andreas Meyer, Safety Management Officer, ICAO Headquarters, attended the meeting. Mr. Adriano Monteiro de Oliveira, Brazil, and Mr. Gabriel Acosta, IATA, acted as PA-RAST Co-Chairpersons of the Meeting, representing States/Territories and International Organizations and Industry respectively.
Discussion Items	
Agenda Item 1:	**Approval of the Provisional Agenda** 1.1 The Co-Chairperson, International Organizations and Industry, presented WP/01 inviting the Meeting to approve the provisional agenda, which was approved. 1.2 The Meeting agreed to hold breakout sessions of the Safety Enhancement Teams (SETs), in order to continue developing the Detailed Implementation Plans (DIPs) for Loss of Control – In Flight (LOC-I), Controlled Flight Into Terrain (CFIT), and Runway Excursion (RE).
Agenda Item 2:	**PA-RAST Action Items** 2.1 The Meeting updated the status of the PA-RAST action items. See **Appendix B.**

Agenda Item 3: **Twelfth Information Analysis Team (IAT/12) Report**

3.1 The IAT/12 Meeting was held on 14 December 2015 at the same location and with the same participation of the PA-RAST/22 Meeting.

3.2 The appropriate non-disclosure agreements for Aviation Safety Information Analysis and Sharing (ASIAS) data were duly signed by RASG-PA Members attending the IAT and PA-RAST Meetings for the first time.

3.3 Boeing, as the IAT Rapporteur, informed that ASIAS database and IATA Flight Data eXchange (FDX) database were reviewed, seeking precursors in a predictive way for preventing RE, LOC-I, CFIT, and Mid Air Collision (MAC) events such as:

- Unstable Approach (UA)
- Loss of Control – In flight (LOC-I) indicators
- Terrain Avoidance Warning System (TAWS)
- Traffic Collision Avoidance System (TCAS)

3.4 The Rapporteur also informed that the ASIAS data from North American airlines have been compared with the IATA FDX data from Latin American airlines, all operating in the CAR and SAM Regions, and that they coincided on the identified “hot spots” as mentioned under 3.5.

3.5 The Rapporteur indicated the Meeting that the locations of concern in the CAR and SAM Regions, identified as “hot spots” by RASG-PA (six international airports and four areas in the airspace) continue to be the same.

3.6 The Rapporteur informed the Meeting that no emerging regional trend was identified by the IAT.

3.7 The Meeting was informed that RASG-PA representatives met in closed sessions, particularly with the Civil Aviation Authorities that attended the Fourteenth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/14) in Santiago, Chile, from 27 to 30 October 2015, to share proactive safety information on Flight Operations Quality Assurance (FOQA) collected by ASIAS and IATA FDX in their States, and to offer RASG-PA assistance, through monitoring or visits of a RASG-PA Tactical Go-Team as required. The Meeting was informed that the States that attended the sessions considered them very valuable. It was agreed by the Meeting that this methology would be key for promoting RASG-PA and for encouraging States to participate in the activities and to adopt RASG-PA Safety Enhancement Initiatives (SEIs), as applicable.

Agenda Item 4: **Safety Enhancement Team (SET) 1 — *Loss Of Control-Inflight (LOC-I) Detailed Implementation Plan (DIP)***

4.1 United States, as Rapporteur of SET 1, presented the progress of the DIPs as follows:

- Safety Enchancement (SE) 192: IATA/ALTA has completed a world-wide service bulletin implementation status survey. The response rate is 30%. Only one respondent in the Pan American Region has not implemented an Original Equipment Manufacturer (OEM) Alert Service Bulletin. Additional information will be provided at the next PA-RAST.

- SE 196 – 199:

    a. The Team formed a group to identify and evaluate existing guidance material;
    b. the Team will catalogue the material and cross-referenced the DIP training scenarios (an interactive set of guidance/DIP material); and
    c. another team will prepare two surveys:
        i. States:
            1. Certification of flight safety training devices
            2. Approval of flight crew training programmes
        ii. Operators:
            1. Training scenarios
            2. Enhanced crew resource management

4.2 **Appendix C** shows the SET 1 presentation provided to the Meeting.

4.3 IATA informed that it will lauch a survey to assess the use of available terrain awareness technologies and how frequently the software/database used is updated. This survey includes 14 mandatory questions, available at the following link: https://www.surveymonkey.com/r/L5M8YM8

Agenda Item 5: **Safety Enhancement Team (SET) 2 — *Controlled Flight Into Terrain (CFIT) Detailed Implementation Plan (DIP)***

5.1 IATA, as Rapporteur of SET 2, informed the Meeting that the coordination is ongoing with SET 1 to schedule the CFIT and LOC-I seminars.

Agenda Item 6: **Safety Enhancement Team (SET) 3 — *Runway Excursion (RE) Detailed Implementation Plan (DIP)***

6.1 ALTA, as Rapporteur of SET 3 presented the four DIPs as follows:

1. RASG-PA/RE/215 – 216 – Landing Training for Flight Crews.
2. RASG-PA/RE/217 – Airline Operations and Training – Take-off Procedures and Training.
3. RASG-PA/RE/218 – Implementation of on-board technologies.

4. RASG-PA/RE/219 – Air Traffic Service Provider Training to Prevent Runway Excursions.

6.2 The Meeting agreed to present the DIPs to the ESC/25 Meeting for consideration. See **Appendix D**.

Agenda Item 7: **PA-RAST/22 Meeting Actions Items (AI)**

7.1 The Meeting reviewed the PA-RAST/22 Meeting AIs. No new AIs were added to the list.

Agenda Item 8: **PA-RAST/23 Meeting**

8.1 The Meeting was informed that the PA-RAST/23 Meeting will be held in Sao Jose Dos Campos, Brazil, from 1 to 3 March 2016, hosted by Embraer.

Agenda Item 9: **Other Business**

9.1 ICAO Headquarters provided a progress report on airport surface wind models for the analysis of tailwind landings and sought input from RASG-PA on the definition of categorization for wind speed. The comments of RASG-PA are taken on board and will be reflected in further refinement of the models. It is anticipated that the wind models will be made available to RASG-PA in the first quarter of 2016.

9.2 Furthermore, ICAO introduced the "Collision Risk Assessment and Communication Coverage Analysis", which is currently in use in the Africa-Indian Ocean (AFI) Region and offered its expertise participation in the MAC SET Team to include these concepts in the Pan American Region.

9.3 ICAO also asked RASG-PA to participate in a small working group for further development of nominal descent path analysis, as presented at the meeting. Visit: https://flightaware.com/adsb/coverage

9.4 Boeing provided a presentation to the Meeting on "Fatality Risk Overview." The fatality risk measure, as used in many of the charts for aviation safety, is a measure of the relative or absolute chance of perishing while onboard a randomly chosen flight in the aviation system. There are several different ways in which fatality risk can be measured. CAST and RASG-PA adopted the method advocated by Arnie Barnett – Massachusetts Institute of Technology professor. See **Appendix E**.

9.5 A presentation from ICAO Headquarters regarding "Nominal Descent Path Analysis", and another from Boeing regarding "Fatality Risk Overview", were provided both under Other Business.

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APPENDIX A

LIST OF PARTICIPANTS

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APPENDIX B

PA-RAST VALID ACTIONS ITEMS (AI)

Action Item #	Description	Action Owner	Remarks	Status
PA-RAST/15/A14	Include LHDs in the work of SET 4 that will deal with MAC. Agenda Item 15	SET 4	• SET 4 will be formed after SET 1 and SET 2 develop their respective DIPs • SET 4 activities to be coordinated with GREPECAS • PA-RAST/19: delayed due to lack of human resources to accomplish the task	Valid
PA-RAST/16/A2	Include Portuguese language tab in the ACI-LAC website. Agenda Item 13.3	ACI-LAC	• ACI-LAC to inform its status	Valid
PA-RAST/17/A1	Boeing to provide crew members and flight simulator use to assist ALTA in simulator video. Agenda Item 4	Boeing	• Reply from Boeing is pending	Valid
PA-RAST/19/A1	Programme session with the assistance of a facilitator between pilots and air traffic controllers, in order to discuss the simulated flight execution presented in the RASG-PA Runway Excursion (RE) Prevention Video RREPV. Agenda Item 4	ALTA	• The Secretariat will coordinate the activity under the RASG-PA Aviation Safety Training Team (ASTT) programme • Seminar to be held at the ICAO NACC RO, sponsored by Mexico, SENEAM, ALTA, IFALPA, CPAM, etc.	Valid
PA-RAST/20/A1	Conduct LOC-I workshops, initially with one State (Chile) and two operators (LATAM and Sky Airways). Agenda Item 4	IATA	• In preparation for the Workshop set up a teleconference with Chile, IATA LATAM and Sky Airways to introduce the team, the LOC-I DIPS and a possible workshop date(s)	Valid

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Loss of Control – Inflight (LOC-I) Safety Enhancement Team (SET)

Status Report

Prepared by: Warren Randolph

Presented to: RASG-PA/ESC/25

Date: December 10, 2015

SET Process

1. Review and analysis of accident risk
2. Review of applicable safety enhancements
3. Start preparing DIPs
4. Review DIPs with PA-RAST
5. Present DIPs to ESC for information

6. Coordinate DIP Implementation at PA-RAST

7. Monitor progress

Completed

Today

Planned

The LOC-I SET TEAM

Team members include:

- IATA*
- ALTA
- CAST/FAA
- IFALPA
- UK/CAA
- Brazil/ANAC

*Champion

LOC-I Design DIP Work Timeline

DIP 192 Low Airspeed Alerting

6 months

Output 1: IATA/ALTA will identify availability of manufacture service bulletins by fleet

30 months

Output 2: Air carriers implement existing manufacturer service bulletins, installing low airspeed alerting functionality in their existing airplanes (as practical and feasible)

Combined Training DIP 196-199 Timeline

DIP 196 Effective Upset Prevention and Recovery Training, Including Approach-to-Stall

- 18 months — **Output 1**: Identify simulator capabilities in the region
- 4 months — **Output 2**: RASG-PA develops guidance material for upset prevention and recovery training
- 12 months — **Output 3**: Conduct a series of joint industry-government workshops to develop training for UPRT
- 48 months — **Output 4**: Air carrier recurrent and initial approach-to-stall training procedures are revised

DIP 197 Flight Crew Training for Non-Normal Situations

- 4 months — **Output 1**: RASG-PA develop guidance material for stable flight in non-normal situation
- 12 months — **Output 2:** Conduct a joint industry-government seminar and workshop for training consensus
- 48 months — **Output 3**: Air carrier recurrent and initial training programs are revised and implemented

DIP 198 Scenario-Based Training for Go-Arounds

- 4 months — **Output 1**: RASG-PA provides guidance from the FAA guidance for go-around scenario training
- 12 months — **Output 2:** Conduct a joint industry-government seminar and workshop for training consensus
- 36 months — **Output 3**: Air carrier policies, procedures, and training are modified for senario based go-around training

DIP 199 Enhanced Crew Resource Management

- 4 months — **Output 1**: RASG-PA Advisory Circular (AC) 120-51 assessed for specific PM duties
- 12 months — **Output 2**: Air carriers assess ECRM training programs using RASG-PA guidance.
- 24 months — **Output 3**: Air carrier revised training programs from Output 1 and Output 2
- 24 months — **Output 4**: Air carrier develops processes to solicit feedback for evaluating EDRM and PM

Thank You!

Gracias!

Obrigado!

Backup Information

Safety Enhancement SE 192
Design – Low Airspeed Alerting
Implementation Status

- Output 1: IATA/ALTA will identify availability of manufacturer service bulletins by fleet
  - IATA has administered a world-wide survey to determine which member airlines have implemented the Alert Service Bulletin (insert bulletin #)
  - Currently analyzing the results of the survey responses
    - World-wide response rate of 30%
    - RASG-PA region response rate higher than the world-wide response rate
    - One operator in the PA Region has not implemented the Alert SB
- Suggested next-step: ICAO offices will send a State Letter with a RASG-PA Safety Advisory (RSA) recommending to conduct a risk analysis for the implementation of the Alert SB

Safety Enhancement SE 196
Training - Effective Upset Prevention and Recovery Training, Including Approach-to-Stall

- Output 1: Identify simulator capabilities in the region
  - Drafting a survey to determine if States:
    - certify flight simulation training devices
    - approve flight training programs
- Output 2: RASG-PA develops guidance material for upset prevention and recovery training
  - A guidance material working group has been formed
  - An online repository has been established
  - The working group is in the process of collecting and evaluating existing UPRT guidance material
  - Relevant material will be uploaded to the online repository
  - Ultimately, the existing guidance material will be cross-referenced with the training scenarios in the DIP

Safety Enhancement SE 196
Training - Effective Upset Prevention and Recovery Training, Including Approach-to-Stall (cont'd)

- Output 3: Conduct a series of joint industry-government workshops to develop training for UPRT
  - Drafting a survey for air carriers in the region
    - Baseline UPRT, including approach-to-stall, training scenarios
    - Web-enabled
  - Developing an introduction to the survey
    - Intended audience (training departments – not safety departments)
    - Qualifications of the respondents

Safety Enhancement SE 197
Training - Policy and Training for Non-normal Situations

- Output 1: RASG-PA develop guidance material for stable flight in non-normal situation
  - A guidance material working group has been formed
  - An online repository has been established
  - The working group is in the process of collecting and evaluating existing policy and training guidance material for non-normal situations.
  - Relevant material will be uploaded to the online repository
  - Ultimately, the existing guidance material will be cross-referenced with the training scenarios in the DIP
- Output 2: Conduct a joint industry-government seminar and workshop for training consensus
  - Drafting a survey for air carriers in the region
    - Baseline non-normal situation training scenarios
    - Web-enabled
  - Developing an introduction to the survey
    - Intended audience (training departments – not safety departments)
    - Qualifications of the respondents

Safety Enhancement SE 198
Training – Scenario-Based Training for Go-Around Maneuvers

- Output 1: RASG-PA develop guidance material for go-around training scenarios
  - A guidance material working group has been formed
  - An online repository has been established
  - The working group is in the process of collecting and evaluating existing policy and training guidance material for go-around training.
  - Relevant material will be uploaded to the online repository
  - Ultimately, the existing guidance material will be cross-referenced with the training scenarios in the DIP
- Output 2: Conduct a joint industry-government seminar and workshop for training consensus
  - Drafting a survey for air carriers in the region
    - Baseline go-around training scenarios
    - Web-enabled
  - Developing an introduction to the survey
    - Intended audience (training departments – not safety departments)
    - Qualifications of the respondents

Safety Enhancement SE 199
Training - Enhanced Crew Resource Management Training

- Output 1: FAA Advisory Circular (AC) 120-51 assessed for specific PM duties
  - A group will be formed to assess FAA AC 120-51 (and other relevant material) to place specific emphasis on the duties and responsibilities of the pilot monitoring
  - The group will include pilot monitoring concepts into the air carrier survey (ref SE 197 & 198; Output 2)
  - The group will draft and disseminate guidance ECRM guidance material
- Output 2: Air carriers assess ECRM training programs using RASG-PA guidance.
  - IATA and ALTA have agreed to disseminate RASG-PA ECRM guidance once developed and approved by RASG-PA ESC.

Draft Airline Survey Questionnaire

Screen Shot

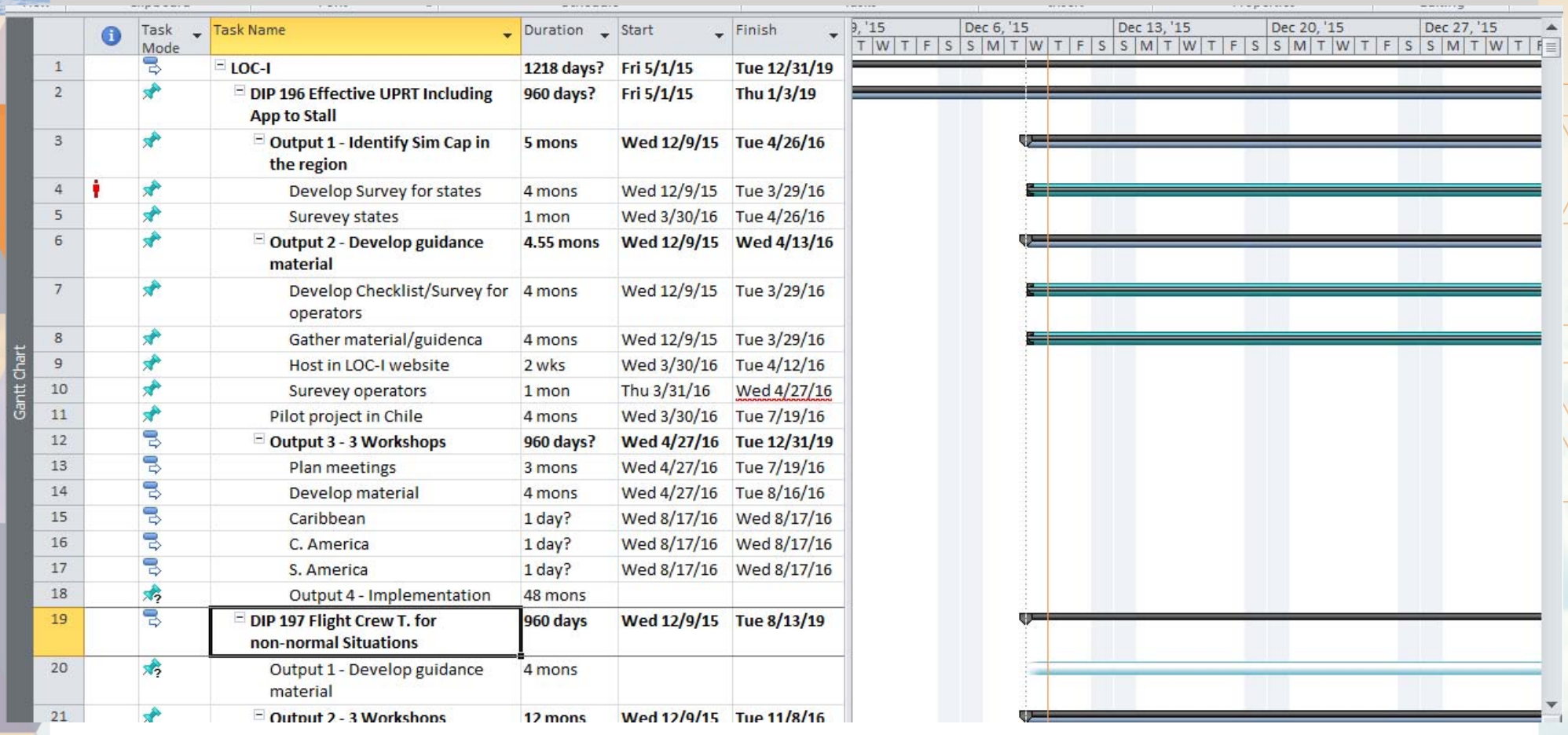
Area	question	no/yes/question is unclear	Comments
a. Approach-to-stall (i.e., up to warning activation) scenarios:	i. approach-to-stall with the autopilot engaged (including autothrottles disengaged, inoperative or not installed), with emphasis on the effect of autopilot trim/auto-trim and combinations of autoflight modes that can lead to low energy state (e.g., use of vertical speed modes in climb near the airplane's performance ceiling)		
	ii. a demonstration of recognition and recovery from initial improper response to approach-to-stall		
	iii. high-altitude approach-to-stall (service ceiling for the weight) to include recognition of low and high speed buffet, performance capabilities of the engines and flight control sensitivity		
	iv. low-altitude approach-to-stall (terrain critical) and recovery with ground proximity warning system (GWPS) alerts		
	v. Indication failures (i.e., speed, altitude failures/malfunctions)		
	i. The key concept that reduction of angle of attack is the most important response when confronted with a stall event. The training should emphasize treating an approach to stall the same as a full stall, executing the stall recovery at the first indication of the stall and emphasizing that reduction of angle of attack is the most important response.		
	ii. Evaluation criteria for a recovery from a stall or approach-to-stall that does not mandate a predetermined value for altitude loss and should consider the multitude of external and internal variables which affect the recovery altitude.		

State Survey Topics

- Two topics for the State Survey
  - Certification of Flight Simulator Training Devices
    - Aerodynamics Evaluation
    - Instructor Operating System Evaluation
    - Statement of Compliance (SOC) requirements
    - Acceptance of foreign certificates
  - Approval of Operator Flight Training Programs
    - Process for evaluating and approving training program (regulations)
    - Criteria/standards used to evaluate proposed training programs
    - Process for reviewing and approving changes to existing training programs
    - Evidence required to support requested changes to training programs.
- Are the training devices appropriate/capable for the proper execution the approved training programs?

LOC-I SET MS Project

Screen Shot



	Task Mode	Task Name	Duration	Start	Finish
1		**LOC-I**	**1218 days?**	**Fri 5/1/15**	**Tue 12/31/19**
2		**DIP 196 Effective UPRT Including App to Stall**	**960 days?**	**Fri 5/1/15**	**Thu 1/3/19**
3		**Output 1 - Identify Sim Cap in the region**	**5 mons**	**Wed 12/9/15**	**Tue 4/26/16**
4		Develop Survey for states	4 mons	Wed 12/9/15	Tue 3/29/16
5		Surevey states	1 mon	Wed 3/30/16	Tue 4/26/16
6		**Output 2 - Develop guidance material**	**4.55 mons**	**Wed 12/9/15**	**Wed 4/13/16**
7		Develop Checklist/Survey for operators	4 mons	Wed 12/9/15	Tue 3/29/16
8		Gather material/guidenca	4 mons	Wed 12/9/15	Tue 3/29/16
9		Host in LOC-I website	2 wks	Wed 3/30/16	Tue 4/12/16
10		Surevey operators	1 mon	Thu 3/31/16	Wed 4/27/16
11		Pilot project in Chile	4 mons	Wed 3/30/16	Tue 7/19/16
12		**Output 3 - 3 Workshops**	**960 days?**	**Wed 4/27/16**	**Tue 12/31/19**
13		Plan meetings	3 mons	Wed 4/27/16	Tue 7/19/16
14		Develop material	4 mons	Wed 4/27/16	Tue 8/16/16
15		Caribbean	1 day?	Wed 8/17/16	Wed 8/17/16
16		C. America	1 day?	Wed 8/17/16	Wed 8/17/16
17		S. America	1 day?	Wed 8/17/16	Wed 8/17/16
18		Output 4 - Implementation	48 mons		
19		**DIP 197 Flight Crew T. for non-normal Situations**	**960 days**	**Wed 12/9/15**	**Tue 8/13/19**
20		Output 1 - Develop guidance material	4 mons		
21		**Output 2 - 3 Workshops**	**12 mons**	**Wed 12/9/15**	**Tue 11/8/16**

Gantt Chart

Dec 6, '15 | Dec 13, '15 | Dec 20, '15 | Dec 27, '15

T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F

Runway Excursion (RE)
Safety Enhancement Team (SET)

Runway Excursion SE Presentation

Prepared by: RE SET

Presented to: RASG-PA ESC 25

Date: 12-10/11, 2015

RASG-PA 2020 Objective

Using 2010 as a baseline, reduce fatality risk of Part 121 equivalent operations by 50% by the year 2020 in Latin America and the Caribbean

The RE SET TEAM

Team members include:

- IATA
- ALTA *
- FAA
- CAST
- ICAO
- Embraer
- Boeing
- Airbus
- Costa Rica DGAC

*Champion- ALTA: Capt. Augusto Herrera and Juan Sarmiento

SET Process

1. Review and analysis of accident risk
2. Review of applicable safety enhancements
3. Start preparing DIPs
4. Review DIPs with PA-RAST
5. Present DIPs to ESC for Approval
6. Coordinate DIP Implementation at PA-RAST
7. Monitor progress

Completed

Today

Planned

5. Present DIPs to ESC for Approval

Landing Excursion Mitigation

Overall Awareness of RE Landing RISK in Policies and Procedures
(Regulators, Air Traffic Control, Airports, Operators, Manufacturers)

Landing Distance Assessment

Enhance approach and landing stability, flare and touchdown: ATC and Crew Training

Timely and accurate field condition reports (winds and runway surface conditions) & ATC tailwind limits

Long Landing Awareness

Crews knowledge and use of airplane stopping devices

Airplane systems that enhance the flight crews ability to land and stop the airplane: (e.g., unstabilized approach alerts, flare guidance, deceleration guidance, and features that enhance the crews situational awareness of the airplanes position on the runway;

Systems that quantify braking performance on slippery runways.

Field Conditions and Reporting, RSA

Takeoff Excursion Mitigation

Overall Awareness of RE Takeoff RISK in Policies and Procedures
(Air Traffic Control, Operators)

Timely and accurate wind and runway information (takeoff decision)

Takeoff Performance Planning and Thrust Setting

RTO decision making – training and operator SOPs

Field Conditions and Reporting, RSA

Safety Enhancement SE 215/216
Training - Landing

To reduce runway excursion accidents, pilots should conduct landing distance assessments when applicable and air carriers should define, publish, and train proper techniques for stabilized approach, flare, touchdown, and use of available airplane stopping devices for the following scenarios:

- Landing with reduced or minimal landing distance margin resulting from one or more of:
  - Wet or contaminated conditions
  - Tailwind, including gusts
  - Runway closures that reduce available landing distance
- Landing with conditions conducive to directional control issues, resulting from one or more of:
  - Crosswind, including gusts
  - System failures (thrust, brakes, nose gearing steering, etc.) or Minimum Equipment List (MEL) conditions that results in directional asymmetries

Safety Enhancement SE 217
Training – Takeoff Performance & RTO Decision

To reduce runway excursion accidents, air carriers should conduct the following :

- Develop standard operating procedures and conduct training to ensure the accuracy and entry of takeoff performance data

- Define and update standardize procedures and training for the rejected takeoff (RTO) decision.

Safety Enhancement SE 218
Design - Implementation of Technologies to Reduce/Prevent Landing Overruns

To reduce landing overrun accidents operators should implement on-board technologies to reduce or prevent landing overruns on new and existing airplane designs, as applicable and feasible, through purchase on new airplanes and retrofit on existing transport category airplanes.

- Examples runway overrun prevention systems that meet the intent of this safety enhancement include systems from the following manufacturers
    - Airbus Runway Overrun Protection System (ROPS)
    - Boeing Runway Situation Awareness Tools (RSAT)
    - Embraer
    - Honeywell SmartLanding system

Safety Enhancement SE 219
Training – Air Traffic Service (ATS)

To reduce the risk of runway excursion accidents, air traffic service (ATS) providers in the Pan America (PA) region should develop and implement training for air traffic controllers on the factors that contribute to the risk of runway excursions, including the following conditions and factors:

- Adverse winds effects
- Runway surface conditions
- Unstable approach factors

RE DIP
Work Timelines

RE DIPs - Work Timelines

RE DIPs Timelines

DIP 215/216 Training - Landing

- 8 months — **Output 1**: Develop Guidance Material
- 12 months — **Output 2**: Conduct a series of joint industry-government workshops
- 18 months / 36 months
  - **Output 3**: Air carries revise procedures and training scenarios (18 months);
  - **Output 3**: Pilot Training (36 months);

DIP 217 Training – Takeoff Performance & RTO

- 8 months — **Output 1**: Develop Guidance Material
- 12 months — **Output 2**: Conduct a series of joint industry-government workshops
- 18 months / 36 months
  - **Output 3**: Air carries revise procedures and training scenarios (18 months);
  - **Output 3**: Pilot Training (36 months);

DIP 218 Design – Airplane Technologies to Prevent Landing Overruns

- 12 months — **Output 1** Conduct a series of joint industry-government workshops
- 6 months (Action1) / 36 months (Action 2)

Output 2: Operators to implement on-board technologies to reduce\prevent overruns:
Action 1: ALTA/IATA promote the benefits of technology that reduce or prevent overruns (6 MO)
Action 2: Feasibility assessment for installation of technology (36 MO)

DIP 219 Training – ATC

- 18 months — **Output 1**: Develop Guidance Material
- 12 months — **Output 2**: Conduct outreach workshop
- 48 months — **Output 3**: ATC Training
- 8 months — **Output 4**: Conduct Survey of ATC training

RE DIPs - Work Timelines

RE DIPs Timelines

DIP 215/216 Training - Landing

8 months — **Output 1**: Develop Guidance Material

12 months — **Output 2**: Conduct a series of joint industry-government workshops

18 months / 36 months

Output 3: Air carries revise procedures and training scenarios (18 months)

Output 3: Pilot Training (36 months);

RE DIPs - Work Timelines

RE DIPs Timelines

DIP 217 Training – Takeoff Performance & RTO

8 months

Output 1: Develop Guidance Material

12 months

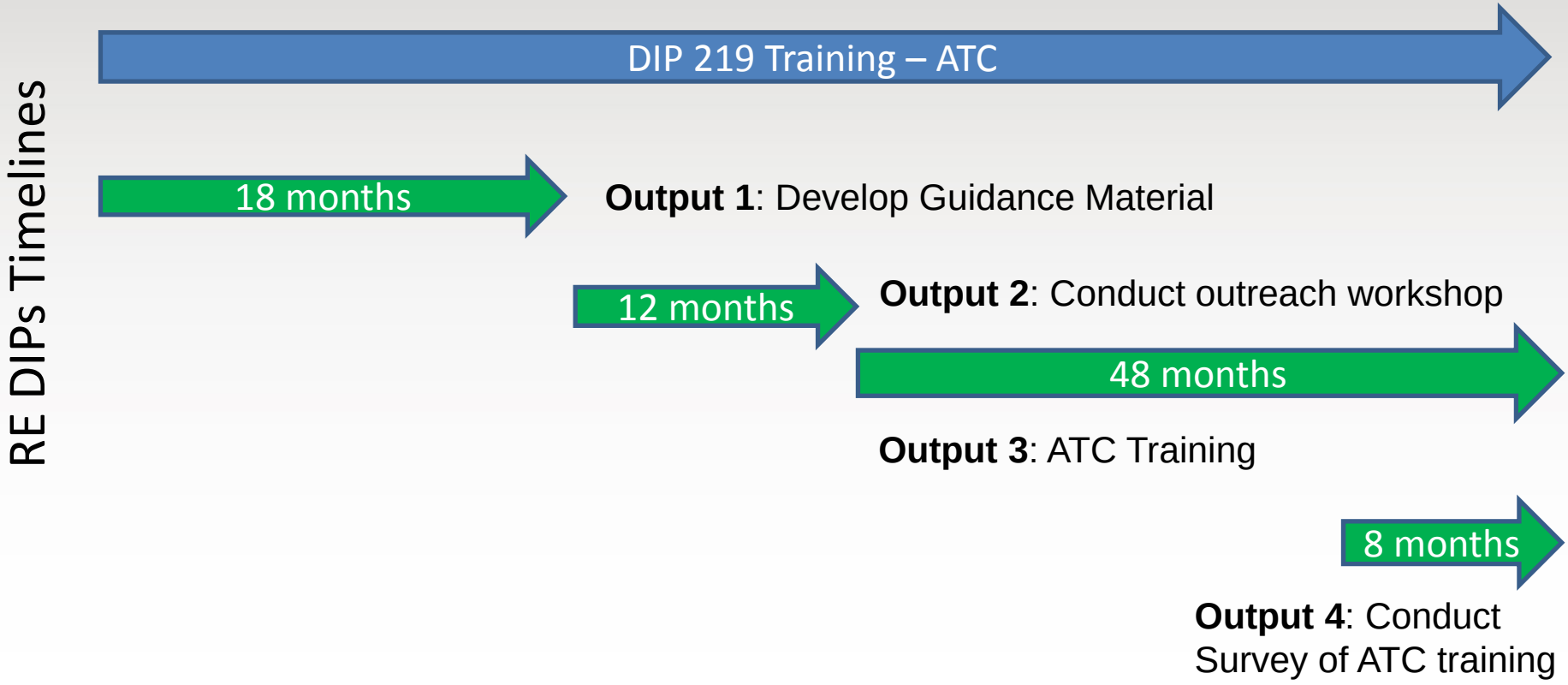
Output 2: Conduct a series of joint industry-government workshops

18 months / 36 months

Output 3: Air carries revise procedures and training scenarios (18 months);

Output 3: Pilot Training (36 months);

RE DIPs - Work Timelines



Future work – RE SET:

5. Develop Guidance Material

6. Support Development of Workshop Presentations

7. Monitor progress of SE Implementation

Thank You!

Gracias!

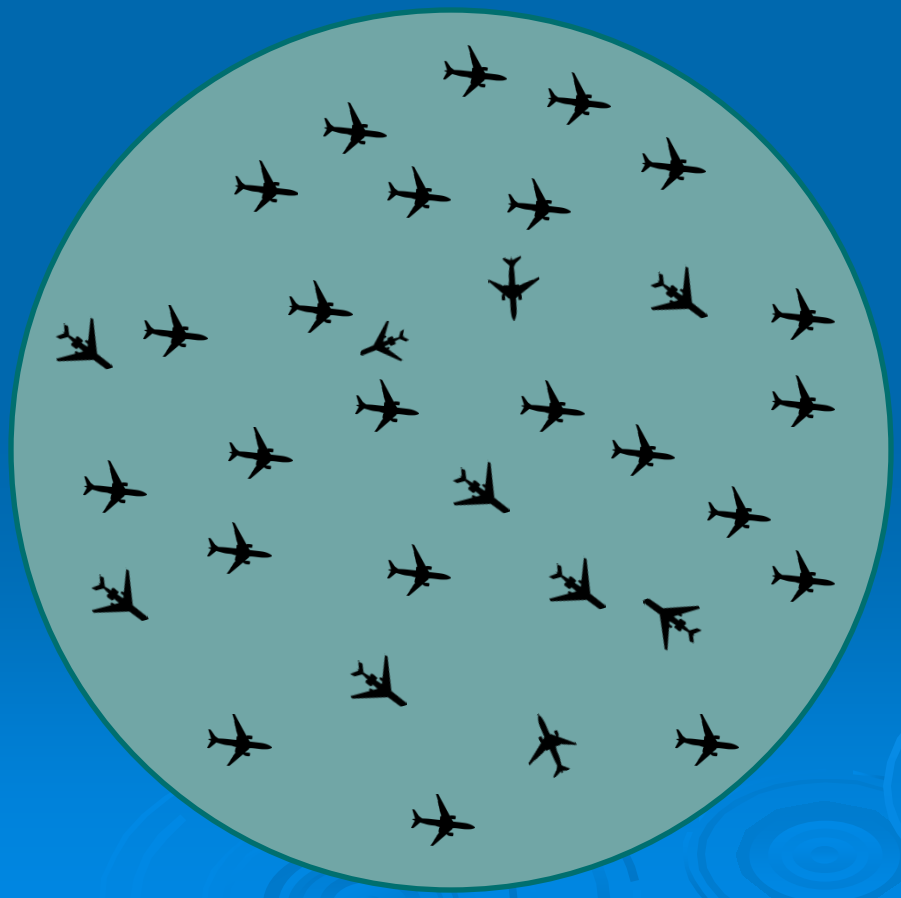
Obrigado!

Appendix E

Fatality Risk Overview

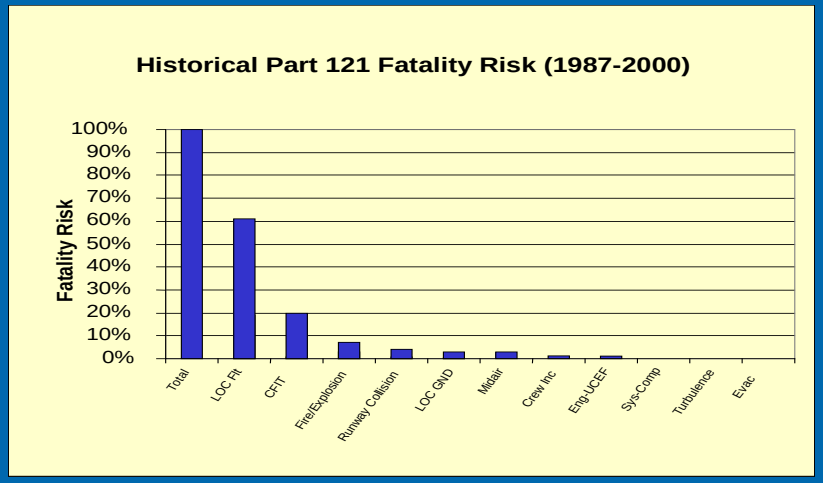
What is Fatality Risk?

Fatality risk is a measure of a person's (passenger or crew) chance of perishing in an accident on a randomly chosen flight.

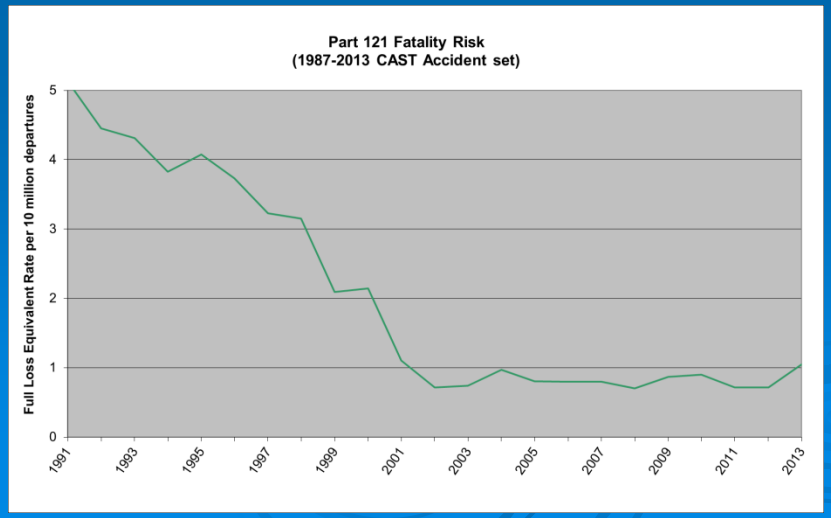


Fatality Risk Can be Shown as Pareto or as a Defined Rate

A fatality risk accident pareto is used to show the historic distribution of accident types that contributed to the overall fatality risk.



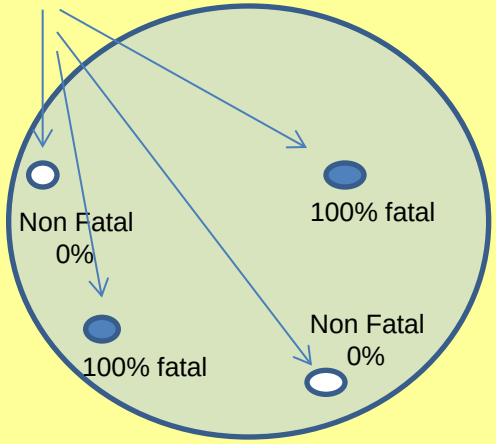
Defined Rate



Calculating Historical Fatality Risk

Accidents

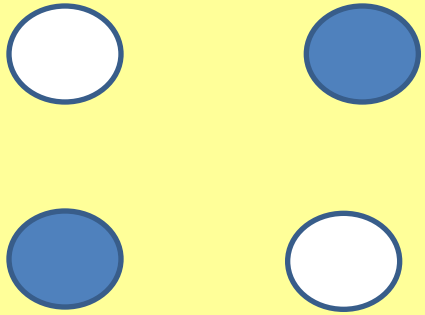
Case 1



All Flights

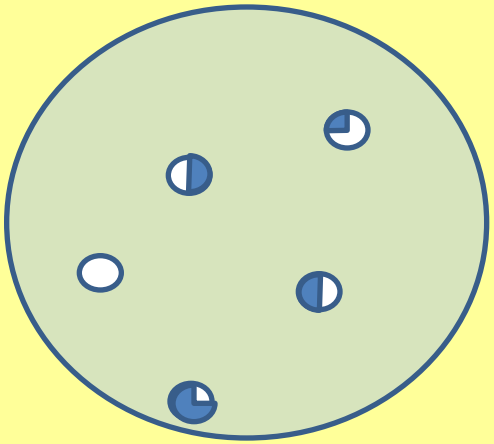
Accidents

Four Accidents - Blue is portion onboard that perish



Expectation of perishing on a randomly chosen flight= 2/total number of flights

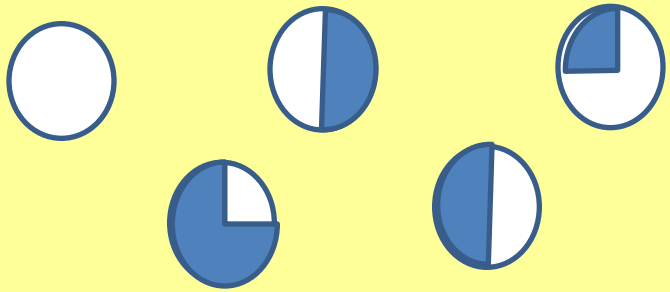
Case 2



All Flights

Accidents

Five Accidents - Blue is portion onboard that perish



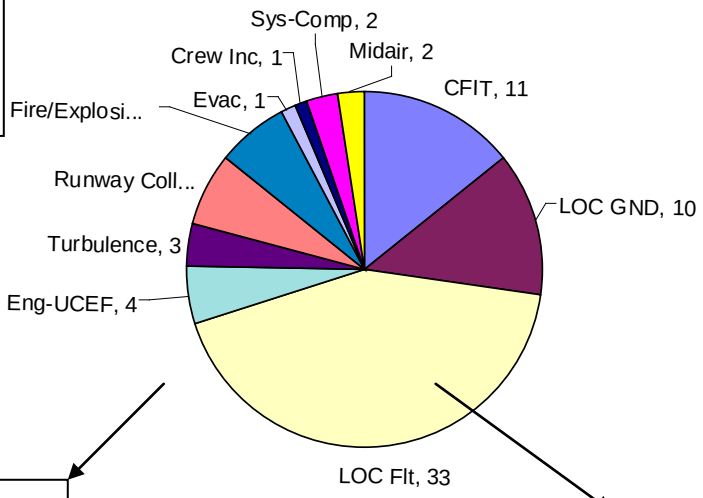
Expectation of perishing on a randomly chosen flight= 2/total number of flights

Compare Case 1 & Case 2

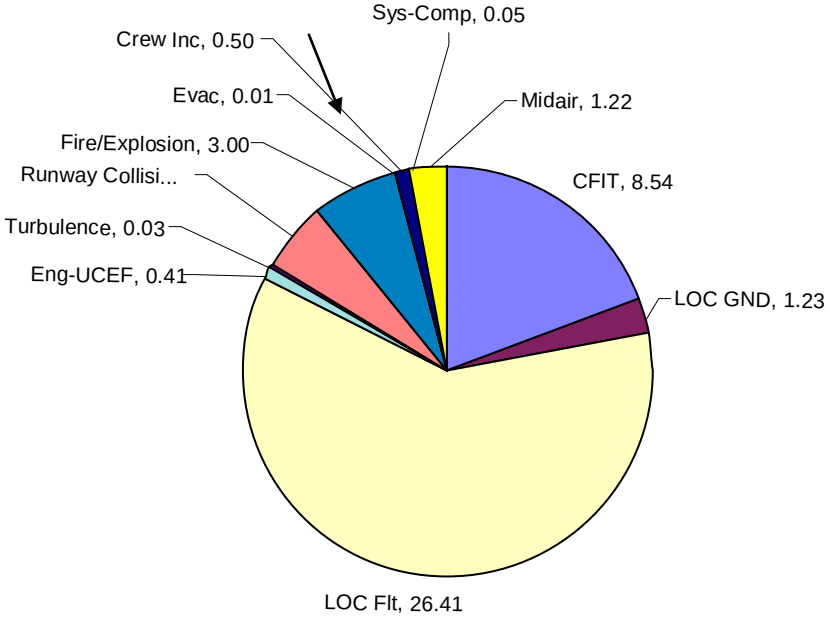
Chance of perishing on a randomly chosen flight is the same for Case 1 & Case 2
= 2/total number of flights

Fatality Risk Rate = Σ (portions of onboard people that perish in accidents / Σ All Fights

1987-2000 Part 121 Hull Loss And/or Fatal Accidents (77 Accidents)
(~118 E6 Departures 1987-2000)

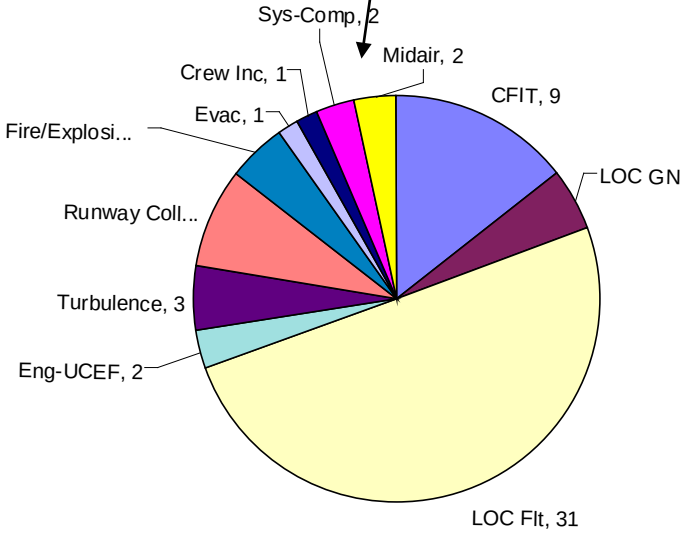


Fatality risk: The number of full airplane fatality equivalents occurring in accident period (43.9 full airplane equivalents)

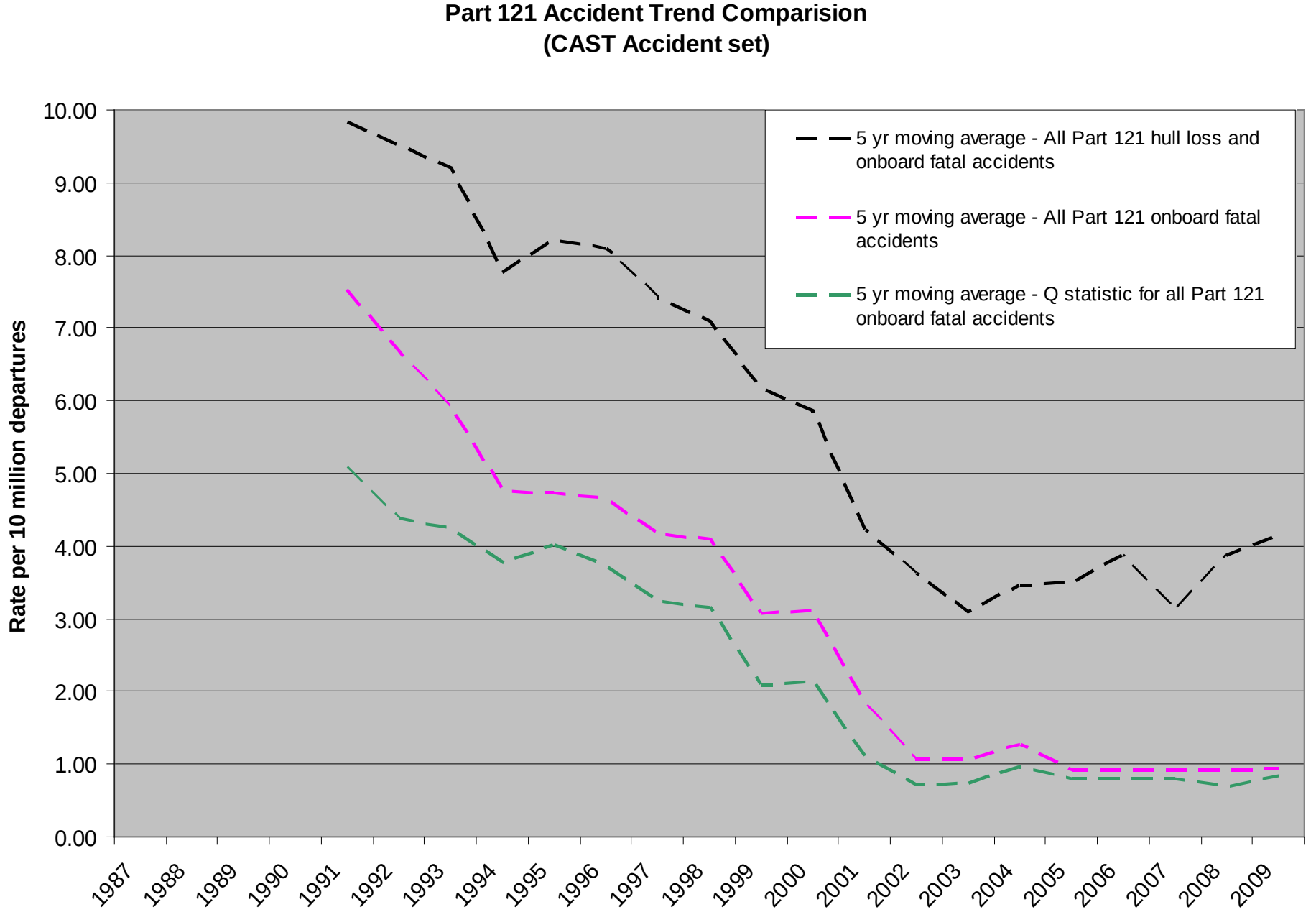


Basis for Fatality Risk Reduction (Current CAST Metric)

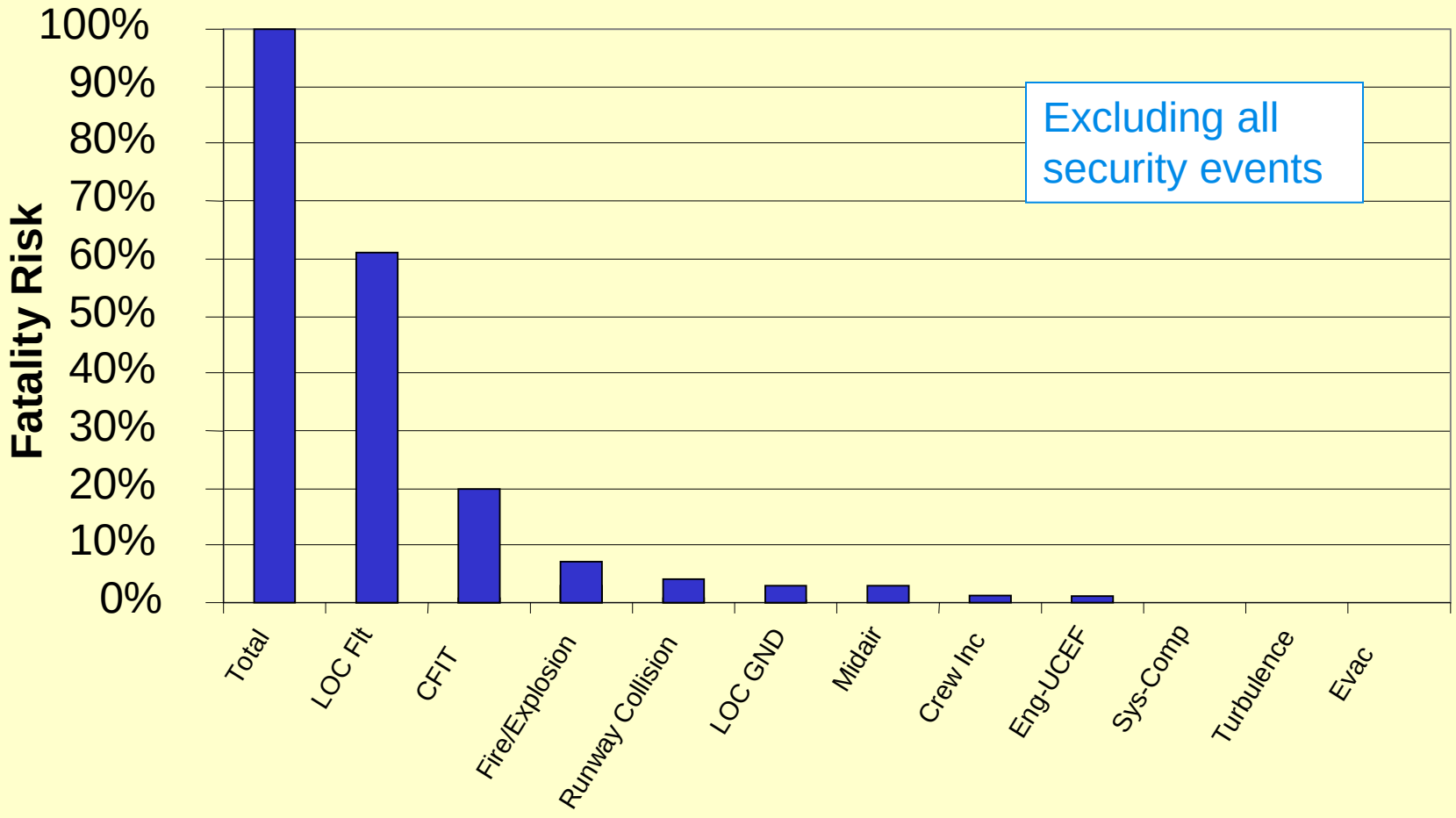
Fatal accident rate: The number of fatal accidents occurring in a given period (62 accidents had on board fatalities)



Basis for Fatality Accident Rate Reduction


Part 121 Accident Trend Comparision
(CAST Accident set)
Rate per 10 million departures
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
5 yr moving average - All Part 121 hull loss and onboard fatal accidents
5 yr moving average - All Part 121 onboard fatal accidents
5 yr moving average - Q statistic for all Part 121 onboard fatal accidents

Historical Part 121 Fatality Risk (1987-2000)



The fatality risk measure, as used in many of the charts for aviation safety, is a measure of the relative or absolute chance of perishing while onboard a randomly chosen flight in the aviation system.

There are several different ways fatality risk can be measured. CAST adopted the method advocated by Arnie Barnett – MIT professor which is explained in the two attached articles. These articles are a good read when you have some time.

In a nut shell this method of calculating fatality risk is based on the outcome severity to the people onboard airplanes during past accidents. The severity value assigned to an accident equals the portion of people onboard that perish in the accident. An accident that kills 100 out of 100 onboard (everyone onboard) would have a severity of 100% or 1, an accident that kills 30 out of 100 would be 30% or.3, an accident where nobody died would be 0/100 or 0 and so on. If a person were onboard one of these airplanes at the time of the accident their average chance of perishing in the accident would be the accidents severity value. As you can see the severity measure is independent of airplane size. The fatality risk measure uses these accident severity values to develop an absolute or relative measure of fatality risk. For an absolute measure of fatality risk the severity value of each accident is summed across the accident set. The summed portions are equal to the number of full fatal loss equivalents (See the PowerPoint Slide to see example of summing the portions). When the number of full fatal loss equivalents is divided by the total flight cycles within the period, the quotient (full loss equivalents/total flight cycles) is as measure of the absolute fatality risk. This number equates to the chance of a person perishing per flight cycle on a randomly chosen flight. In the absence of change, the fatality risk rate calculated this way represents the average chance of perishing onboard a randomly chosen flight in the near future.

Fatality risk can also be expressed as a relative measure as is done in fatality risk pareto charts that show the percentage of overall fatality risk by CICTT category. In this case the pareto chart would be developed by allocating the number of full fatal loss equivalents by accident category (numerators of the distribution) and then these values are divided by the total number of full fatal loss equivalents (the denominator).

Fatality risk pareto charts of this type are used to focus attention to the accident categories that pose the greatest fatality risk to people onboard. This is in contrast to the standard accident pareto that shows the distribution of all accidents in the set independent of fatality risk.

The fatality risk concept can be confusing so please email or call me with any questions you may have.

Rob
425 237-3068

Questions?