

Airport Design & TERPS

Presented by:

Richard K. Compton & Bob Bonanni

NOTE: PowerPoint 2003 required for animations on some slides

Briefing Objectives

AOSC

TERPS

-  Paragraph 251 – Visual Segment

-  POFA - POFZ

-  Departure Surface

-  CAT I Missed Approach Surface

-  CAT II/III Missed Approach Surface

-  Glide Path Qualification Surface (GQS)

Airport Design

-  Runway / Parallel Taxiway Separation

-  Airport Surveys

-  Airport Survey Pilot Program

-  Other Advisory Circular Updates

AOSC

 The **Airport Obstruction Standards Committee** (AOSC) was Chartered May 2003 by the FAA Administrator.

 Tracked under the **FAA Flight Plan**.

 The Purpose of the AOSC is to **coordinate national policy across all FAA lines of business** relating to airspace & obstructions as it relates to airports.

AOSC

Current AOSC programs:

 Tall Airport Traffic Control Tower (ATCT's) Siting

 POFA and Runway Taxiway Separation

 Perimeter/End-Around Taxiways

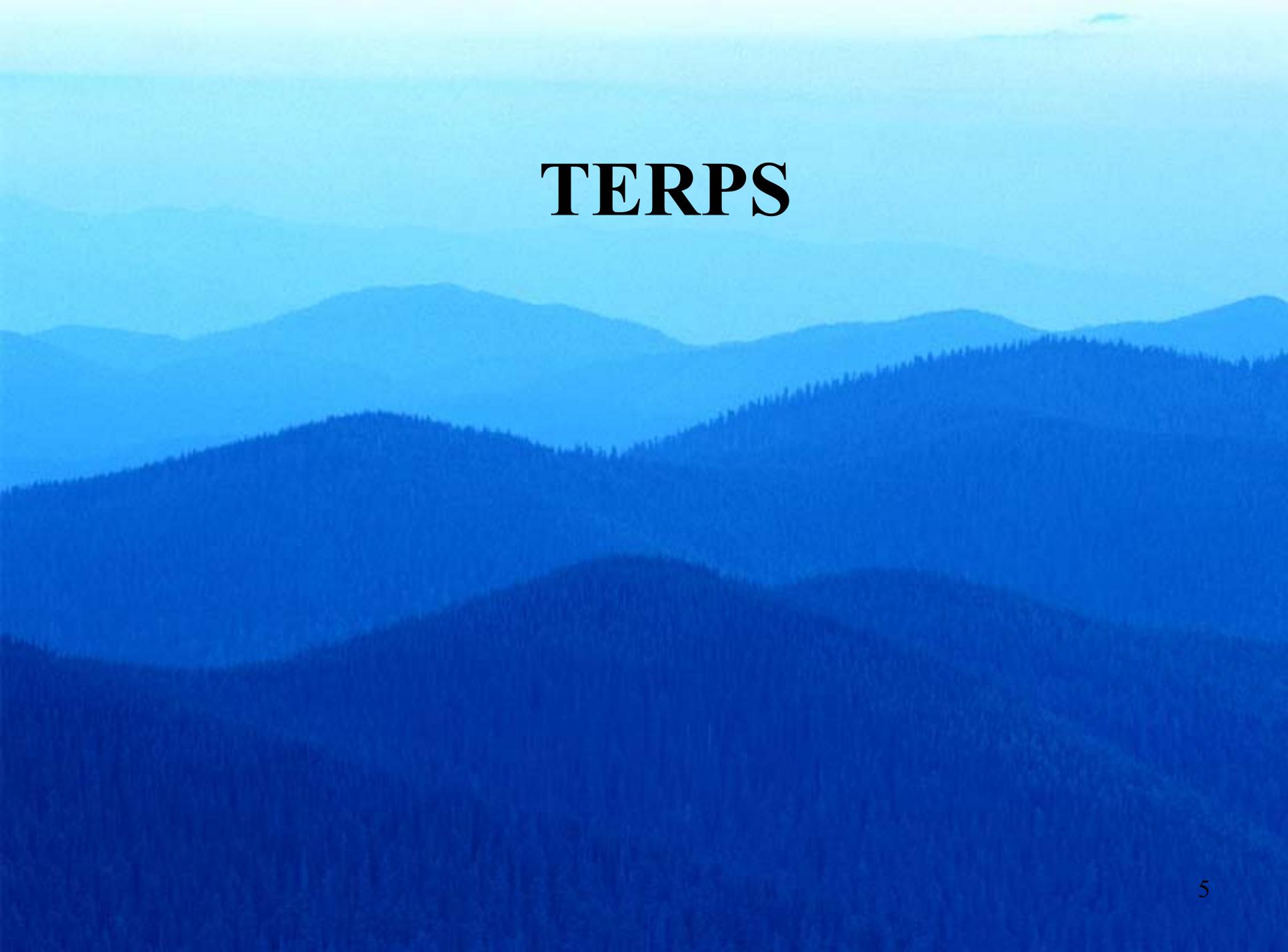
 40:1 Departure Surface

 DP / IAP Airspace

 National Survey Plan

 AOSC Decision require changes to FAA Orders, Advisory Circulars and Policy Letters **prior** to Implementation in the field!

TERPS



Paragraph 251 – Visual Segment

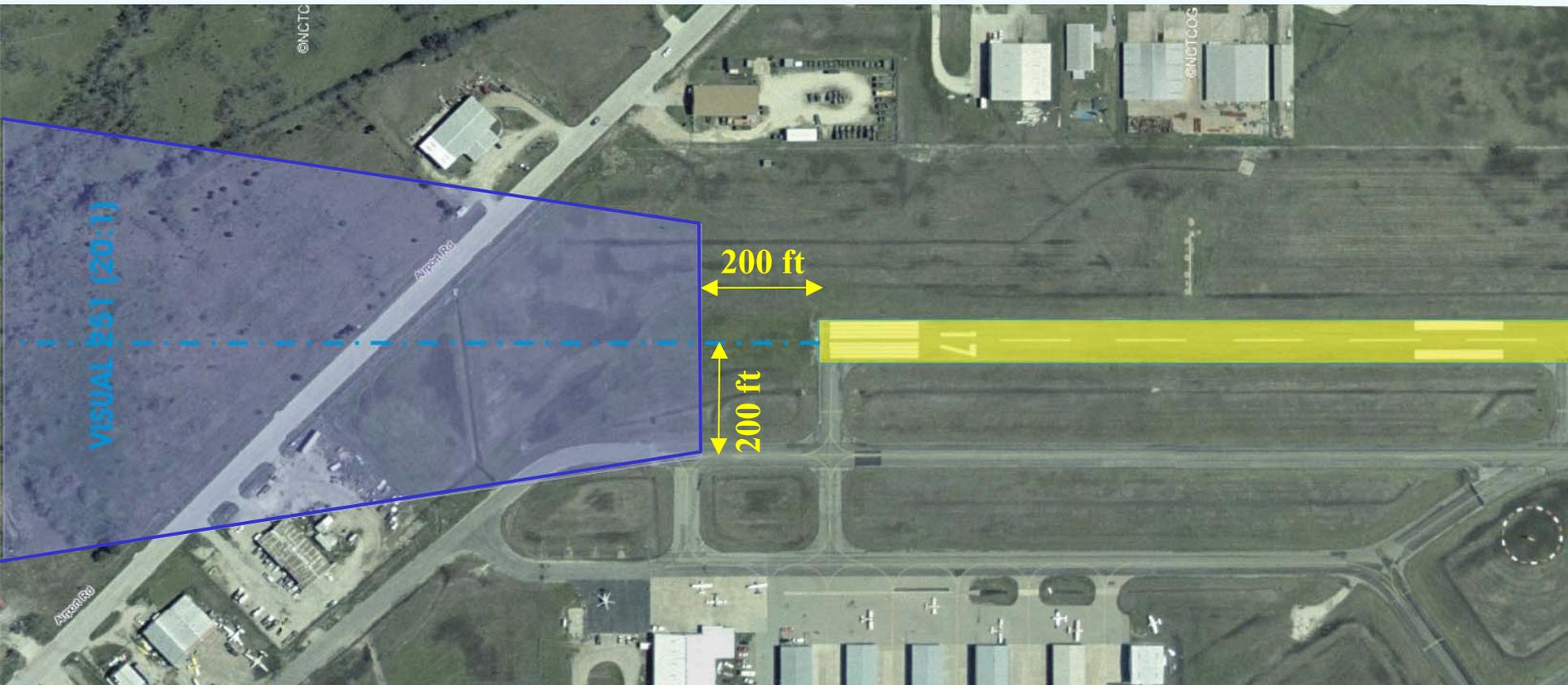
- ✎ Change 17 to TERPS Required an Evaluation of Penetrations to the 20:1 surface

- ✎ Penetrations Not Removed or Lighted would Lose Night Minima
 - ✎ Later TERPS Changes Allowed the Use of a VGSI (i.e. PAPI) as a mitigation Tool

- ✎ New AFS/AVN/AAS policy is being established
 - ✎ AVN will Identify Impacted Procedures to the Airport Sponsor.
 - ✎ The Airport Working with the ADO will have 3 years to Implement Address Obstructions or Lose Night Minima.

- ✎ Threshold Siting Surface “E” Adjusted by letter for Category A & B aircraft only to correlate with Visual 251 criteria.

Paragraph 251 – Visual Segment



from
Precision Obstacle Free Area (POFA)
to
Precision Obstacle Free Zone (POFZ)

POFA - POFZ

POFA is renamed POFZ, published 9/2004.

AC 150/5300-13 Chg 8, Airport Design.

No Penetrations!!

No part of Fuselage or Tail may enter the POFZ

Wing tips are OK

New POFZ Marking/Signage standards issued 12/2004.

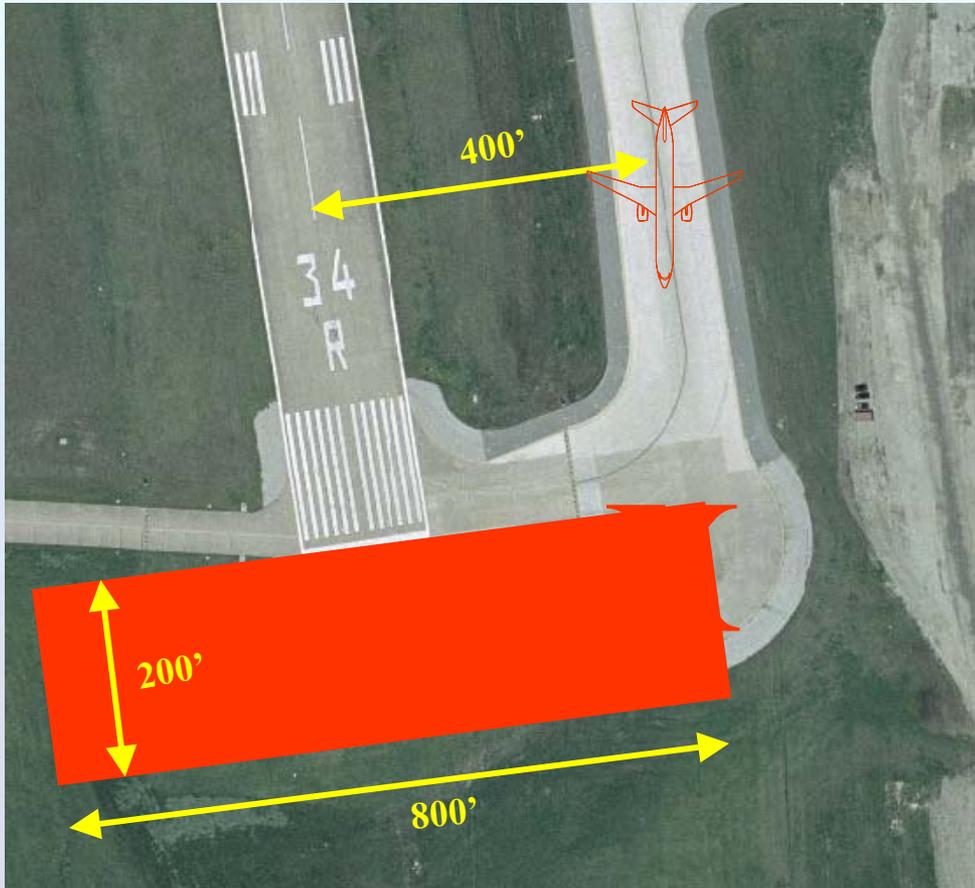
AC 150/5340-1H, Chg 2, Standards for Airport Markings

AC 150/5340-18D Standards for Airport Sign Systems

FAA will issue guidance for controllers to ensure that the POFZ is clear when weather is below 250 feet and $\frac{3}{4}$ mile and an aircraft is within 2 nautical miles final.

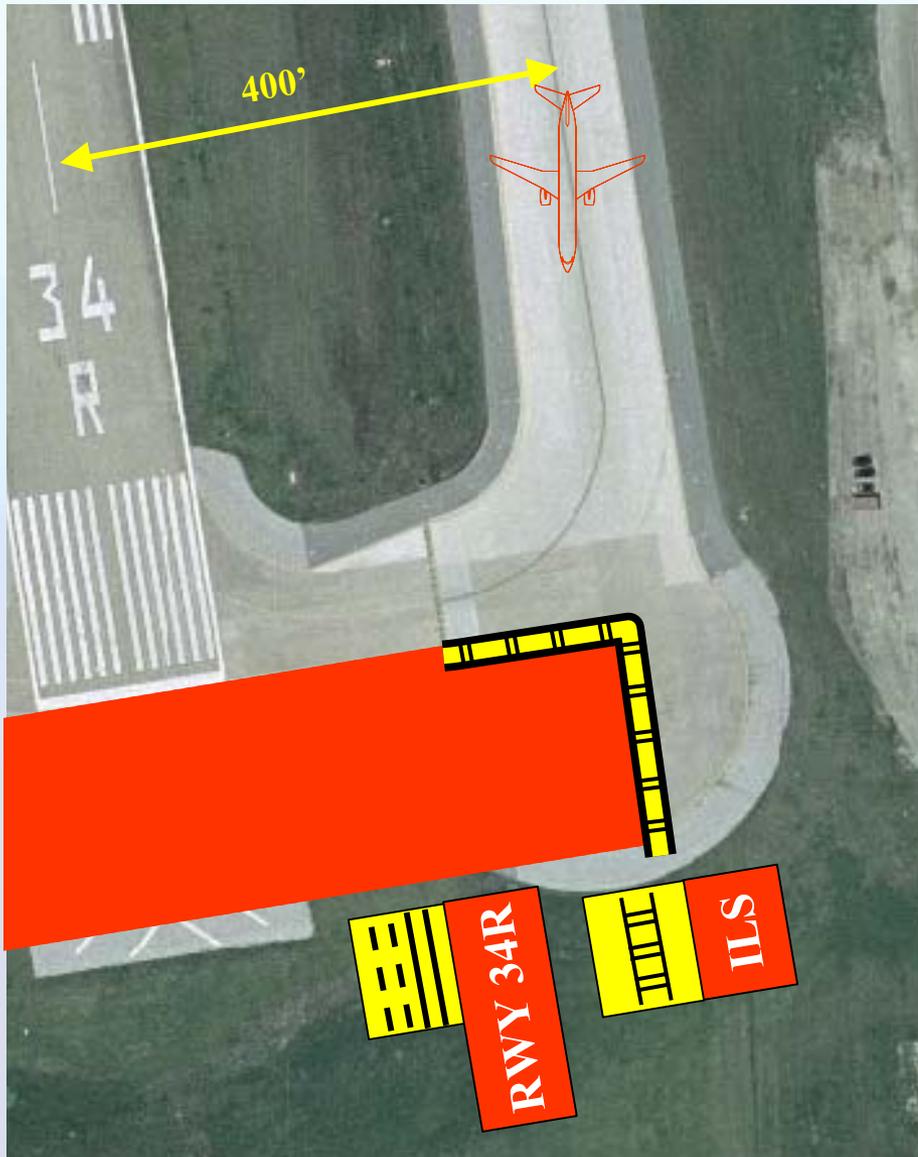
Compliance with POFZ Standards is required no later than January 1, 2007.

POFA - POFZ



- ✎ No part of fuselage or tail in POFZ.
- ✎ Mitigation by 1/1/07
 - ✎ Operational controls.
 - ✎ Revise Marking, Signs and Lighting.
 - ✎ Remove pavement.
 - ✎ Replace Run-up area.

POFZ – Marking & Signage



Marking

ILS/POFZ marking to designate the affected area.

Signage

Corresponding ILS Critical Area/POFZ and ILS/POFZ Holding Position Signs.

Latitude for Holding positions less than 50 foot difference.

POFZ – Operational Impacts?



POFZ – Operational Impacts?



POFZ must be protected when arriving aircraft are within 2NM of Runway Threshold.

Air Traffic must anticipate the aircraft spacing.

Departure Surface

Departure Surface

 Safety initiative!

 Not all obstacles within the Departure Surface area were being evaluated the same way.

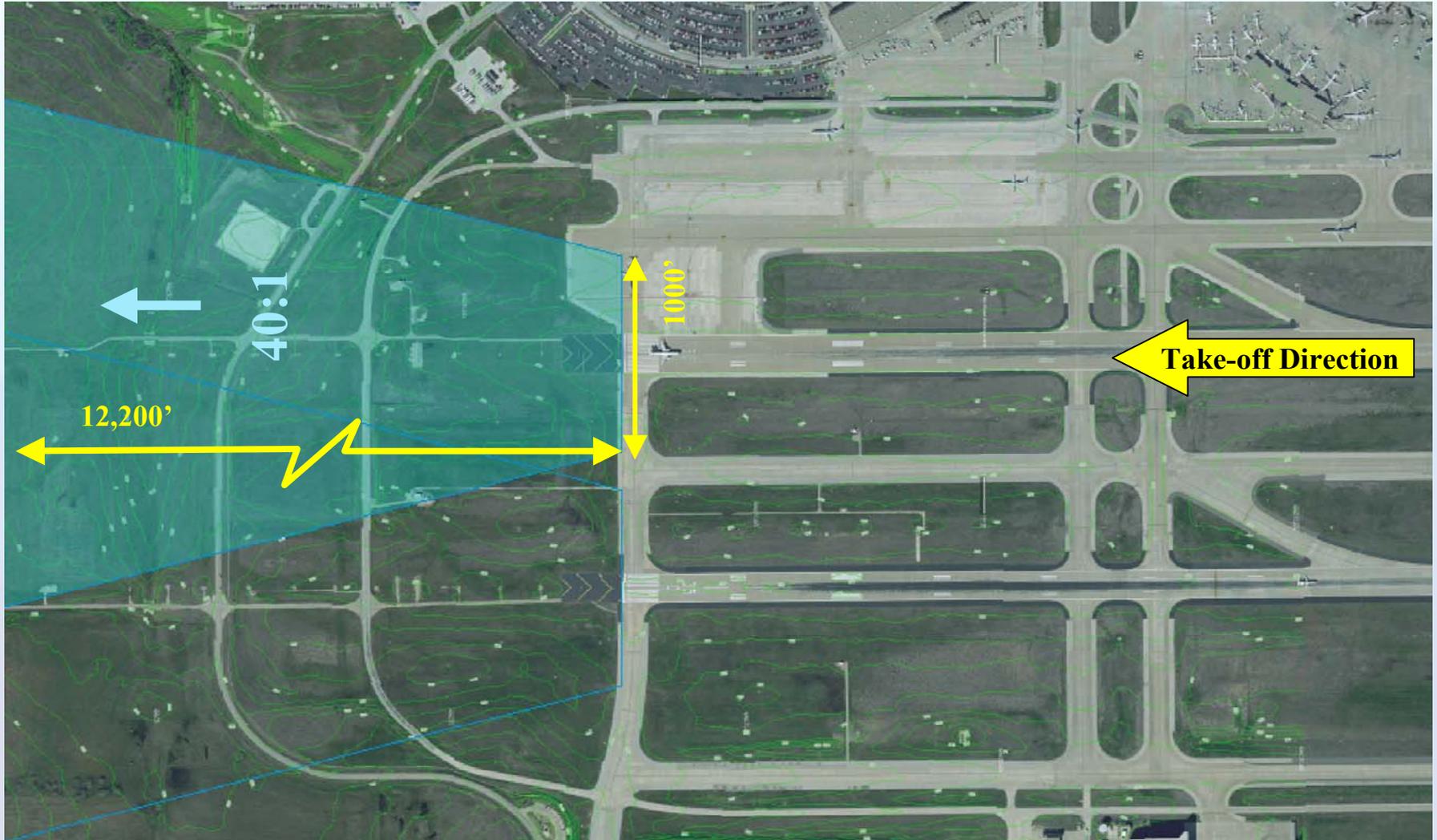
 Obstacle Database

 Required for **Airline Dispatchers**

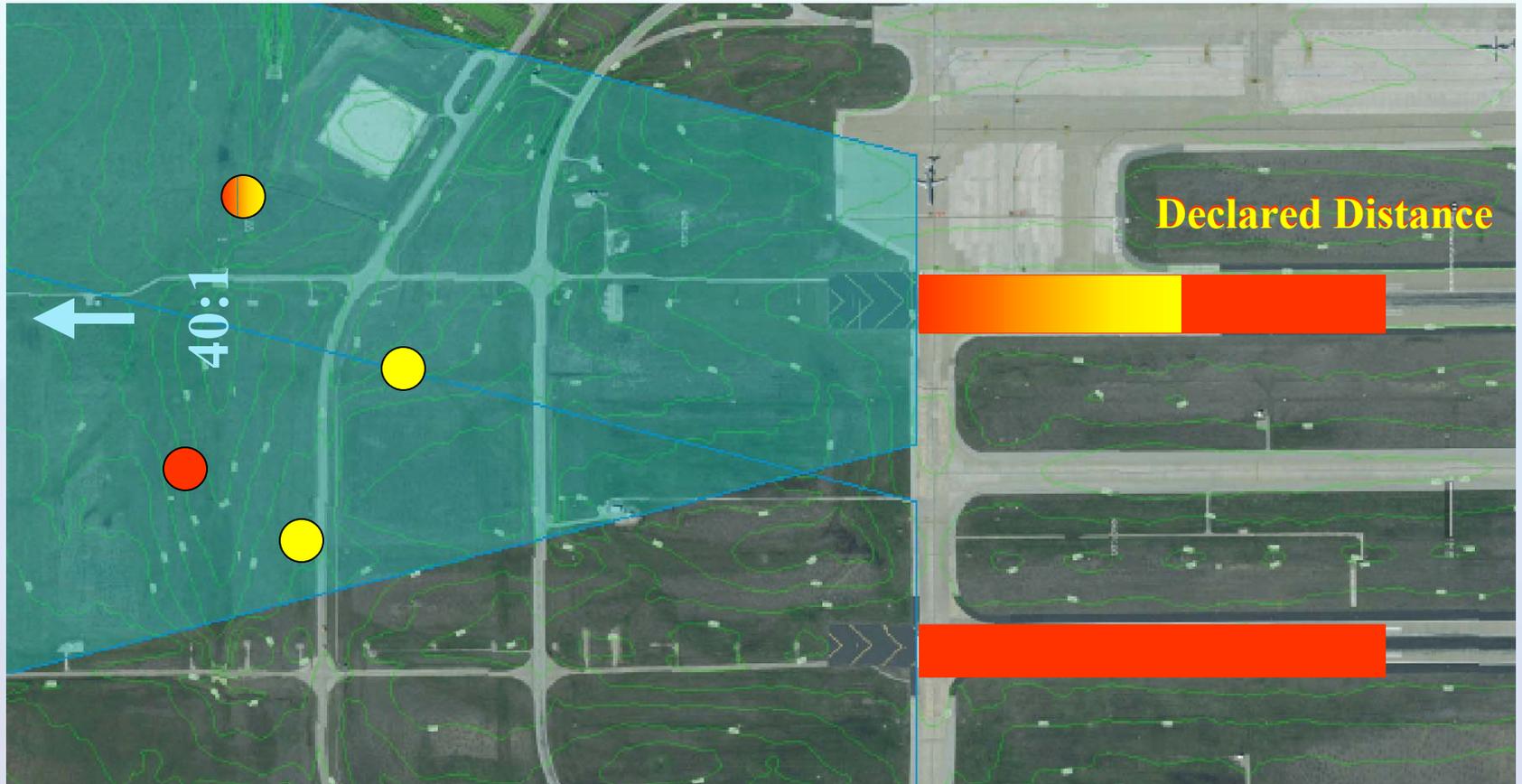
 New process will **Enhances Safety!**

 Potential for **Declared Distance** impact!

Departure Surface

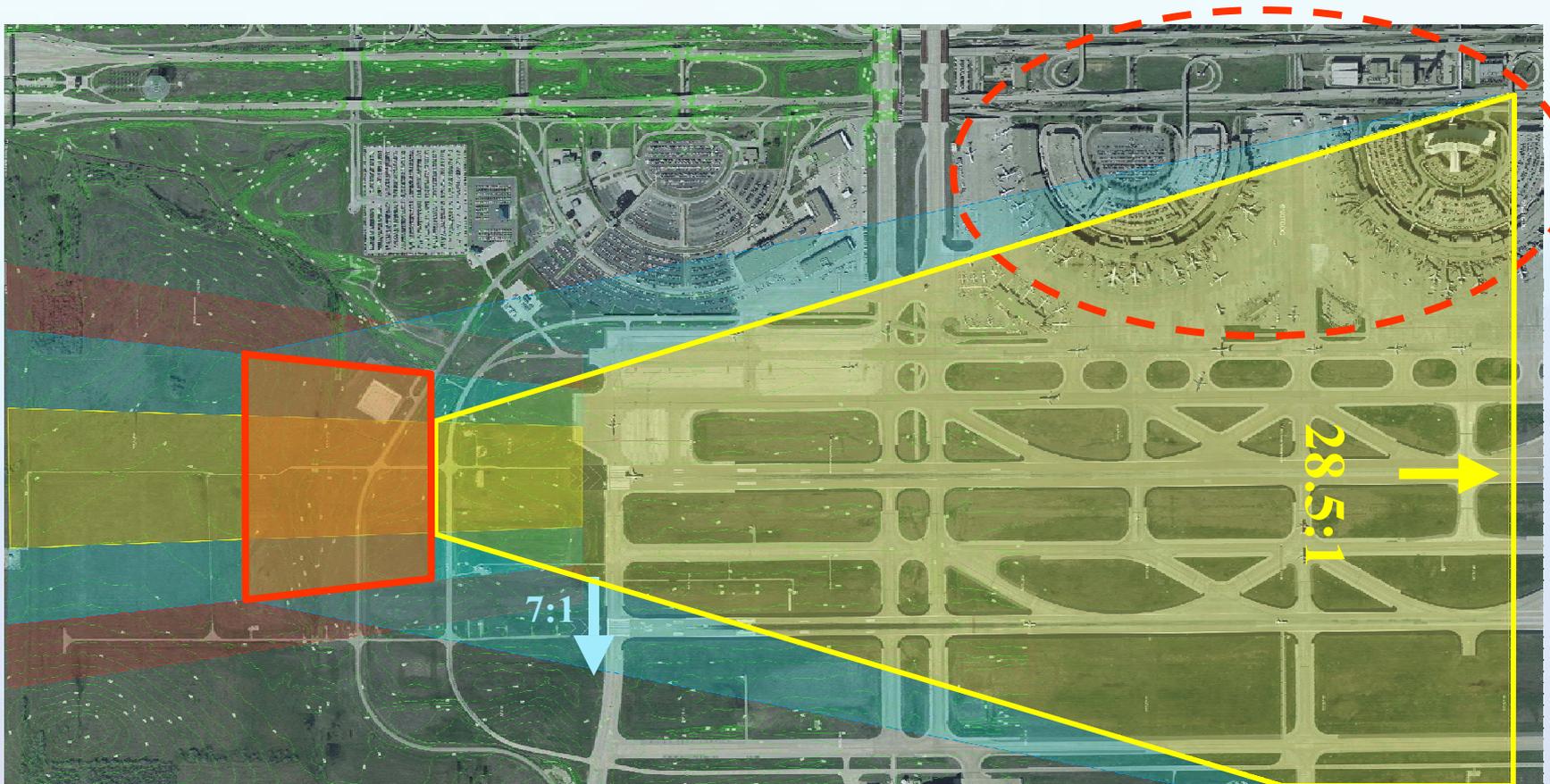


Departure Surface



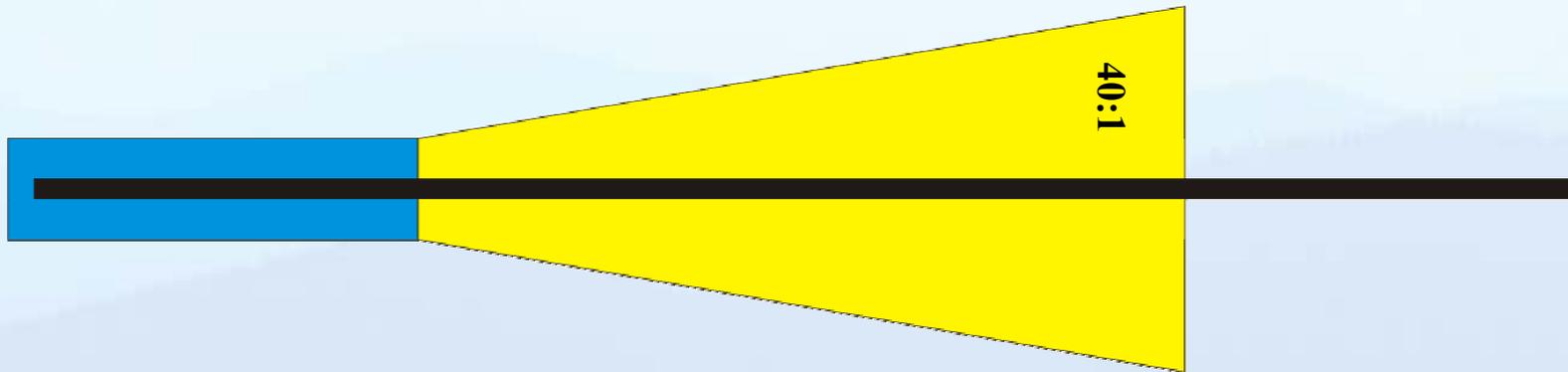
CAT I Missed Approach Surface

CAT I Missed Approach Surface

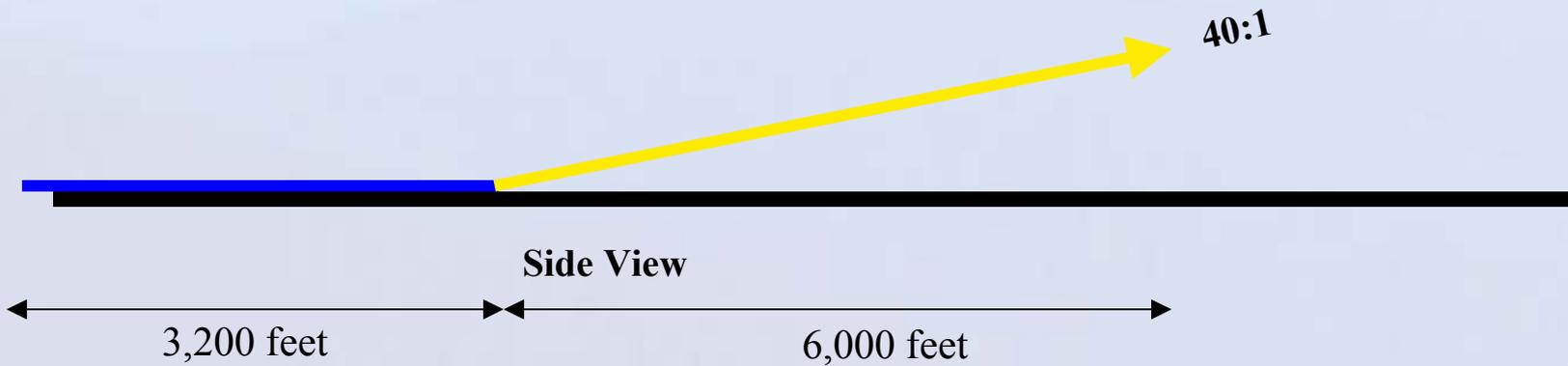


CAT II / III Missed Approach Surface

CAT II/III Missed Approach



Top Down View



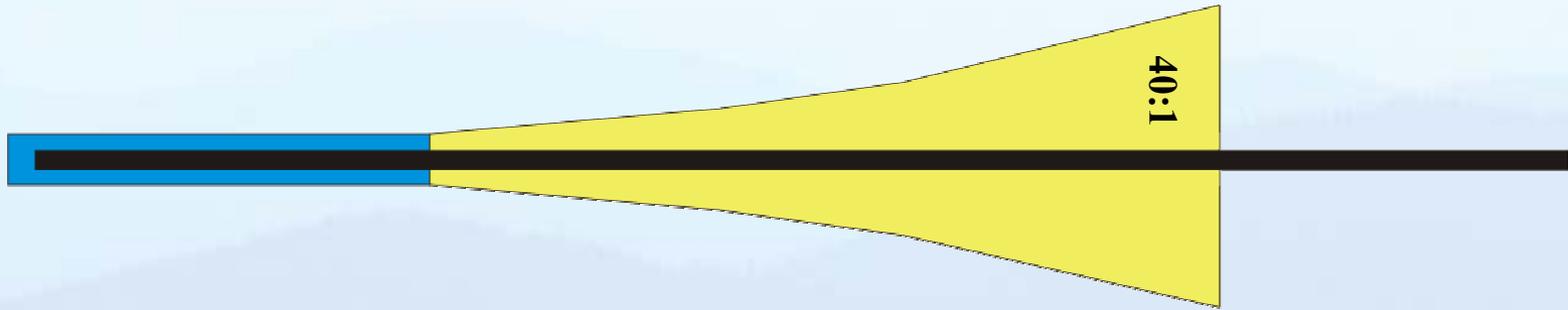
Side View

3,200 feet

6,000 feet

CAT II/III Missed Approach

Preliminary



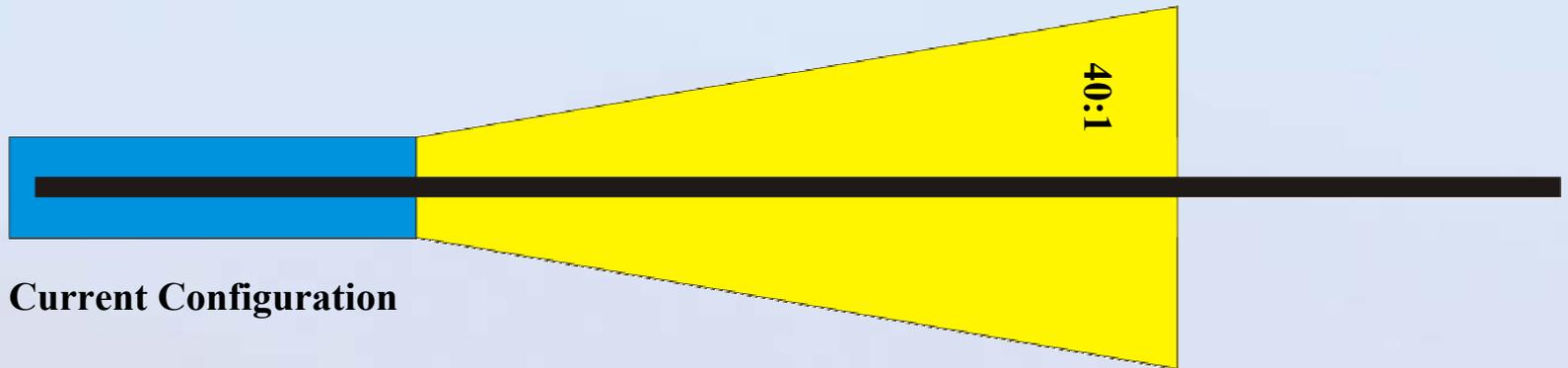
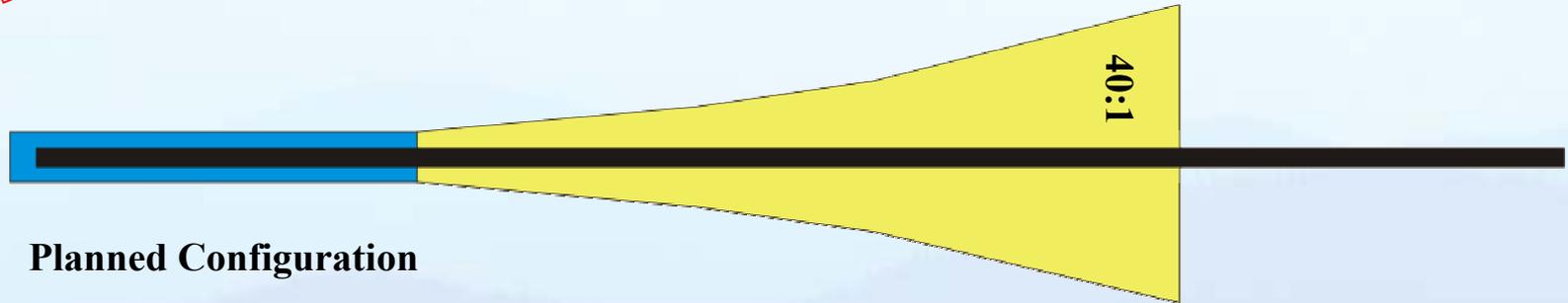
Top Down View



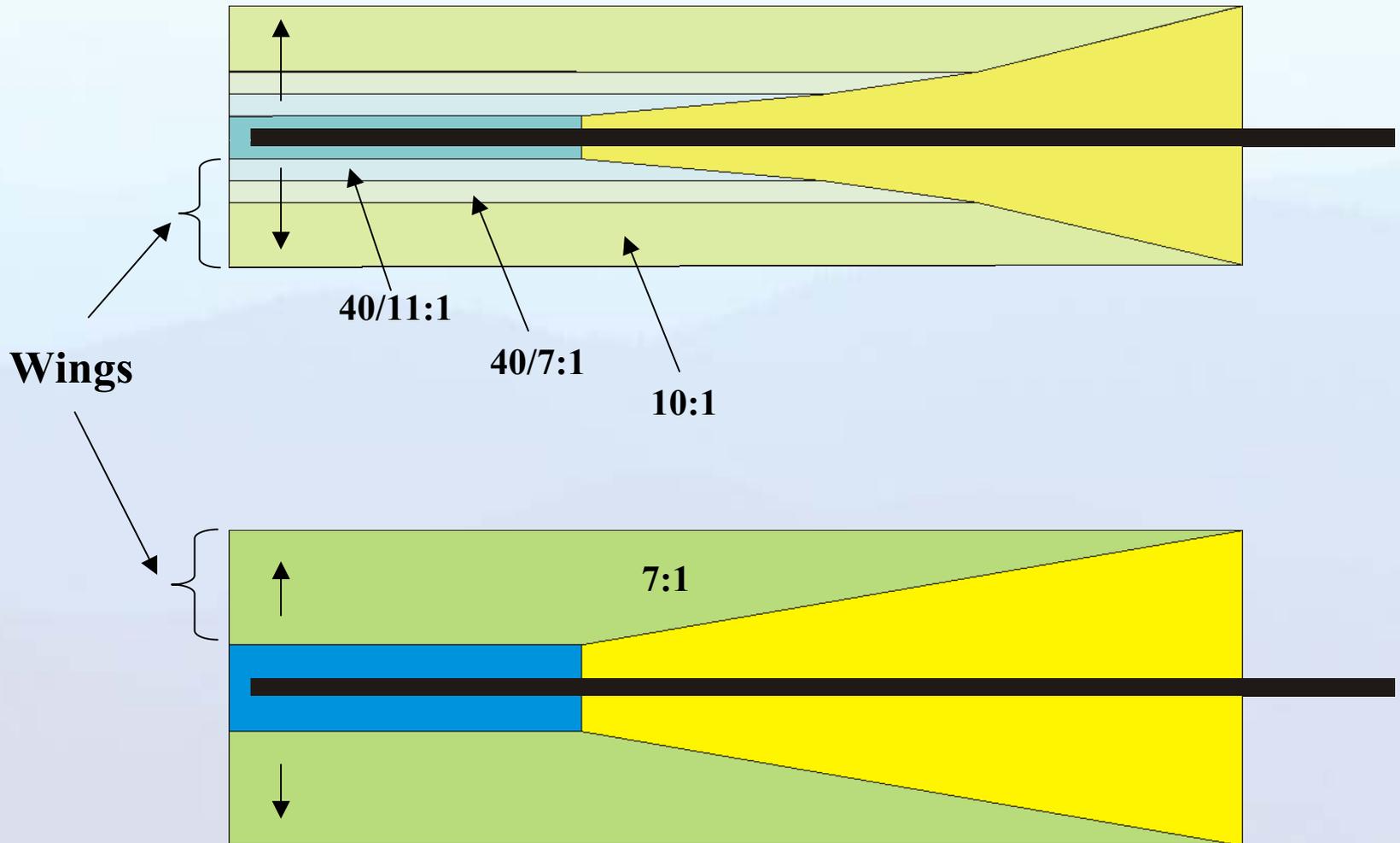
Side View

CAT II/III Missed Approach

Preliminary

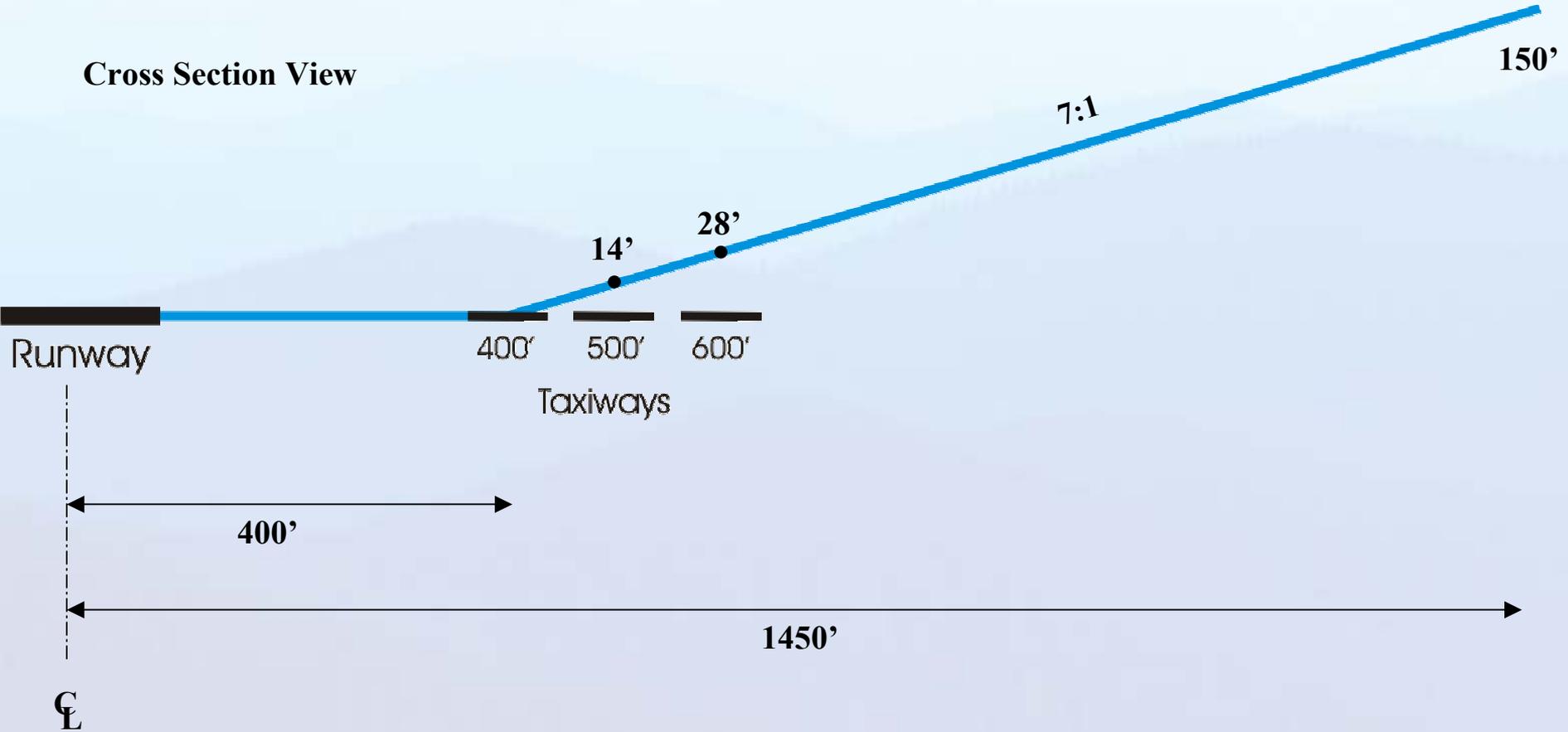


CAT II/III Missed Approach - Wings



CAT II/III Missed Approach - Wings

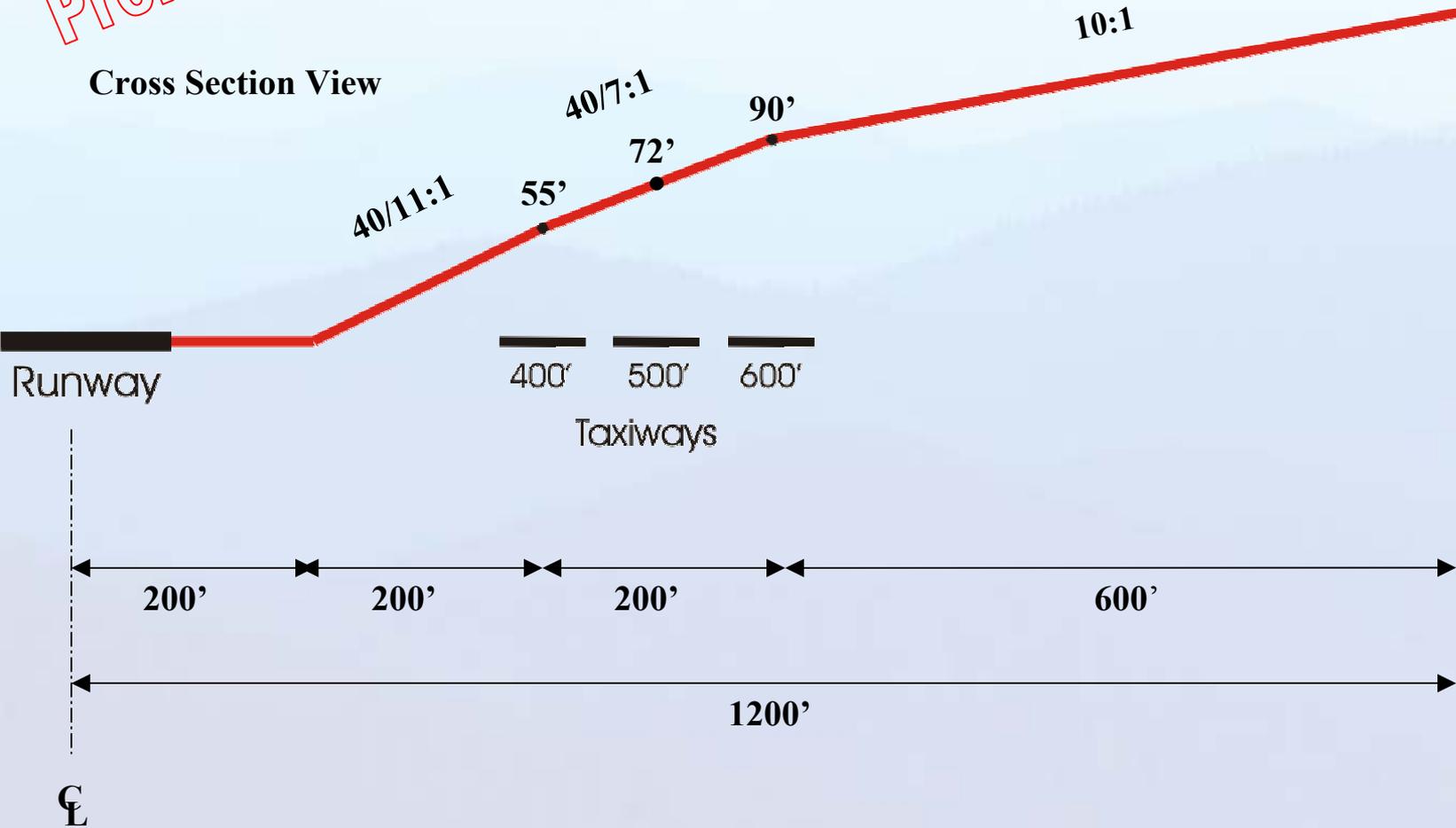
Cross Section View



CAT II/III Missed Approach - Wings

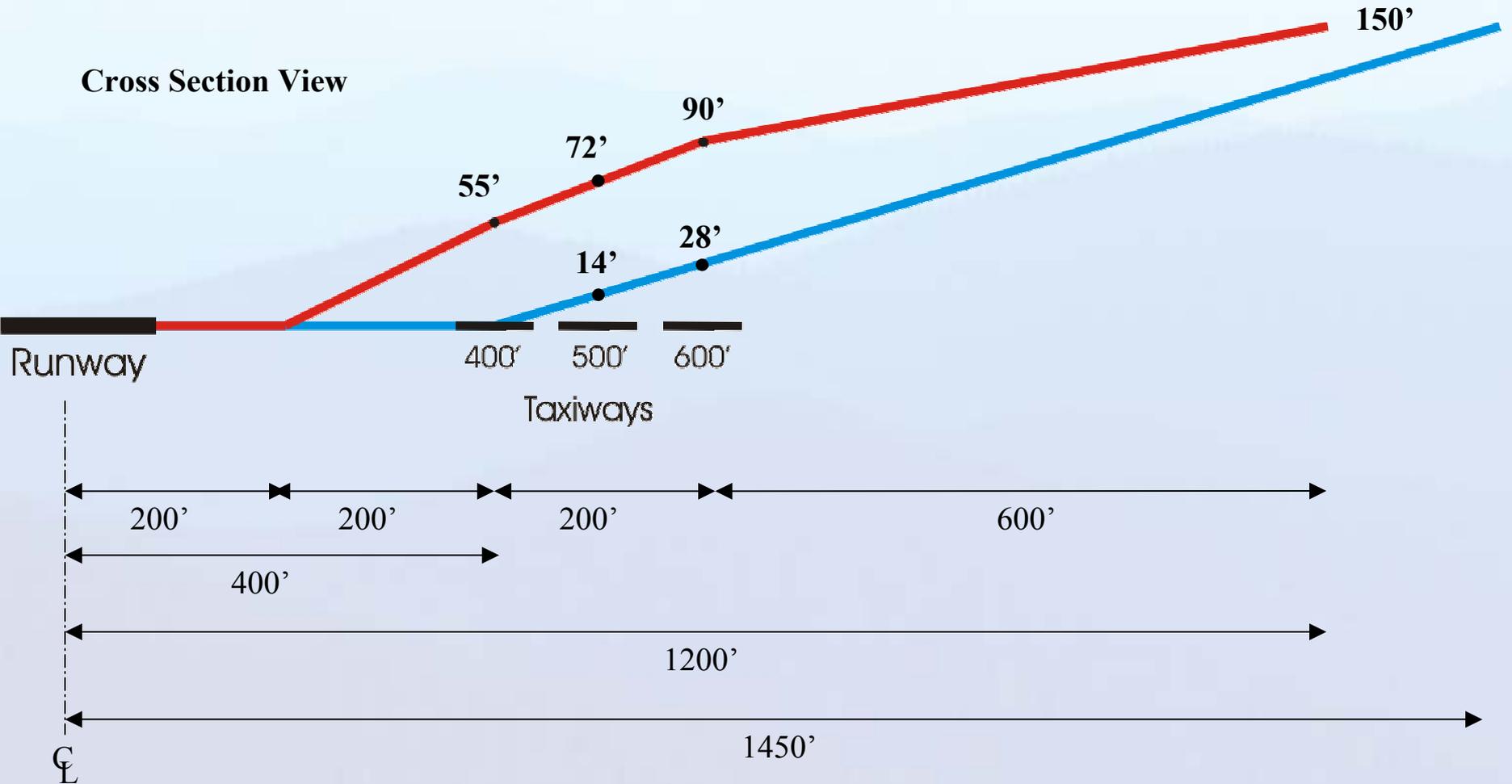
Preliminary

Cross Section View



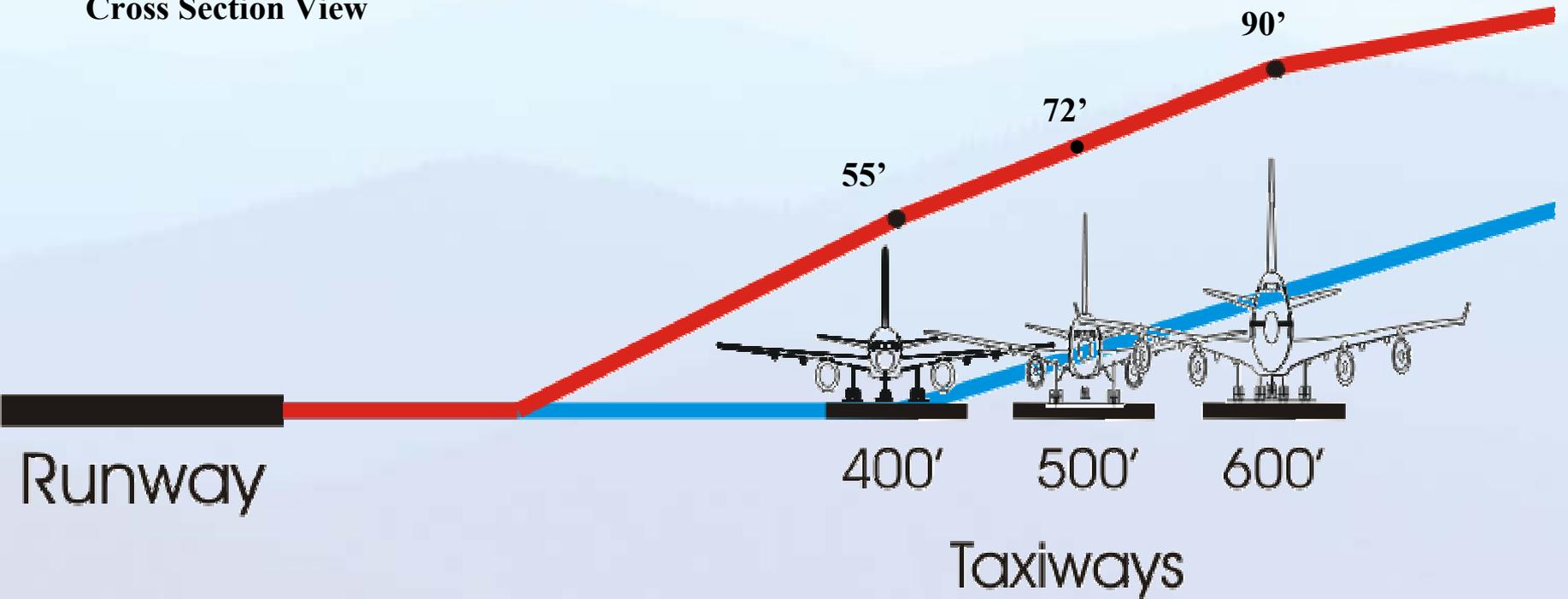
CAT II/III Missed Approach - Wings

Cross Section View



CAT II/III Missed Approach - Wings

Cross Section View

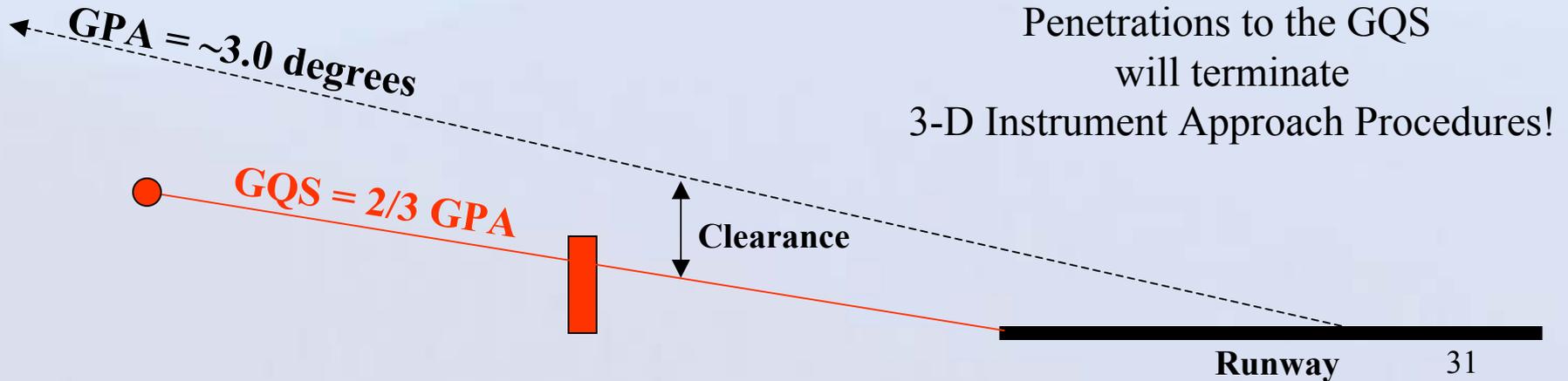
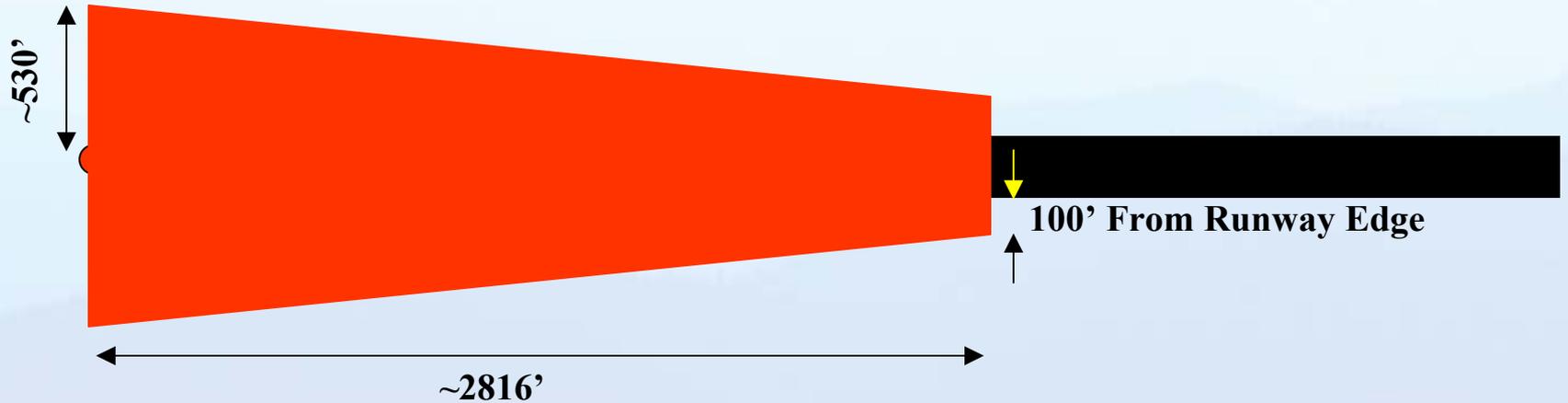


Glide Path Qualification Surface (GQS)

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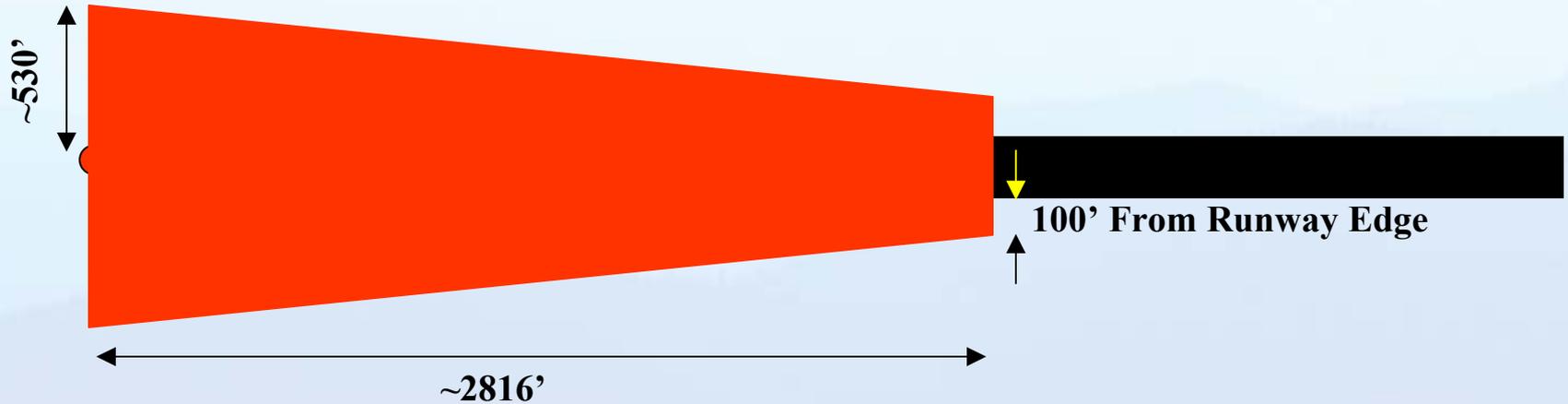
- 📁 Located between the Runway Threshold (RWT) and the Decision Altitude (DA) point.
- 📁 Provides a **Safety Margin** to help ensure a stabilized approach.
 - 📁 **Limits Obstacle heights** between DA and RWT.
 - 📁 Determines which approaches will support 3-D Instrument Approaches.

Glide Path Qualification Surface

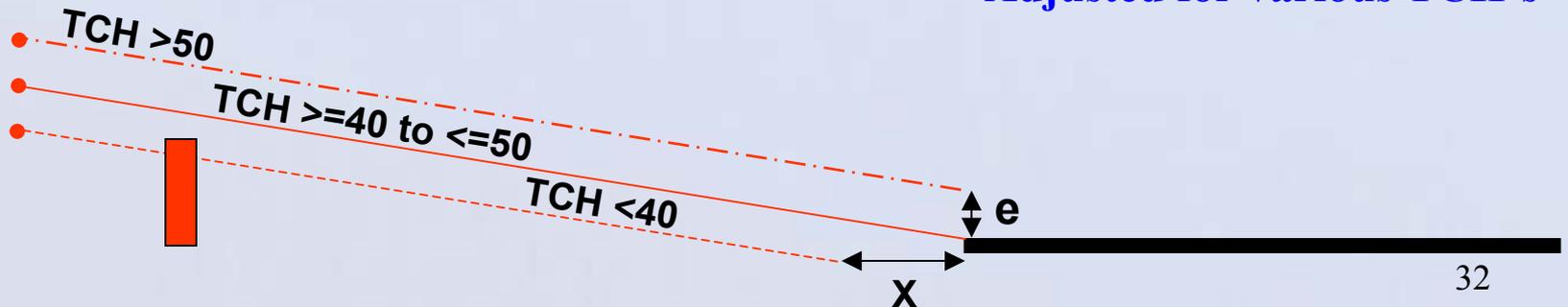


Glide Path Qualification Surface

Preliminary



- 2 new GQS Surfaces
- Adjusted for various TCH's



Airport Design



Runway to Parallel Taxiway Separation

Runway / Parallel Taxiway Separation

FAA Order 8260.3B TERPS, Change 19

 Runway / Parallel Taxiway separation must be 500 feet for Group V aircraft (i.e. 747)

AOSC Actions

 Identify locations that do not meet the criteria.

 Attempt to develop & implement Operational Mitigation without significantly impacting airport operations.

 Taxi routes

 Restricting Group V & VI aircraft

 Increase Hold Line Distance

 Perform Flight Standards Safety Assessment for alternative mitigation.

Runway / Parallel Taxiway Separation

- ✎ AOSC initiative to **correct inconsistencies** with various FAA lines-of-business guidance.

- ✎ TERPS FAA Order 8260.3B, Change 19

- ✎ AC 150/5300-13, Airport Design

- ✎ AC 129-29,

- ✎ TIL 00-005A CAT II/III TERPS Criteria,

- ✎ **Taxiing & parked aircraft are obstacles.**

- ✎ Encourage new airport construction to **comply with the new guidance.**

- ✎ Updating & refining the **Safety Assessment Toolset.**

- ✎ Collision Risk Model

- ✎ Airspace Simulation

- ✎ Target completion in the 2006 / 2007 time frame.

Runway / Parallel Taxiway Separation

📁 AOSC Decision requirement

📁 New Construction

📁 Optimum Runway / Parallel Taxiway separation is 600 feet.

📁 CAT I

📁 The runway to parallel taxiway, separation standard is 400 feet.

📁 CAT II/III

📁 Groups I-IV (up to 767) = 400 feet

📁 Group V (i.e. 747) = 500 feet

📁 Group VI (380) = 550 feet

📁 All separation distance are based on sea level.

📁 Formal guidance coming soon!

Runway / Parallel Taxiway Separation

 AOSC Decision requirement

 Existing Infrastructure

 FAA will work with airports to develop operational guidance where compliance can be achieved utilizing existing infrastructure without significant impact on airport efficiency.

 Environmental decisions (EIS, EA) prior to 12/18/2003 will be treated as existing infrastructure.

Runway / Parallel Taxiway Separation

- ✎ AOSC Decision requirement

 - ✎ Existing Infrastructure - Exceptions

- ✎ Airports unable to comply with operational guidance, **minimums associated with CAT II/III approach procedures** will not be affected unless;

 - ✎ Runway/Parallel Taxiway extensions 3,000' or more.

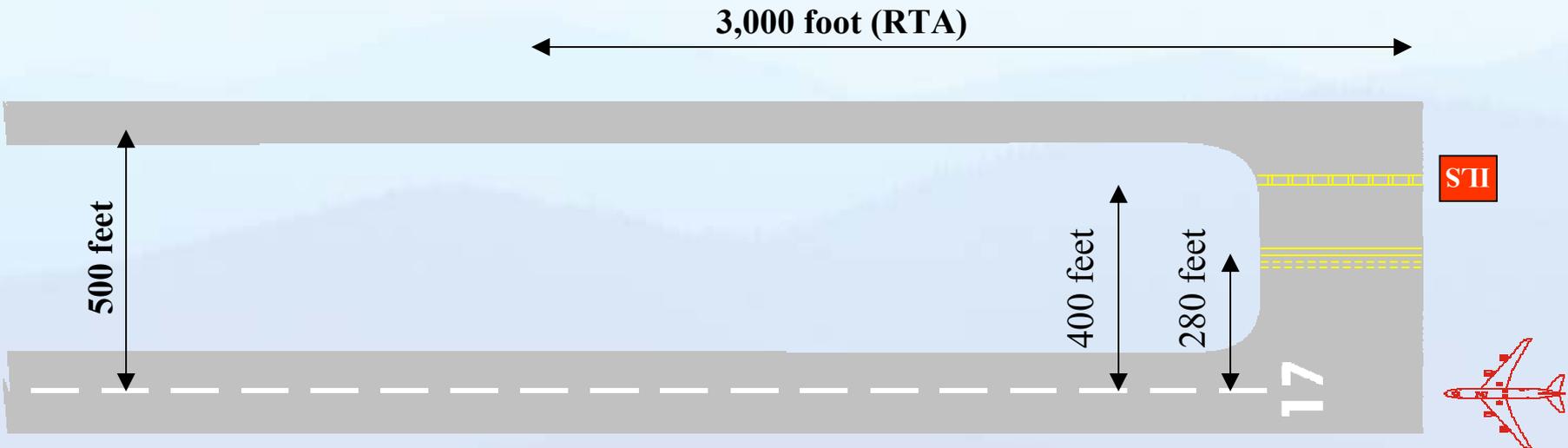
 - ✎ The operational environment changes to allow adherence.

 - ✎ Applicable guidance is changed to allow adherence without adverse impact.

- ✎ Flight Standards reserves the right to modify CAT II/III approach procedures and/or increase minima in compliance with **obstacle clearance criteria and policy**, unrelated to runway / taxiway separation.

Runway / Parallel Taxiway Separation

Preliminary



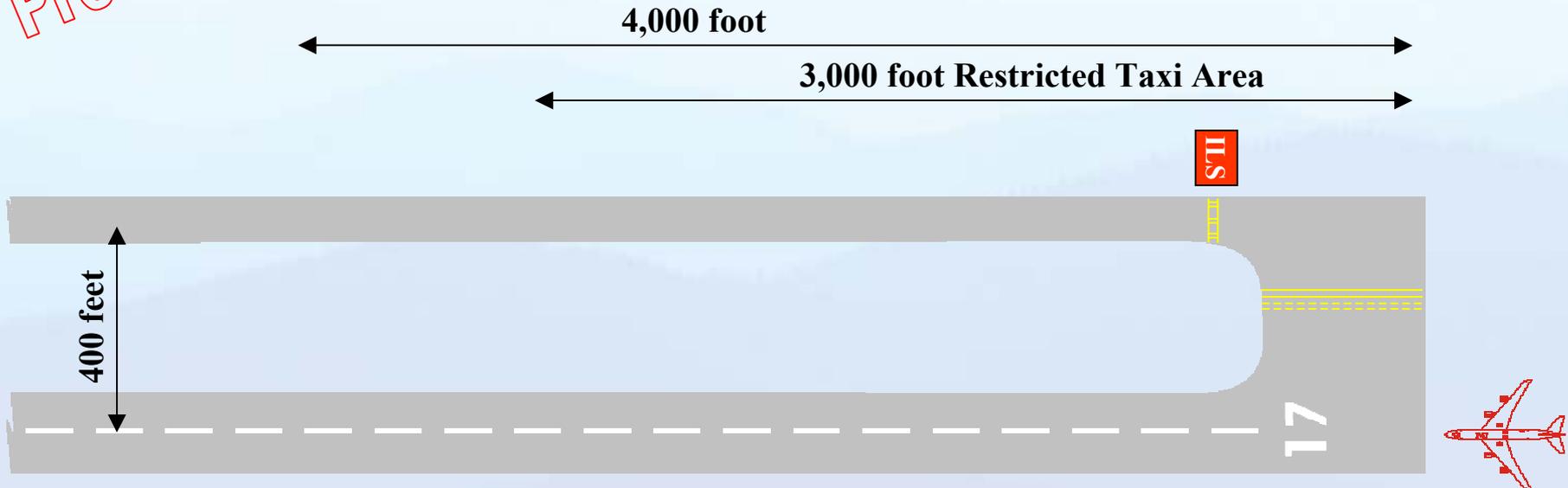
- **Unrestricted taxi operations** for Aircraft Groups **I thru V**.
- Only 1 Group VI aircraft is allowed in the **Restricted Taxi Area (RTA)** when an aircraft flying a CAT II approach reaches the Decision Altitude (DA) point.
- Groups V & VI must **hold at least 400** feet from the runway centerline.

Aircraft on Final Approach, inside **Decision Altitude (DA)**

- **DA** is approximately 3,000 feet from Runway Threshold

Runway / Parallel Taxiway Separation

Preliminary



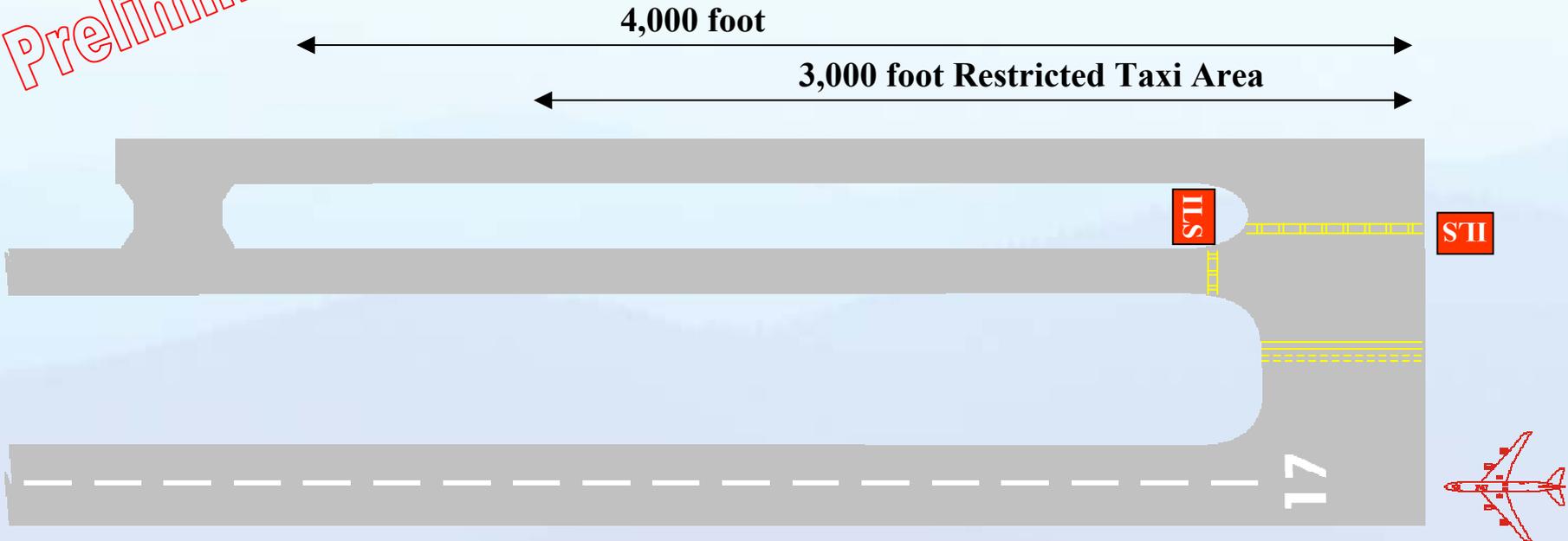
- **Unrestricted taxi operations** for Aircraft Groups **I thru IV**.
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- Group **V** must **hold at least 400** feet from the runway centerline.
- Group **VI** aircraft are **not allowed** within 4,000 feet of the runway threshold.

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Runway / Parallel Taxiway Separation

Preliminary



- **Unrestricted taxi operations** for Aircraft Groups **I thru IV**.
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Aircraft on Final Approach, inside **Decision Altitude (DA)**

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Surveys

Airport Survey Pilot Program

- ✎ Eliminate the FAA's use of NGS for field surveys and Transition the Survey to Private Contractors
- ✎ Allow 405 surveys conducted by third party surveyors to use Federal Grants as well as other State & Local Aviation Resources.
- ✎ Standardize the Survey Process in a Cost-Effective and Expedited Manner
- ✎ Increase the Number of Surveys Conducted Annually
- ✎ Provide a standard GIS database capable of producing Digital ALPs and OC Drawings.

Airport Survey Objectives

 Create a **Standardized Process** for Conducting Aeronautical Surveys

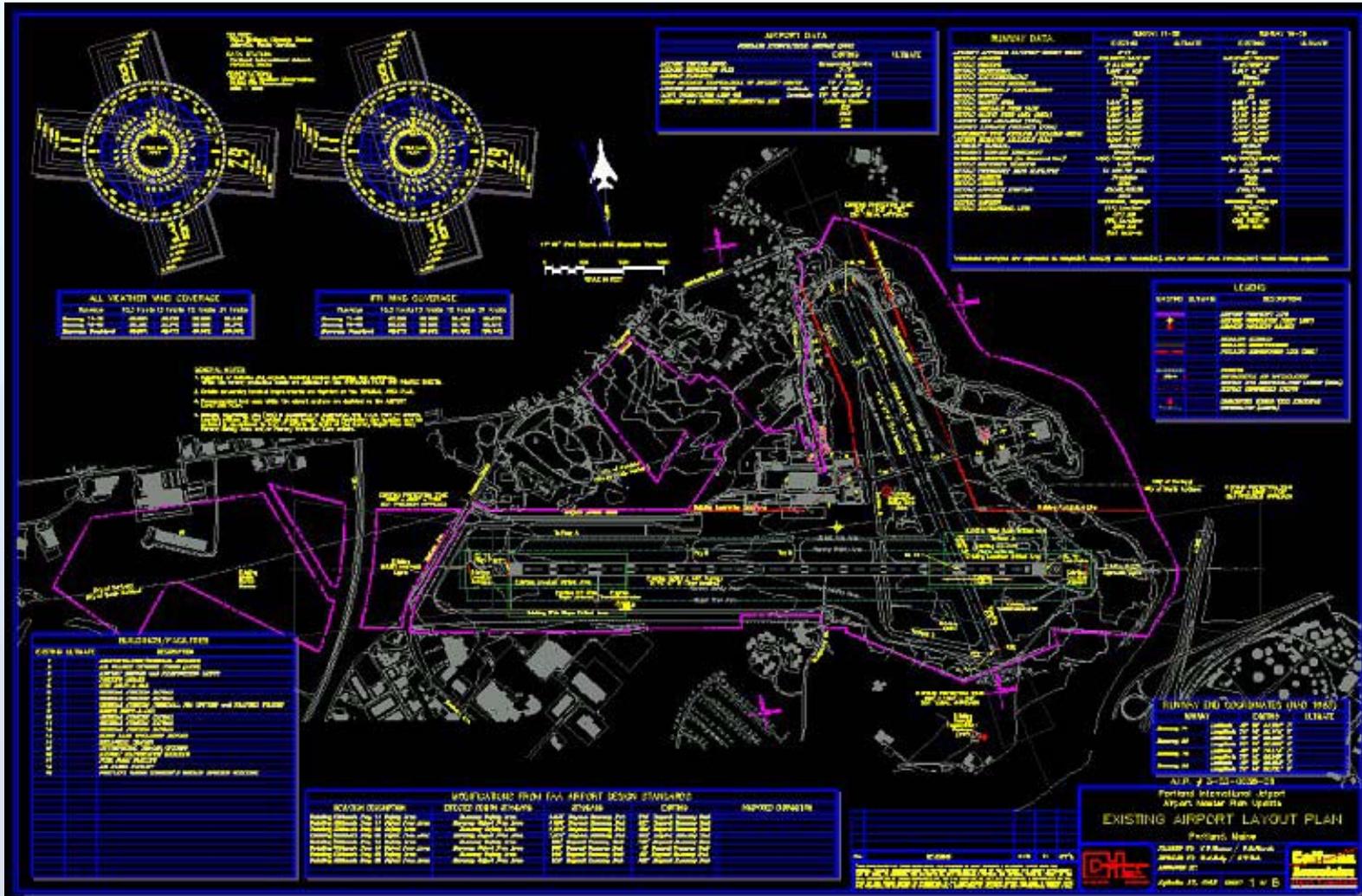
 Create an Airport Geographic Information (GIS) System **Website and Database**

 Create a **Detailed Set of Instruction Manuals** for Conducting Obstruction Surveys in Accordance with *FAA Spec 405, Standards for Aeronautical Survey and Related Products*

Airport Survey Objectives, continued

- 📁 **Develop Technical Guidance**, Instructions and Templates on Conducting Aeronautical Surveys for Airport Managers & Surveyors, Electronically Accessible
- 📁 **Develop Tools** for Airports and Surveyors to Capture and Provide Survey Data in Digital Form
- 📁 **Consolidate** all FAA Airport Data Requirements into a New Standard for Airport Layout Data for FAA and Industry

Airports Survey Pilot Program



Airport Surveys - Program Resources

Four new Airports Advisory Circulars:

 AC- 150/5XXXX, [Data Standards for Airport Layout & Surveys.](#)

 AC- 150/5XXXX, [Establishment of Geodetic Control](#)

 AC- 150/5XXXX, [Airport Imagery Collection and Submission](#)



 AC- 150/5XXXX, [Survey Data Collection & Submission](#)

Program will be fully Web Enabled at:

 <http://airports-gis.faa.gov>

Instrument Approach Procedure Surveys

Airport Obstruction Surveys

 Required for **ALL IAP**

 **Airport Projects** – new airports, runway extensions, threshold displacements, overlays

 **F & E Projects** – new Instrument Landing Systems

 Commercial Aviation Safety Team requests

 General Aviation Program (State requests)

 **Accomplished IAW FAA STD 405**

Airport Data Form

AIRPORT DATA FORM - INSTRUMENT APPROACH PROCEDURES							
Use to report Runway, Elevation, or other data for new IAPs or changes affecting existing IAPs							
A. Airport Information – Items 1- 5 are mandatory. (Items 4 and 5 will not be available for new airports under construction.)							
1. Official Airport Name (5010 Item 2)	2. Associated City (5010 Item 1)	3. State	4. FAA Site #	5. Location Identifier	6. Airport Reference Code (Aircraft Approach Category/ Airplane Design Group from ALP)		
7. ARP Coordinates (NAD83, nearest sec.)	7.a. Latitude ° ' . "	7.b. Longitude ° ' . "	8. Apt. Elevation		Ft. MSL		
B. Project Information							
1. Describe any changes in airport data such as runway extensions or displaced thresholds. (Example: Runway 12-30 extended 1000' northwest end, shortened 500' southeast end, new total length: 7,500')					2. Approximate Date Completed Month Year		
C. Runway Information							
				Runway		Opposite Runway	
1. Runway Identification (5010 Item 30)							
2. Runway True Azimuth (to nearest 1/100th of a degree)							
3. Runway Threshold Coordinates at Centerline (based on North American Datum of 1983, 1/100th of second accuracy)				Latitude ° ' . "	Latitude ° ' . "		
				Longitude ° ' . "	Longitude ° ' . "		
4. Runway Threshold Elevations (North American Vertical Datum of 1988, 1/10th of a foot accuracy)				Ft. MSL		Ft. MSL	
5. Touchdown Zone Elevation (TDZE) (1/10th of a foot accuracy, the highest elevation in the first 3000 feet of the landing surface.)				Ft. MSL		Ft. MSL	
6. Runway Length and Width (Must agree with coordinates shown) (5010 Items 31 & 32) (1/10th of foot accuracy)				Length	Ft	Width	Ft
7. Runway Edge Light System (5010 Item 40) (HIRL, MIRL, LIRL, if nonstandard, describe)							
8. Approach Lighting Systems (5010 Item 49) (e.g. ALSF1, MALSR, SSALS, ODALS, etc.)							
9. Runway Surface Type (5010 Item 33) (note all that apply: concrete, asphalt, grooved, porous friction course, turf)							
10. Runway Markings (5010 Item 42) (Precision, Non-Precision, Visual, or Numbers Only. If non-standard, describe.)							
11. Holding Position Signs and Marking installed and meet FAA standards? (A.C. 150/5340-18C and 150/5340-1H)				Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
12. Pilot-Controlled Lighting (Describe how activated & radio frequencies for CTAF/Unicom. Include rotating beacon and approach lights. See A.C. 150/5340-27)							
13. Declared Distances (as shown on an approved Airport Layout Plan. Provide a sketch or reduced-size copy of the ALP showing the declared distances per AC 150/5300-13, or identify the declared distance being altered.)				TORA	Ft.	TODA	Ft.
				ASDA	Ft.	LDA	Ft.
14. Threshold Siling Criteria Met (Appendix 2, A.C. 150/5300-13) (If not, explain in remarks on separate page)				Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
15. Obstacle Free Zone(s) clear of penetrations, including aircraft or vehicles on parallel twy (Par 306, A.C. 150/5300-13) (If not, explain in remarks on separate page)				Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
16. Miscellaneous Information / Remarks (e.g. Displaced Threshold Distance & Coordinates, Runway Weight Bearing Capacity, etc.)							
D. Data Source Information							
1.a. Data from: <input type="checkbox"/> National Ocean Service (OC or ANA survey) <input type="checkbox"/> Registered Surveyor				1.b. Date of Document / Survey			
<input type="checkbox"/> Engineering drawings <input type="checkbox"/> FAA-approved ALP <input type="checkbox"/> Estimated <input type="checkbox"/> Other							
2. Name of Firm or Govt. Agency Creating Data		3. Name of Contact Person		4. Phone No.		5. Fax No.	
6. Address of Firm or Government Agency							
E. Submitting Office (FAA Airports Division)							
1. Routing Symbol of Office Submitting Data		2. Name of Person Submitting Data		3. Phone No.		4. Fax No.	
Signature of Person Submitting Data				Date			

 Submit revised data to the Airports Development Office & Flight Procedures Office

 Reduces processing time over submitting a new ALP

 List only CHANGES

 Submit electronically to reduce need to re-enter critical data

AC 150/5300-13 Airport Design

Runway survey types from FAA No. 405, Standards for Aeronautical Surveys and Related Products:

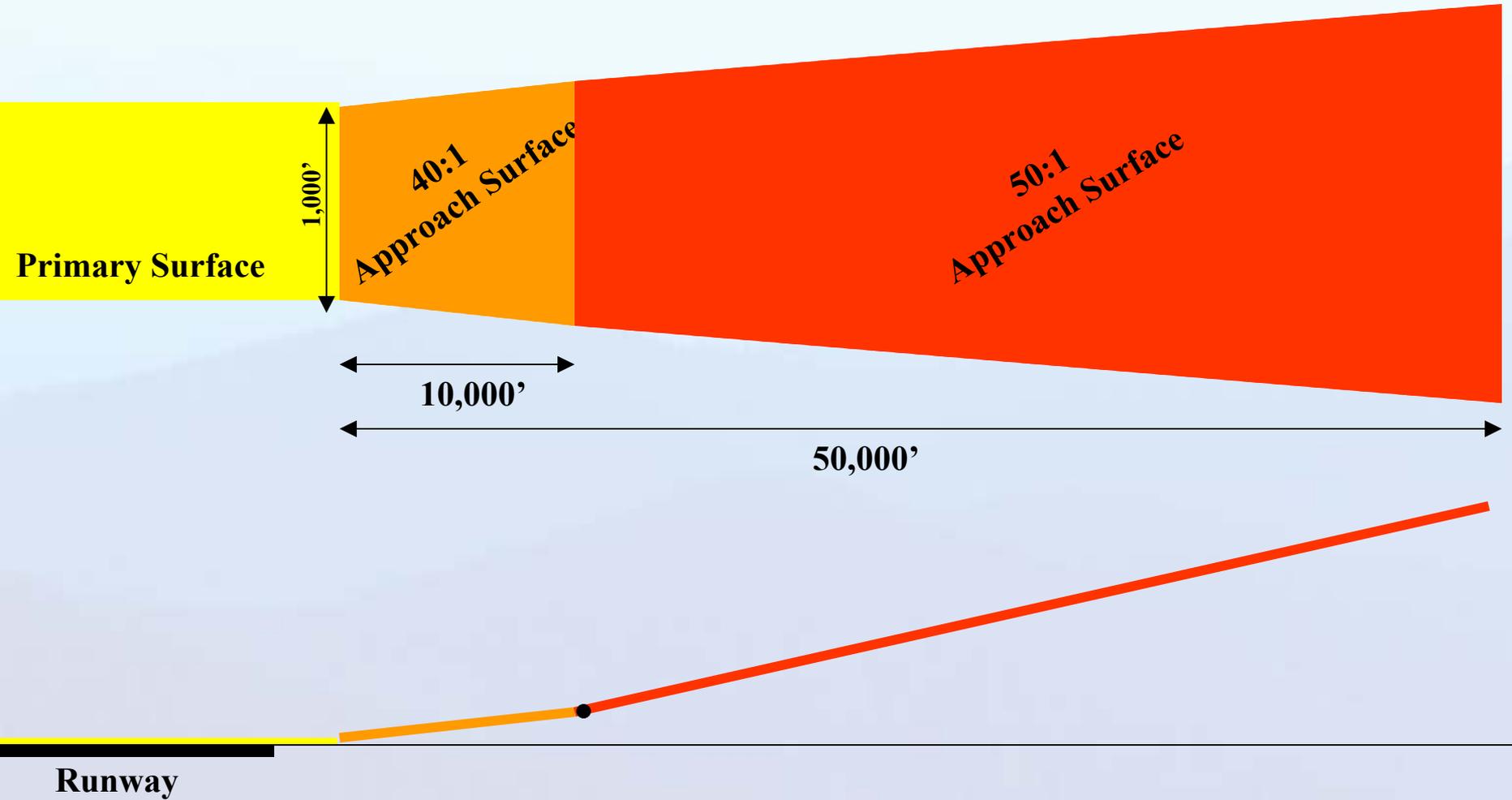
- AV -** FAR77 Visual Approach - Utility runway, includes approach and primary surfaces only.
- BV -** FAR77 Visual Approach, includes approach and primary surfaces only.
- ANP -** FAR77 Nonprecision Approach - Utility runway, includes approach and primary surfaces only.
- C -** FAR77 Nonprecision Approach - Visibility minimums greater than 3/4 mile includes approach and primary surfaces only.
- SUPLC -** C Approach underlying a BV approach, includes approach and primary surfaces only.
- D -** FAR77 Nonprecision Approach - Visibility minimums as low as 3/4 mile includes approach and primary surfaces only.
- ANAPC -** Area Navigation Approach - Precision, conventional landing, includes approach, primary, transition, and missed approach surfaces.

Table A-16-2



	Approach	Runway Survey Type								
		None	AV	BV	ANP	C	SUPLC	D	ANAPC	PIR
1	Night Circling			X	X	X	X	X	X	X
2	Non-Precision Approach ≥ 1SM, Day Only	X	X	X	X	X	X	X	X	X
3	Non-Precision Approach ≥ 1SM				X	X	X	X	X	X
4	Non-Precision Approach < 1SM					X	X	X	X	X
5	Non-Precision Approach < ¾ SM								X	X
6	NPV Approach ≥ ¾ SM							X	X	X
7	NPV Approach < ¾ SM								X	X

PIR Survey



405 Survey Requirements

- Primary Surface (See Figure 2.3)

The highest obstruction outward from the runway end.

The highest obstruction and the highest non man-made obstruction in each 3,000 foot (approximately) section of the primary area on each side of the runway.

- Approach Surface (See Figure 2.4 and Figure 2.5)

The highest object that is both within the first 2,000 feet of an approach area and higher than the runway approach end. This object may or may not penetrate the approach surface and may be a nonobstructing EME point.

The most penetrating obstruction in the first 2,000 feet of an approach area.

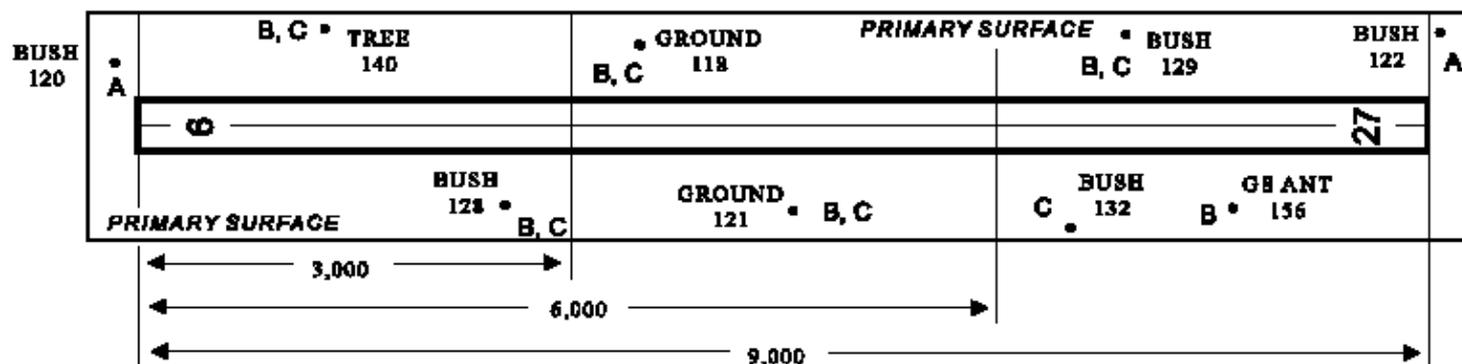
The highest approach obstruction in: (1) first 10,000 feet, (2) first 20,000 feet, (3) first 30,000 feet, (4) first 40,000 feet, and (5) the approach area.

OBSTRUCTION REPRESENTATION IN THE PRIMARY AREA SHALL INCLUDE THE:

- A- HIGHEST OBSTRUCTION OUTWARD FROM THE RUNWAY END**
- B- HIGHEST OBSTRUCTION IN EACH 3,000 FOOT (APPROXIMATELY) PRIMARY SECTION ON EACH SIDE OF THE RUNWAY**
- C- HIGHEST NON-MANMADE OBSTRUCTION IN EACH 3,000 FOOT (APPROXIMATELY) PRIMARY SECTION ON EACH SIDE OF THE RUNWAY**

SEE TEXT WHEN OBJECT/OBSTRUCTION CONGESTION OCCURS.

SEE TEXT AND FIGURE 2.7 FOR OBSTRUCTING AREA REQUIREMENTS



THIS FIGURE EXPLAINS OR CLARIFIES CERTAIN DATA REQUIREMENTS - SEE TEXT AND STYLE SHEET OC 000 FOR COMPLETE STANDARDS

DIMENSIONS ARE IN FEET

NOT TO SCALE

FIGURE 2.3

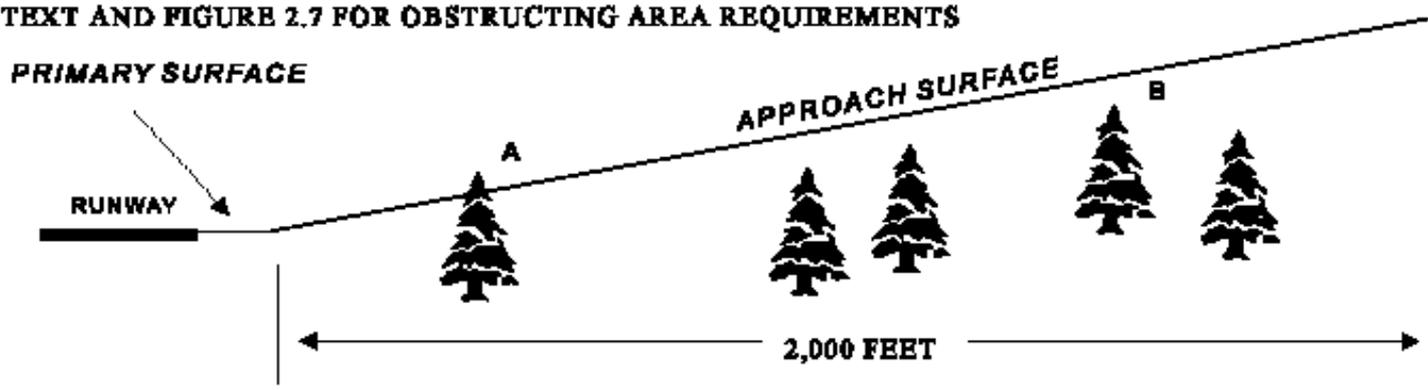
OBSTRUCTION REPRESENTATION IN THE PRIMARY AREA

OBJECT REPRESENTATION IN THE FIRST 2,000 FEET OF AN APPROACH AREA SHALL INCLUDE THE:

- A- MOST PENETRATING OBSTRUCTION**
- B- HIGHEST OBJECT ABOVE THE RUNWAY END
(THIS OBJECT MAY NOT PENETRATE APPROACH)**

SEE TEXT WHEN OBJECT/OBSTRUCTION CONGESTION OCCURS

SEE TEXT AND FIGURE 2.7 FOR OBSTRUCTING AREA REQUIREMENTS



*THIS FIGURE EXPLAINS OR CLARIFIES
CERTAIN DATA REQUIREMENTS - SEE TEXT
AND STYLE SHEET OC 000 FOR COMPLETE
STANDARDS*

DIMENSIONS ARE IN FEET

NOT TO SCALE

FIGURE 2.4

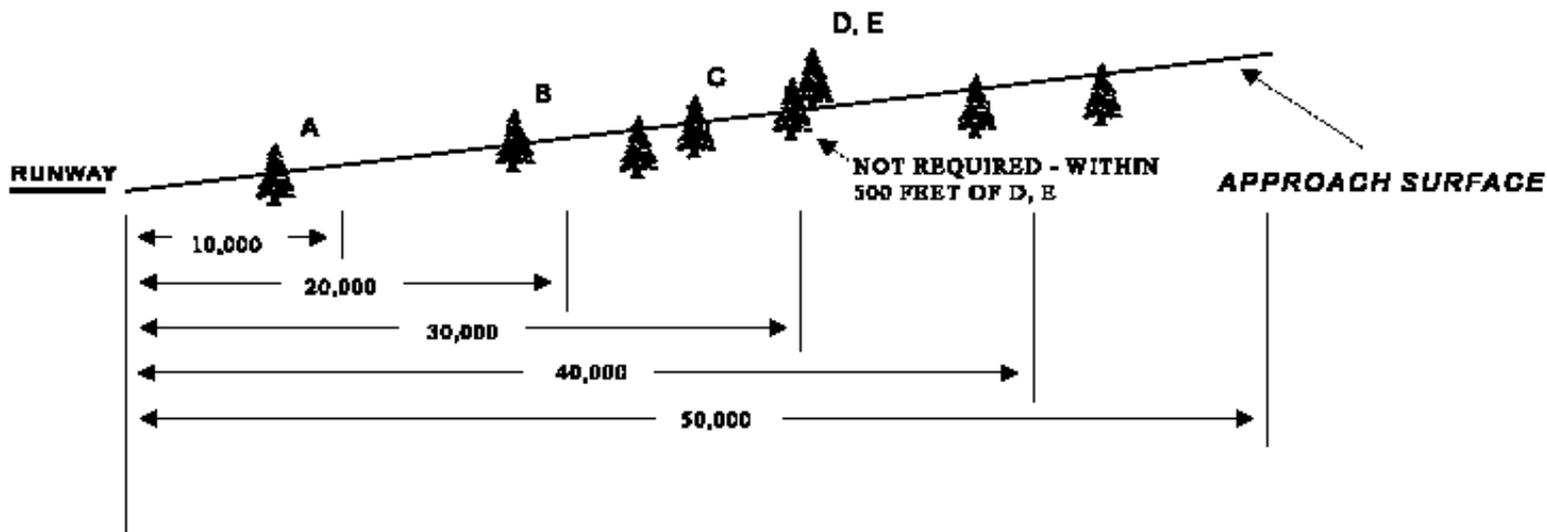
**OBJECT REPRESENTATION IN THE
FIRST 2,000 FEET OF AN APPROACH AREA**

OBSTRUCTION REPRESENTATION IN AN APPROACH AREA SHALL INCLUDE THE HIGHEST APPROACH OBSTRUCTION IN THE:

- A- FIRST 10,000 FEET OF THE APPROACH AREA**
- B- FIRST 20,000 FEET OF THE APPROACH AREA**
- C- FIRST 30,000 FEET OF THE APPROACH AREA**
- D- FIRST 40,000 FEET OF THE APPROACH AREA**
- E- APPROACH AREA**

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SEE TEXT AND FIGURE 2.7 FOR OBSTRUCTING AREA REQUIREMENTS



THIS FIGURE EXPLAINS OR CLARIFIES CERTAIN DATA REQUIREMENTS - SEE TEXT AND STYLE SHEET OC 000 FOR COMPLETE STANDARDS

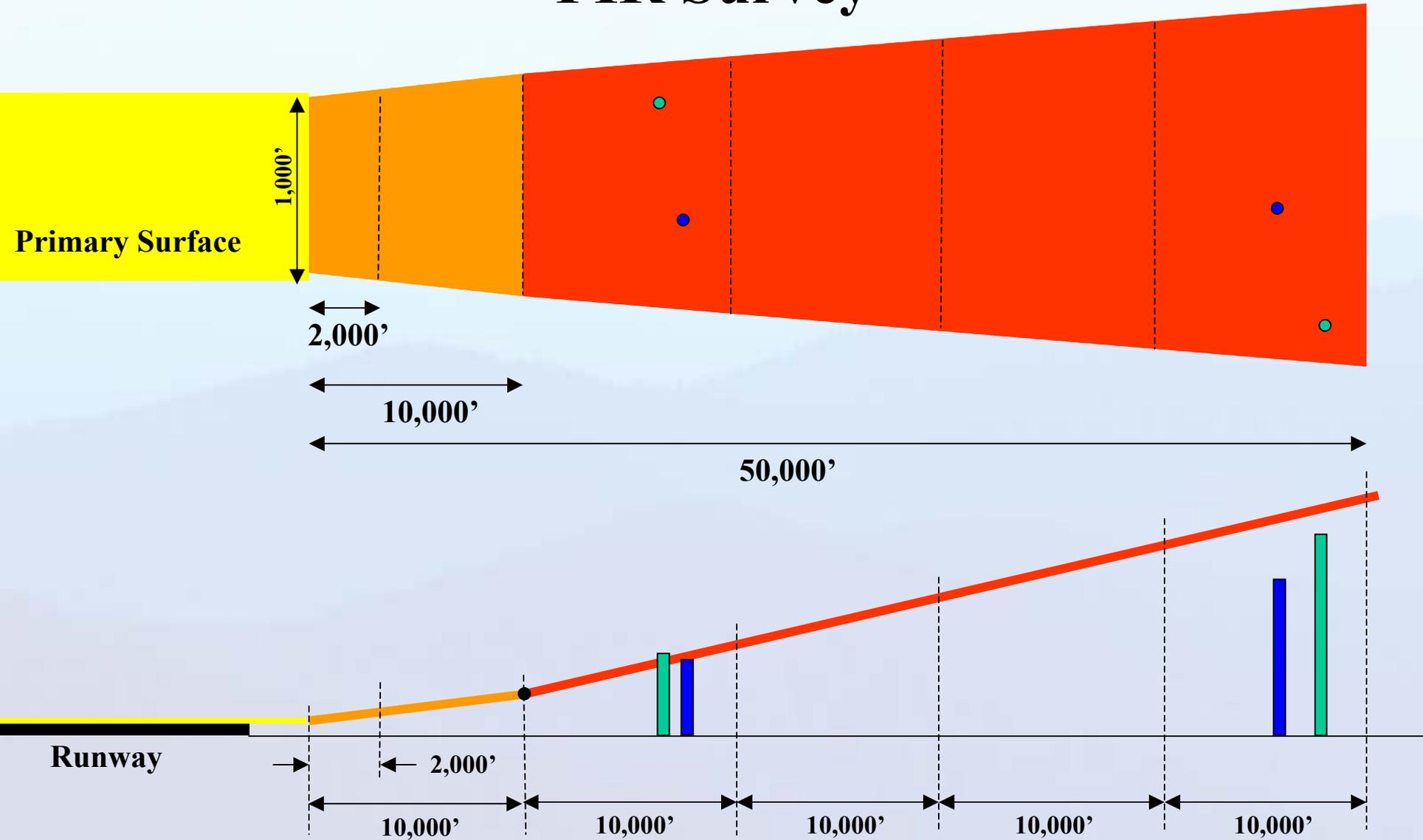
DIMENSIONS ARE IN FEET

NOT TO SCALE

FIGURE 2.5

OBSTRUCTION REPRESENTATION IN AN APPROACH AREA

PIR Survey



Airport Obstruction Surveys

- ✂ **Identify approaches and area to be surveyed**
- ✂ **Identify FAR Part 77 approach surfaces for the surveyor**
- ✂ **Sponsor/Consultant obtains maps, photos, etc.**
- ✂ **Get any available NOS survey data & monuments**
- ✂ **Conduct 405 survey**
- ✂ **Surveyor develops Graphic and Data Table Exhibits**
- ✂ **Surveyor coordinates preliminary results with ADO & FPO**
- ✂ **Sponsor removes or marks/lights critical objects**
- ✂ **Surveyor completes survey showing final condition**
- ✂ **Surveyor develops Survey Report**
- ✂ **Stamp and sign survey document**
- ✂ **Sponsor verifies that Airport Design Standards are met!**
- ✂ **Sponsor sends survey results to ADO & FPO**
- ✂ **Follow-on survey required for as-built data**

Other Advisory Circular Updates

Advisory Circular Updates

Two New Departure Surfaces :

 For All Instrument Runways

 40:1 Departure Surface

 For Runways Supporting Commercial Service

 Engine Out Surface

Engine Out Surface

 Surface for all air carrier Departures:

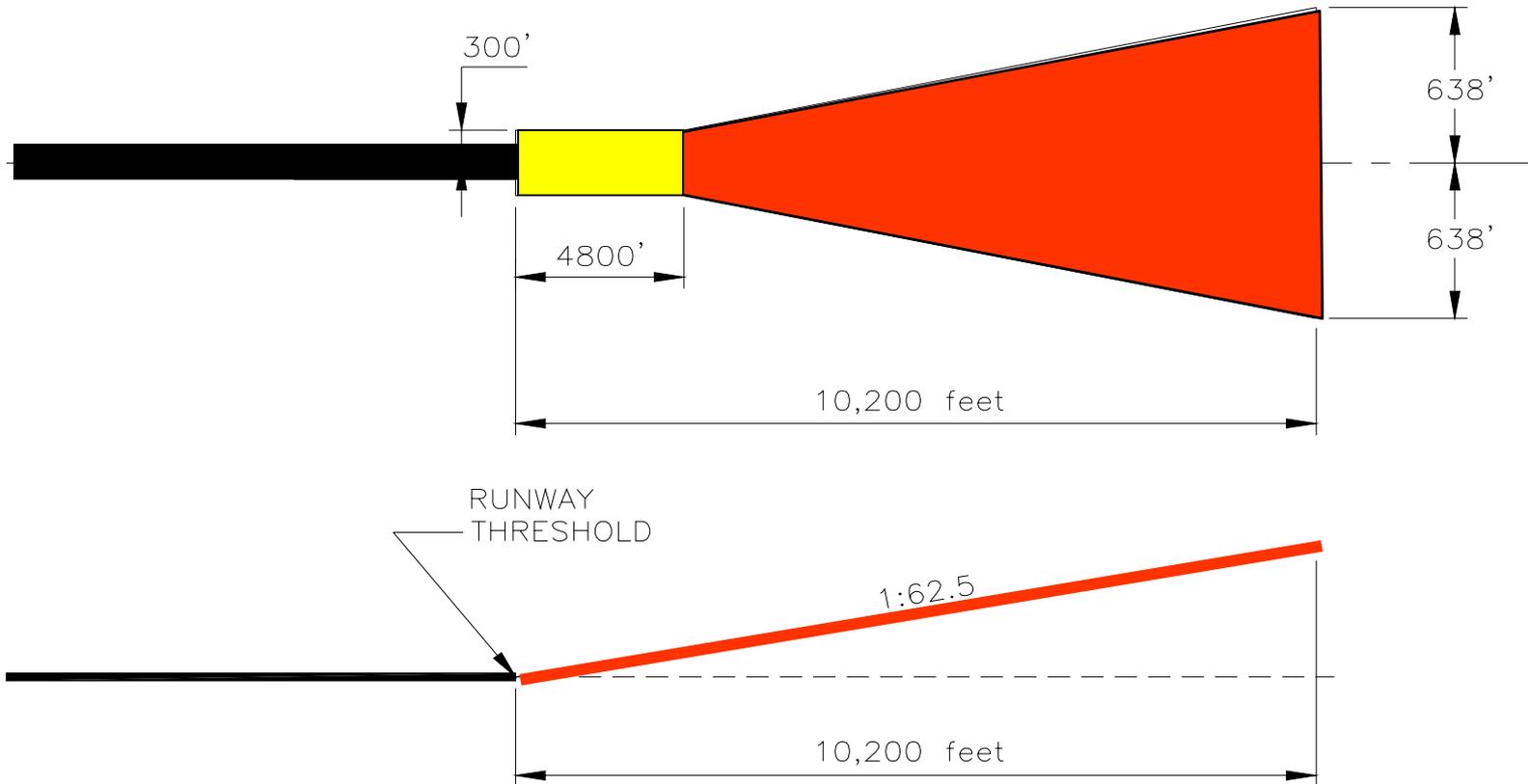
 Proposed Trapezoid Extending out 10,200 feet, Following Annex 6 Engine-Out Requirements.

 Proposed 1:62.5 Surface.

 Will Not be a Clearance Surface.

 Most likely a Notification Surface

Engine Out Surface



Advisory Circular Updates

Revised OFZ Surfaces:

 LPV

 Cat I

 CAT II/III

Advisory Circular Updates

New Guidance on APV (LPV)

-  New Appendix 16 requirements

-  New Appendix 2 trapezoids

WAAS and LAAS added to NAVAIDS

New ALP Requirements

-  New AC incorporating FAA #405

-  Replacement of Appendix 7 with new spatial standard

Design Group Changes incorporating Tail Height

Thank You !!!!!

Richard K. Compton

Senior Program Manger

Texas Airports Development Office

FAA Southwest Region

817-222-5608

Rick.Compton@faa.gov

Robert Bonanni P.E.

Senior Engineer

Airport Design Division, AAS-100

FAA Headquarters

202-267-8761

Robert.Bonanni@faa.gov