ATTACHMENT 19
FAA ORDER 8200.1 Excerpt

214.3 FLIGHT INSPECTION PROCEDURES

a. The objective of evaluating instrument flight procedures is to ensure safety and flyability. The following items are included in this evaluation:

(1) Aircraft maneuvering is consistent with safe operating practices for the category of aircraft intending to use the procedure.

(2) Cockpit workload is acceptable.

(3) Navigation charts properly portray the procedure and are easily interpreted.

(4) Runway markings, lighting, and communications are adequate.

(5) The applicable system (NAVAID, Satellite, FMS, etc.) supports the procedure.

References in this section are for clarification purposes only and do not supersede instructions or flight inspection criteria for facilities or systems contained elsewhere in this order.

b. A restricted NAVAID may still support an instrument flight procedure when the procedure does not use the out-of-tolerance area. Those areas shall be reflected on the flight inspection report and on the navigation charts where performance will restrict or limit the expected procedure.

c. A distance measuring equipment (DME) arc segment may be used in areas of unusable radial information, provided that the DME, the radial where the arc starts, the lead radial, the final approach radial, and any other radial used in the procedure meet required tolerances.

d. The flight inspection of an instrument flight procedure and verification of the SIAP obstacle data may be conducted during the applicable system inspection if visual meteorological conditions (VMC) prevail throughout each segment of the procedure to be evaluated.

e. Verification of Obstacle Clearance

(1) Identification of New Obstacles. In most instances, accurate information concerning the location, description, and heights of tall towers and other considerable obstacles is available from the FAA data base and/or other government sources. When a new obstruction not identified in the procedures package is discovered and may become the controlling obstruction for the segment, the procedure commissioning will be denied until the procedure specialist can analyze the impact of the obstacle on the overall procedure.

(2) Obstacle Locations shall be noted in latitude/longitude as determined from a flight inspection receiver (e.g., GPS), or radial/bearing and distance from a known facility. If these methods are not available, an accurate description on the flight inspection map may be used.

(3) Estimation of Obstacle Heights.

(a) When a new obstacle not identified from current data base information is discovered, the flight inspector will ascertain via the safest and most expeditious method available the location and height of the new obstruction and forward the information to the procedure specialist listed on the request for flight inspection cover sheet. Obstacle heights measured in flight will not be used unless the actual height of the obstruction cannot be

determined by other means. If inflight height determination is required, accurate altimeter settings and altitude references must be used to obtain precise results.

(b) An alternative method for determining obstacle height is to select another obstacle in the near vicinity which has a known or published elevation. Fly abeam the uppermost point of the known obstacle and set the co-pilot's altimeter to read the same mean sea level (MSL) altitude as published. Without resetting the altimeter, fly abeam of the obstacle for which the height is unknown and note the altimeter reading. Where possible, note the AGL elevation for the procedure specialist and any deviation from the above procedure necessary to compensate for unlevel terrain.

(4) The flight inspection report will reflect the documentation for the method of height determination.

(5) Controlling obstacles in each approach segment shall be confirmed visually by inflight or ground observation. If unable to confirm that the declared controlling obstacle is the highest obstacle in the segment, list the location, type, and approximate elevation of the obstacles the flight inspector desires the procedure specialist to consider. The flight inspector will place special emphasis on discovered obstacles that may not be listed in the FAA data base. If the controlling obstacle is listed as terrain/trees or Adverse Assumption Obstacle (AAO), it is not necessary to verify which tree is controlling, only that no higher manmade obstacle is present in the protected airspace. If the flight inspector observes that the controlling obstacle has been eliminated or dismantled, the flight inspector shall forward that information to the procedures specialist.

(6) Conduct obstacle evaluations in visual meteorological conditions (VMC) only. The flight inspector retains the responsibility to ensure that the procedure is operationally safe and may use his/her discretion to vary the pattern to best suit the evaluation. If during a periodic inspection the procedure is flown at night, in IMC conditions, or the flight inspector cannot ascertain the required obstacle clearance (ROC), he/she shall state in the "Remarks" section of the flight inspection report that the obstacle verification was not accomplished and for which SIAP. If the obstacle verification cannot be accomplished either by other ground means or cannot be accomplished during the next periodic inspection, the procedure shall be notamed out of service until the check can be accomplished. During periodic inspections, it is not necessary to visually identify the controlling obstacle but rather to visually verify the integrity of the required obstacle clearance plane for the final and missed approach segment. For precision approaches with sloping obstacle clearance planes, only surveyed data should be used when considering obstructions.

214.31 Checklist.

Check	Ref. Para.	C	P
Final Approach Segment	214.3201	X	
	214.32011	X	X
Missed Approach Segment	214.32012	X	X
Circling Segment	214.32013	X	1
En route/Terminal Segments	214.3202	X	1
Fixes/Holding Pattern	214.3203	X	1
Air/Ground Communications	214.3204	X	1
Area Navigation/ GPS/FMS	214.3205	X	2

NOTE:

1. Surveillance.
2. SIAPs require periodic inspection per Section 105.

214.32 Detailed Procedures.

214.3201 Approach Segments

214.32011 Final Approach.

The final approach course shall deliver the aircraft to the desired aiming point. The aiming point varies with the type of system providing procedural guidance and will be determined by the procedure specialist. After flight inspection verifies the aiming point, it will not be changed without the concurrence of the procedure specialist. When the system no longer delivers the aircraft to the established aiming point and the system cannot be adjusted to regain the desired alignment, consideration should be given to amending the procedure.

214.32012 Missed Approach.

Flight inspection of the missed approach segment will assure that the designed procedural altitudes provide obstacle clearance per paragraph 214.3e. The flight inspector shall also determine that the procedure is safe and operationally sound for the category aircraft intended.

214.32013 Circling.

The flight inspector shall verify that proposed circling maneuvers are safe and sound for the category of aircraft proposed. Procedural altitudes shall be evaluated per paragraph 214.3e.

214.3202 En route/Terminal Routes.

Evaluate each en route or terminal segment during commissioning flight inspection to ensure that the proposed minimum obstacle clearance altitude (MOCA) is adequate per paragraph 214.3e.

214.32021 Minimum En route Altitude (MEA) and Changeover Points.

The MEA and change-over points shall be predicated on minimum obstruction altitude (MOCA), minimum reception altitude (MRA), airspace, and communication requirements. If more than one of the above altitudes is procedurally required, the highest altitude determined through flight inspection will become the minimum operational altitude.

214.32022 Maximum Authorized Altitudes (MAA).

MAAs are limitations based on airspace restrictions, system performance characteristics, or interference predictions. If the MAA are based on an interference problem, the source of the interference must be identified and corrective action initiated where possible.

214.3203 Fixes/Holding Patterns.

Controlling obstacles shall be verified to ensure the adequacy of minimum holding altitude (MHA) per paragraph 214.3e. System performance will be evaluated to ensure conformance with appropriate tolerance sections of this manual. If system performance and obstacle clearance data are on file, flight inspection of the procedure is not required.

214.3204 Air/Ground Communications.

Air/ ground communications with the controlling facility must be satisfactory at the minimum initial approach fix altitude and at the missed approach altitude. Where ATC operations require continuity in communication coverage and ATC requests verification, flight inspection shall evaluate that coverage in accordance with appropriate sections of this order.

214.3205 Area Navigation (RNAV), GPS, FMS.

All procedures based on RNAV, GPS, or FMS shall be evaluated by flight inspection for conformance to safe and sound operational practices. Flight inspection of these procedures shall, as a minimum, evaluate the following:

a. Waypoint accuracy;

b. Bearing accuracy;
c. Distance accuracy;
d. Conformancy with paragraph 214.3a;
e. Obstacle clearance per paragraph 214.3e;
f. System support of the procedure at altitudes proposed for use.

214.32051 Detailed Procedures

a. The flight inspector shall review and evaluate each segment of the procedure for conformance with safe and sound operational practices. Where required, the flight inspector shall coordinate and brief ATC on special handling requirements and procedural operation. Prior to flight, the inspector shall verify that all supporting equipment or systems are in place and functioning (e.g., Rho Theta systems in operation, satellite ephemeral data and availability, etc.).

(1) Waypoint Accuracy. The purpose is to verify that the waypoints as depicted on the procedure are properly labeled and correct. Rho-Theta systems shall properly depict supporting facilities; systems utilizing coordinates are depicted in a manner compatible with equipment requirements. Specific equipment tolerances or displacement errors are addressed in other portions of this order. The procedure will comply with tolerances listed in the appropriate section.

(2) Bearing Accuracy. AFIS is the standard for determining the bearing accuracy to and between waypoints. The procedurally depicted bearings will agree with the bearings announced from AFIS. Where there is disagreement, the procedure will be denied and the procedure specialist advised.

(3) Distance Accuracy. AFIS is the standard for determining the distance accuracy between waypoints. Where there is a difference between depicted waypoints and AFIS, the procedure will be denied and the procedure specialist advised.

(4) The flight inspector shall evaluate all facets of the procedure to ensure compliance with safe operating practices. The evaluation shall include the clarity and readability of the depiction and that workloads imposed on the air crew to select or program the procedure are reasonable and straightforward. Objective and professional judgment from air crews trained in flight inspection is expected.

(5) Runway Markings, Lighting, and Communication. The flight inspector shall evaluate the suitability of the airport to support the procedure. Unsatisfactory or confusing airport markings, non-standard or confusing lighting aids, or lack of communication at critical flight phases are grounds for denying the procedure. In all cases, the procedure specialist will be appraised of the conditions discovered during the flight inspection.

(6) Applicable System Support. The variation in systems dictates a progressive approach in determining evaluation methods. Study of the procedure by the flight crew prior to flight will normally reveal the type of system verification required. Where a ground-based NAVAID supports the procedure, the flight inspector shall verify its status prior to flight. RNAV systems will be evaluated through emulation with AFIS aircraft. Where emulation is not possible, the procedure will be performed in an aircraft certified for the procedure with the flight inspector aboard and in a position where evaluation per paragraph 214.32051a(4) can be accomplished.

b. En route and terminal route segments shall be flown at the proposed MEA using the applicable system for guidance and to or from a point where course or obstacle clearance has been established. In the case of a SID, the procedure shall be evaluated to an established NAVAID or fix or to a point where en route obstacle clearance has been established. For STAR

type procedures, the route shall be evaluated from where it departs known obstacle clearance and guidance to where the route intercepts a portion of an established SIAP or procedure from which a normal descent and landing can be accomplished. Periodic inspection of en route and terminal route segments is not required.

c. Standard Instrument Approach Procedures (SIAP). All standard instrument approach procedures intended for publication shall be inflight evaluated. The final approach trapezoid shall be evaluated per paragraph 214.3e. The final approach segment shall be flown to an altitude 100 feet below the proposed minimum descent altitude. Approaches with precision vertical guidance shall be evaluated to the proposed decision or missed approach altitude. Misalignment or inaccurate data indications will be forwarded to the procedure specialist for further review prior to commissioning the procedure.

214.4 ANALYSIS.

Flight inspection determines that the procedure is flyable and safe. If a new procedure is unsatisfactory, the flight inspector shall coordinate with the procedure specialist to determine the necessary changes. When an existing procedure is found unsatisfactory, initiate NOTAM action immediately and advise the procedure specialist.

214.41 Cartographic Standards.

Changes to cartographic standards are the responsibility of the Interagency Air Cartographic Committee and the Intra-Agency Committee for Flight Information. Recommendations for changes to these standards should be sent to the Office of Aviation System Standards, Flight Inspection Operations Division, AVN-200, for consolidation and forwarding to the appropriate committee.

214.42 Night Evaluations.

a. For new flight procedures at airports with no prior IFR service, a night flight inspection shall be conducted to determine the adequacy of airport lighting systems prior to authorizing night minimums.

b. Inspect light systems during the hours of darkness. Evaluate the light system for:

(1) Faithful representation of the depiction (correct light pattern);

(2) Operation in the manner proposed (e.g., photocell, radio control etc.);

(3) Local lighting patterns in the area surrounding the airport do not distract, confuse, or incorrectly identify the runway environment.

214.43 Human Factors.

Human Factors are concerned with optimizing the relationship between people and their activities by systematic application of human sciences integrated within the framework of systems engineering. In the context of flight inspection, it is a question of whether a flight procedure is operationally safe and flyable for a minimally qualified sole pilot flying an aircraft with basic IFR instrumentation in instrument meteorological conditions using standard navigation charting.

The criteria used to develop instrument flight procedures represent many factors such as positioning requirements, protected airspace, system and avionics capabilities, etc. Human factors such as cockpit workload, pilot error, and memory limitations have been considered. Sensory, perceptual, and cognitive restrictions historically have been incorporated in the criteria only to a limited extent; e.g., length of approach segments, descent rates, turn angles, etc. These are products of subjective judgments in procedure development and cartographic standards. It is incumbent upon the flight inspector to apply the principles of human factors when certifying an original or amended procedure. The following factors shall be evaluated:

a. Complexity. The procedure should be as simple as possible. It should not impose an excessive workload on a sole pilot flying a minimally equipped aircraft.

b. Interpretability

(1) The final approach course should be clearly identifiable, with the primary guidance system or NAVAID unmistakable;

(2) The procedure should clearly indicate which runway the approach serves and indicate which runway(s) circling maneuvers apply to;

(3) Areas not to be used for maneuvering shall be clearly defined.

c. Human Memory Considerations. Pilots must be able to extract information quickly and accurately during an instrument approach. Multiple tasks complicate the memory process and tend to produce prioritization during stressful phases of flight. Workload reduction can be accomplished through methodical chart layout that encourages the pilot to periodically refer to the depicted procedure rather than trying to memorize complex maneuvers.

214.5 TOLERANCES.

The procedure should be safe, practical, and easily interpreted with minimal additional cockpit workload. Supporting facilities/ systems shall meet tolerances of the appropriate sections of this manual and not contribute to operational confusion.