

July 9, 2010

Ms. Margaret Gilligan  
Associate Administrator for Aviation Safety  
Federal Aviation Administration  
800 Independence Avenue  
Washington, DC 20591

Dear Peggy:

The PARC is pleased to submit the enclosed government/industry consensus recommendations for changes to the Autopilot Minimum Use Height rules in FAR 121.579 and FAR 135.93.

There has been a long-standing need to modernize these autopilot minimum use height rules to accommodate the operational and safety improvements that are currently in widespread use in modern air carrier aircraft. Many of these improvements were not envisioned when the existing rules were written; including advanced automatic flight guidance and control system designs and operational concepts and capabilities such as RNAV, GPS, HUD, Enhanced Flight Vision Systems (EFVS), and Performance-based Navigation. There is also the need to accommodate the new operational capabilities that characterize NextGen and the Performance-based National Airspace System (NAS).

In recognition of this need, PARC tasked its Autopilot Use Rulemaking Action Team to develop recommendations that could be used as the basis for developing a government/industry consensus on the critical decisions FAA needs to make to modernize these rules and enable the safety, efficiency, and operational flexibility enhancements these advanced avionic capabilities can provide.

The Action Team's recommendations were reviewed in detail and a government/industry consensus on those recommendations was developed during several recent PARC meetings. The attachment to this letter outlines PARC recommendations regarding changes to FAR 121.579 and FAR 135.93 that are needed to eliminate differences between these rules, to eliminate ambiguities in these rules, and to align the operating rules with the existing aircraft certification rules to enhance operating safety and efficiency and to support the implementation of NextGen Performance-based operations. These recommendations only apply to airplane operations; FAR 135 helicopter operations are not affected. These recommendations are due to the efforts of Ted Demosthenes, Jerry Davis, and the other members of the Autopilot Use Rulemaking Action Team.

PARC appreciates your continued support of our activities and invites you to join us in a discussion of these recommendations at your convenience. Please call me if you have any questions or would like to set up a discussion.

Sincerely,



Cc: J. McGraw  
L. Smith  
B. DeCleene  
J. McCarthy

Chairman  
Performance based operations Aviation  
Rulemaking Committee

# ***FAR 121.579 And FAR 135.93 Rulemaking Proposals***

## **Introduction**

The autopilot minimum use height rules, FAR 121.579 and its counterpart FAR 135.93, have not been amended in any significant way since the recodification of the Civil Aviation Regulations (CAR) and Civil Aviation Manuals (CAM) to the FAR on December 31, 1964. However, there have been major advances since these early turbojet days in technology, automatic flight guidance and control system design, and operational concepts and capabilities such as RNAV, GPS, HUD, EFVS, and Performance-based Navigation.

There is a long-standing need to modernize these autopilot minimum use height rules to accommodate the operational and safety improvements that are currently available in modern air carrier aircraft. There is also the need to accommodate the new operational capabilities that characterize the Performance-based National Airspace System (NAS).

## **Need for Regulatory Change**

In modern air carrier aircraft, it is now commonplace to have autopilots that have zero or at least minimal height loss due to autopilot malfunctions. The installation of automatic landing systems, which can be safely used to touchdown and rollout, has also been commonplace since the introduction of the A300-600, A310, B757, and B767 in 1982. DME/DME/IRU RNAV capabilities became basic equipment in these aircraft in the same timeframe. GPS capabilities, including LNAV, VNAV and RNP, have been delivered as basic equipment in new air carrier airplanes, beginning in 1997, providing worldwide 3D RNAV capabilities.

There have also been major advances in operational concepts, such as Performance-based Navigation (RNAV, RNP, and RNP SAAAR) and safety concepts such as use of RNAV and RNP SIDS and STARS, Stabilized Approaches, and satellite-based Lateral and Vertical “ILS-like” Guidance (LNAV / VNAV, LPV, and GLS) for all instrument approaches.

The combination of major improvements in autopilot performance, continuity, integrity, and availability, as well as significant advances in operational and safety concepts, now permit autopilots to be safely used well below the levels permitted by the existing autopilot rules.

For example, large safety benefits can be achieved by leaving the autopilot engaged as low as the minimum certificated use height, when operating with adequate visual references below Decision Altitude. Using autopilots in this manner reduces pilot workload and enables better evaluation of the adequacy of the available visual cues, the aircraft trajectory, and its energy state. This is especially true when conducting operations such as “DA in the Turn” during a RNP SAAAR approach.

The current rules only address En route, Landing, and Takeoff. These rules do not address the use of autopilot to initiate go around or its use during go around, which is a capability that is widely available in modern airplanes.

The current autopilot rule also mandates autopilot disconnection when operating more than 50 feet below the MDA/DA/DH even though the certificated minimum use height is frequently much lower and the pilot determines that the autopilot performance is totally satisfactory. In fact, some manufacturers have interpreted this rule as requiring the autopilot design to automatically disconnect when operating below the MDA/DA/DH. This is clearly an

undesirable situation that can actually reduce the level of safety of operations during high workload situations.

It is equally undesirable to be forced to disconnect a normally performing autopilot at the DA and then re-engage it if a missed approach is initiated before reaching the certificated minimum use height.

## **Previous Rulemaking Efforts**

There have been numerous efforts to initiate rulemaking to modernize and improve the autopilot rules.

### ***1980s Regulatory Review***

During a robust Regulatory Review program in the early 1980's, led in Flight Standards by Cliff Weaver (AFS-240), Tom Imrich (AFS-203) submitted proposals to amend the autopilot rules. While the need to modernize these rules was recognized by the Regulatory Review process, other higher priority rulemaking efforts did not permit the proposed autopilot amendments to be including in these revisions.

### ***1997 Rulemaking***

The FAA amended §§ 121.579, 125.329, and 135.93 of Title 14 of the Code of Federal Regulations to permit certificate holders that operate under parts 121, 125, or 135 to obtain authorization to use an approved autopilot system for takeoff if authorized by the FAA in the certificate holder's operations specifications.

In taking this action, the FAA noted that the Aviation Rulemaking Advisory Committee (ARAC) and some industry members expressed their opinion that amending the regulation to permit increased usage of autopilot engagement during takeoff would have certain benefits, such as allowing pilots to focus proportionately more attention on duties other than the manual manipulation of the flight controls and constant surveillance of the cockpit instruments during the critical takeoff phase of flight.

Based on a recommendation from the Autopilot Engagement Working Group of the ARAC, the FAA published a Notice of Proposed Rulemaking (NPRM) in the Federal Register on December 9, 1994 (59 FR 63868). Comments on the proposal closed January 9, 1995. Seven comments were received, all of which supported amending the rule..

Based on autopilot technology, the expectation that technology will continue to advance, and the safety benefits that will result from using improved technology, the FAA amended the existing regulations on May 21, 1997 to permit authorization for the use of an autopilot during the takeoff and initial climb phases of flight; to enable parts 121, 125, and 135 operators, when authorized, to use existing technology; and to further promote technological advances while increasing the level of public safety.

The FAA also noted that it and the aviation industry anticipate that further technological advances will lead to the evolution of additional autoflight guidance systems that can safely be used from initiation of takeoff roll to completion of landing.

### ***ARAC Flight Guidance Harmonization Group Recommendations***

The next major effort to revise both the autopilot certification and operational use rules occurred during the Aviation Rulemaking Advisory Committee (ARAC) Flight Guidance and Harmonization Working Group activities within the last 15 years. The ARAC provided

numerous recommended changes to the FAA for the certification rules (FAR 25.1329) and operating rules (FAR 121.579 and FAR 135.93).

In its action on April 11, 2006 to amend FAR 25.1329 the FAA noted that this rule adopts new airworthiness standards specifically to address potential pilot confusion about various aspects of the operation of flight guidance systems (FGS), including automatic mode reversions, hazardous disengagement transients, speed protection, and potential hazards during an autopilot override. These new standards will apply to new designs and some design changes (as required under 14 CFR 21.101) for transport category airplanes.

FAA also noted that this rule revises, reorganizes, and adds additional material to address the performance, safety, failure protection, alerting, and basic annunciation of these systems. This rule addresses the autopilot, autothrust, and flight director in a single section. This rule covers the portion of the head up display (HUD) that contains flight-guidance information displayed to the pilot while manually flying the airplane. Finally, this rule harmonizes the regulations for FGS between the FAA and the European Airworthiness Authorities. This harmonization will not only benefit the aviation industry economically, but also maintain the necessary high level of aviation safety. These certification rule changes were adopted by both the FAA and the European Authorities but the operational changes were never implemented in FAR 121 and FAR 135.

### ***RNAV Rulemaking***

During the RNAV rulemaking effort, 121.579 and 135.93 were revised on 7 June, 2007 to use the term DA/DH instead of decision height.

During the NPRM comment period, Boeing, ATA, and Terminal Area Operations Aviation Rulemaking Committee (TAOARC, the predecessor to PARC) suggested completely rewriting Sec. 121.579 and 135.93 to reflect the previous input of ARAC's Flight Guidance System Harmonization Working Group. In its response, FAA noted that it is currently reviewing the recommendations of this group. To date, no further rulemaking action has been taken.

### **PARC Recommended Changes**

PARC recommends that the FAR 121.579 and FAR 135.93 Autopilot Minimum Use Height rules and the associated Operations Specifications be amended as specified in the following sections. These changes would align the operating rules with the existing aircraft certification rules to enhance operating safety and efficiency and support the implementation of NextGen Performance-based operations.

### **Proposed FAR 121.579**

*§ 121.579 Minimum altitudes for use of autopilot.*

*(a) Unless otherwise approved by the Administrator, no person may use an autopilot lower than the applicable heights specified below. Enroute altitudes or heights are considered to be above terrain as applicable to the route flown. For takeoff, approach, or landing, the heights are above the runway touchdown zone elevation, runway elevation, or airport elevation, as applicable.*

*(b) Takeoff and initial climb.*

*No person may use an autopilot for takeoff or initial climb below the following heights:*

*(1) Below the value specified in the approved AFM for takeoff, or*

*(2) If a minimum engagement height is not specified by the AFM, an autopilot may not be used below 500' above the departure airport elevation.*

*Notwithstanding (1) or (2) above, the Administrator may determine that an autopilot engagement height lower than 500 feet above airport elevation, or an engagement height different than that specified by the AFM may be used by issuing operations specifications authorizing an alternate minimum engagement height*

*(c) Enroute.*

*No person may use an autopilot enroute, including climb and descent, at a height less than twice the height loss specified in the Airplane Flight Manual for a malfunction of the autopilot under cruise conditions, or 500 feet above applicable terrain, whichever is higher. For autopilots that do not specify a height loss or specify a negligible height loss, the autopilot may not be used at a height less than 500 feet above applicable terrain.*

*(d) Approach.*

*Except in accordance with section (e) below, no person may use an autopilot during approach at a height that is less than the following, as applicable:*

*(1) The minimum use height specified in the Airplane Flight Manual for the approach mode(s) used, or not lower than a height equal to twice the maximum height loss specified in the Airplane Flight Manual for a malfunction of the autopilot under applicable approach conditions, or less than 50 feet above the landing runway touchdown zone, whichever is higher.*

*(2) For systems that are demonstrated to have negligible or zero height loss (below the intended descent flight path) for applicable failure conditions, the autopilot may not be used below 50 feet above the landing runway touchdown zone, runway elevation or airport elevation.*

*(3) For systems where a minimum use height, or height loss for approach is not specified in the AFM, no person may use an autopilot at any altitude less than 50 feet below the lowest applicable DA(H) or MDA(H) for the instrument procedure being used, except as follows:*

*(i) If the pilot determines that suitable visual reference, as specified in § 91.175 of this chapter, has been established during an instrument approach, and can reasonably be expected to be maintained, or*

*(ii) If weather conditions do not require use of an approved instrument approach procedure, an autopilot may be used for approach no lower than the greatest of the applicable minimum use height specified in the AFM, or twice the applicable height loss, or 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable, or*

*(iii) If an approved and appropriately functioning autoland capability is used in accordance with section (e) below, or*

*(iv) If the Administrator issues operations specifications authorizing use of a lower autopilot minimum use height, but not less than 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable. Issuance of operations specifications based on this provision requires that the certificate holding office determine that a lower minimum use height can be safely used by that operator, for that operators type(s) of aircraft, authorized airport(s), underlying approach terrain, instrument procedures used, applicable DA(H) or MDA(H), and flight crew procedures, or*

(v) *If executing an autopilot coupled go-around or missed approach, using an appropriately certificated and functioning autopilot with go-around capability.*

(e) *Landing.*

*Notwithstanding paragraph (d) of this section, autopilot minimum use height provisions do not apply to autopilot operations when an approved automatic landing system mode is used. Automatic landing systems may not be used except in accordance with approved operations specifications.*

(f) *Go-Around.*

*Following a go-around, unless an automatic go-around is accomplished, no person may engage an autopilot below the minimum height specified in section (b) above for takeoff or initial climb. For an automatic go-around initiated with an autopilot already engaged, an autopilot minimum use height does not apply. Use of automatic go-around capability must not adversely affect safe obstacle clearance.*

### **Proposed FAR 135.93**

*§ 135.93 Minimum altitudes for use of autopilot.*

(a) *Unless otherwise approved by the Administrator, no person may use an autopilot lower than the applicable heights specified below. Enroute altitudes or heights are considered to be above terrain as applicable to the route flown. For takeoff, approach, or landing, the heights are above the runway touchdown zone elevation, runway elevation, or airport elevation, as applicable.*

(b) *Takeoff and initial climb.*

*No person may use an autopilot for takeoff or initial climb below the following heights:*

(1) *Below the value specified in the approved AFM for takeoff, or*

(2) *If a minimum engagement height is not specified by the AFM, an autopilot may not be used below 500' above the departure airport elevation.*

*Notwithstanding (1) or (2) above, the Administrator may determine that an autopilot engagement height lower than 500 feet above airport elevation, or an engagement height different than that specified by the AFM may be used by issuing operations specifications authorizing an alternate minimum engagement height*

(c) *Enroute.*

*No person may use an autopilot enroute, including climb and descent, at a height less than twice the height loss specified in the Airplane Flight Manual for a malfunction of the autopilot under cruise conditions, or 500 feet above applicable terrain, whichever is higher. For autopilots that do not specify a height loss or specify a negligible height loss, the autopilot may not be used at a height less than 500 feet above applicable terrain.*

(d) *Approach.*

*Except in accordance with section (e) below, no person may use an autopilot during approach at a height that is less than the following, as applicable:*

(1) *The minimum use height specified in the Airplane Flight Manual for the approach mode(s) used, or not lower than a height equal to twice the maximum height loss specified in the*

*Airplane Flight Manual for a malfunction of the autopilot under applicable approach conditions, or less than 50 feet above the landing runway touchdown zone, whichever is higher.*

*(2) For systems that are demonstrated to have negligible or zero height loss (below the intended descent flight path) for applicable failure conditions, the autopilot may not be used below 50 feet above the landing runway touchdown zone, runway elevation or airport elevation.*

*(3) For systems where a minimum use height, or height loss for approach is not specified in the AFM, no person may use an autopilot at any altitude less than 50 feet below the lowest applicable DA(H) or MDA(H) for the instrument procedure being used, except as follows:*

*(i) If the pilot determines that suitable visual reference, as specified in § 91.175 of this chapter, has been established during an instrument approach, and can reasonably be expected to be maintained, or*

*(ii) If weather conditions do not require use of an approved instrument approach procedure, an autopilot may be used for approach no lower than the greatest of the applicable minimum use height specified in the AFM, or twice the applicable height loss, or 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable, or*

*(iii) If an approved and appropriately functioning autoland capability is used in accordance with section (e) below, or*

*(iv) If the Administrator issues operations specifications authorizing use of a lower autopilot minimum use height, but not less than 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable. Issuance of operations specifications based on this provision requires that the certificate holding office determine that a lower minimum use height can be safely used by that operator, for that operators type(s) of aircraft, authorized airport(s), underlying approach terrain, instrument procedures used, applicable DA(H) or MDA(H), and flight crew procedures, or*

*(v) If executing an autopilot coupled go-around or missed approach, using an appropriately certificated and functioning autopilot with go-around capability.*

*(e) Landing.*

*Notwithstanding paragraph (d) of this section, autopilot minimum use height provisions do not apply to autopilot operations when an approved automatic landing system mode is used. Automatic landing systems may not be used except in accordance with approved operations specifications.*

*(f) Go-Around.*

*Following a go-around, unless an automatic go-around is accomplished, no person may engage an autopilot below the minimum height specified in section (b) above for takeoff or initial climb. For an automatic go-around initiated with an autopilot already engaged, an autopilot minimum use height does not apply. Use of automatic go-around capability must not adversely affect safe obstacle clearance.*

*(g) This section does not apply to operations conducted in rotorcraft.*

## Positive Impact of Proposed Rule Change

The rulemaking proposal for FAR 121.579 and FAR 135.93 contained herein will have a major positive operational and safety impact of flight operations with modern airplanes. The proposed rule would create the following improvements.

Firstly, the proposal would eliminate differences between FAR 121.579 and FAR 135.93. It would also eliminate ambiguities in the current rules thereby making the rules easier to understand and apply thereby enhancing compliance and safety of flight. The proposal also clarifies the reference height datums used to define the minimum use heights for each of the various flight phases.

Secondly, the proposed rule would apply to all flight phases, including those such as landing and go around that are not addressed in the current rule.

Thirdly and most significantly, the proposal recognizes the enhanced operational and safety capabilities of modern airplanes thereby providing greater operational flexibility and enhancing flight safety. This proposal also enables operators to take advantage of the full range of Performance-based Navigation capabilities and other Performance-based operations that are fundamental to implementation of NextGen and the Performance-based National Airspace System.

## Proposed Operations Specifications For FAR 121.579 and FAR 135.93

As soon as the decision is made to undertake rulemaking for FAR 121.579 and FAR 135.93, issue the change proposed in this paragraph to the C061 Operations Specification:

### “C061. Autopilot Use Authorizations

HQ Control: 08120/02

HQ Revision: 02a

#### a. Autopilot Minimum Use Heights:

Notwithstanding provisions of (*insert FAR 121.579 or FAR 135.93 as applicable*) the certificate holder is authorized to use the autopilot minimum engage and disengage heights for the aircraft types listed below:

Aircraft	Takeoff/Initial Climb	En Route	Approach	Landing
(Axxx)	(hhh ft)	(hhh ft)	(hhh ft)	(hhh ft)
(Bxxx)	(hhh ft)	(hhh ft)	(hhh ft)	(hhh ft)
(Cxxx)	(hhh ft)	(hhh ft)	(hhh ft)	(hhh ft)”

#### b. Flight Control Guidance Systems for Automatic Landing Operations Other Than Categories II and III

The certificate holder is authorized to conduct automatic approach and landing operations (other than Categories II and III) at suitably equipped airports. The certificate holder shall conduct all automatic approach and landing operations in accordance with the provisions of this paragraph.

- (1) Authorized Airplanes and Flight Control Guidance Systems. The certificate holder is authorized to conduct automatic approach and landing operations using the following aircraft and automatic flight control guidance systems.

Airplane Type	Flight Control Guidance Systems	
---------------	---------------------------------	--

<b>M/M/S</b>	<b>Manufacturer</b>	<b>Model</b>	
<b>TABL01</b>	<b>TABL02</b>	<b>TABL03</b>	

(2) Special Limitations.

- (a) The certificate holder shall conduct all operations authorized by this paragraph in accordance with applicable Section of Title 14 Code of Federal Regulations and the airworthiness certification basis of the automatic flight control guidance system used.
  - (b) The certificate holder shall not conduct automatic landing operations to any runway using these systems, unless the certificate holder determines that the flight control guidance system being used permits safe automatically flown approaches and landings to be conducted at that runway.
  - (c) The certificate holder shall not conduct any operations authorized by this paragraph, unless the certificate holder's approved training program provides training in the equipment and special procedures to be used.
  - (d) Except when automatic approaches and landings are performed under the supervision of a properly qualified check airman, any pilot used by the certificate holder to conduct automatic approaches and landings must be qualified in accordance with the certificate holder's approved training program.
- (3) These operations may be conducted on any ILS facility but only in CAT I or better weather unless prior coordination with ATC was done by the certificate holder to ensure the protection of the critical areas.

=====

- 1. Issued by the Federal Aviation Administration.
  - 2. Support information reference:
  - 3. These Operations Specifications are approved by direction of the Administrator.
  - 4. Date Approval is effective: Amendment Number:
  - 5. I hereby accept and receive the Operations Specifications in this paragraph.
- C061-1

# Appendix 1

## **Current FAR 121.579 Rule**

§ 121.579 Minimum altitudes for use of autopilot.

(a) Enroute operations. Except as provided in paragraphs (b), (c), and (d) of this section, no person may use an autopilot enroute, including climb and descent, at an altitude above the terrain that is less than twice the maximum altitude loss specified in the Airplane Flight Manual for a malfunction of the autopilot under cruise conditions, or less than 500 feet, whichever is higher.

(b) Approaches. When using an instrument approach facility, no person may use an autopilot at an altitude above the terrain that is less than twice the maximum altitude loss specified in the Airplane Flight Manual for a malfunction of the autopilot under approach conditions, or less than 50 feet below the approved minimum descent altitude or DA/DH for the facility, whichever is higher, except -

(1) When reported weather conditions are less than the basic VFR weather conditions in § 91.155 of this chapter, no person may use an autopilot with an approach coupler for ILS approaches at an altitude above the terrain that is less than 50 feet higher than the maximum altitude loss specified in the Airplane Flight Manual for the malfunction of the autopilot with approach coupler under approach conditions; and

(2) When reported weather conditions are equal to or better than the basic VFR minimums in § 91.155 of this chapter, no person may use an autopilot with an approach coupler for ILS approaches at an altitude above the terrain that is less than the maximum altitude loss specified in the Airplane Flight Manual for the malfunction of the autopilot with approach coupler under approach conditions, or 50 feet, whichever is higher.

(c) Notwithstanding paragraph (a) or (b) of this section, the Administrator issues operations specifications to allow the use, to touchdown, of an approved flight control guidance system with automatic capability, in any case in which -

(1) The system does not contain any altitude loss (above zero) specified in the Airplane Flight Manual for malfunction of the autopilot with approach coupler; and

(2) He finds that the use of the system to touchdown will not otherwise affect the safety standards required by this section.

(d) Takeoffs. Notwithstanding paragraph (a) of this section, the Administrator issues operations specifications to allow the use of an approved autopilot system with automatic capability below the altitude specified in paragraph (a) of this section during the takeoff and initial climb phase of flight provided:

(1) The Airplane Flight Manual specifies a minimum altitude engagement certification restriction;

(2) The system is not engaged prior to the minimum engagement certification restriction specified in the Airplane Flight Manual or an altitude specified by the Administrator, whichever is higher; and

(3) The Administrator finds that the use of the system will not otherwise affect the safety standards required by this section.

[Doc. No. 6258, 29 FR 19219, Dec. 31, 1964, as amended by Amdt. 121-13, 30 FR 14781, Nov. 30, 1965; Amdt. 121-33, 32 FR 13912, Oct. 6, 1967; Amdt. 121-130, 41 FR 47229, Oct. 28, 1976; Amdt. 121-206, 54 FR 34331, Aug. 18, 1989; Amdt. 121-265, 62 FR 27922, May 21, 1997; Amdt. 121-333, 72 FR 31661, June 7, 2007, effective August 6, 2007]

## Appendix 2

### ***Current FAR 135.93 Rule***

§ 135.93 Autopilot: Minimum altitudes for use.

(a) Except as provided in paragraphs (b), (c), (d), and (e) of this section, no person may use an autopilot at an altitude above the terrain which is less than 500 feet or less than twice the maximum altitude loss specified in the approved Aircraft Flight Manual or equivalent for a malfunction of the autopilot, whichever is higher.

(b) When using an instrument approach facility other than ILS, no person may use an autopilot at an altitude above the terrain that is less than 50 feet below the approved minimum descent altitude for that procedure, or less than twice the maximum loss specified in the approved Airplane Flight Manual or equivalent for a malfunction of the autopilot under approach conditions, whichever is higher.

(c) For ILS approaches, when reported weather conditions are less than the basic weather conditions in § 91.155 of this chapter, no person may use an autopilot with an approach coupler at an altitude above the terrain that is less than 50 feet above the terrain, or the maximum altitude loss specified in the approved Airplane Flight Manual or equivalent for the malfunction of the autopilot with approach coupler, whichever is higher.

(d) Without regard to paragraph (a), (b), or (c) of this section, the Administrator may issue operations specifications to allow the use, to touchdown, of an approved flight control guidance system with automatic capability, if -

(1) The system does not contain any altitude loss (above zero) specified in the approved Aircraft Flight Manual or equivalent for malfunction of the autopilot with approach coupler; and

(2) The Administrator finds that the use of the system to touchdown will not otherwise adversely affect the safety standards of this section.

(e) Notwithstanding paragraph (a) of this section, the Administrator issues operations specifications to allow the use of an approved autopilot system with automatic capability during the takeoff and initial climb phase of flight provided:

(1) The Airplane Flight Manual specifies a minimum altitude engagement certification restriction;

(2) The system is not engaged prior to the minimum engagement certification restriction specified in the Airplane Flight Manual, or an altitude specified by the Administrator, whichever is higher; and

(3) The Administrator finds that the use of the system will not otherwise affect the safety standards required by this section.

(f) This section does not apply to operations conducted in rotorcraft.

## Appendix 3

### **ARAC FGSHWG FAR 121.579 Proposal**

§ 121.579 Minimum altitudes for use of autopilot.

(a) Unless otherwise approved by the administrator, an autopilot may not be used lower than the applicable heights specified below. Enroute altitudes or heights are considered to be above terrain as applicable to the route flown. For takeoff, approach, or landing, the heights are above the runway touchdown zone elevation, runway elevation, or airport elevation, as applicable.

(b) Enroute.

(1) For autopilots certificated in accordance with AC 25.1329 (dated .....), as amended, the autopilot may not be used during cruise at a height less than twice the demonstrated height loss, or 500 feet above applicable terrain, which ever is higher. For autopilots that do not specify a height loss or specify a negligible height loss, the autopilot may not be used during cruise at a height less than 500 feet above applicable terrain.

(2) For autopilots not certificated in accordance with paragraph (1) above, the autopilot may not be used during cruise at a height less than twice the demonstrated height loss, or 500 feet above applicable terrain, which ever is higher. For autopilots that do not specify a height loss, the autopilot may not be used during cruise at a height less than 750 feet above applicable terrain.

(c) Approach.

Except in accordance with section (d) below, no person may use an autopilot during approach at a height that is less than the following, as applicable:

(1) The minimum height specified in the AFM for autopilot approach for the mode(s) used, or

(2) Not lower than a height equal to twice the maximum height loss specified in the Airplane Flight Manual for a malfunction of the autopilot under applicable approach conditions, or less than 50 feet above the landing runway touchdown zone, whichever is higher, or

(3) For systems that are demonstrated to have negligible or zero height loss (below the intended descent flight path ) for applicable failure conditions, the autopilot may not be used below 50 feet above the landing runway touchdown zone, runway elevation or airport elevation; or

(4) For systems where a minimum use height, or height loss for approach is not specified in the AFM, an autopilot may not be used at any altitude less than 50 feet below the lowest applicable DA(H) or MDA(H) for the instrument procedure being used, except as follows:

(i) If the pilot determines that suitable visual reference, as specified in § 91.175 of this chapter, has been established during an instrument approach, and can reasonably be expected to be maintained, or

(ii) If weather conditions do not require use of an approved instrument approach procedure, an autopilot may be used for approach no lower than the greatest of the applicable minimum use height specified in the AFM, or twice the applicable height loss, or 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable, or

(iii) If an approved and appropriately functioning autoland capability is used in accordance with section (d) below, or

(iv) If the Administrator issues operations specifications authorizing use of a lower autopilot minimum use height, but not less than 50 feet above the landing runway touchdown zone elevation, runway elevation, or airport elevation, as applicable. Issuance of operations specifications based on this provision requires that the certificate holding office determine that a lower minimum use height can be safely used by that operator, for that operators type(s) of aircraft, authorized airport(s), underlying approach terrain, instrument procedures used, applicable DA(H) or MDA(H), and flight crew procedures, or

(v) If executing an autopilot coupled go-around or missed approach, using an appropriately certificated and functioning autopilot with go-around capability.

(a) Takeoff and initial climb.

An autopilot may not be used for takeoff or initial climb below the following height:

(1) Below the value specified in the approved AFM for takeoff, or

(2) If a minimum engagement height is not specified by the AFM, an autopilot may not be used below 500' above the departure airport elevation.

Notwithstanding (1) or (2) above, the Administrator may determine that an autopilot engagement height lower than 500 feet above airport elevation, or an engagement height different than that specified by the AFM may be used by issuing operations specifications authorizing an alternate minimum engagement height

(d) Landing.

Notwithstanding paragraph (c) of this section, autopilot minimum use height provisions do not apply to autopilot operations when an approved automatic landing system mode is used. Automatic landing systems may not be used except in accordance with approved operations specifications.

(e) Go-Around.

Following a go-around, unless an automatic go-around is accomplished, an autopilot may not be engaged below the minimum height specified in section (a) above for takeoff or initial climb. For an automatic go-around initiated with an autopilot already engaged, an autopilot minimum use height does not apply. Use of automatic go-around capability must not adversely affect safe obstacle clearance.

## **Appendix 4**

### ***ARAC FGSHWG FAR 135.93 Proposal***

The ARAC Flight Guidance System Harmonization Working Group (FGSHWG) did not recommend specific wording for a FAR 135.93 rulemaking proposal. The intent of the working group recommendation was to assure that the language for any FAR 135.93 rulemaking proposal should be equivalent to the language in the FAR 121.579 rulemaking proposal contained in Appendix 3 above.