All Safety Enhancements			(more →)					
CAST Plan as of 06/25/07				**double-click on imbedded files to open**				
Status	**SE #**	**Safety Enhancement**	**Background**	**Detailed Implementation Plans**	**Completed Outputs**	**Output Files**		**Implementation Measurement Templates**
Completed	1	1. CFIT TAWS – One Project	This safety enhancement substantially reduces or eliminates CFIT accidents by improving pilot situational awareness by establishing appropriate procedures for the installation and use of Terrain Awareness and Warning System (TAWS) equipment. Procedures include proper flight crew reaction in regard to TAWS aural and visual warnings.	SE 1.doc	The FAA issued a final rule in March 2000 that requires all new commercial aircraft to be equipped with TAWS equipment by March 2003, and the entire commercial fleet to be equipped by March 2005. The file in this box provides a TAWS report published by the FAA: TAWS final report.doc	TAWS rule.doc	TAWS TSO.doc	
Completed	2	2. CFIT SOPs – One Project	This safety enhancement ensures that all operators establish flight crew Standard Operating Procedures (SOP's) that fit that operator's particular operation, institute SOP training, and encourage operators to use SOP's in all normal operations.	SE 2 .doc	Industry and the FAA worked together to develop an SOP template that was published in new guidance, Standard Operating Procedures for Flight Deck Crew Members (AC 120-71).	AC120-71A.pdf		
Completed	3	3. CFIT PAI – Vertical Angles (PAI 1-7, 11)	This safety enhancement develops criteria to support the inclusion of vertical angles on all existing instrument approach procedures allowing for a stabilized vertical descent to the runway end at all certificated airports within the United States.	SE 3, 4, (5), 6, 7 and 8 .doc	FAA's Aviation Systems Standards (AVN) developed a plan to include vertical angles on instrument approach procedures. Certificated airports (Part 139) were prioritized into high-, medium-, and low-risk categories and were completed first. Eighty-four percent of certificated airports currently have vertical angles included in their published instrument approach procedures.	AVN implementation plan. Note: Numbers do not correspond to SEs. Refer to wording, not numbers.	Latest plan available at: http://avn.faa.gov/content/ifp/cast.pdf	
Completed	4	4. CFIT PAI – VGSI at Runway Ends (PAI 8)	This safety enhancement develops and implements a plan to install Visual Glide Slope Indicators (VGSI) at each runway end of runways used by air carriers.	SE 3, 4, (5), 6, 7 and 8 .doc	New precision-like instrument approach procedures to all runway ends required VGSI lighting at all runway ends used by air carriers. FAA's Air Traffic System Requirements (ARS) developed a plan, and installation has begun.			
Completed	5	5. CFIT PAI – DME at Airports (PAI 2)	This safety enhancement establishes a plan to ensure installation of DME at airports where significant numbers of older air carrier aircraft are expected to operate or where particularly vulnerable instrument approach procedures are located, allowing for a stabilized vertical descent to the runway end.	SE 3, 4, (5), 6, 7 and 8 .doc	Additional DME installation is required in order for older generation commercial aircraft to use the new precision-like instrument approach procedures. FAA's ARS developed a plan to install DME's at locations where older generation commercial aircraft operate.			
Completed	6	6. CFIT PAI – RNAV 3-D Instrument Approach (PAI 13-22)	This safety enhancement develops criteria in FAA Order 8260.48 for approach charts that include 3D RNAV minima and charting specifications for publication of approach charts, which include 3D RNAV minima. This will allow for a stabilized vertical descent to the runway end.	SE 3, 4, (5), 6, 7 and 8 .doc	Elements of this Safety Enhancement are covered in the FAA's Aviation Systems Standards (AVN) plan to include vertical angles on instrument approach procedures.	AVN implementation plan. Note: Numbers do not correspond to SEs. Refer to wording, not numbers.	Latest plan available at: http://avn.faa.gov/content/ifp/cast.pdf	
Completed	7	7. CFIT PAI – RNAV RNP Instrument Approach Procedures (PAI 23-27)	This safety enhancement adds Required Navigational Performance (RNP) criteria and guidance to FAA Order 8260.48, allowing for reduced landing minima. There are only a few air carriers that currently use RNP, and only on their newest airplanes. Authorization is granted by special operation specifications. This enhancement would allow all air carriers to use RNP for equipped aircraft.	SE 3, 4, (5), 6, 7 and 8 .doc	Elements of this Safety Enhancement are covered in the FAA's Aviation Systems Standards (AVN) plan to include vertical angles on instrument approach procedures.	AVN implementation plan. Note: Numbers do not correspond to SEs. Refer to wording, not numbers.	Latest plan available at: http://avn.faa.gov/content/ifp/cast.pdf	
Completed	8	8. CFIT PAI – XLS (ILS, MLS, GLS) (PAI 28-30)	This safety enhancement defines the parameters for future installation of the xLS (laterally and vertically guided approach path) to runway ends not served by Instrument Landing System (ILS).	SE 3, 4, (5), 6, 7 and 8 .doc				

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Completed	9	9. CFIT MSAW – One Project	This safety enhancement ensures that ground-based radars and their associated by-products provide the necessary levels of terrain avoidance protection to aircraft operating domestically within the United States and that air traffic controller MSAW training is adequate and appropriate to operate.	SE 9.doc	All current MSAW data was verified for accuracy. All MSAW systems were checked and a plan for re-check every 540 days was developed. ATC controllers were provided with initial and recurrent training on the use of MSAW.			
Completed	10	10. CFIT Proactive Safety Programs (FOQA + ASAP)	This safety enhancement develops and implements a mutually agreed upon methodology to use de-identified Flight Operations and Quality Assurance (FOQA), and Aviation Safety Action Partnership (ASAP) information to identify safety-related issues and corrective actions. This will give operators the tools to identify safety issues and trends, and initiate corrective actions prior to an accident. It will also allow air carriers to share safety information.	SE 10.doc	The FOQA rule for disclosure protection of reported data was issued in October 2001. FOQA and ASAP are voluntary programs. There are currently 11 carriers participating in the FOQA programs. An additional two carriers are expected to have FOQA programs by March 31, 2003. FAA ASAP guidance was issued in January 2000 and revised in November 2002. There are currently 25 carriers participating in ASAP programs. The ASAP guidance is contained in AC120-66B.	FOQA rule.doc	AC120-66B.pdf	
Completed	11	11. CFIT CRM Training	This safety enhancement reduces CFIT accidents by promoting comprehensive SOPs as a key element of every Part 121 air carrier's CRM training program. Under a related project, a template for comprehensive SOPs is being developed, including SOPs that specifically address CFIT accident prevention.	SE 11.doc	Crew Resource Management Training (AC 120-51) was revised to stress the use of CFIT prevention using SOP's in CRM training. The new AC Standard Operating Procedures for Flight Deck Crew Members (AC 120-71) was also referenced.	AC120-51C.pdf	AC120-71A.pdf	
Completed	12	12. CFIT Prevention Training – One Project	This safety enhancement substantially reduces or eliminates the CFIT accident rate by adding CFIT prevention training and procedures to all Part 121 air carrier training curriculums that emphasize pilot situational awareness and escape procedures for flight crews to use in the event of a terrain warning indication.	SE 12.doc	The CFIT Education and Training Aid was posted on the FAA's website and distributed to every FAA principal inspector for U.S. Part 121 air carriers. It was also sent to every Regional Technical Branch requesting a review to determine if carriers were conducting CFIT training and, if they were not, requesting them to voluntarily initiate a CFIT training program. It was determined that all U.S. air carriers were conducting CFIT Training.	available at http://www1.faa.gov/avr/afs/afs200/afs210/index.cfm		
Completed	13	13. CFIT ATC CFIT Training – One Project	This safety enhancement reinforces current safety alert procedures and good air traffic operating practices by providing initial and recurrent ATC CFIT training for all controllers.	SE 13.doc	Through the use of Air Traffic Bulletins (ATBs), Air Traffic Controllers now receive required initial and annual recurrent ATC CFIT training.	ATB CFIT.doc		
Completed	14	14. ALAR Policies (Safety Culture) – CEO and DOS More Visible (1-2)	This safety enhancement develops a strategy that makes CEOs and other key officers of Part 121 air carriers more visible and more effective in promoting a safety culture targeted to preventing approach and landing accidents.	SE 14, 15 and 16.doc	The following safety culture guidance materials are endorsed by CAST: Operator's Aviation Safety Handbook, SAE-G18 committee document, and the FAA Audit Tool. Handbook Bulletin Air Transportation – 14 CFR Part 121 and 135 Air Carrier Safety Departments, Programs, and the Director of Safety (HBAT 99-19) was also endorsed by CAST and distributed to all certificate holders. CAST member organizations requested and received a safety commitment statement from air carrier CEO's. Directors of safety (DOS's), working through senior management, were requested to implement the guidance contained in HBAT 99-19. Results were	HBAT 99-19.doc		

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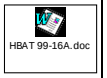
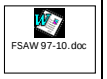
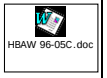
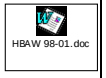
Completed	15	15. ALAR Policies (Safety Culture) – Safety Info in Manuals (3)	This safety enhancement tasks the Director of Safety to ensure the establishment of a process to identify, review, analyze and include appropriate safety information in training programs and in manuals used by flight crews and maintenance staff.	 SE 14, 15 and 16.doc	Handbook Bulletin Air Transportation – Policy Company Operating Manuals and Company Training Program Revisions for Compliance with Current Airplane or Rotorcraft Flight Manual Revisions (HBAT 99-07) was endorsed by CAST. The DOS's, through senior management, were asked to apply the principles of HBAT 99-07 to training programs and manuals used by flight crews and maintenance staff.	 HBAT 99-07.doc		
Completed	16	16. ALAR Policies (Safety Culture) – AFM Database for Inspectors (4)	This safety enhancement tasks the FAA to fully implement the AFM database for inspectors' use in surveillance by populating the database with records pertaining to all aircraft used in all operating Parts of the CFR, and to support daily changes in records contained in the database.	 SE 14, 15 and 16.doc	Handbook Bulletin for Air Transportation – Airplane Flight Manual Revisions and Aircraft Manufacturers Operations Bulletins (HBAT 99-16) was issued as guidance for aircraft manufacturers. Flight manual and operations bulletin revisions are forwarded to a centralized location to populate a database for use by FAA field inspectors conducting surveillance of their assigned air carriers.	 HBAT 99-16A.doc		
Completed	17	17. ALAR Maintenance Procedures – Servicing Landing Struts (1)	This safety enhancement reduces approach and landing accidents by re-emphasizing current maintenance rules, policies, and procedures developed by the commercial airline operators and the FAA. This re-emphasis specifically directs that approved maintenance programs related to the servicing of components incorporate all of the Original Equipment Manufacturer (OEM) safety-related components and procedures.	 SE 17, 18, 19 and 20 .doc	Flight Standards Information Bulletin for Airworthiness – Cold Weather Servicing of Aircraft Nose Landing Gear Struts (FSAW 97-10) was issued as guidance for FAA field inspectors regarding adequate procedures to ensure aircraft nose landing gear struts are serviced in accordance with the manufacturers recommended methods for cold weather operations.	 FSAW 97-10.doc		
Completed	18	18. ALAR Maintenance Procedures – Subcontractor Maintenance Guidance (2)	This safety enhancement reduced approach and landing accidents by re-emphasizing current maintenance rules, policies, and procedures developed by the commercial airline operators and the FAA. This re-emphasis specifically directs that both the operators and regulators increase oversight of sub-contract activity.	 SE 17, 18, 19 and 20 .doc	Handbook Bulletin for Airworthiness – Air Carrier Operations Specifications to Make Arrangements with Other Organizations to Perform Substantial Maintenance and Aircraft and Maintenance Provider Contracts (HBAW 96-05C and 98-01) were issued to FAA field inspectors to specifically address FAA surveillance oversight activity of air carriers sub-contractor activities and evaluation of contractual relationships between air carriers and maintenance	 HBAW 96-05C.doc	 HBAW 98-01.doc	
Completed	19	19. ALAR Maintenance Procedures – Policy on MELs (3) (Covers Recurring Maintenance Events)	This safety enhancement reduces approach and landing accidents by re-emphasizing current maintenance rules, policies, and procedures developed by the commercial airline operators and the FAA. This re-emphasis directs operators to strictly adhere to MEL policy and procedures.	 SE 17, 18, 19 and 20 .doc	Joint Handbook Bulletins for Air Transportation and Airworthiness (HBAT 98-18 and HBAW 98-09) were issued to provide guidance to FAA aviation safety inspectors regarding the requirement for air carriers to include instructions concerning the MEL conditions and limitations.	 HBAT 98-18 HBAW 98-09.doc		
Completed	20	20. ALAR Maintenance Procedures – DOS Internal Survey (4)	This safety enhancement tasks the Directors of Safety to determine 1) that the maintenance deficiencies described in safety enhancements 17-19 have been remedied and 2) that quality control procedures have been implemented to ensure that those deficiencies are continually addressed.	 SE 17, 18, 19 and 20 .doc	The Directors of Safety were asked to conduct an internal audit of their carriers to ensure that maintenance procedures adequately address the specified bulletins in SE 17, 18, and 19. Audit outcomes are to be reported to his/her respective CAST member.			

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Completed	21	21. ALAR Flight Deck Equipment Upgrades – New Type Designs (1-3)	This safety enhancement ensures altitude awareness and accomplishment of checklist items. This will be accomplished through the development of guidelines and procedures for flight deck smart alerting system design and supporting operational procedures and training based upon: - The installation of equipment to provide automatic aural altitude alert call-outs on final approach or other such altitude alerting systems. - The installation of automated or mechanical checklist devices to provide a positive means for checklist completion. - Research and assessment of existing technology in flight deck smart-alerting system design.		Aircraft Manufacturers and Airline/Operators, in collaboration with the FAA's Aircraft Certification Service (AIR), have agreed to: (1) the implementation of interactive electronic checklist and smart alerting systems for New Type Design Aircraft; and (2) evaluate/consider, during checklist design, the principles contained in the FAA Report "Human Performance Considerations in the Use and Design of Aircraft Checklists", the NASA Contract Report "On the Design of Flight-Deck Procedures", and the NASA Contract Report "Human Factors of Flight-Deck Checklists: The Normal Checklist" for new type design aircraft. Additionally, a Notice of Availability was issued by AIR defining the standards for manufacturers to use in designing Automatic Aural Altitude call-outs on final approach, including arrival at Minimum Descent Altitude (MDA) and Decision Height	 		
Not currently on plan	22	22. ALAR Flight Deck Equipment Upgrades – Existing Type Designs (4-5)	See SE 21.		Prior to the development of the CAST plan, a letter was issued by AFS-200 to use various methods for altitude awareness. While this was not an Advisory Circular, it did contain guidance on the use of altitude reminder systems (such as altimeter bugs for MDA/DH) to improve altitude awareness on final approach. Output 5 is thus complete.			
Completed	23	23. ALAR Flight Crew Training – One Project	This safety enhancement ensures that Part 121 air carriers implement syllabi that train and evaluate aircrews on stabilized approaches, unusual attitudes, and upset recoveries. Specific topics related to stabilized approaches should include: crew resource management, go around criteria, approaches with system malfunctions, non-normal conditions, emphasis on basic airmanship, approach briefings, approach and missed approach procedures.		AFS-200 issued FSAT 01-12 highlighting the importance of ALAR type flight crew training. AFS-200 also introduced a training guide, developed by ATA and the ALAR JSIT (Joint Safety Implementation Team), which contained instructions to all Part 121 POI's to convey the contents of FSAT 01-12 to their assigned Air Carrier. AFS-1 then conducted a review to ascertain the number of Air Carriers that implemented the recommended ALAR training. The review revealed that all Air Carriers were in fact training in the 8 topic areas described in FSAT 01-12, with the exception of 8 Carriers who were training in 7 of the ALAR topics and one Carrier who was training in 6 of the topic areas. ATA, RAA, and NACA, as appropriate, contacted the 8 Air Carriers and requested they voluntarily implement all of the ALAR	 		

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On plan	24	24. ALAR Aircraft Design – Continuing Airworthiness (1-3)	This safety enhancement promotes incorporation of fault-tolerant design principles for flight-critical system components and to facilitate critical point, flight-realistic-condition, certification testing/analysis. Changes to flight-critical system components will be considered a major change unless the applicant can show the change is in fact a minor change and monitors the continued airworthiness (in-service failures) of these systems using a risk assessment-focused methodology.	 SE24R2.doc	The KSI Report is the culmination of an industry effort initiated by the Certification Process Study (CPS) effort and directed to be implemented by Commercial Aviation Safety Team (CAST) through Safety Enhancement #24. The KSI Development Team consisted of aircraft and engine manufacturers, airline operators, and aviation regulatory agencies. The goal of the project and the report is to increase the level of aviation safety via an Advisory Circular that describes methods and processes whereby OEM's can make operators aware of Key Safety Information. All parties have worked together to develop a mutually agreed document that also outlines operator's and regulatory agency's responsibilities in the process. This report	 KSI Report -SE-24.pdf		
Cancelled (will be replaced by forthcoming SE)	25	25. ALAR Aircraft Design – Critical System Maintenance (4)	This safety enhancement is for the FAA to issue guidance on acceptable procedures to ensure that maintenance activities involving flight-critical system components do not reduce or compromise the designed level of safety and are in accordance with FAA approved data.	 SE 24 25.doc				
Completed	26	26. LOC Policies and Procedures – SOP – One Project	This safety enhancement ensures that all airline operators publish and enforce clear, concise, and accurate flight crew SOPs. These SOPs should include expected procedures during pre/post flight and all phases of flight; i.e., checklists, simulator training, PF/PNF duties, transfer of control, automation operation, rushed and/or unstabilized approaches, rejected landings and missed approaches, in-flight pilot icing reporting, and flight crew coordination. Operator instructors and check airmen should ensure these SOPs are trained and enforced in	 SE 26.doc	AC120-71 has been revised and inspector guidance has been issued.	 AC120-71A.pdf		
On plan	27	27. LOC Policies and Procedures – Risk Assessments and Management – One Project	This safety enhancement identifies or develops and implements methods for operators, regulators, and manufacturers to prioritize safety-related decisions. The project will improve methods of risk assessment for operational issues related to service bulletins, aircraft accident/incident analysis, flight-critical safety information, and recurring intermittent failures related to dispatch	 SE 27.doc	ATA Human Factors Committee published guidance material. Also, the Global Aviation Information Network (GAIN) Working Group B (Analytical Methods and Tools) published a guide to existing analytical methods and tools that can help the airline community turn data into safety information.	 Gain Guide.pdf		
Completed	28	28. LOC Policies and Procedures – Policies – Process to Inform Personnel/Flight Crew (1)	This safety enhancement ensures that essential safety information and operational procedures generated by airplane manufacturers are included in operating manuals and training programs for pilots and other appropriate employee groups.	 SE 28 29.doc	Aerospace Industries Association (AIA) communicated to aircraft manufacturers the importance of timely discrimination of essential safety information and procedures to aircraft operators. As guidance, AIA also distributed "Handbook Bulletin Air Transportation, Flight Standards Policy company operating Manuals and Company Training Programs for Compliance with Current Airplane or Rotorcraft Revisions" (HBAT 99-	 HBAT 99-07		

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Completed	29	29. LOC Policies and Procedures – Policies – Flight Crew Proficiency Program (2)	This safety enhancement is to ensure that air carriers have a process to enhance pilot proficiency.	 SE 28 29.doc	ALPA (Air Line Pilots Association), in collaboration with other Pilot Associations, developed a program to continuously improve pilot performance and proficiency using information from other programs such as FOQA (Flight Operation Quality Assurance), AQP (Advanced Qualification Program) and ASAP (Aviation Safety Action Program). The program is non-punitive and voluntary, and is managed by the individual airlines. ATA (Air Transport Association), in collaboration with other Airline Groups (Aligned Carriers), voluntarily			
Completed	30	30. LOC Training – Human Factors and Automation – One Project	To reduce loss of control accidents, Part 121 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.	 SE-30R1.doc	ATA developed and distributed a report containing consensus policies and procedures relating to mode awareness and energy state management, as appropriate to their respective operations.	 SE-30 FINAL REPORT.pdf		
On plan	31	31. LOC Training – Advanced Maneuvers – Implement Ground and Flight Training (1-3)	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 Part 121 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. Additionally, research should be conducted to determine how existing flight simulation devices may be used	 SE 31.doc	Outputs, including upset recovery training guidance and videos, are available at http://www.faa.gov/other_visit/aviation_industry/airline_operators/training/	http://www.faa.gov/other_visit/aviation_industry/airline_operators/training/	 Upset recovery	
Completed	32	32. LOC Autoflight Design – New Designs (1-4)	This safety enhancement reduces fatal accidents due to loss of control by recommending and supporting the development of regulations and guidance material that ensure or encourage autoflight (autopilot and autothrust) systems in new airplane designs to accomplish the following: - Minimize the probability of creating a thrust asymmetry that could lead to loss of control; - Yield control to significant manual flight control forces (e.g., force disconnects); - Annunciate to the flight crew if aircraft response differs significantly from what the autopilot has been commanded to do; - Ensure autopilot internal monitor logic does not inappropriately disconnect the autopilot when it is properly attempting to correct for deviations from the commands it receives; and	 SE 32.doc	A revised rule and AC for Flight Guidance Systems have been published.	 25-1329.pdf	 AC 25.1329-1B.pdf	
Withdrawn	33	33. (Withdrawn by JSIT) LOC Autoflight Design – Existing Designs		 SE 33.doc				

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On plan	34	34. LOC Displays and Alerting Systems – New designs (1-2) (Removed VSD)	This safety enhancement reduces fatal accidents due to loss of control, display and alerting systems in new airplane designs should include: - Graphic speed trend information - A pitch limit indication - Bank angle limits to buffet - Barber poles and amber bands on primary airspeed indications - Detection and annunciation of conflicting attitude, airspeed and altitude data information - Detection and removal of invalid attitude, airspeed and altitude data information (i.e.. from an internal fault) - Detection and removal of misleading attitude, airspeed and altitude data information (e.g., from an external sensor fault) to the extent feasible - Information to perform effective manual recovery from unusual attitudes using chevrons, sky pointers, and/or permanent ground-sky horizon on all attitude indications - Salient annunciation of autoflight mode changes and engagement status changes (e.g., blinking/colored/boxed mode information)					
R&D	35	35. LOC Displays and Alerting Systems – Existing Designs	See SE 34.					
R&D not currently on plan	36	36. LOC Basic Airplane Design – Mode Confusion (1-2)						
Withdrawn	37	37. (Withdrawn by JSIT) LOC Basic Airplane Design – Publish Crossover Speeds (3)						
Withdrawn	38	38. (Withdrawn by JSIT) LOC Basic Airplane Design – Disseminate Info on Aircraft						
On plan	39	39. LOC Basic Airplane Design – Icing (4-5) (scored zero for ground ice)	This safety enhancement reduces loss of control fatal accidents by recommending amended icing certification criteria for new airplane designs not equipped with evaporative (i.e., hot wing) systems. The criteria would include performance and handling quality requirements for: - Residual ice; - Inter-cycle ice; - Delayed anti-icing/de-icing system activation; and - De-icing/anti-icing system malfunction.					
Completed	40	40. LOC Envelope Protection – New Airplanes (3)	This safety enhancement reduces fatal accidents due to loss of control. New airplane designs should include angle-of-attack/low speed protection, thrust asymmetry compensation, and bank angle protection using hard or soft limits. Fly-by-wire active flight envelope protection technology does not exist for turboprop airplanes. Turboprop manufacturers should strive, to the fullest extent, to provide the protection benefits of these systems in their new		Aerospace Industries Association communicated with Airbus Industries, Boeing, Embraer, and Bombardier Aerospace to encourage them to incorporate angle-of attack/low speed protection, thrust asymmetry compensation, and bank angle protection into all new fly-by-wire aircraft designs. All four manufacturers have agreed to incorporate flight envelope protection into future airplane designs.			

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On R&D plan (study)	41	41. LOC Envelope Protection – Existing Airplanes (1-2) (Assuming the same level of protection as new airplane if it can be implemented: pitch, roll, thrust asymmetry protection) - Output 1						
Not currently on plan	41	41. LOC Envelope Protection – Existing Airplanes (1-2) (Assuming the same level of protection as new airplane if it can be implemented: pitch, roll, thrust asymmetry protection) - Output 2	See SE 40.					
Not currently on plan	42	42. RI Visual Aids Enhancement and Automation Technology – Airports – Variable Message Signs (1)						
Not currently on plan	43	43. RI Visual Aids Enhancement and Automation Technology – Airports – All-Weather Sign Conspicuity Improvements (2)						
On R&D plan	44	44. RI Visual Aids Enhancement and Automation Technology – Airports – Runway Occupancy Signal (3)	The purpose of this project is to develop and install airport visual aids that provide clear guidance (taxi route, runway entrance, runway exit and construction area avoidance) for flight crews and other persons operating aircraft and vehicles on the movement area. It is intended that this project will provide unambiguous visual signals to convey runway occupancy clearances as well as to convey runway occupancy status to aircraft on final approach to a runway. Such visual aids are intended to prevent runway incursions and surface incidents and improve situational awareness. The systems will comply with appropriate aviation standards and be visible under all meteorological conditions. Configuration, installation and performance standards will be developed as a part of this statement of work. Final configuration and application of each safety enhancement is dependent upon the implementation of associated technologies, operational and workload factors, and benefit-cost analyses. The JSAT Runway Incursion					
Not currently on plan	45	45. RI Visual Aids Enhancement and Automation Technology – Airports – Smart Lighting Systems (4)						
Completed	46	46. RI Air Traffic Control Training – Enhanced Tower Controller Training (1-4)	This safety enhancement updates controller training programs and course curriculums designed to improve the level of knowledge, skill and proficiency that supports and enhances system efficiency, thereby increasing safety by fostering a higher level of situational awareness		Outputs summarized in this file: 			
On plan	47	47. RI – Tower Controller CRM Training (ATTE or similar)	This safety enhancement increases teamwork in the tower cab environment. All tower controllers should receive a course similar to CRM for pilots.					

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Not currently on plan	48	48. RI Air Traffic Control Training – Tower Simulators (5)		SE 46, 47, 48.doc				
On plan	49	49. RI SOPs for Ground Operations (1)	This safety enhancement reduces the risk of runway incursions and surface incidents by recommending that all FAR Part 121 operators and Part 135 operators establish, document, train and follow SOPs for ground operations.	SE 49, 50, 51, 52.doc	Advisory Circular 120-74A, "Flightcrew Prcedures During Taxi Operations", was issued to provide Standard Operating Procedures for ground operations (Output 2). Also issued was Flight Standards Handbook Bulletin for Air Transportation (HBAT) 04-04, "Incorporating Standard Operating Procedures During Taxi Operations in Training Programs, the Use of SOPs During Taxi Operations, and Special Emphasis Inspection Items for Runway Incursion	AC120-74A.pdf	hbat0404.pdf	
Completed	50	50. RI SOPs for Ground Operations for GA (1)	This safety enhancement reduces the risk of runway incursions by establishing and disseminating recommended practices for general aviation (GA) ground operations.	SE 49, 50, 51, 52.doc	Part 91 Pilot and Flight Crew Procedures during Taxi Operations and Part 135 Single-Pilot Operations (AC 91-73) was drafted and published as guidance for general aviation ground operations.	AC 91-73.doc		
Completed	51	51. RI SOPs for Tow Tug Operators (3)	This safety enhancement reduces the frequency and severity of runway incursions by the developing and implementing recommended best practices for mechanics and others who tow or otherwise move aircraft within the airport movement area.	SE 49, 50, 51, 52.doc	FAA prepared and distributed a CD (FAA Taxi 101) as guidance for mechanics and others who tow or move aircraft within airport movement areas.	AC150-5210-21.pdf	CD's available from: http://www.faa.gov/runwaysafety/order/	
Completed	52	52. RI SOPs for Vehicle Operators (4)	This safety enhancement helps prevent runway incursions/surface incidents by developing and implementing recommended best practices for vehicle operations in the aircraft movement area and driver training.	SE 49, 50, 51, 52.doc	On February 10, 2004, 14 CFR 139, "Certification of Airports", was adopted. Section 139.303 now requires specific training for vehicle operators.	139_303.doc		
On plan	53	53. RI Situational Awareness Technology for ATC – Enhanced Airport Surveillance Equipment (1-3)	This Safety Enhancement develops and implements technology tools including data link that will provide and/or enhance airport surface situational awareness to air traffic controllers. Examples of these technology tools include, but are not limited to, Airport Movement Area Safety System (AMASS), Airport Surface Detection Equipment (ASDE-X), Automated Dependent Surveillance – Broadcast (ADS-B), Next Generation Air-Ground Communications System (NEXCOM), Surface Movement Advisor (SMA), and Airport Target Identification System (ATIDS). The strategies for accomplishing this project include: - New technology tools will be developed by the FAA to enable enhanced surveillance, information, communication and conflict detection for ATC operations. - FAA and airport operators will provide airport surface surveillance equipment with conflict alerting capability at air traffic control towers. - Digital data link capability will be developed and implemented to enable automatic transmission of ATC	SE 53, 54.doc				
Not currently on plan	54	54. RI Situational Awareness Technology for ATC – Digital Data Links for ATC Instructions (4)		SE 53, 54.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
Completed	55	55. RI ATC Procedures – SOPs for Controller Situational Awareness (1)	This safety enhancement substantially reduces runway incursions and improves aviation safety through the use of nationally standardized procedures that focus on situational awareness in the control tower.		The Office of Runway Safety incorporated this Safety Enhancement into their 2002 – 2003 Runway Safety Blueprint (Objective 3.2). Objective 3.2 of the Runway Safety Blueprint was closed in December of 2002, thus, closing Safety Enhancement 55 as well. The national situational awareness requirements are outlines in FAA Order 7210.3S (Facility Operation and Administration)			
On R&D plan (study)	56	56. RI ATC Procedures – Review Capacity Enhancement Program (2) (Original Name – LAHSO) (Safety Enhancement 2 in RI DIP)						
Not currently on plan	57	57. RI ATC Procedures – Clarify Surface Movement Phraseology (3)						
Not currently on plan	58	58. RI ATC Procedures – Delete FAR 91.129 Sentence (4)						
Completed	59	59. RI ATC Procedures – Readback requirement (5) (CAST decision is to implement the intent of this safety enhancement through policy rather than rule)	This safety enhancement recommends a shared responsibility to ensure clear understanding of specific control instructions through the use of read-backs of any clearance to enter a specific runway, hold short of a specific runway, or "taxi into position and hold" instructions. It is currently the sole responsibility of the controller to seek and receive acknowledgement for these instructions.		Advisory Circulars (AC's) 120-74A and 91-73A were published, providing for readback of all ATC instructions or clearances in the three specific areas. Additionally, the Runway Safety Program Office issued related material recommending the readback of all ATC instructions or clearances. Finally, the readback requirements will be published in the February 2005 issue of the AIM (Airman's Information Manual).			
Completed	60	60. RI Pilot Training – One Project/SA, SOPs, CRM, All Resources	This safety enhancement substantially reduces or eliminates the risk of Runway Incursions (RI) by the incorporation of RI training into flight crew qualification, approved training, and other pilot training programs. This training will increase the pilot's ability to recognize and avoid situations leading to runway incursions					
Not currently on plan	61	61. RI Aircraft/Vehicle Upgrade and Installation – Part 121/135 Cockpit Moving Map Display						
Not currently on plan	62	62. RI Aircraft/Vehicle Upgrade and Installation – Vehicle Moving Map Display						
Not currently on plan	63	63. RI Aircraft/Vehicle Upgrade and Installation – Non-121 Aircraft Moving Map Display						
Not currently on plan	64	64. TURB Corporate Culture of Turbulence Avoidance						
Not currently on plan	65	65. TURB Upgrade Corporate Communications for Information Management (*Capabilities)*						
Not currently on plan	66	66. TURB Additional Observations – Manual PIREPS and Automated EDRs						

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
Not currently on plan	67	67. TURB Additional Observations – Semi-Automate Manual PIREP Entry		SE 66 67 68 69 70.doc				
Not currently on plan	68	68. TURB Improved Forecast Accuracy		SE 66 67 68 69 70.doc				
Not currently on plan	69	69. TURB Standardized Terminology		SE 66 67 68 69 70.doc				
Not currently on plan	70	70. TURB Thunderstorm Clearance Standards		SE 66 67 68 69 70.doc				
Not currently on plan	71	71. TURB Graphical Displays – Carry On		SE 71 72 73 74 75.doc				
Not currently on plan	72	72. TURB Graphical Displays – Panel Mounted – New Production		SE 71 72 73 74 75.doc				
Not currently on plan	73	73. TURB Airborne Detection – Enhanced Radar – New Production		SE 71 72 73 74 75.doc				
Not currently on plan	74	74. TURB Airborne Detection – Enhanced Radar – Retrofit Windshear-Equipped Aircraft		SE 71 72 73 74 75.doc				
Withdrawn	75	75. TURB (Withdrawn by JSIT) Airborne Detection – Enhanced Radar – Retrofit Non-Windshear-		SE 71 72 73 74 75.doc				
R&D not currently on plan	76	76. TURB Airborne Detection – Next Generation Sensors – New Production and Retrofit		SE 76.doc				
R&D not currently on plan	77	77. TURB Active Turbulence Mitigation – Next Generation Control Systems – New		SE 77.doc				
On plan	78	78. TURB Procedures for Reducing Cabin Injuries	This safety enhancement is aimed at reducing turbulence injuries to flight attendants (FA's) and passengers by standardizing the following techniques across all Part 121 air carriers: improved situational awareness, turbulence encounter management procedures (before, during and after encounter), and enhanced communication methodologies.	SE 78.doc	AFS-200 published advisory material AC120-88A on preventing turbulence injuries.	AC120-88A.pdf		
R&D not currently on plan	79	79. TURB Improved Seat Belt Usage		SE 79 80 83.doc				
R&D not currently on plan	80	80. TURB Aircraft-wide Communications Systems		SE 79 80 83.doc				
Not currently on plan	81	81. TURB Cabin Design – Galley Handholds - New Production		SE 81 82.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
Not currently on plan	82	82. TURB Cabin Design – Galley Handholds – Retrofit		 SE 81 82.doc				
R&D not currently on plan	83	83. TURB Cabin Design – Equipment Other than Handholds – New Production		 SE 79 80 83.doc				
Completed	84	84. UEF (Uncontained Engine Failures)	This safety enhancement reduces UEF by mandatory inspections of the disks of turbine engines during shop visits.	 SE 84.doc	The aviation industry is using improved methods and technology to detect potential defects in aircraft engines. Working in partnership, government and industry are using enhanced inspections for certain high-energy rotating engine components. The initiative is based on an extensive analysis conducted by the FAA and industry on the historical causes of engine-related accidents. The FAA issued 23 Airworthiness Directives (ADs) requiring that operators inspect fan, high-pressure turbine and priority low-pressure turbine			
Completed	85	85. LOC Vertical Situation Display **(Output 1)**	This safety enhancement reduces loss of control accidents by including vertical situation displays in all new airplane designs and determines the feasibility of installing vertical situation displays on existing airplanes.	 SE 85.doc	Aerospace Industries Association communicated with Airbus Industries, Boeing, Embraer, and Bombardier Aerospace encouraging them to incorporate vertical situation displays into all new aircraft designs. All four manufacturers have agreed to incorporate vertical situation displays into future airplane designs			
R&D not currently on plan	86	86. LOC Training (Delta over LOC Training) – Advanced Maneuvers -Research on Flight simulation devices (4) (R&D) ((Flight Training (1-3) and further enhancement to AMT by research)) Remove From Safety Enhancement List as of 10-10-						
On Plan	101	101. RR - Maintenance - Aircraft Design – Advanced Circuit Protection	Develop and install advanced circuit protection / arc fault breaker technology in commercial airplanes (new type designs, current production airplanes, and retrofit).	 SE101R1.doc				
Not currently on plan	110	110. RI – Cockpit Moving Map Phase 1	The purpose of this project is to reduce runway incursion incidents by improving pilot situational awareness using cockpit/vehicle moving map technology in commercial	 SE 61, 110, 111, 112.doc				
Not currently on plan	111	111. RI – Cockpit Moving Map Phase 1 & 2	See SE 110.	 SE 61, 110, 111, 112.doc				
Not currently on plan	112	112. RI – Cockpit Moving Map Phase 1, 2, & 3	See SE 110.	 SE 61, 110, 111, 112.doc				
On R&D plan	113	113. CFIT – Synthetic Vision Systems	Develop capabilities that permit flight crews to operate in a day VMC-like environment, regardless of visibility. - Terrain and obstacle alerting, Geospatial databases, Weather display, Traffic display and alerting, Flight path information, Energy state awareness information	 SE 113.doc				
On R&D plan	114	114. CFIT – FOQA & ASAP		 SE 114.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
On R&D plan	115	115. CFIT – Datalink		SE 115.doc				
On R&D plan	116	116. CFIT – Precision-Like Approach		SE 116.doc				
On R&D plan	117	117. ALAR – Human Factors		SE 117.doc				
On R&D plan	118	118. ALAR – Health & Usage Monitoring Systems (HUMS)		SE 118.doc				
On R&D plan	119	119. LOC – Icing		SE 119.doc				
On plan	120	120. CFIT - TAWS Improved Functionality	Current production models, new type design airplanes, and existing aircraft where appropriate include GPS equipment to allow incorporation of certain TAWS enhancements. Standard operating procedures should be established to help flight crews operate in areas with limited navigation aids.	SE-120.doc	Output 2 completed (option for GPS).	SE-120, OP2.pdf		
On plan	121	121. RR - Cargo – Cargo Loading Training and SOPs	Reduce cargo-related accidents and incidents by publishing and enforcing clear, concise and accurate standard operating procedures, and training the rationale behind those procedures; ensuring company training programs are approved and monitored; and ensuring adequacy of contractor training.	SE121.doc				
R&D not currently on plan	122	122. RR - Cargo - CG and Loading – Locking Mechanisms Research	Reduce the occurrence of Center of Gravity and Cargo Loading related accidents and incidents by conducting research to develop improved pallet locking mechanisms that provide ease of operation and remote sensing of lock status.	SE-122 - RD-LOCKING MECHANIS				
Withdrawn by JIMDAT	123	123. RR - Cargo - CG and Loading – Onboard Weight and Balance System Researc	To reduce the occurrence of Center of Gravity and Cargo Loading related accidents and incidents by conducting research on equipment to measure and display weight and balance and gross weight information (onboard weight and balance equipment) to the flight crew.	SE-123-RD-ONBOARD WEIGHT				
Withdrawn	124	124. RR - Cargo - Cargo Flight Crew Training	To reduce cargo-related accidents and incidents by providing flight crew training that includes taxi and power application cues of improper loading and resulting mis-trim conditions on rotation.	SE-124.doc				
On plan	125	125. RR - Cargo - Hazardous Materials – HazMat Processing	To reduce the occurrence of accidents and incidents, regulators should improve their legal processes for compliance, enforcement and operational restrictions by allowing faster imposition of restrictions on operations to address significant safety concerns and promoting disclosure of safety concerns by enhancing legal protections for airline/operator employees, contractors, and their employees.	SE125.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
R&D not currently on plan	126	126. RR - Cargo - Hazmat Containment Research	To reduce the occurrence of accidents and incidents from undeclared high-consequence hazardous materials, research should be conducted to develop and/or improve containment systems that provide a final line of defense for personnel, equipment and cargo that is usable both on the ground and in flight.	 SE-126.doc				
On plan	127	127. RR - Cargo - Fire Containment	Improved cargo containers should be developed to contain (or suppress) fires originating in shipped cargo. Standards for fire containment/suppression should be developed, and containers standardized. New containers should be implemented whenever containers are replaced. Consideration should be given to using improved containers for as much cargo as is feasible.	 SE127.doc				
R&D not currently on plan	128	128. RR - Cargo - Hazmat Research	To reduce the occurrence of accidents and incidents from undeclared high-consequence hazardous materials, research should be conducted to improve non-invasive, broad-based detection systems usable both on the ground and in the airplane.	 SE-128.doc				
On plan	129	129. RR - Cargo - Compliance, Enforcement and Restricted Operations	Regulators should improve their legal processes for compliance, enforcement and operational restrictions by allowing faster imposition of restrictions on operations to address significant safety concerns and promoting disclosure of safety concerns by enhancing legal protections for airline/operator employees, contractors, and their employees.	 SE129.doc				
On plan	130	130. RR - Cargo - Regulation and Policy - Oversight	To provide adequate oversight, regulators should develop/enhance and implement a system that ensures appropriate inspector coverage for all airlines, sub-contracting, and leasing operations and assign highly-experienced inspectors (appropriate for the operation) to operators that require the most comprehensive oversight.	 SE-130.doc				
On plan	131	131. RR - Cargo - Safety Culture	To reduce cargo-related accidents and incidents by encouraging a culture that enhances operational safety. A safety culture can be enhanced by a safety management system that includes: (1) development of an accident/incident cost analysis tool, (2) a self-audit process, (3) risk management programs, (4) revised standards for the Director of Safety (DOS), (5) development of incident reporting and quality assurance.	 SE-131.doc				
Not currently on plan	132	132. RR - Cargo - Flightcrew Smoke/Fume Protection	To reduce the risk of flightcrew incapacitation or visual impairment due to smoke and/or fumes in the cockpit by requiring full-face crew smoke mask/oxygen system that accommodates eyeglasses.	 SE-132.doc				
On plan	133	133 RR - Icing - Turboprop Aircraft Ice Detection Systems	Adapt and implement systems that automatically detect ice, measure the rate of ice accretion, and provide annunciation to the flightcrew, on turboprop aircraft that have non-evaporative ice protection systems and non-powered flight controls on all aircraft operated in commercial passenger and cargo revenue service.	 SE133R1.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
On plan	134	134. RR - Icing - Aircraft Design - Avionics	Install smart pitch guidance systems on all new type designs to prevent over rotation in conjunction with a low energy state or aerodynamic degradation due to the presence of ice on critical flight surfaces.	 SE134R1.doc				
Not currently on plan	135	135. RR - Icing - Ground Operations	Develop and implement ground operations policies and procedures to reduce the likelihood of ice contamination on flight critical surfaces. 3/27/07 - needs rewrite, remove OP2, need info from G-12 SAE, may pass to G-12.					
On plan	136	136. RR - Icing - Training – Engine Surge Recovery	To prevent fatal accidents resulting from an engine surge caused by ice ingestion, airlines should provide adequate training for flight crews to ensure appropriate responses to this event. This training should include engine out identification, engine surge recovery procedures, and associated aircraft recovery in all the varying	 SE136.doc				
Not currently on plan	137	137. RR - Icing - Weather Information	Provide airport zone specific advanced weather detection and forecast products (e.g., WSDDM) to operators, flight crews, and airport authorities for ground operations.	 Se-137				
Withdrawn by JIMDAT	138	138. RR - Icing - Hazardous Icing Identification	Perform research to improve identification of hazardous icing conditions through the use of in-situ and remote sensing, nowcasting and forecasting, and ePirep data sharing.	 SE-138.doc				
R&D not currently on plan	139	139. RR - Icing - Ice Dection	Perform research to improve in-flight detection and monitoring of ice contamination for all possible conditions.	 SE-139-.doc				
Cancelled by JIMDAT, to JPDO	140	140. RR - Icing - Icing Aerodynamics & Performance Effects.	Perform research to better understand the effect of ice accretion on aircraft and aircraft system (e.g., pitot-static system) performance and develop measurement and control systems to further protect aircraft from these	 SE-140.doc				
On plan	159	159. RR - Midair - Airspace Design	To prevent midair collisions by: designing B/C/D airspace to be more easily identifiable; improving the usability of VFR charts; and ensuring adequate and timely coordination of airspace design changes with all airspace	 SE-159.doc				
Not currently on plan	160	160. RR - Midair - ATC Situational Awareness	The purpose of this enhancement is to prevent midair collisions by improving ATC situational awareness by expediting the deployment of improved displays (e.g., STARS).	 SE 160.doc				
Not currently on plan	161	161. RR - Midair - ATC Safety Culture	The purpose of this enhancement is to prevent midair collisions by the development of an improved safety culture in ATC operations.	 SE 161.doc				
On plan	162	162. RR - Midair - Advanced Navigation	The purpose of this enhancement is to prevent midair collisions by facilitating aircraft separation for users of advanced navigation systems not receiving ATC separation services.	 SE 162.doc				
On plan	163	163. RR - Midair – See-and-Avoid	The purpose of this enhancement is to prevent midair collisions by improving see-and-avoid capability.	 SE163.doc				
Not currently on plan	164	164. RR - Midair - Part 121 TCAS Installation.	All advantages of this SE have been accomplished in the US, therefore not part of the CAST Plan, however, this SE was approved by CAST and will be used in the internation arena	 SE 164.doc				

Status	SE #	Safety Enhancement	Background	Detailed Implementation Plans	Completed Outputs	Output Files		Implementation Measurement Templates
On plan	165	165. RR - Midair - TCAS Policies and Procedures	The purpose of this enhancement is to prevent midair collisions by: requiring flightcrews to follow TCAS Resolution Advisories (RA's) even in the presence of contravening ATC instructions; establishing procedures for TCAS range setting; and requiring that TCAS-capable simulators and flight-training devices are used for training TCAS responses and maneuvers.	 SE165.doc				
Cancelled by JIMDAT, to JPDO	166	166. RR - Midair – See-and-avoid – Research	To minimize the risk of mid-air collisions, review available research related to the inherent human limitations with, and over-reliance on, the concept of "see and avoid".	 SE 166.doc				
Withdrawn by JIMDAT	167	167. RR - Midair - ATC Task Prioritization – Research	Research should be conducted to improve the understanding of how/why controllers mis-prioritize or become fixated upon concerns and tasks and how/why controllers make errors.	 SE 167.doc				
Cancelled by JIMDAT, to JPDO	168	168. RR - Midair - ATC Situational Awareness - Research	Conducting research to improve ATC situational awareness by developing ATC system technology to incorporate real-time TCAS Resolution Advisory (RA) display capability on controllers' situational displays.	 SE 168.doc				
On plan	169	169. RR - Midair - Work Cards / Shift Change / Responsibilities / Manuals	Ensure that work cards or other written instructions are used at the start of each task, and written and oral status reports are provided at every shift change. Procedures should be written to include clear responsibility and authority for work assignments, and necessary manuals (operational & maintenance) are complete, accurate, available, and appropriately used.	 SE169.doc				
On plan	170	170. R R- Maintenance - Aircraft Design – OEM Continuous Monitoring of Service History	Operators should develop processes to ensure adherence to OEM-recommended maintenance procedures, or a substantiated alternative, and to report maintenance tasks performance difficulties to OEMs.	 SE170.doc				
On plan	172	172. RR - Maintenance - Gap Analysis of Existing Airplane Maintenance Process & Follow on Action Plan	The purpose of this project is to identify and correct gaps within and between the maintenance processes that could otherwise inhibit the intended design level of safety from being sustained throughout the airplane life.	 SE172R1.doc		 KSI Report -SE-24.pdf		
On plan	175	175. RR - Maintenance - Policy & Procedures – Flight Critical Configurations Changes Made During Maintenance	To prevent loss of pitot static system flight data, airlines/maintenance should provide visible tagging any time the pitot static system (pitot tubes and static ports) are covered during maintenance or servicing (e.g. washing). In addition, preflight walk-around procedures should include specific verification that pitot static ports are	 SE175.doc				