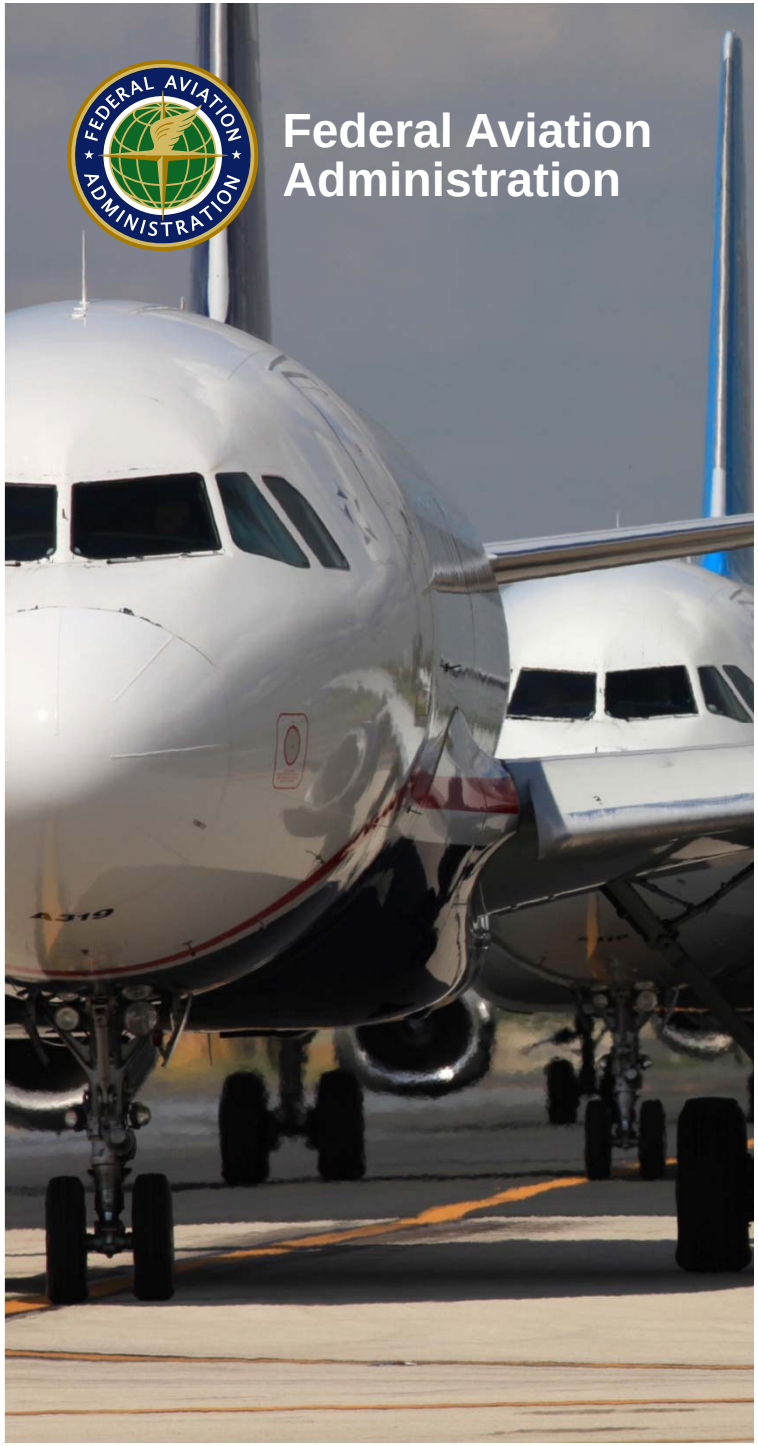
ACF-CG RD 12-01-252

Charting
Vertical Descent Angle



Presented to: Aeronautical Charting Forum

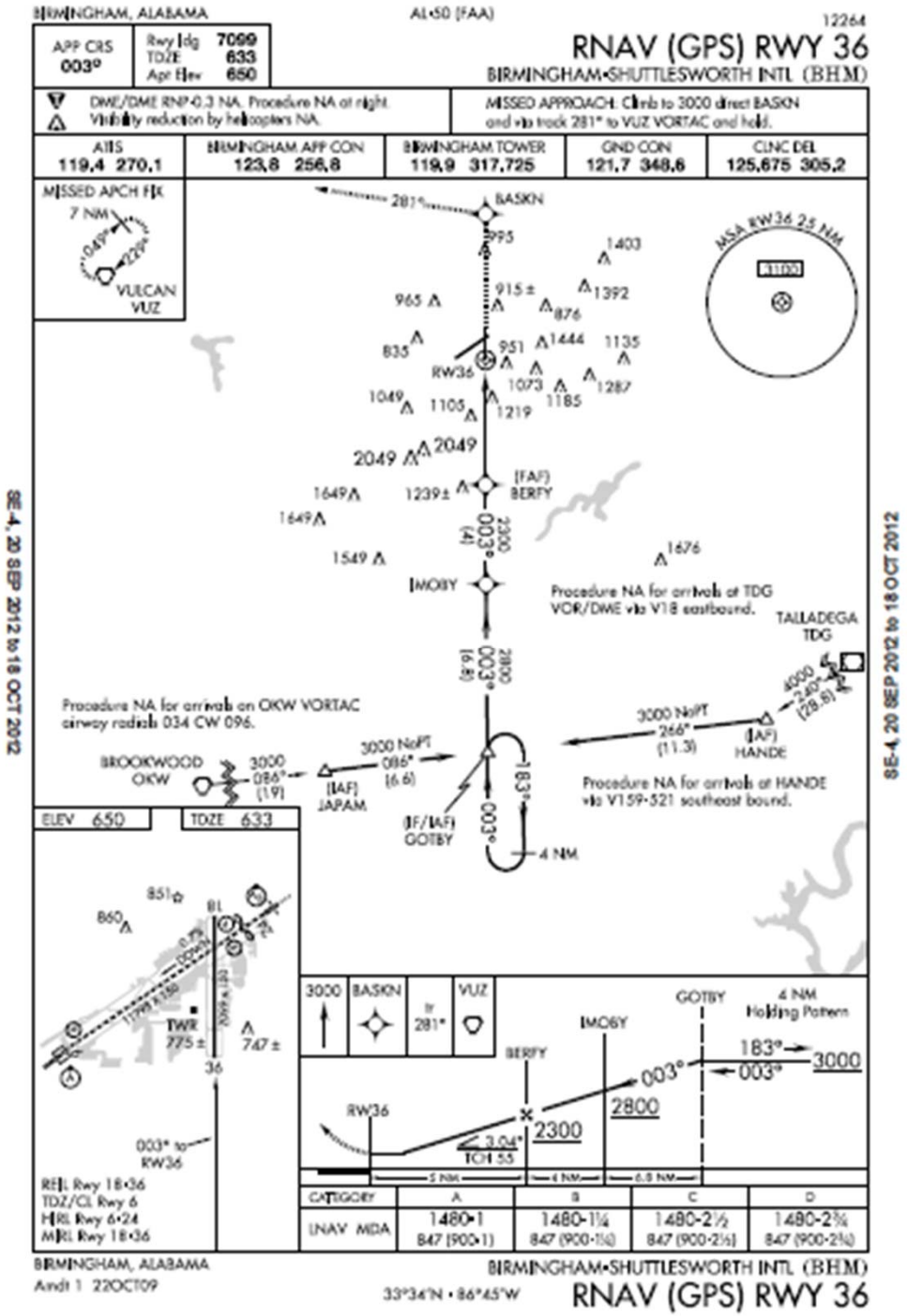
By: William Geiser,
Chief Pilot, Flight Inspection Services

Date: October 2012

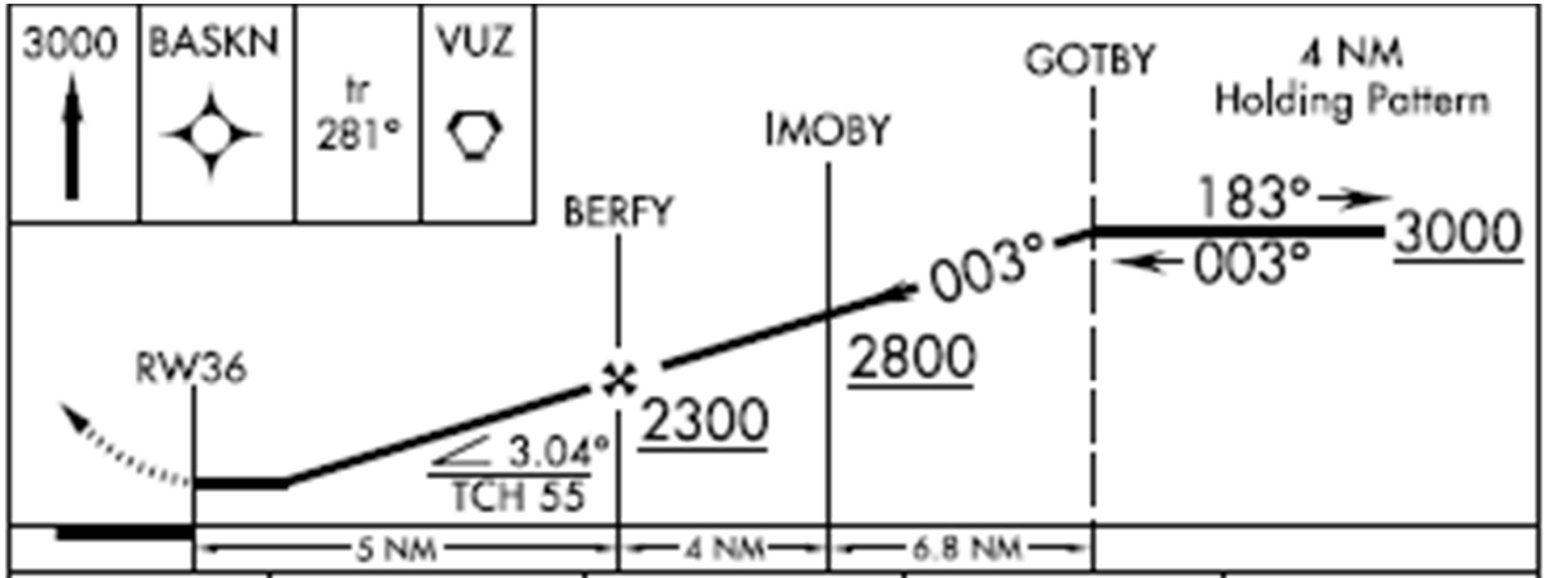
Charting: Vertical Descent Angle

- **User Complaint**
- **Industry Assumptions**
- **Definitions**
- **Background**
- **Flight Inspection Actions**
- **Recommendations**

- **Birmingham:**
  - RNAV (GPS) Rwy 36
- **User Complaint:**
  - Too Low Terrain
    - On Path
    - Above Path

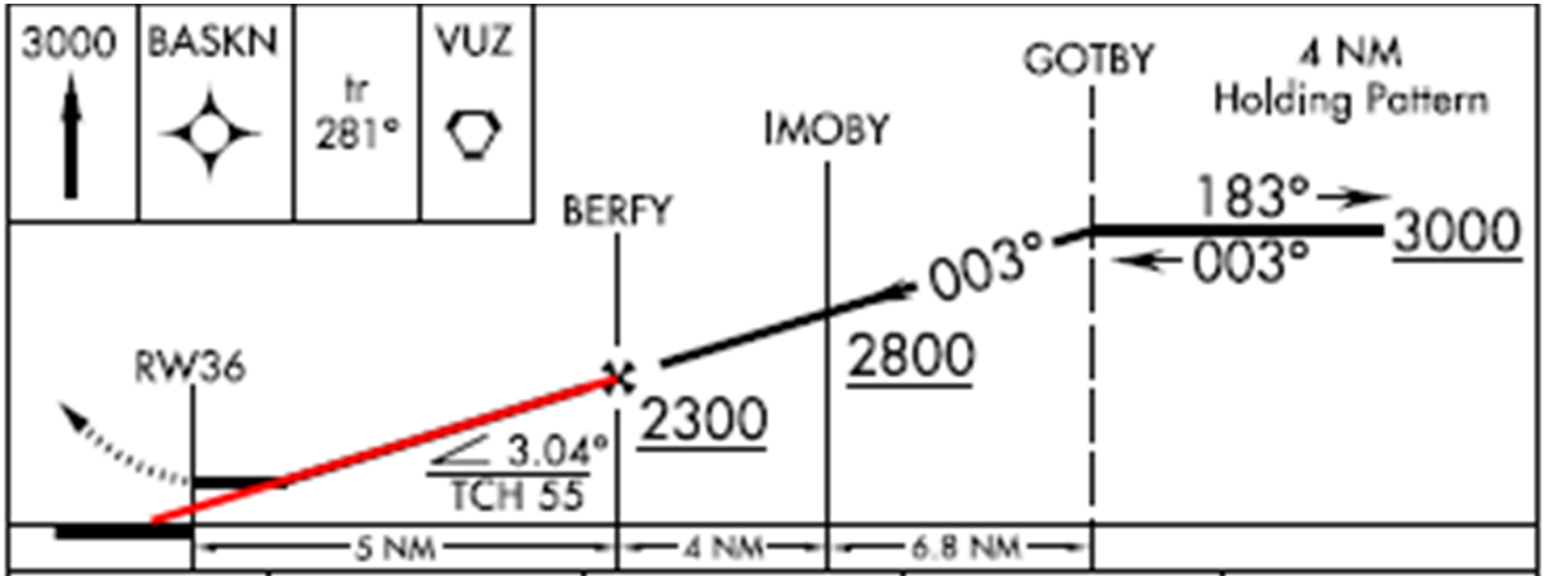


KBHM: RNAV (GPS) Rwy 36



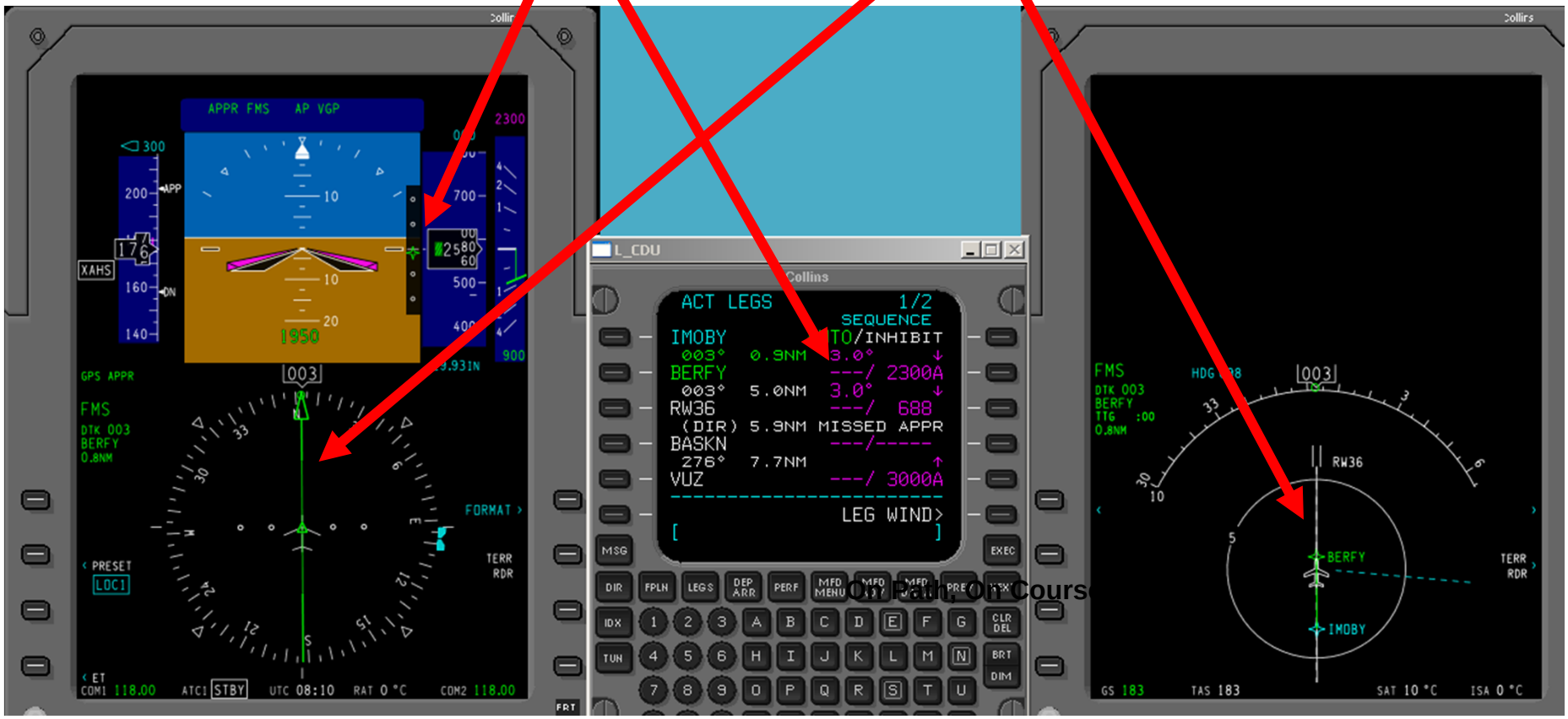
CATEGORY	A	B	C	D
LNAV MDA	1480-1 847 (900-1)	1480-1¼ 847 (900-1¼)	1480-2½ 847 (900-2½)	1480-2¾ 847 (900-2¾)

3.04 Degrees from BERFY to TCH



CATEGORY	A	B	C	D
LNAV MDA	1480-1 847 (900-1)	1480-1¼ 847 (900-1¼)	1480-2½ 847 (900-2½)	1480-2¾ 847 (900-2¾)

On Path / On Course

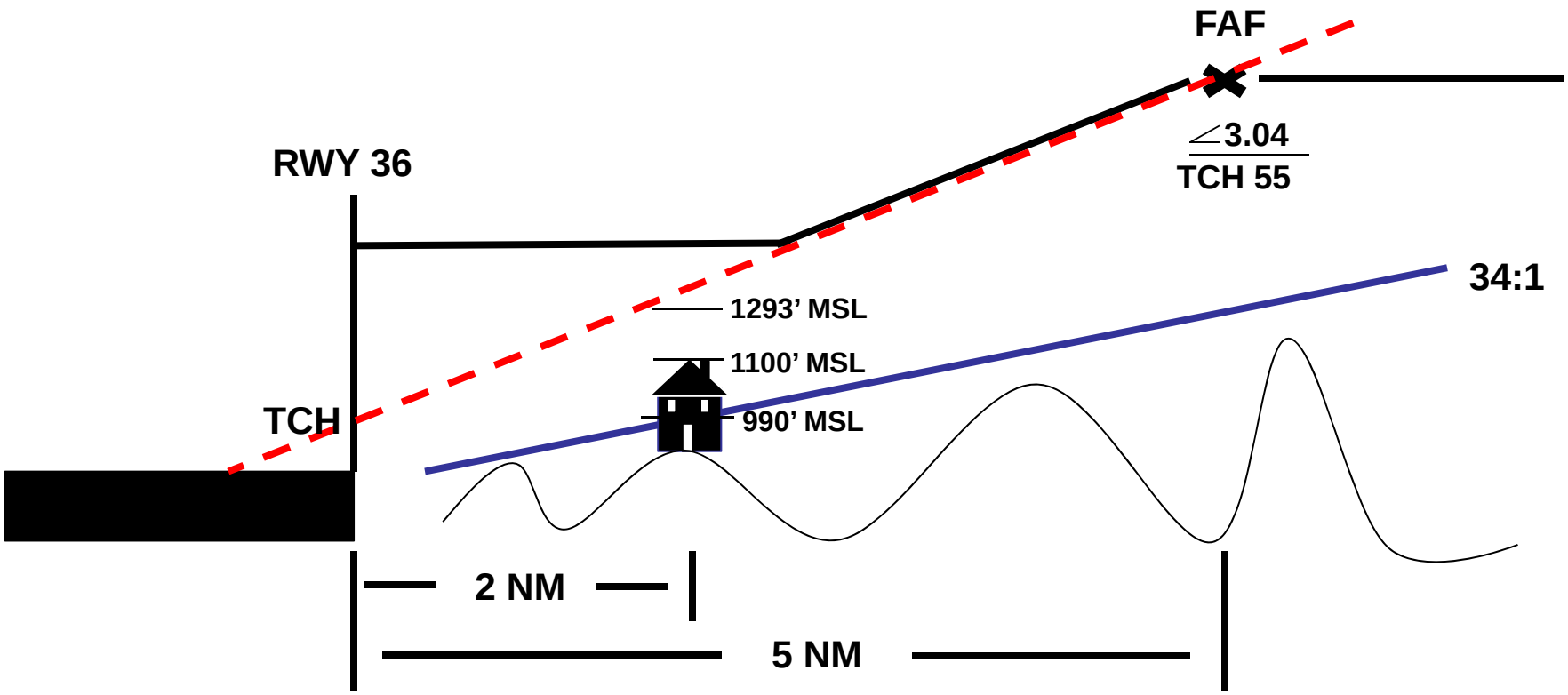


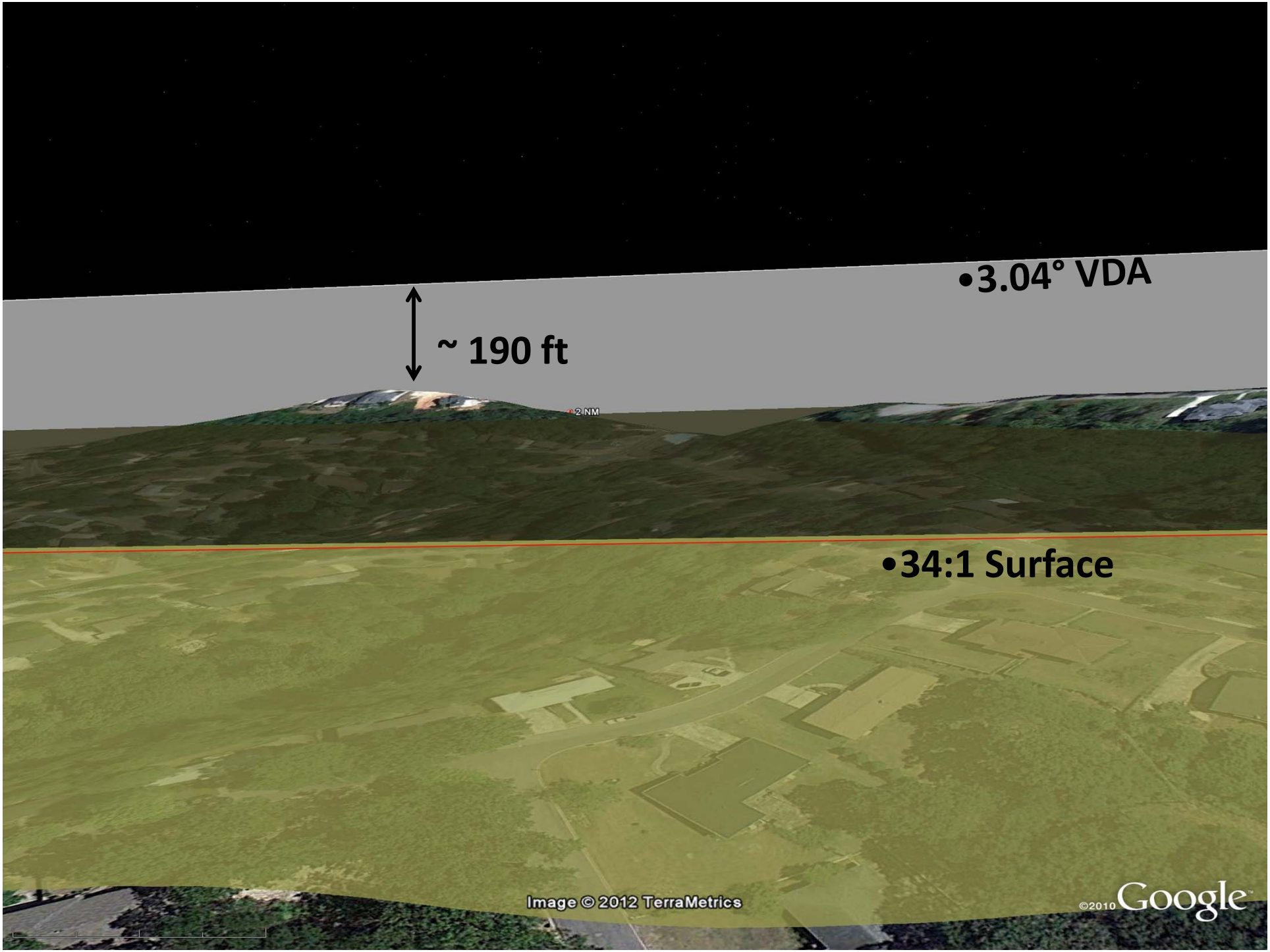






RNAV Rwy 36 with VDA and 34:1 Slope

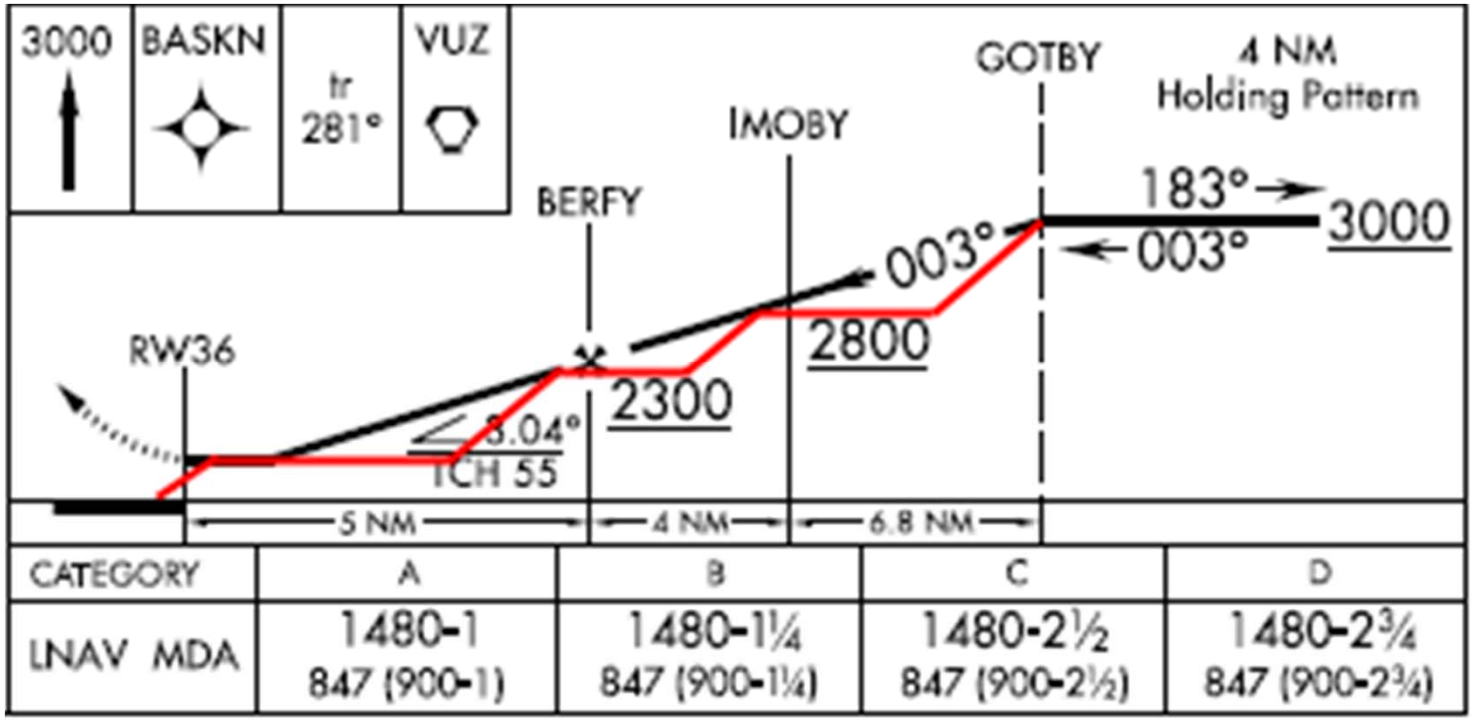



•3.04° VDA
~ 190 ft
2 NM
•34:1 Surface
Image © 2012 TerraMetrics
©2010 Google

- **Above Path**
  - Too Low Terrain

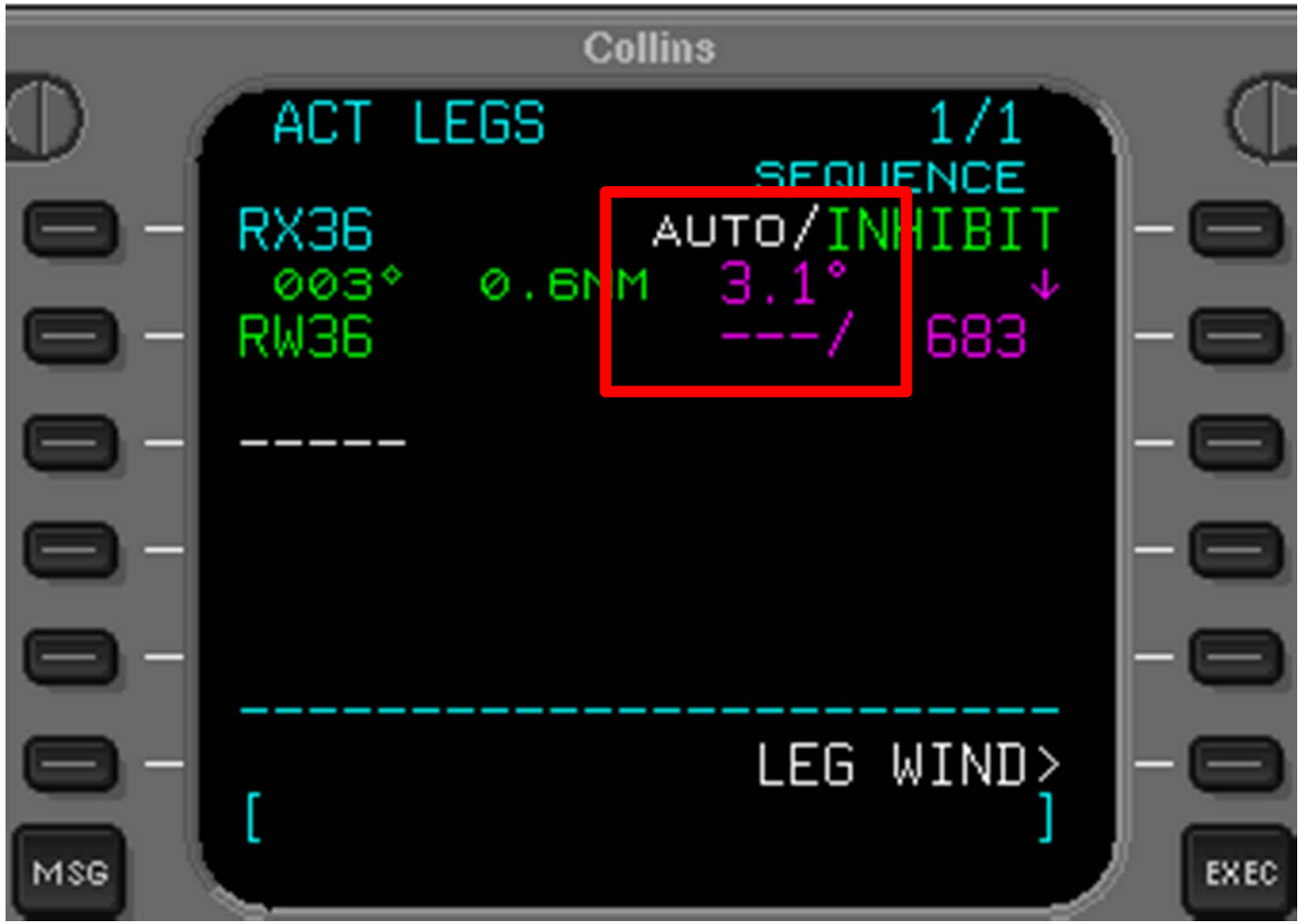


Fly Procedure as Designed



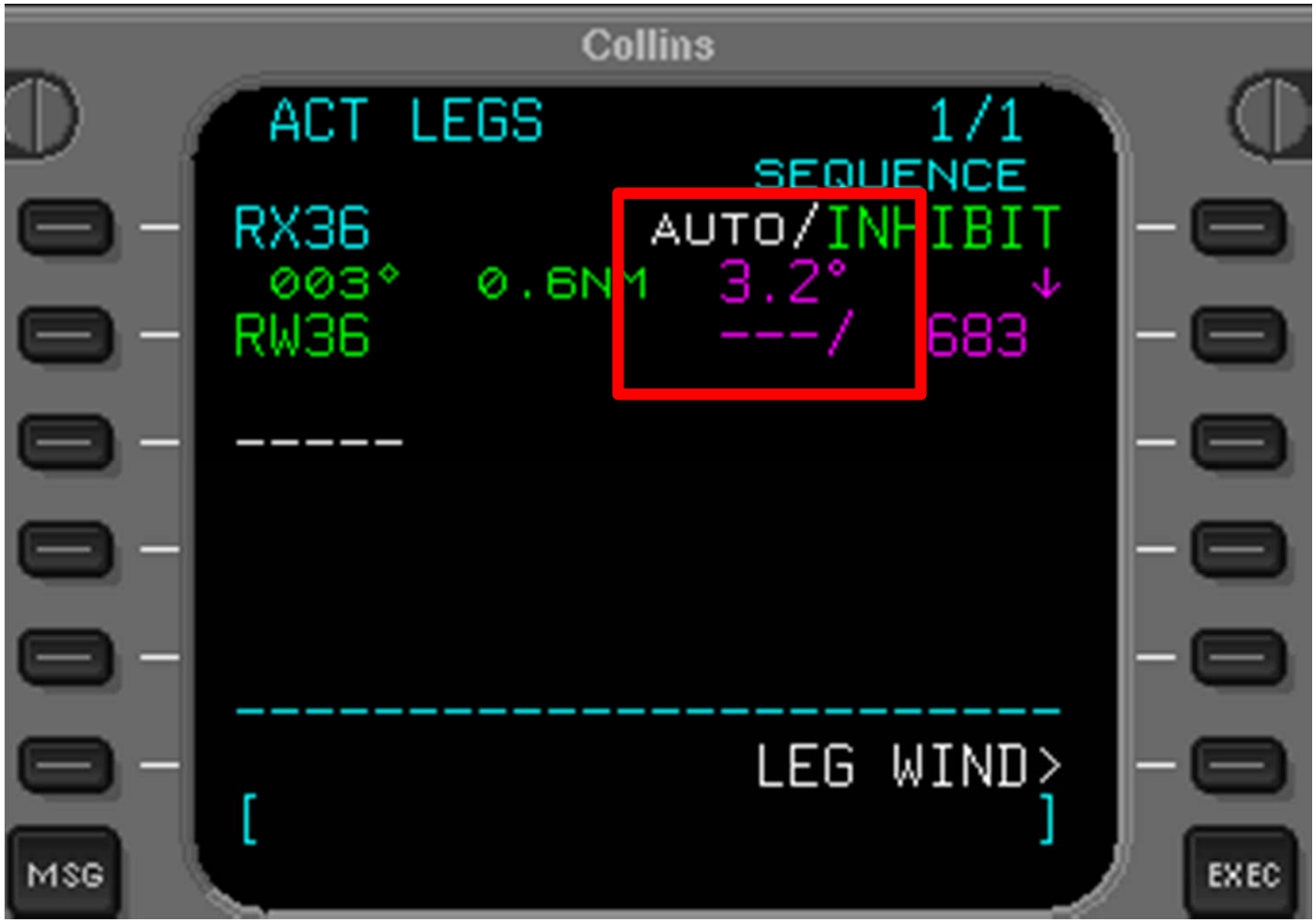
CATEGORY	A	B	C	D
LNAV MDA	1480-1 847 (900-1)	1480-1¼ 847 (900-1¼)	1480-2½ 847 (900-2½)	1480-2¾ 847 (900-2¾)

On Path: 3.10 Degrees

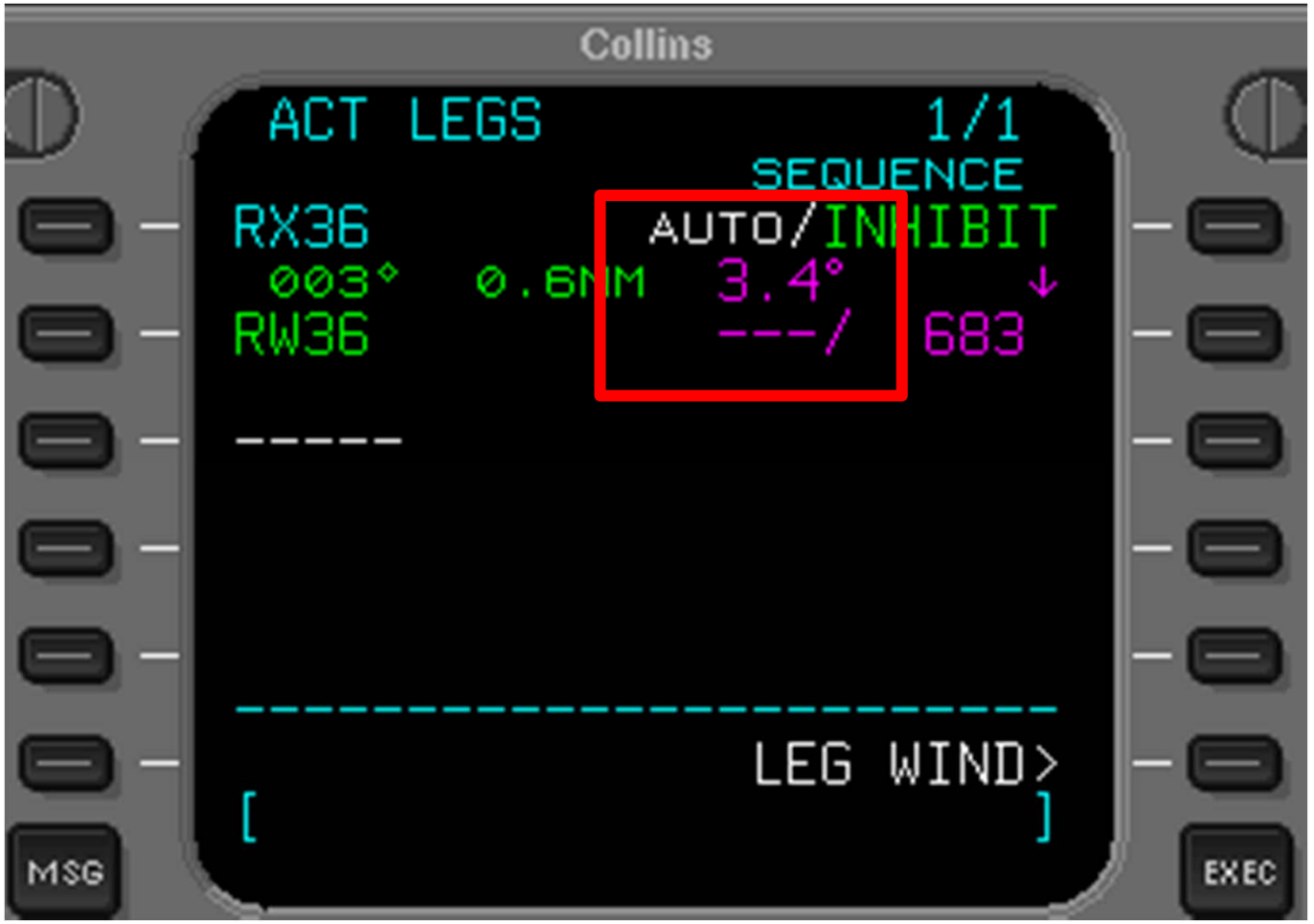


Federal Aviation Administration

On Path: 3.20 Degrees

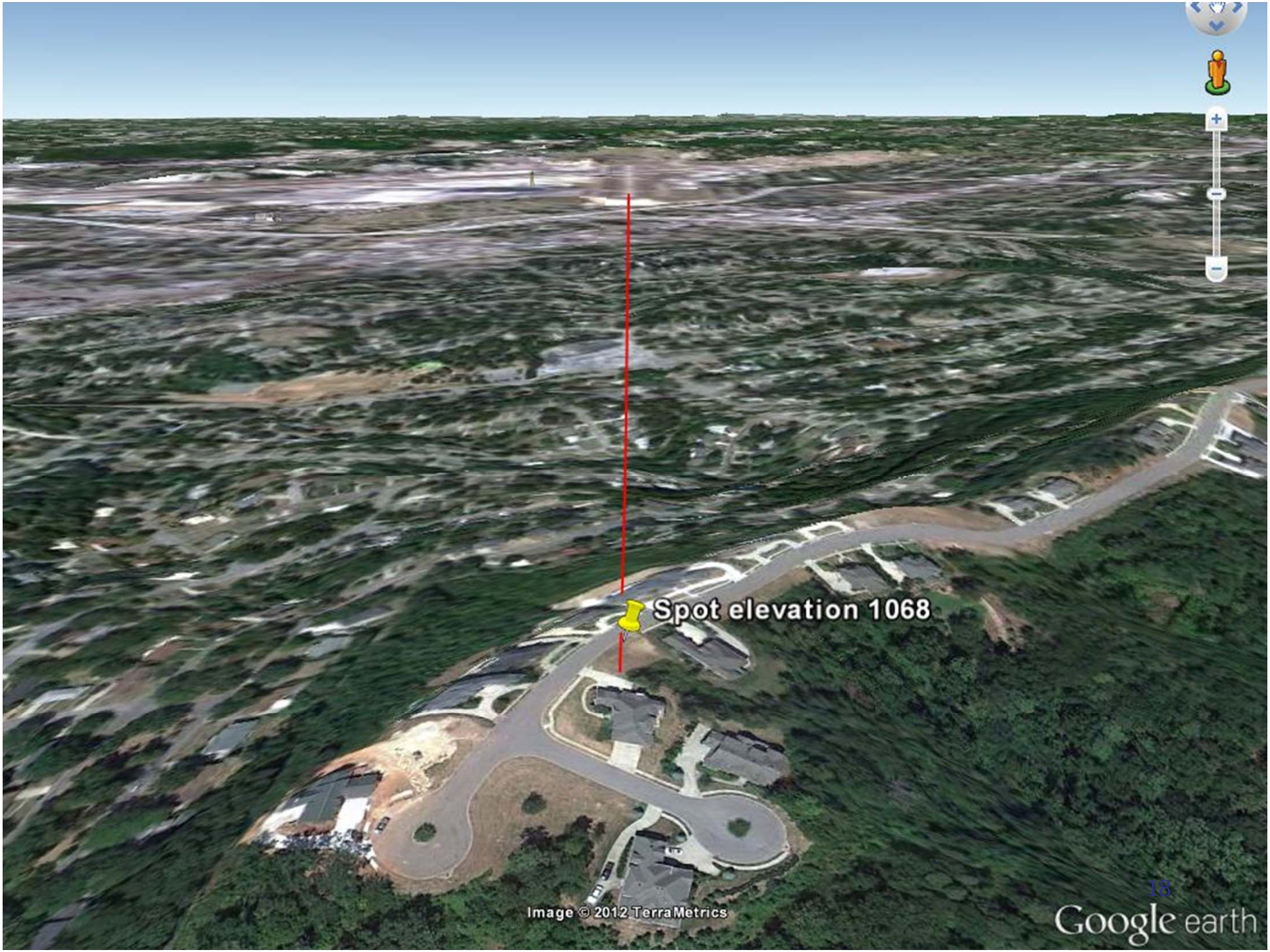


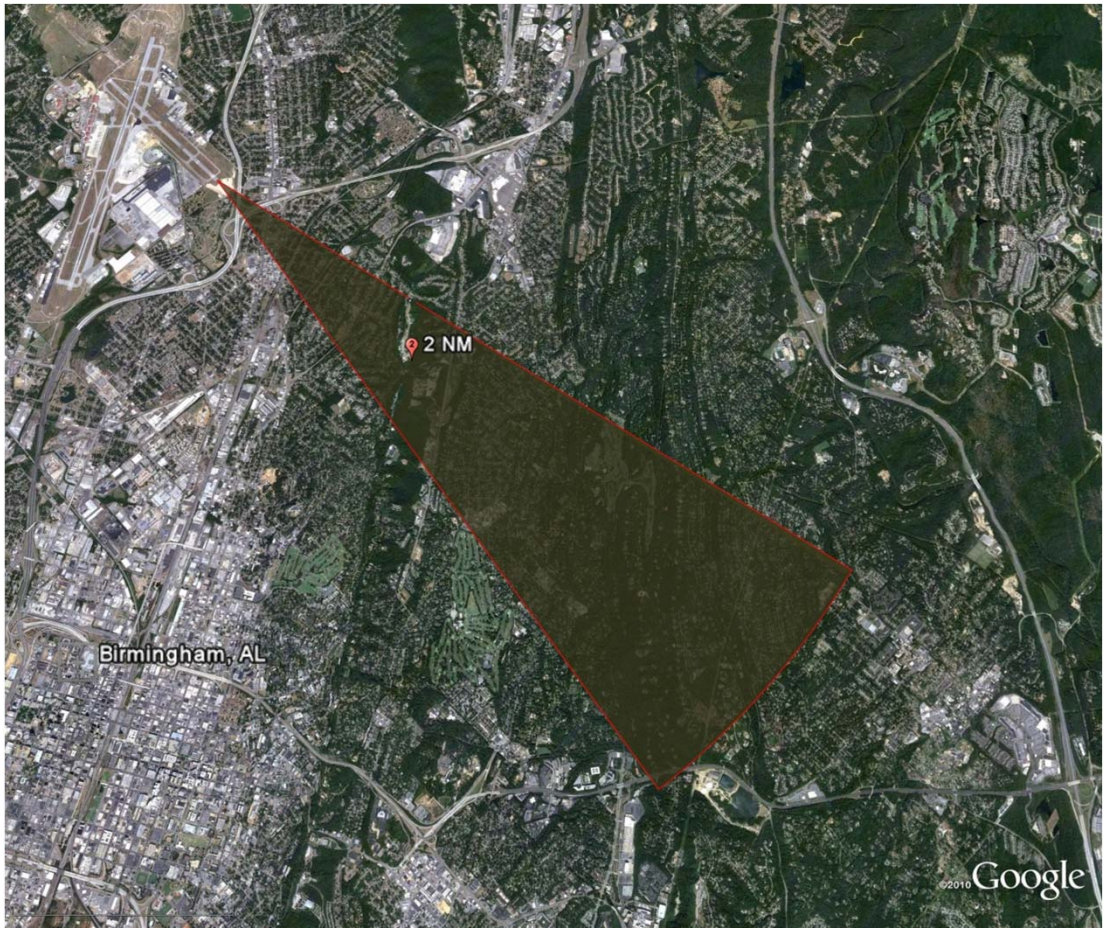
On Path: 3.40 Degrees



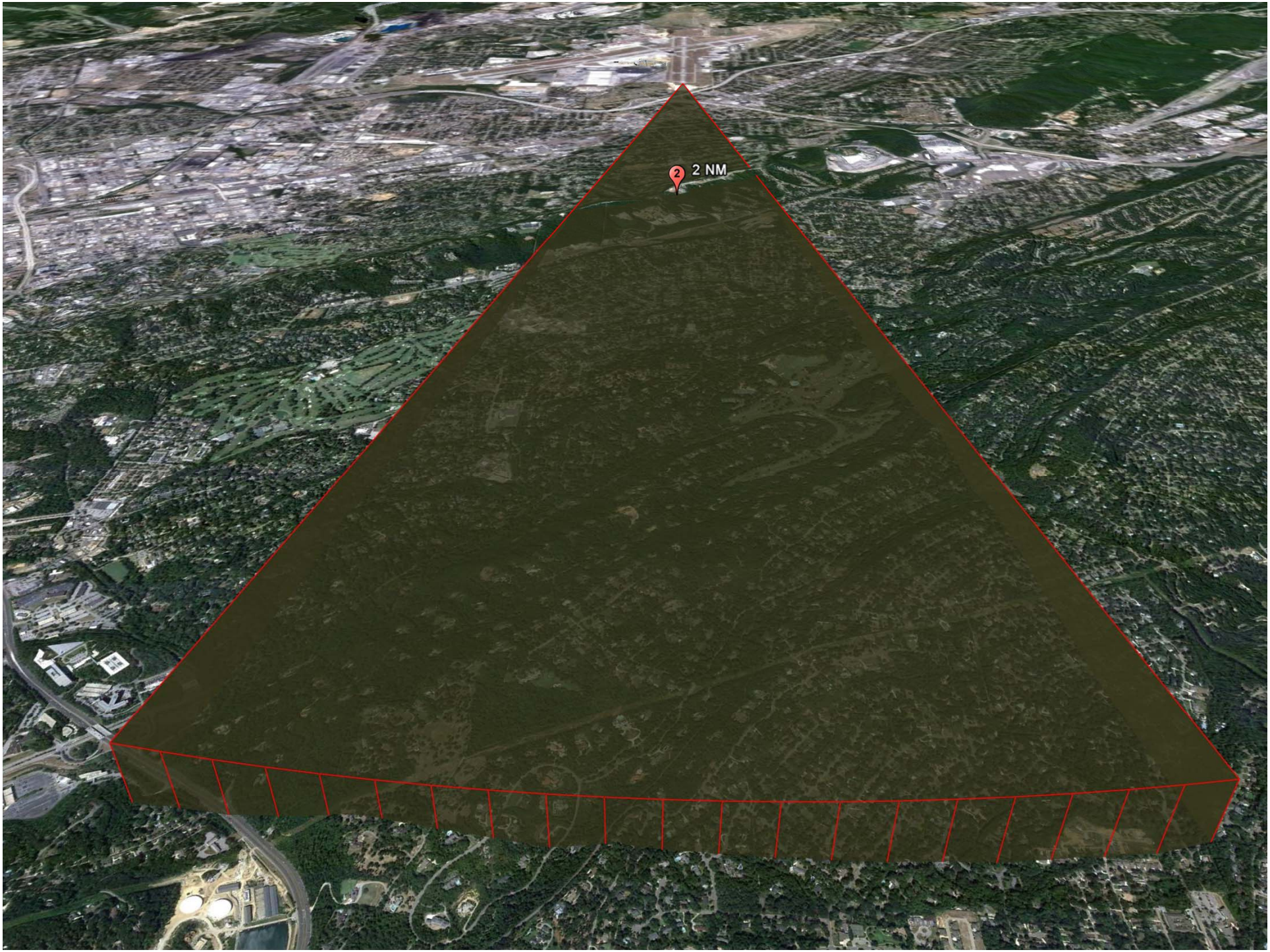
Industry Assumption Is:
On Path / On Course Is Safe

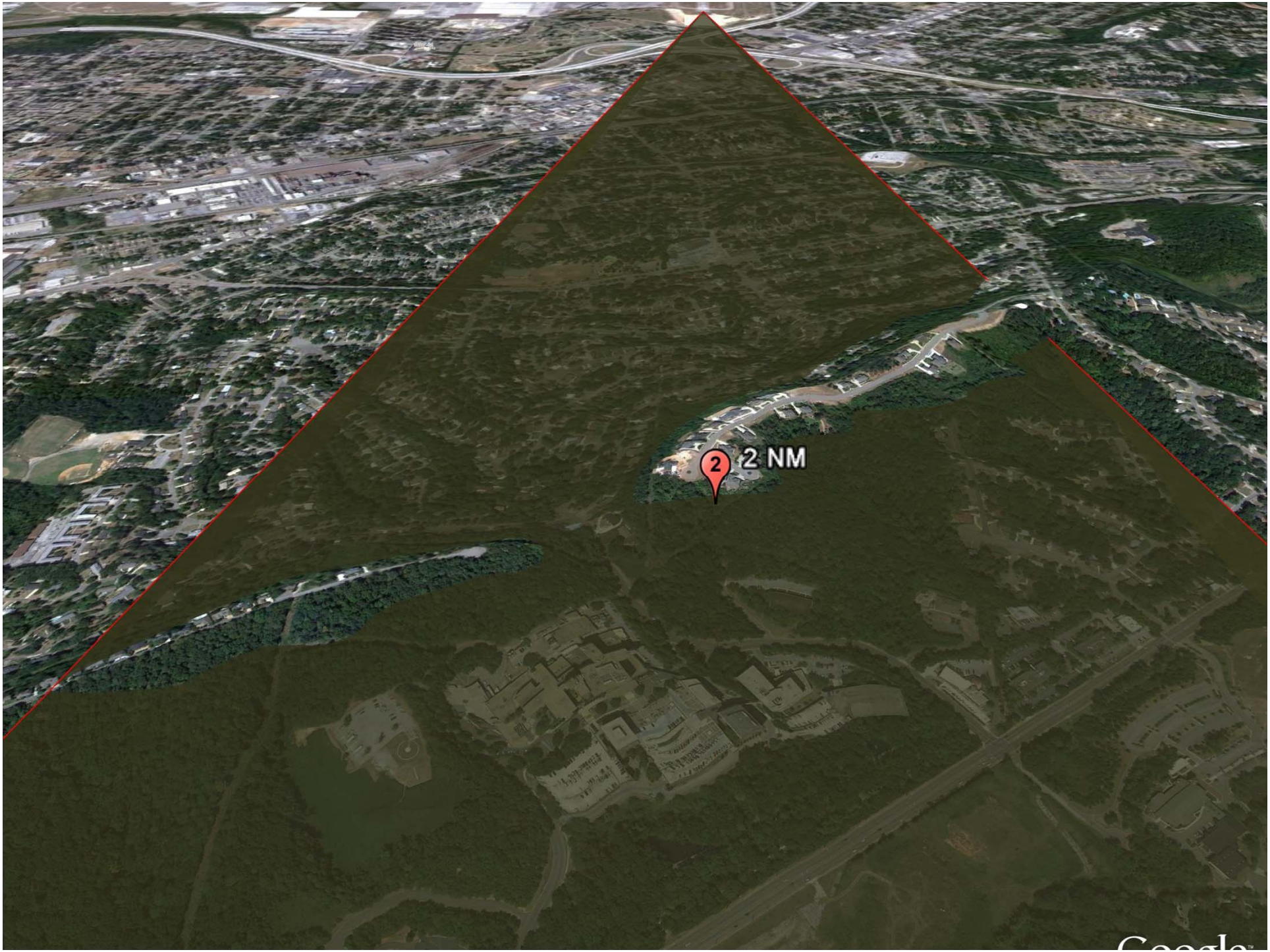



Spot elevation 1068
Image © 2012 TerraMetrics
Google earth



Federal Aviation Administration


2
2 NM


2
2 NM

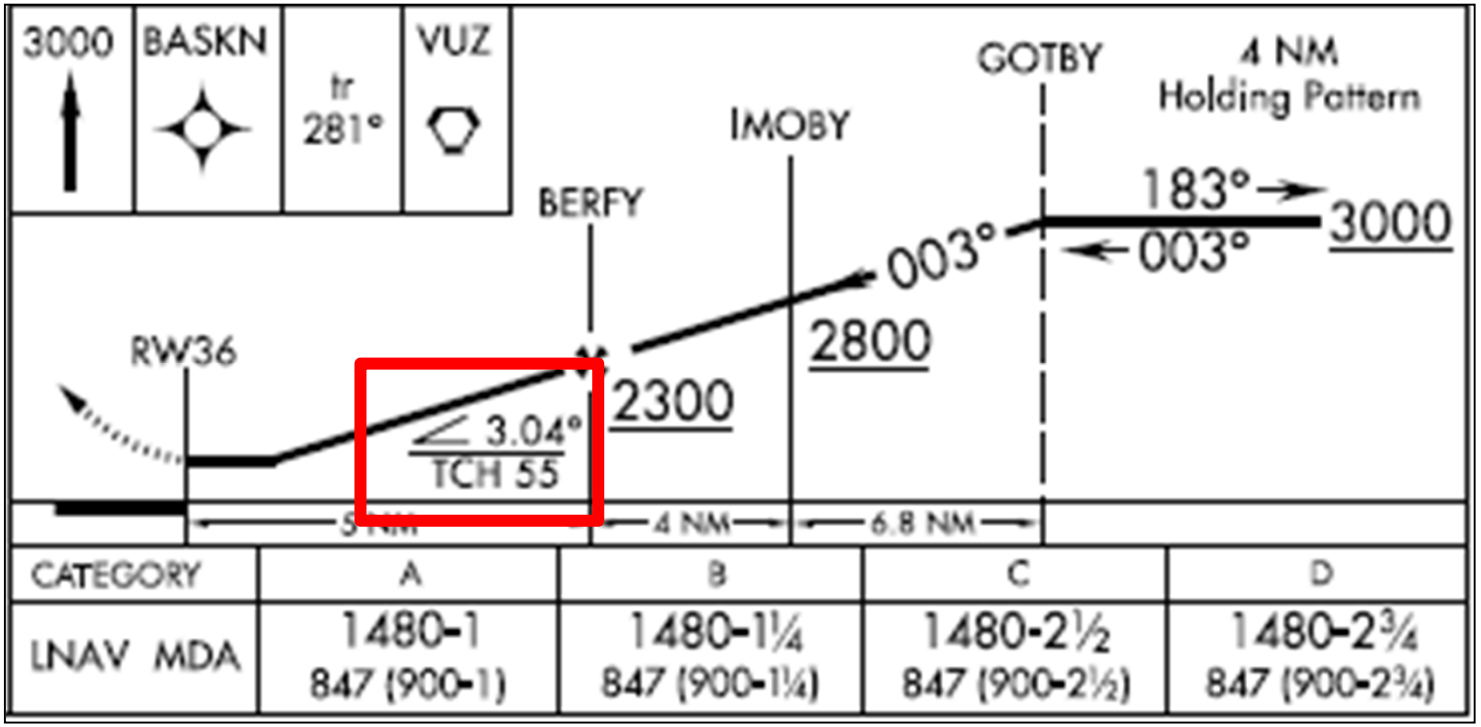
Advisory Circular 90-107

- **Advisory Vertical Guidance**
  - Vertical path deviation guidance indication that is generated by any means.
  - An aid provided by some manufacturers to help pilots meet altitude restrictions.

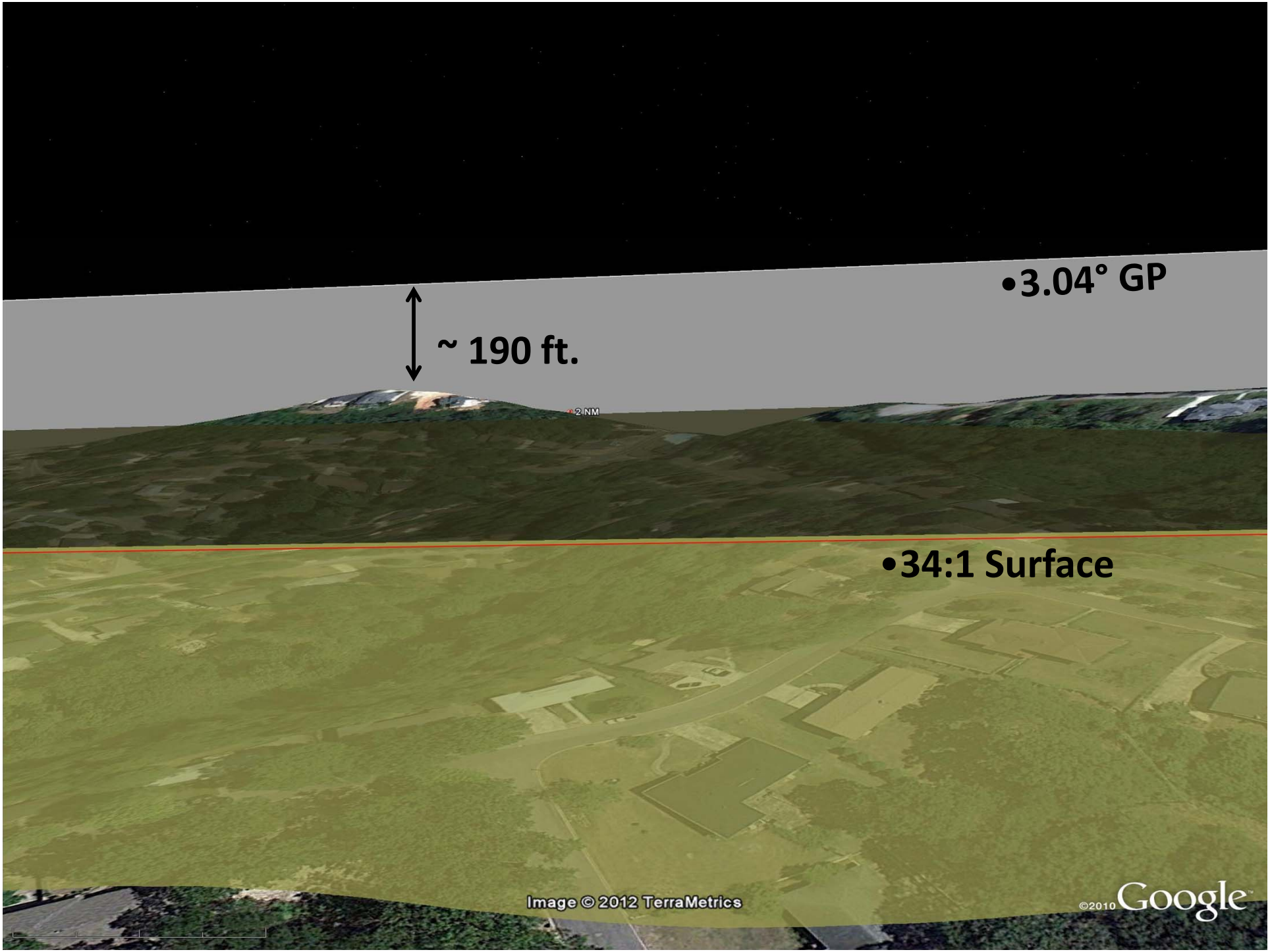
Background Information

- **Commercial Aviation Safety Team (CAST)**
  - Add advisory glide path
  - Operational Evolution Plan (OEP) Airports
  - Promotes stabilized approach
  - Applies to VOR & NDB coding
  - Going below MDA:
    - Pilot is responsible
    - No longer on the instrument approach

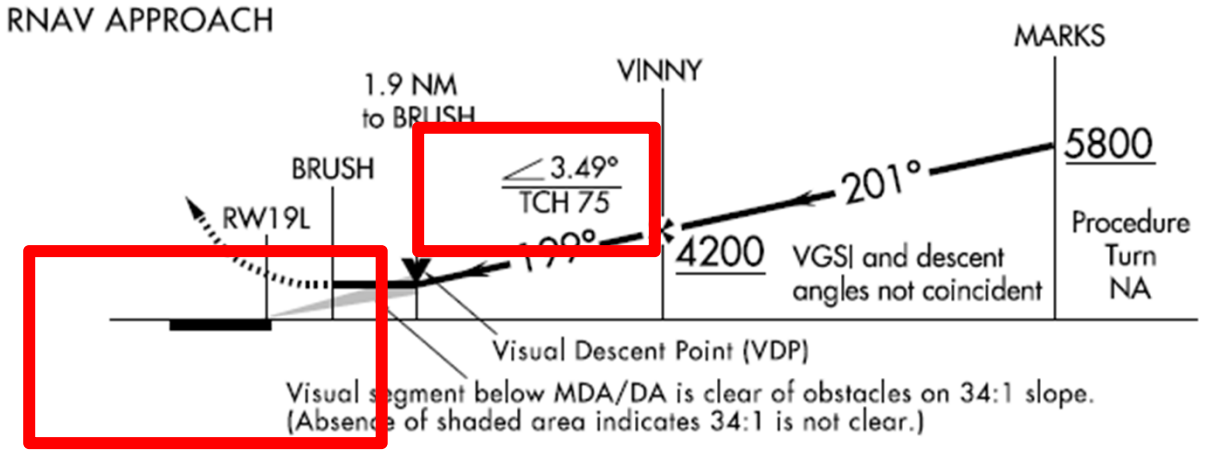
Non Precision RNAV are published with VDA and TCH



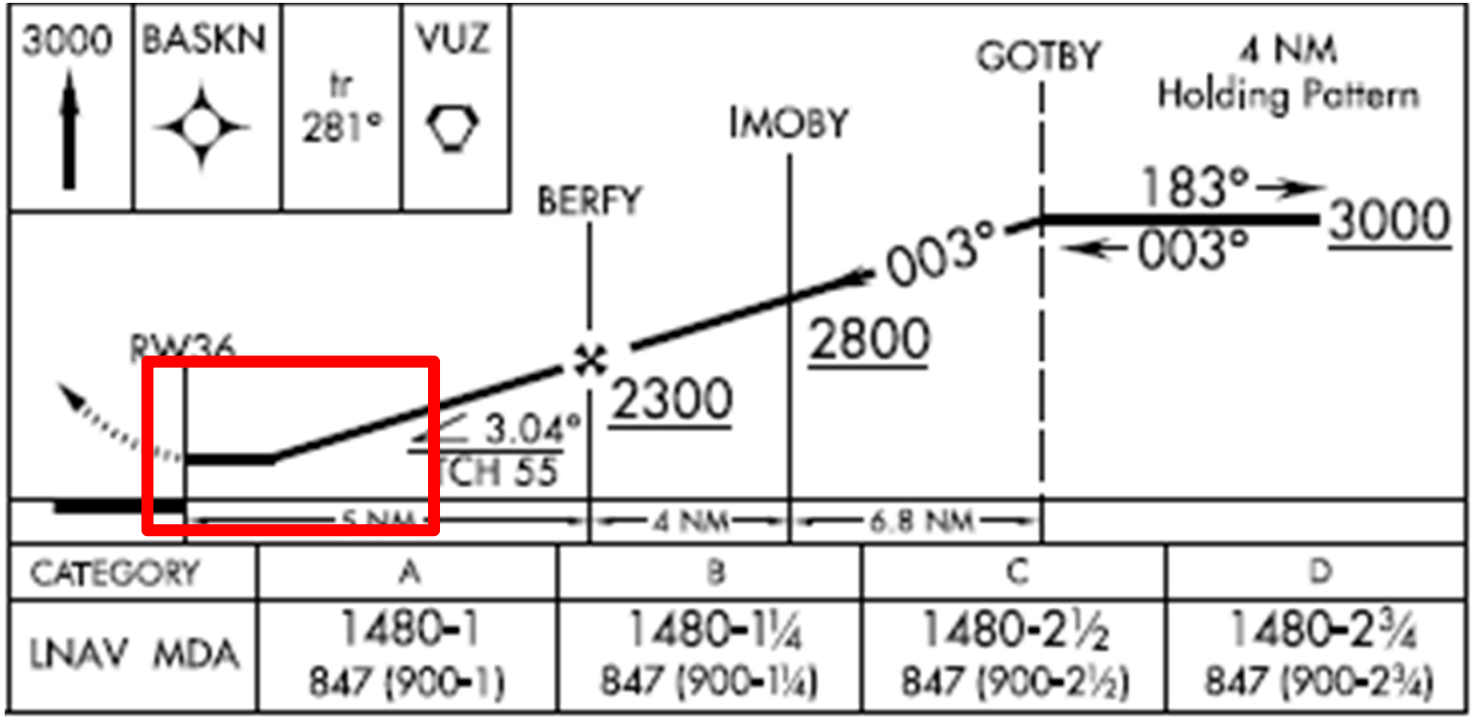
CATEGORY	A	B	C	D
LNAV MDA	1480-1 847 (900-1)	1480-1¼ 847 (900-1¼)	1480-2½ 847 (900-2½)	1480-2¾ 847 (900-2¾)


•3.04° GP
~ 190 ft.
2 NM
•34:1 Surface
Image © 2012 TerraMetrics
©2010 Google

Visual Segment Clear 34 : 1

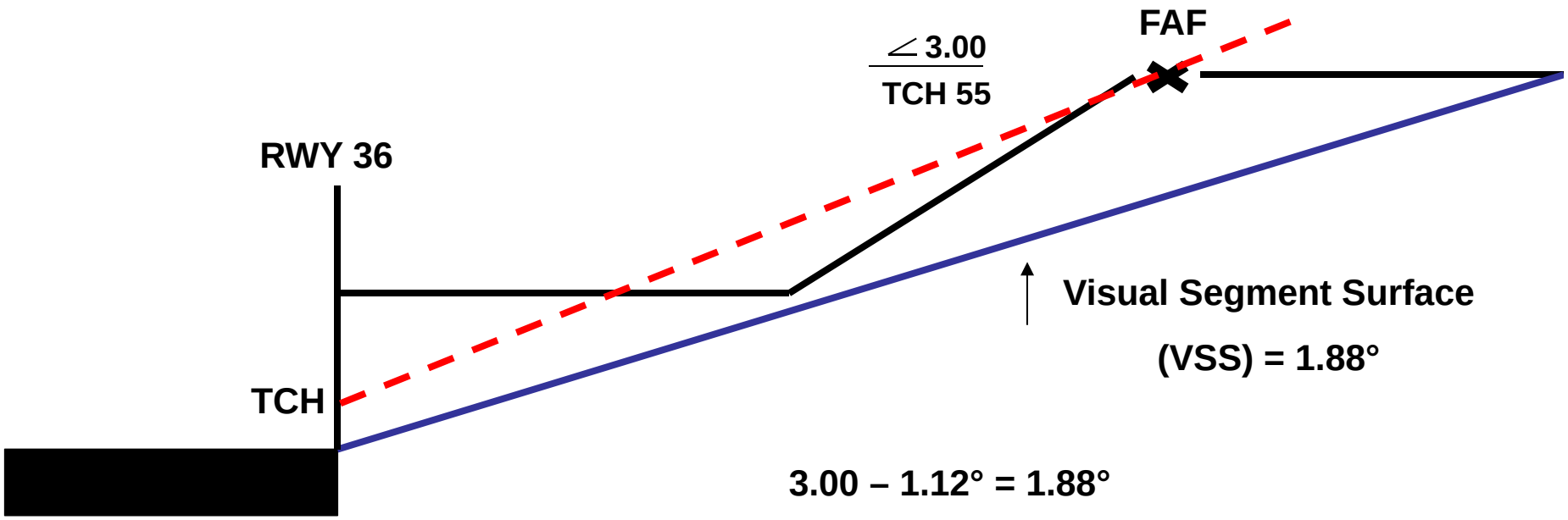


Birmingham, AL



CATEGORY	A	B	C	D
LNAV MDA	1480-1 847 (900-1)	1480-1¼ 847 (900-1¼)	1480-2½ 847 (900-2½)	1480-2¾ 847 (900-2¾)

ICAO Requirements



Flight Inspection Actions

- **Fly Advisory Vertical Guidance**
  - One-dot below path
  - Does the path provide reasonable clearance from obstacles?
- **What is reasonable?**
    - There is no criteria for the visual segment below MDA
    - Inspector's judgment
- **What is unreasonable?**
    - An EGPWS alert by proximity to terrain
    - Pilot has to destabilize aircraft to clear obstacles

Flight Inspection Actions If:

- **Vertical Descent Angle (VDA) does not clear obstacles below MDA**

  And / Or

- **Pilot has to destabilize aircraft to clear obstacles:**
  - Raise angle to mitigate obstacles

    And / Or
  - VDA and TCH will not be charted

Flight Inspection Actions

- **Procedure is not Unsatisfactory**
- **FAA Order 8260.19E paragraph 8-57u:**
  - Creates a conflict with policy
  - Memorandum has been created to support Flight Inspection Actions

Recommendations

- **FAA Order 8260.19E**
  - Revise VDA Charting Policy
    - Increase angle to avoid obstacles
      - Promotes stabilized approach
    - If 34:1 surface is penetrated
      - Do not publish VDA and TCH
- **Flight Standards**
  - Issue a SAFO on use of Vertical Descent Angles with non-precision approaches
  - Publish articles in aviation publications

Recommendations

- **Industry**
  - Revise coding policy for non-precision approaches:
    - Do not code angle if 34:1 surface is not clear
    - Do not code angle if it is not provided


Questions?

TPP Definitions – Profile View

Two different methods are used for vertical guidance:
a. "GS" indicates an electronic glide slope or barometric vertical guidance is present. In the case of an Instrument Landing System (ILS) and Wide Area Augmentation System (WAAS) LPV approach procedures, an electronic signal provides vertical guidance. Barometric vertical guidance is provided for RNP and LNAV/VNAV instrument approach procedures. All ILS, LPV, RNP, and LNAV/VNAV will be in this format $\frac{\text{GS } 3.00°}{\text{TCH } 55}$, located in the lower left or right corner.

b. Other charts without electronic or barometric vertical guidance will be in this format $\frac{\angle\ 3.00°}{\text{TCH } 55}$, indicating a non-precision vertical descent angle to assist in preventing controlled flight into terrain. On Civil (FAA) procedures, this information is placed above or below the procedure track following the fix it is based on.

