National Transportation Safety Board

Crash During Nighttime Nonprecision Instrument Approach

UPS 1354, A300-600
Birmingham, AL
August 14, 2013

Dan Bower, Ph.D.
Investigator-in-Charge

Basic Information

- Airplane destroyed
- 2 crewmembers fatally injured
- Departed Louisville, KY
- Scheduled arrival at 0450 local
- Full go-team launch
- Investigative hearing

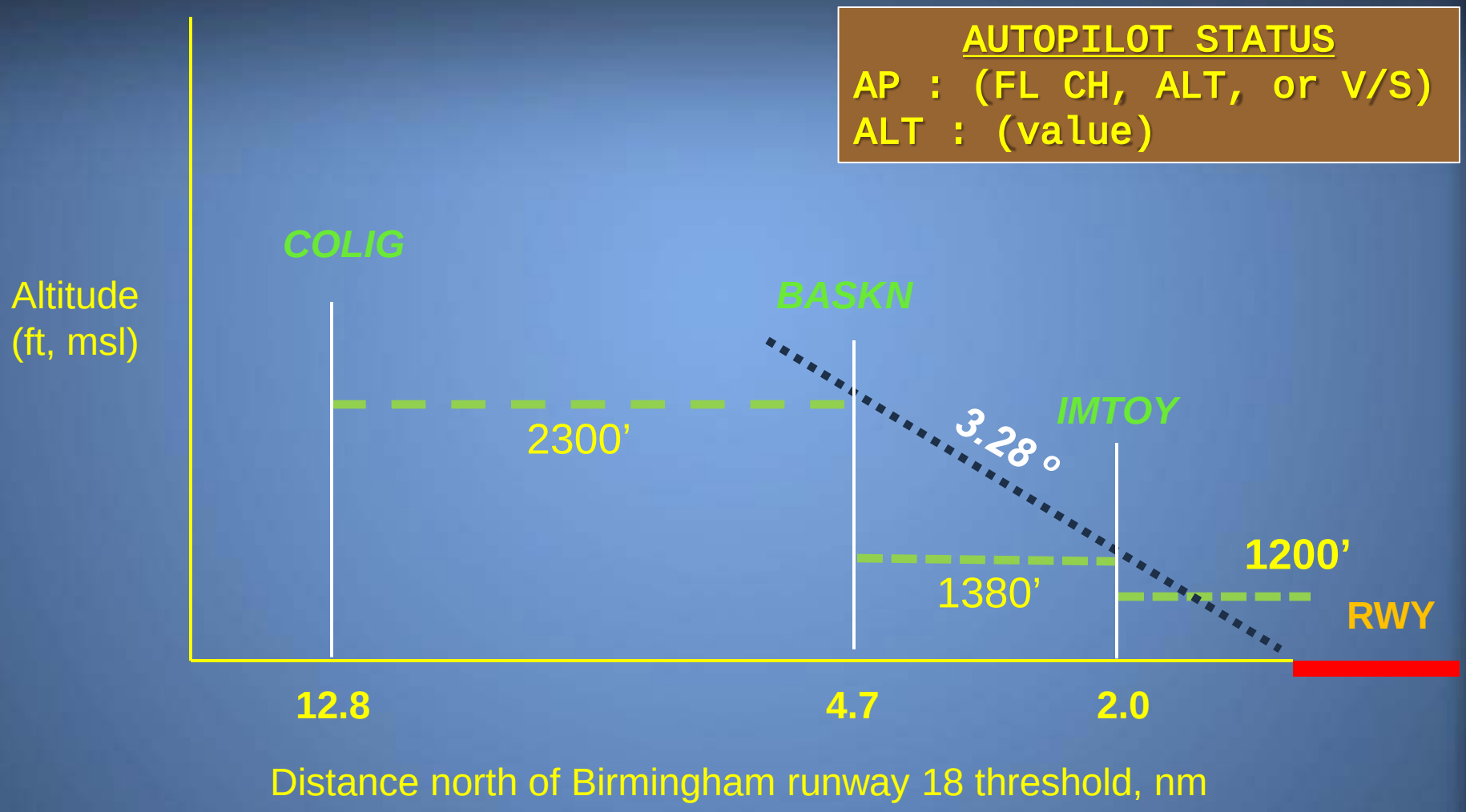
Sequence of Events

- Captain: pilot flying
- First officer: pilot monitoring
- Runway 6/24 closed for repairs between 0400 and 0500 local time
- Flight dispatched with planned approach to runway 18
- Captain briefed localizer approach to runway 18

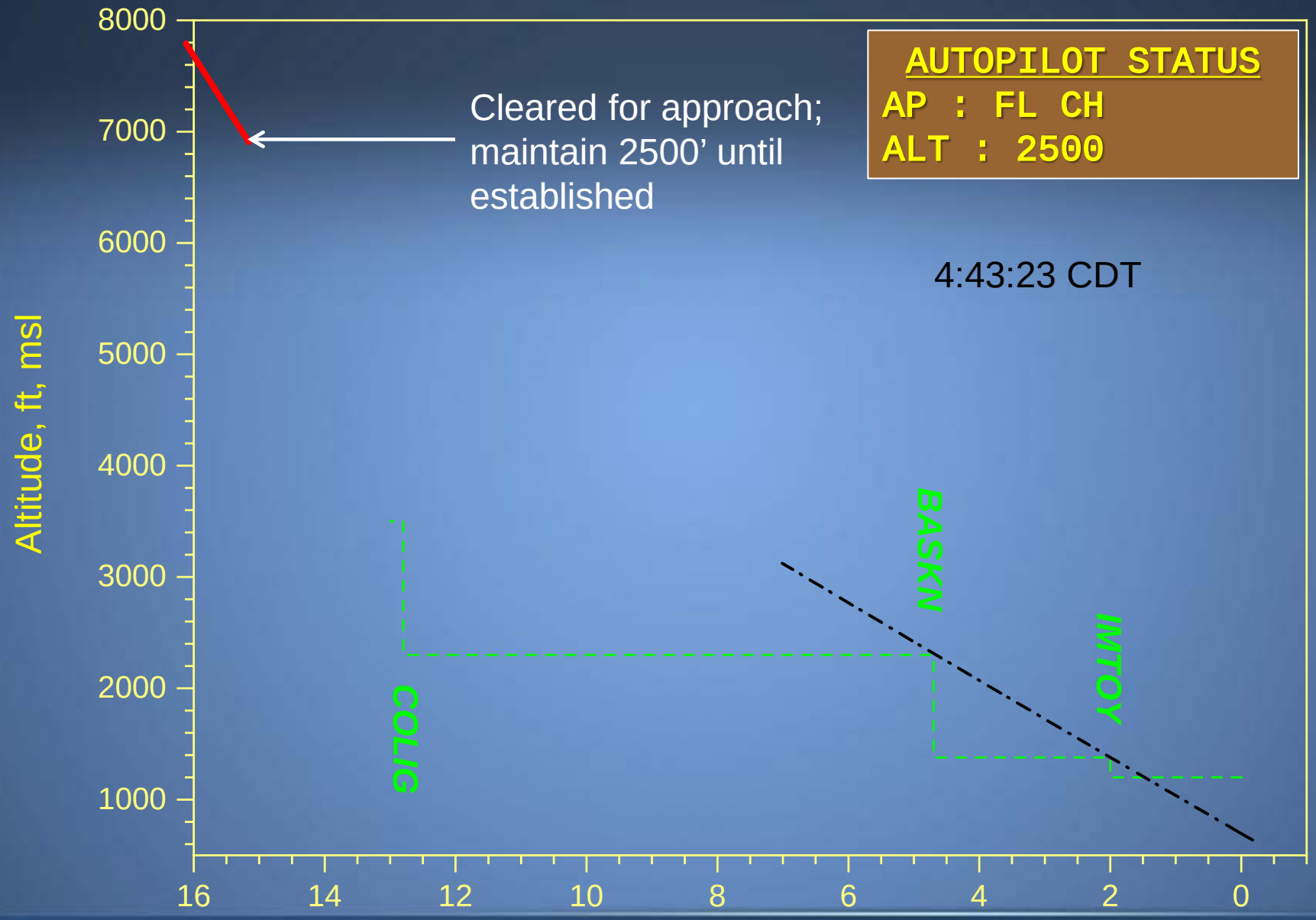
Sequence of Events

- Localizer runway 18 approach to BHM is **nonprecision approach**:
  - Lateral guidance from airport (localizer)
  - Vertical guidance provided by flight management computer on airplane

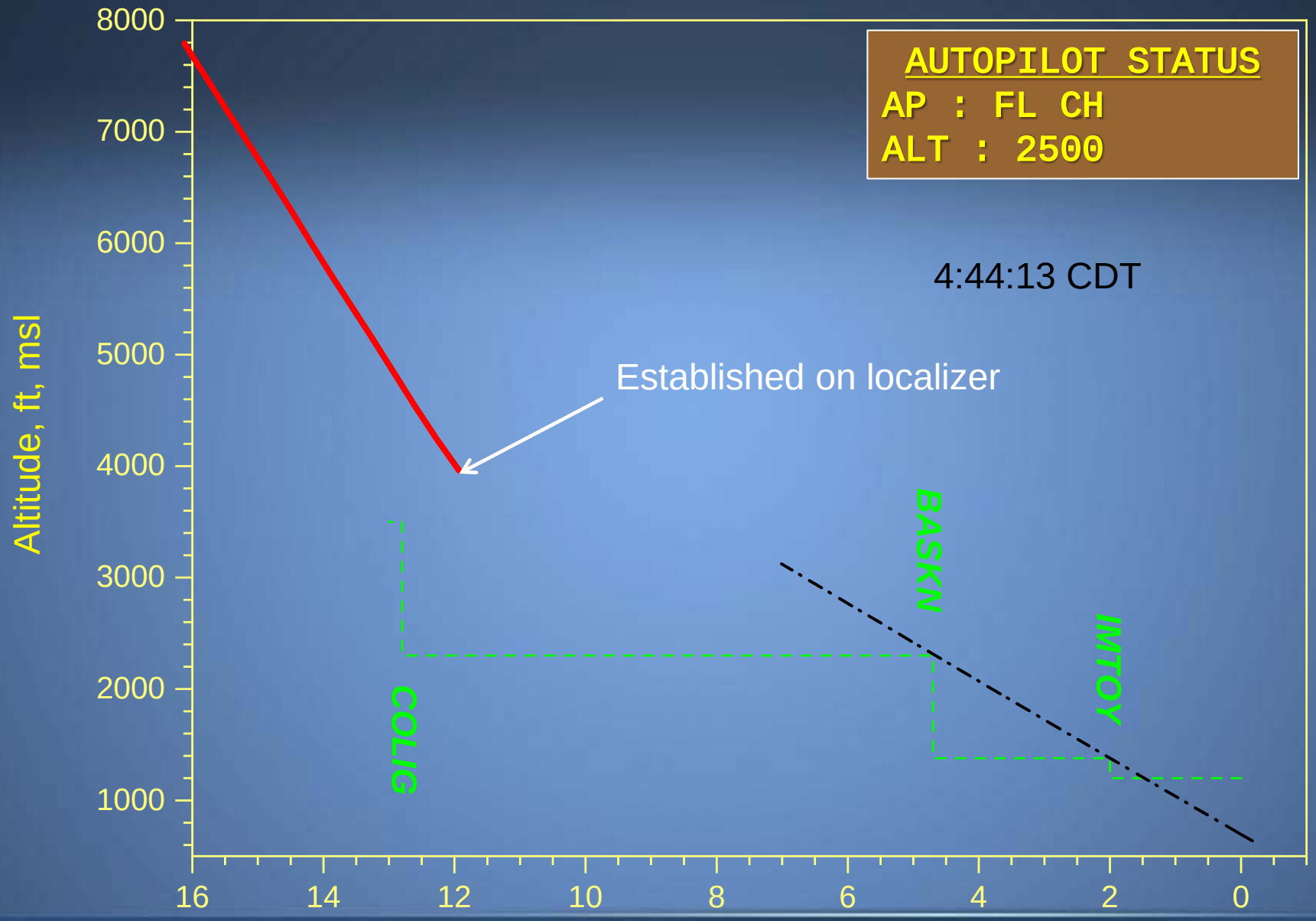
Vertical Path Defined By Fixes



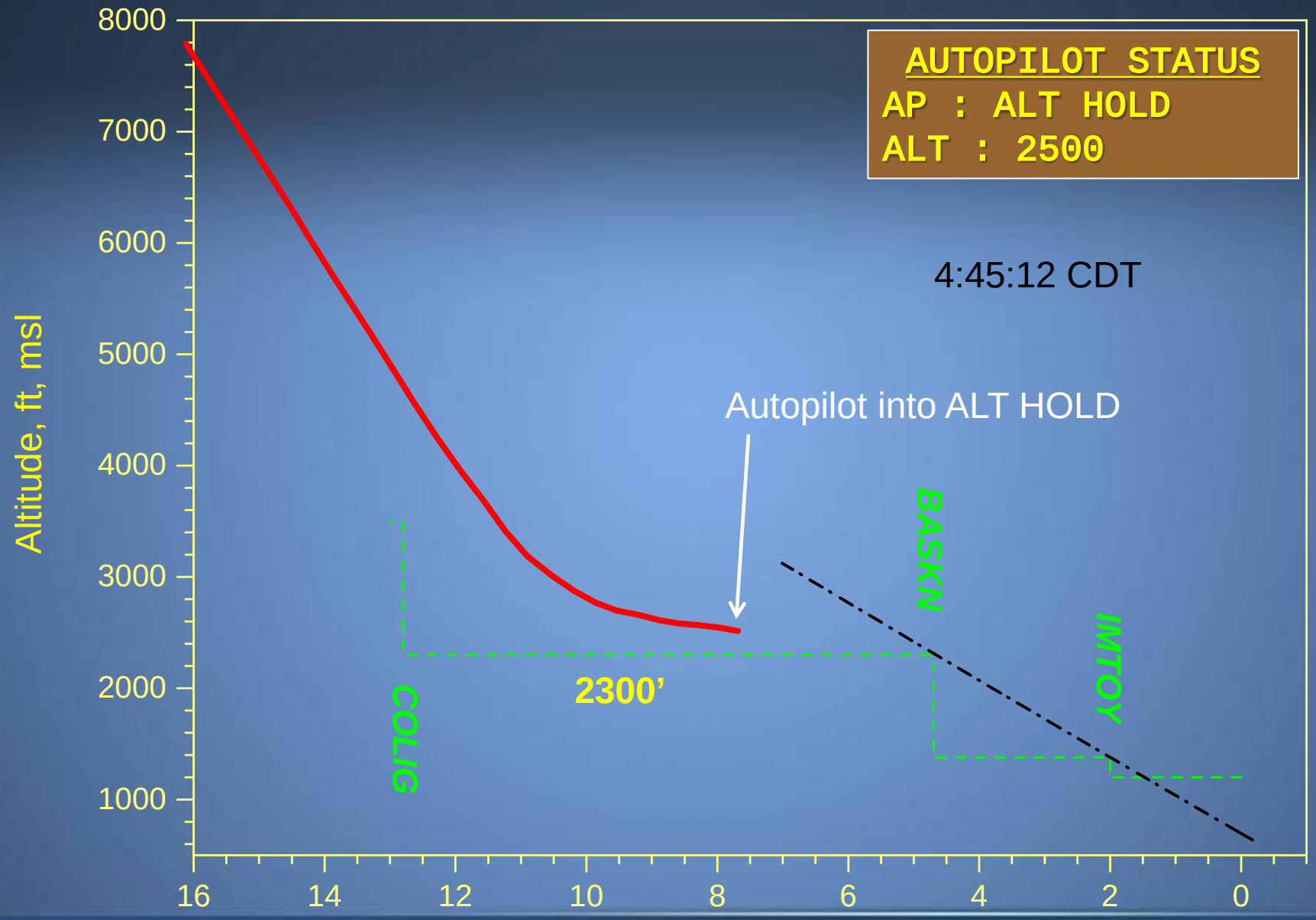
NTSB


AUTOPILOT STATUS
AP : FL CH
ALT : 2500
Cleared for approach; maintain 2500' until established
4:43:23 CDT
COLIG
BASKN
IMTOY
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

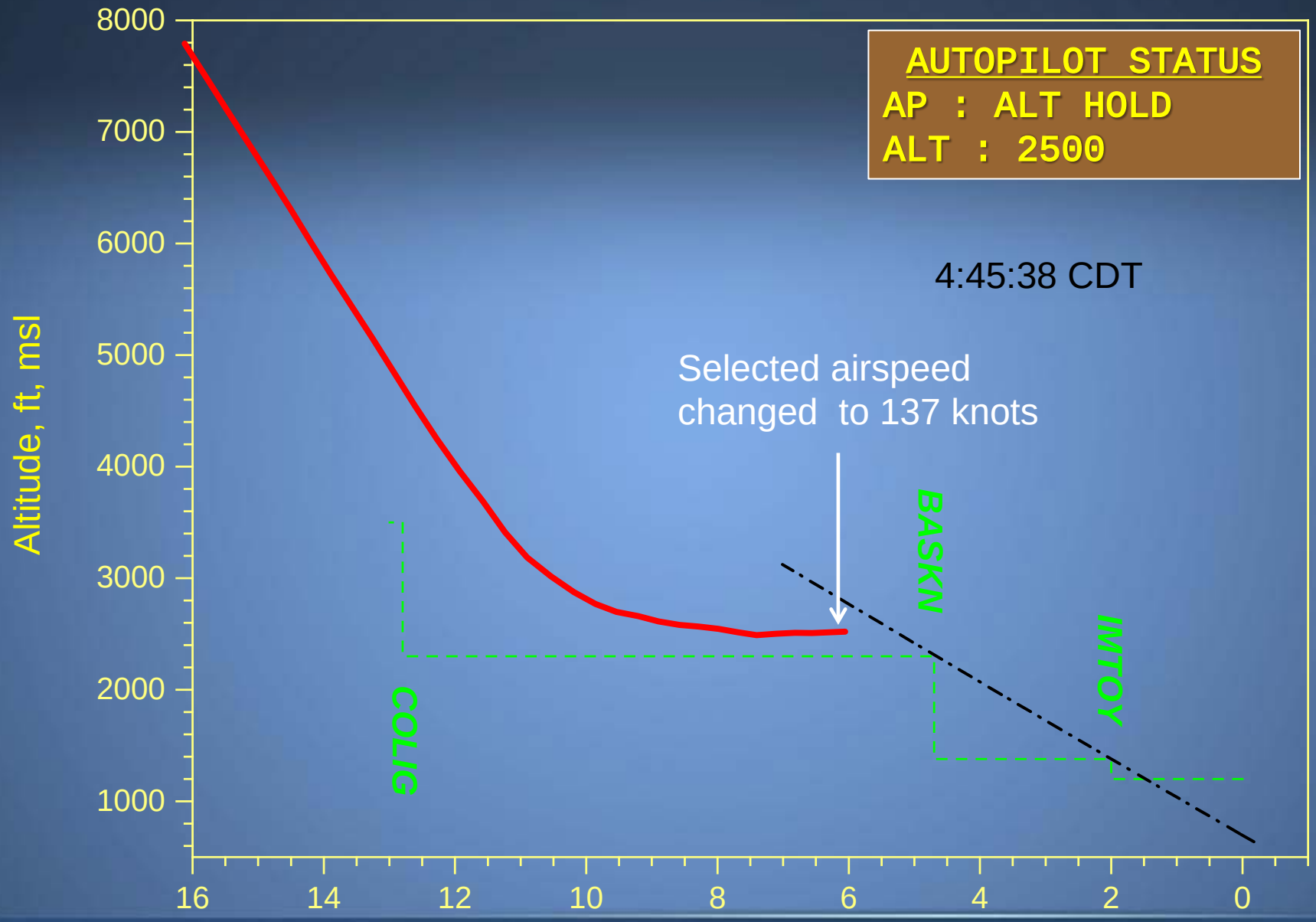
NTSB


AUTOPILOT STATUS
AP : FL CH
ALT : 2500
4:44:13 CDT
Established on localizer
BASKN
IMTOY
COLIG
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

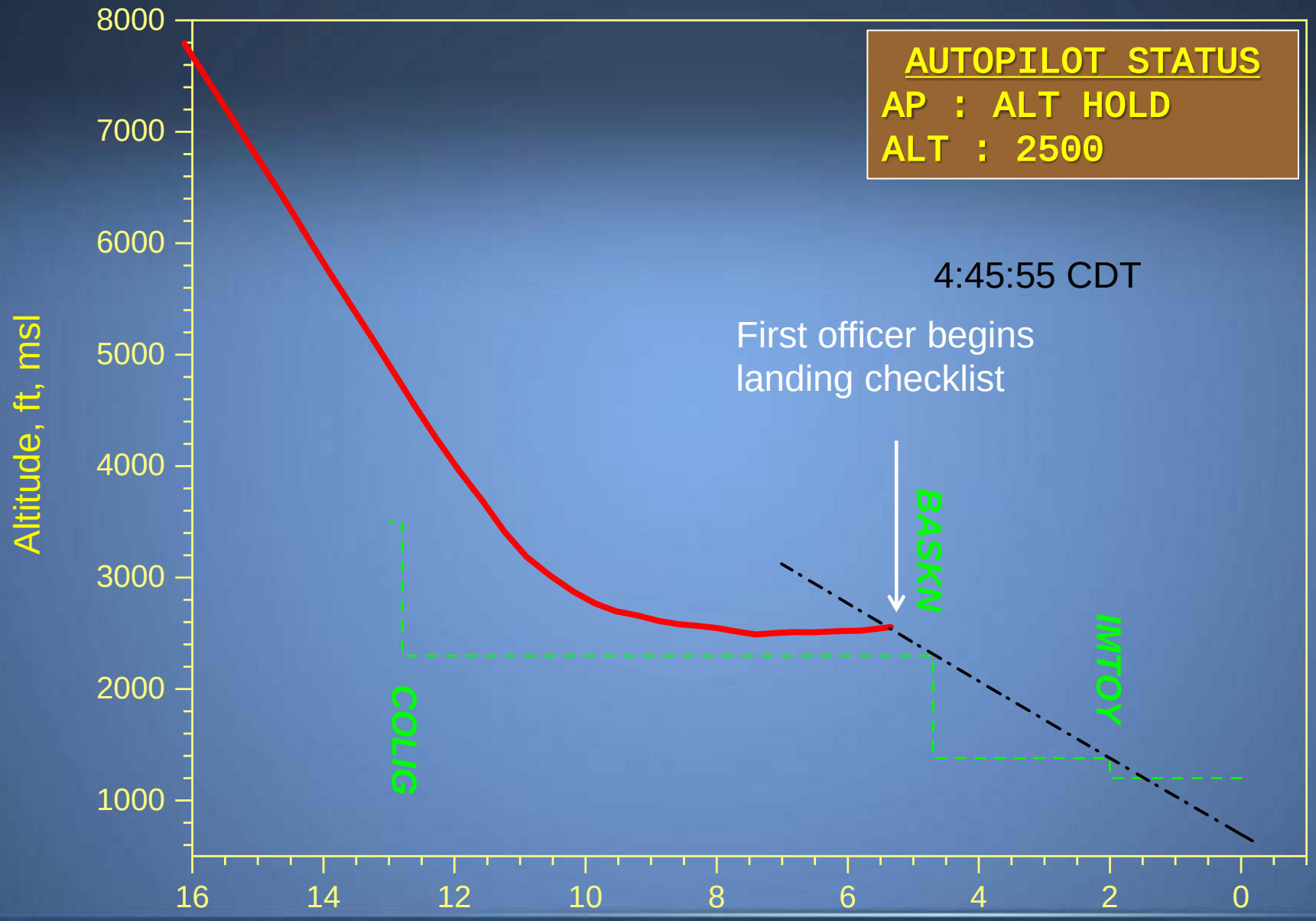
NTSB


AUTOPILOT STATUS
AP : ALT HOLD
ALT : 2500
4:45:12 CDT
Autopilot into ALT HOLD
BASKN
IMTOY
COLIG
2300'
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

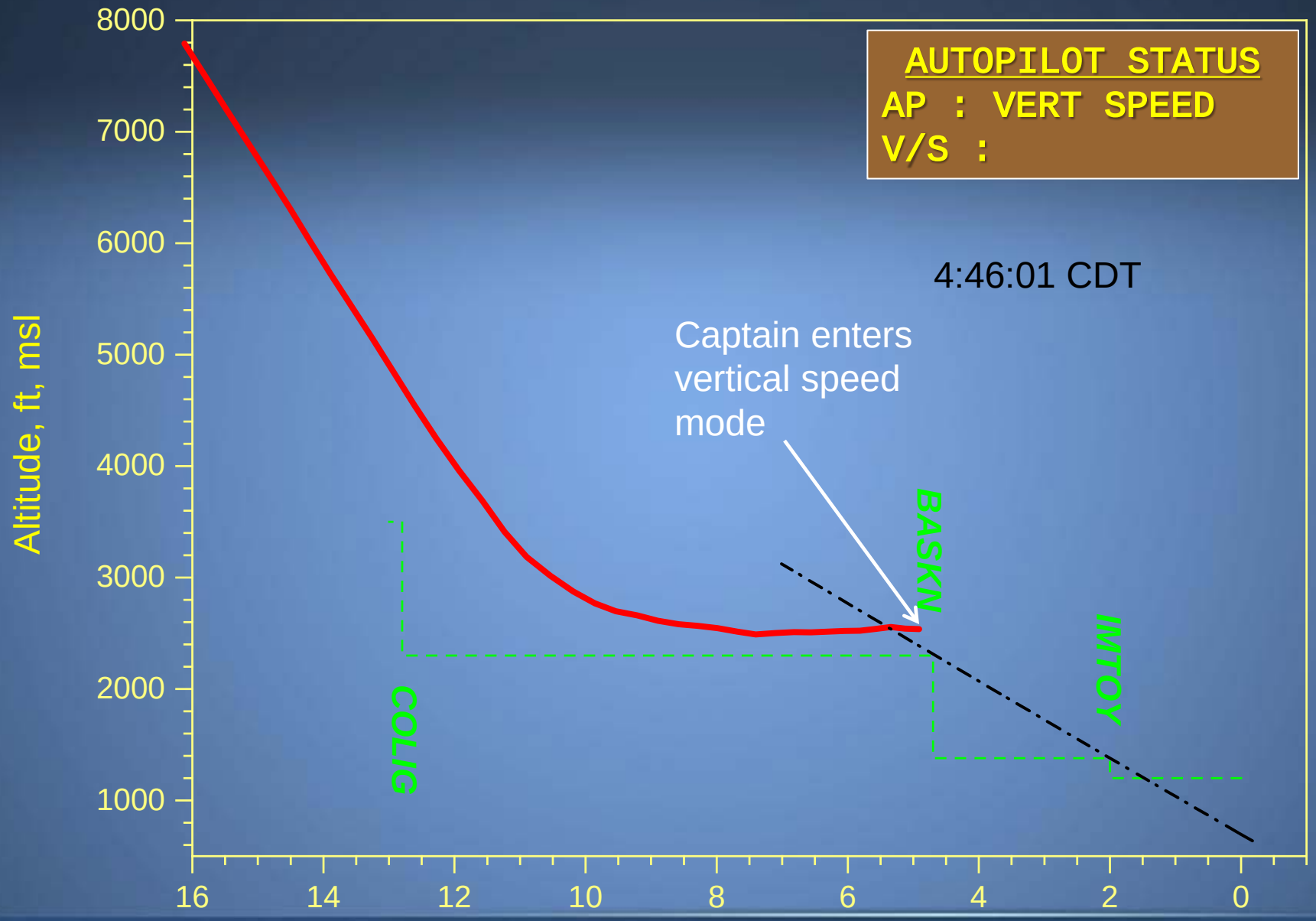
NTSB


AUTOPILOT STATUS
AP : ALT HOLD
ALT : 2500
4:45:38 CDT
Selected airspeed
changed to 137 knots
BASKN
IMTOY
COLIG
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

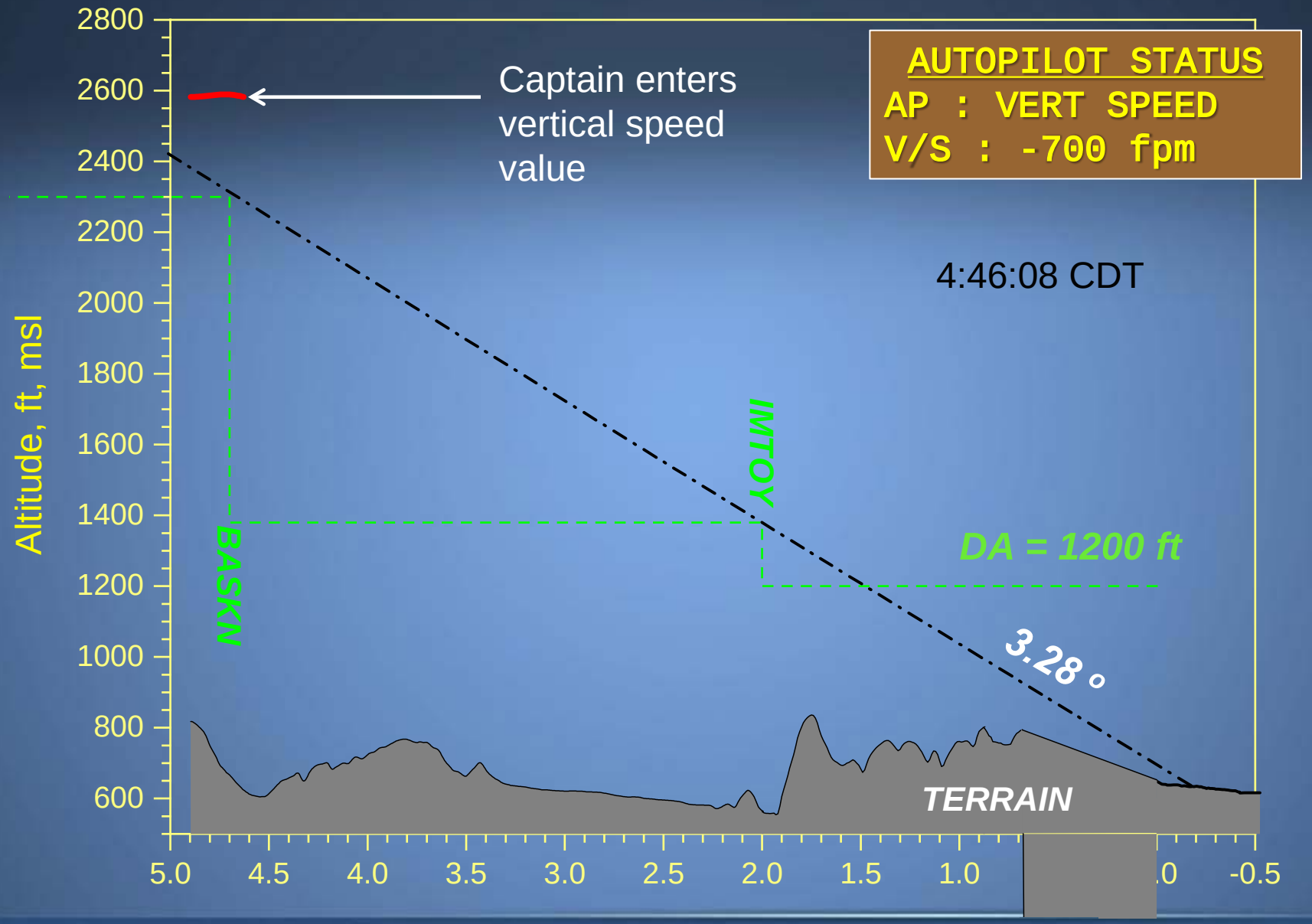
NTSB


AUTOPILOT STATUS
AP : ALT HOLD
ALT : 2500
4:45:55 CDT
First officer begins landing checklist
BASKN
IMTOY
COLIG
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

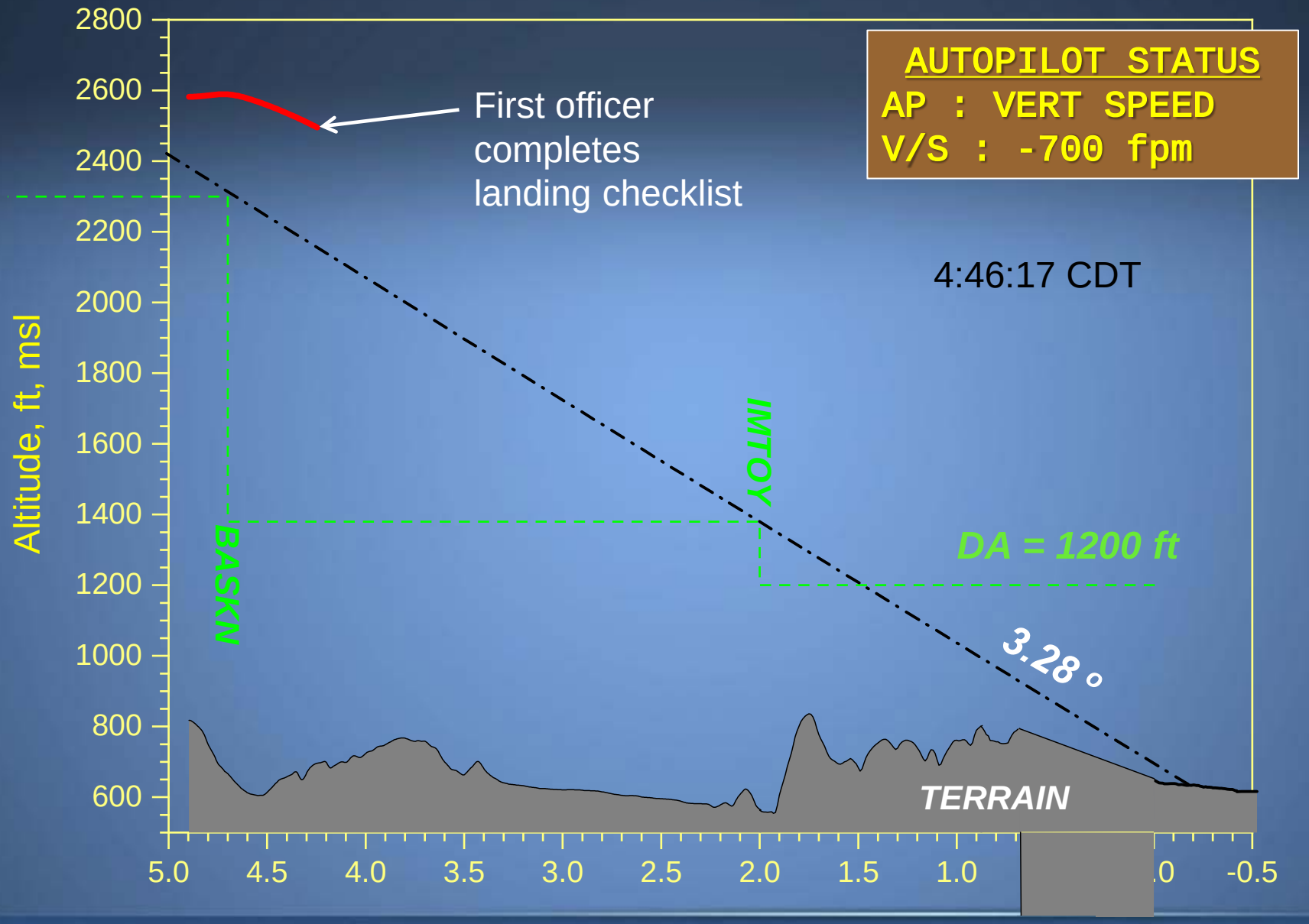
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S :
4:46:01 CDT
Captain enters vertical speed mode
BASKN
IMTOY
COLIG
Altitude, ft, msl
8000
7000
6000
5000
4000
3000
2000
1000
16
14
12
10
8
6
4
2
0
Distance north of Birmingham runway 18 threshold, nm

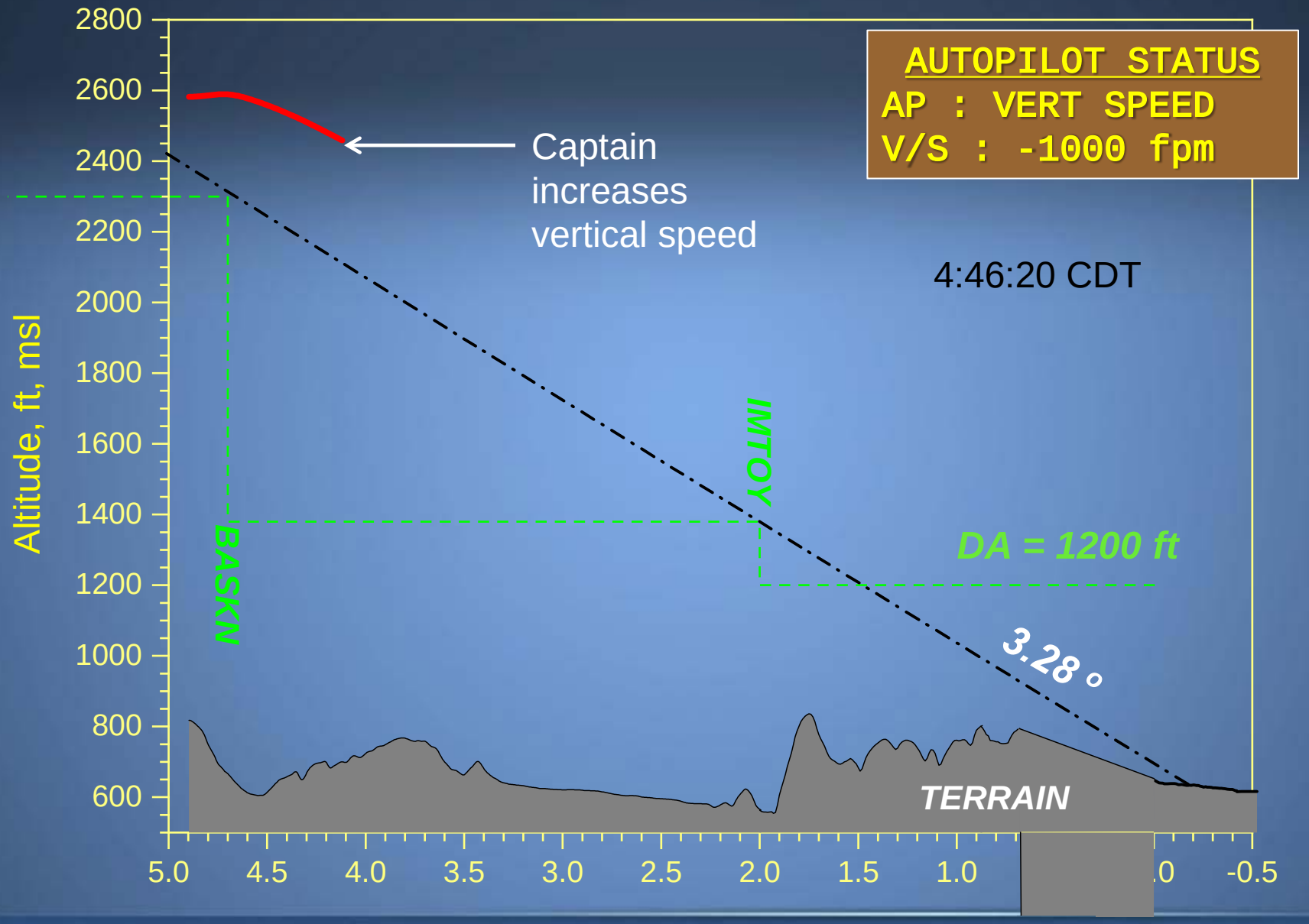
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -700 fpm
Captain enters vertical speed value
4:46:08 CDT
Altitude, ft, msl
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
BASKN
IMTOY
DA = 1200 ft
3.28 °
TERRAIN
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
-0.5
Distance north of Birmingham runway 18 threshold, nm

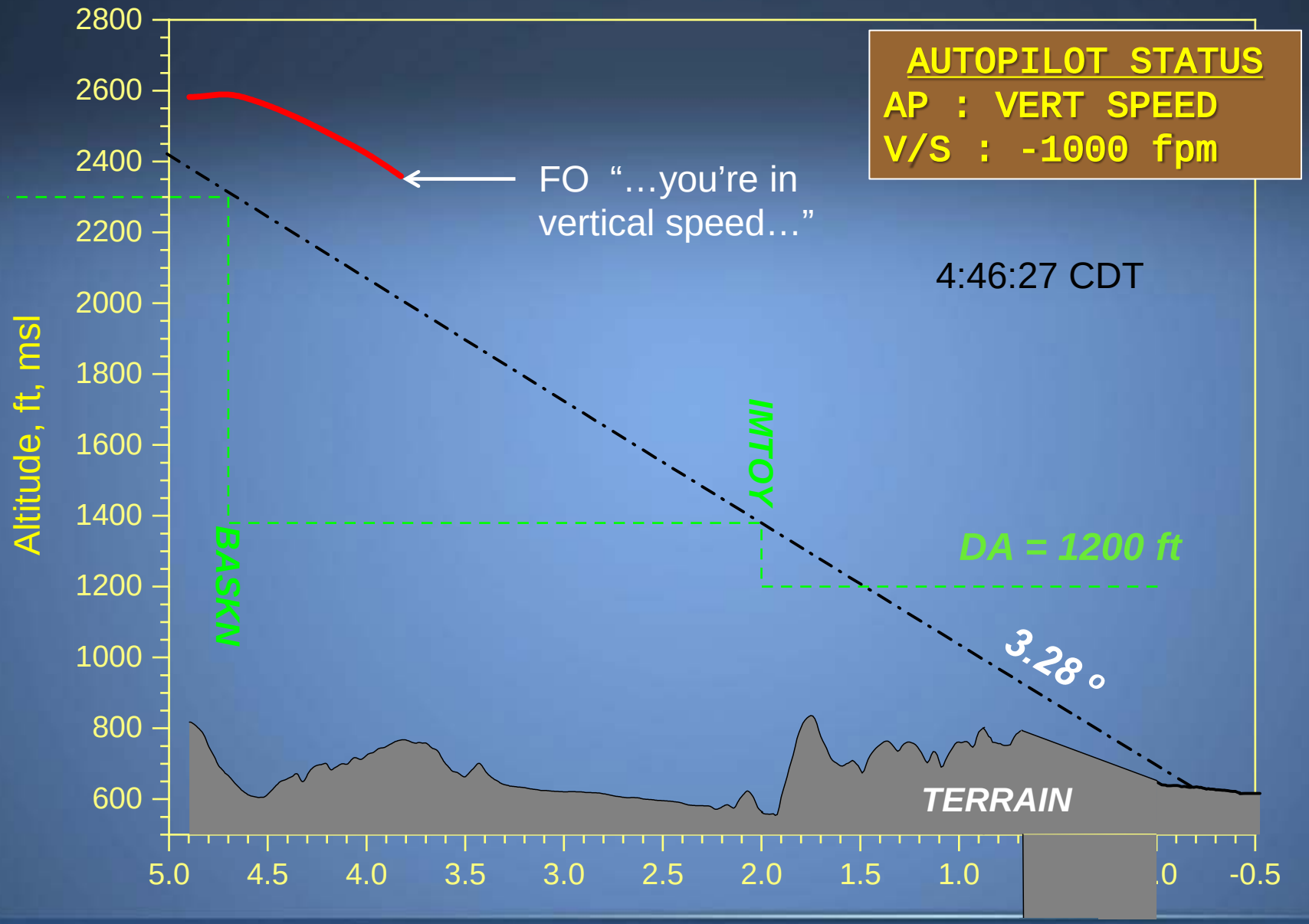
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -700 fpm
First officer completes landing checklist
4:46:17 CDT
Altitude, ft, msl
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
BASKN
IMTOY
DA = 1200 ft
3.28 °
TERRAIN
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
-0.5
Distance north of Birmingham runway 18 threshold, nm

NTSB

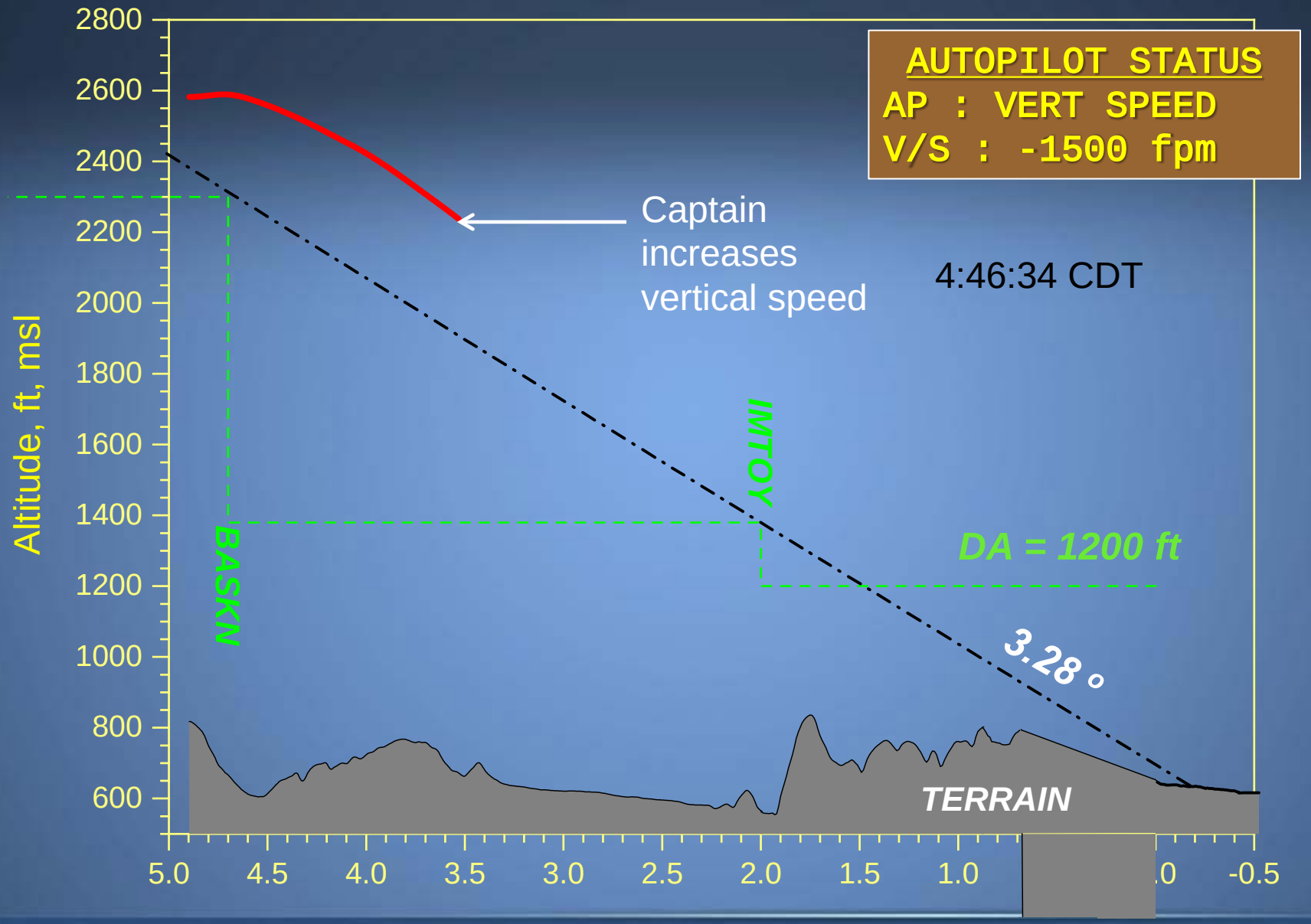

AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1000 fpm
Captain increases vertical speed
4:46:20 CDT
Altitude, ft, msl
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
BASKN
IMTOY
DA = 1200 ft
3.28 °
TERRAIN
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
-0.5
Distance north of Birmingham runway 18 threshold, nm

NTSB

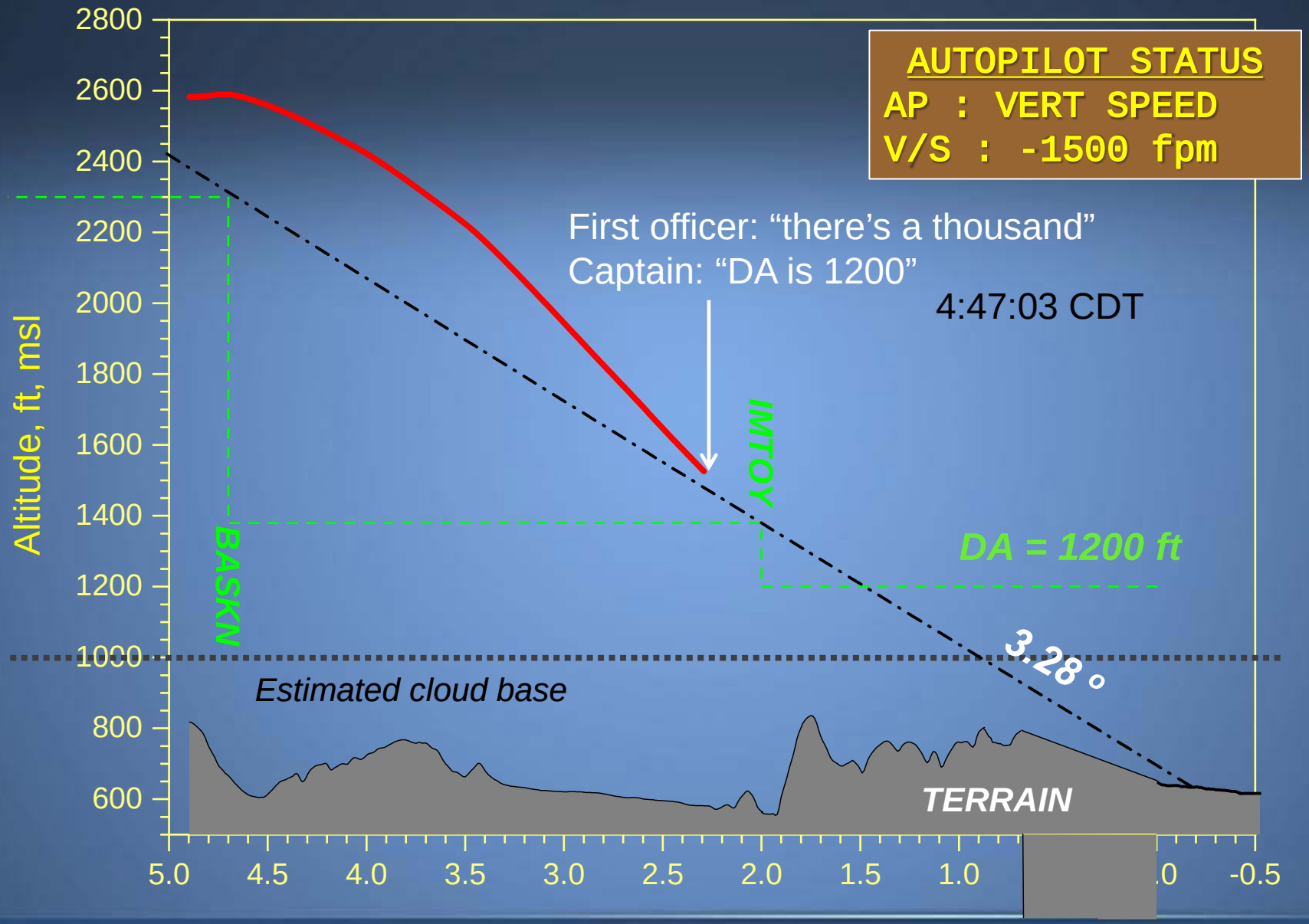


Distance north of Birmingham runway 18 threshold, nm

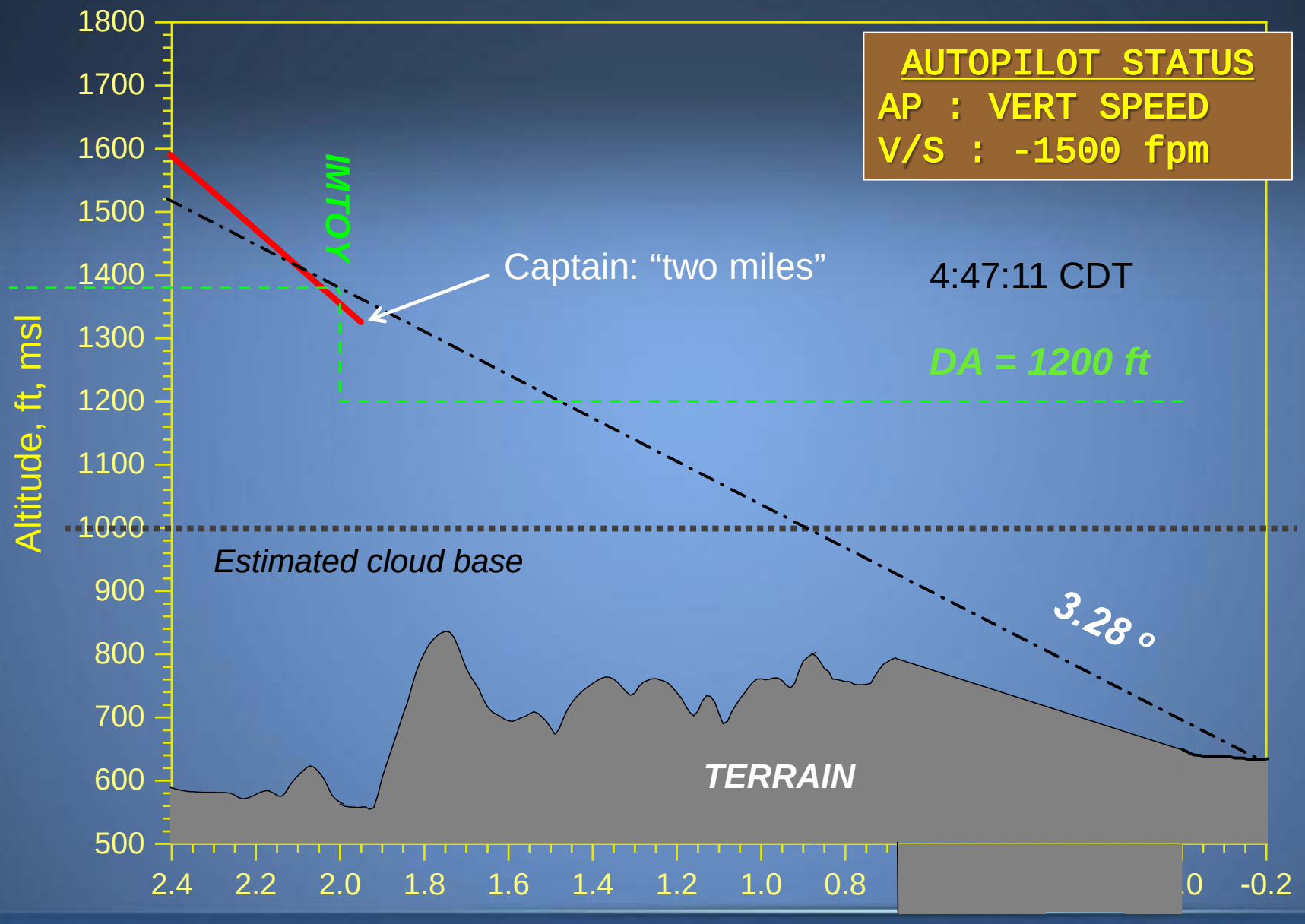
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
Captain increases vertical speed
4:46:34 CDT
IMTOY
BASKN
DA = 1200 ft
3.28 °
TERRAIN
Altitude, ft, msl
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
-0.5
Distance north of Birmingham runway 18 threshold, nm

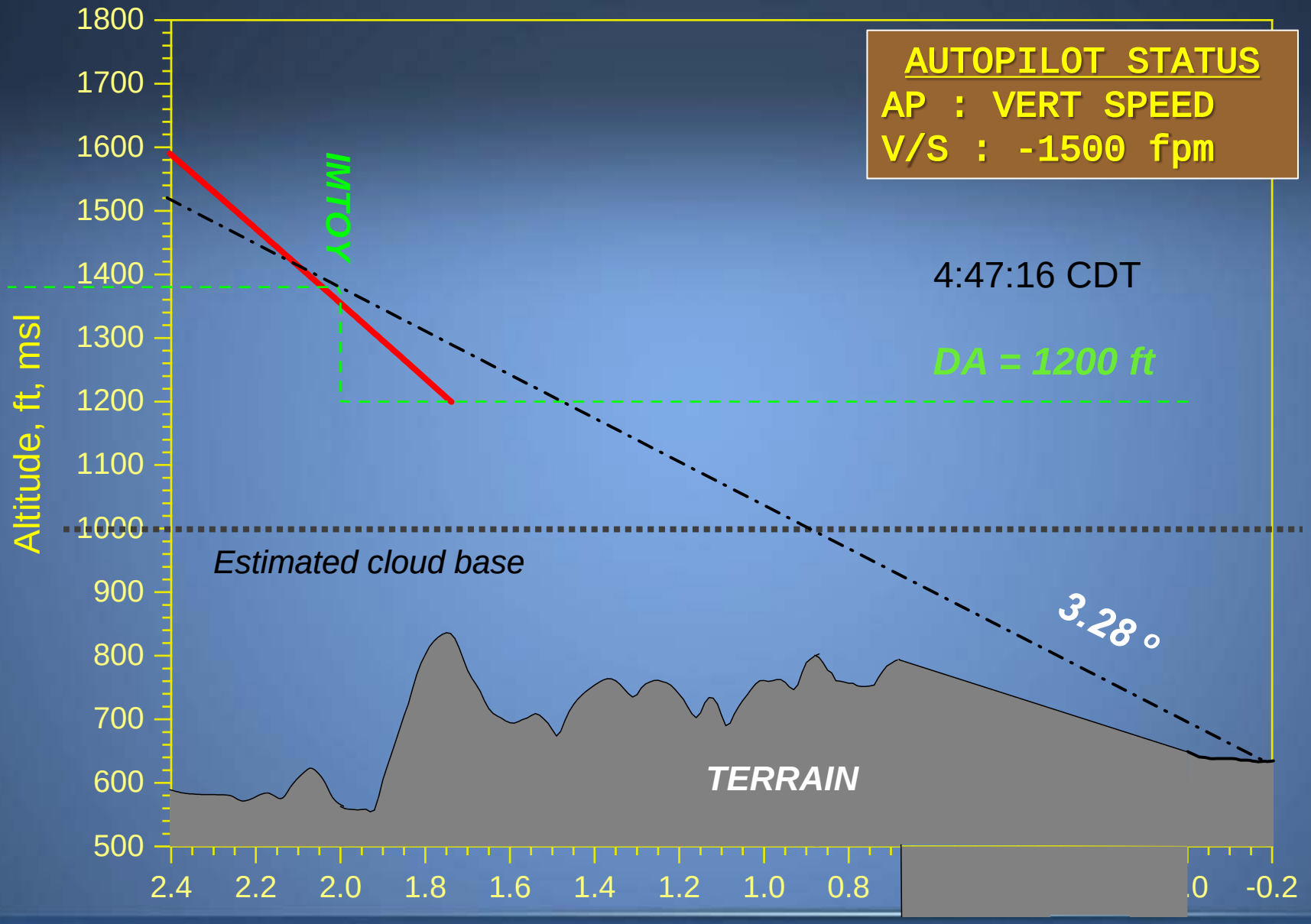
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
First officer: “there’s a thousand”
Captain: “DA is 1200”
4:47:03 CDT
IMTOY
BASKN
DA = 1200 ft
3.28 °
Estimated cloud base
TERRAIN
Altitude, ft, msl
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
-0.5
Distance north of Birmingham runway 18 threshold, nm

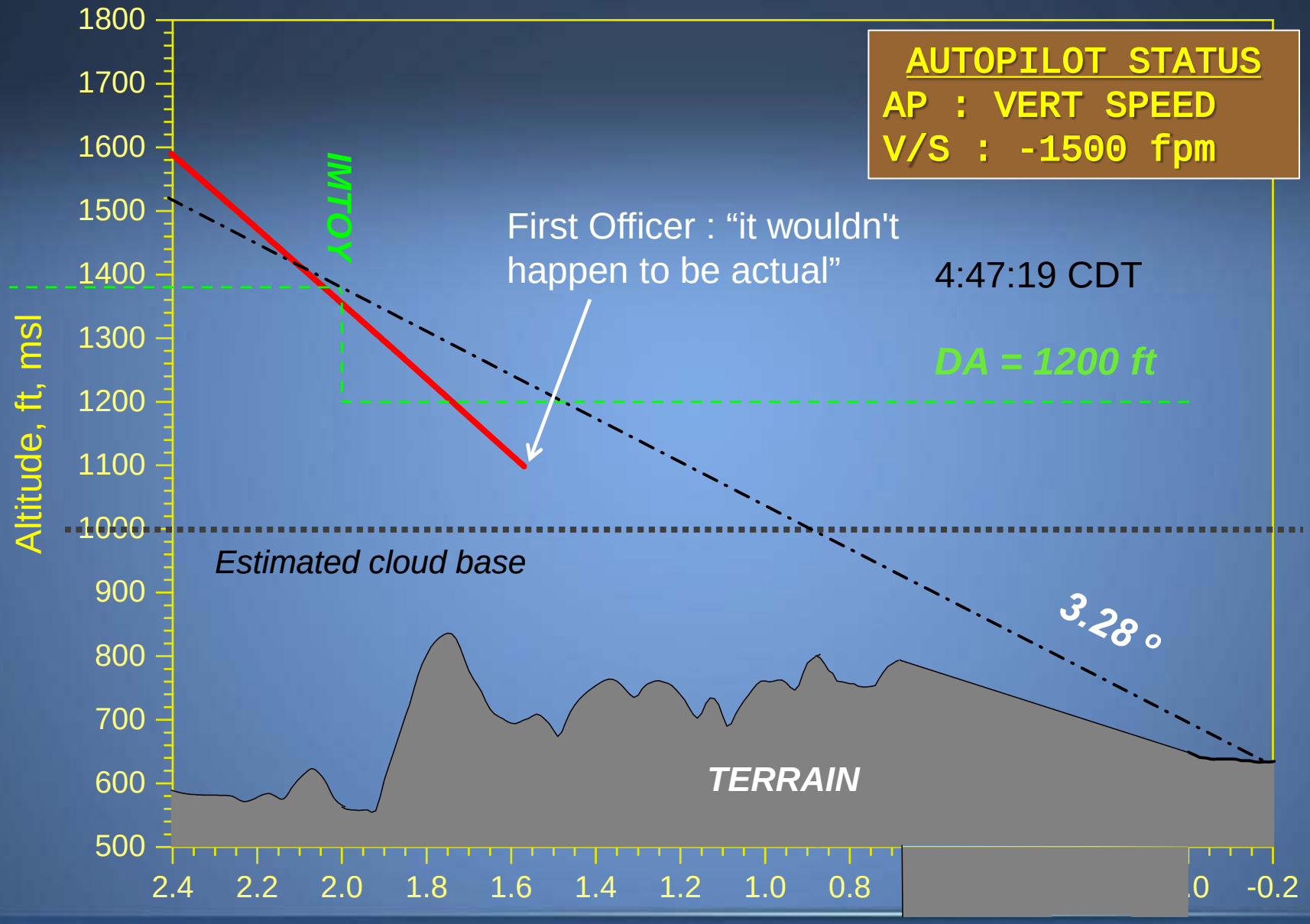
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
IMTOY
Captain: "two miles"
4:47:11 CDT
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

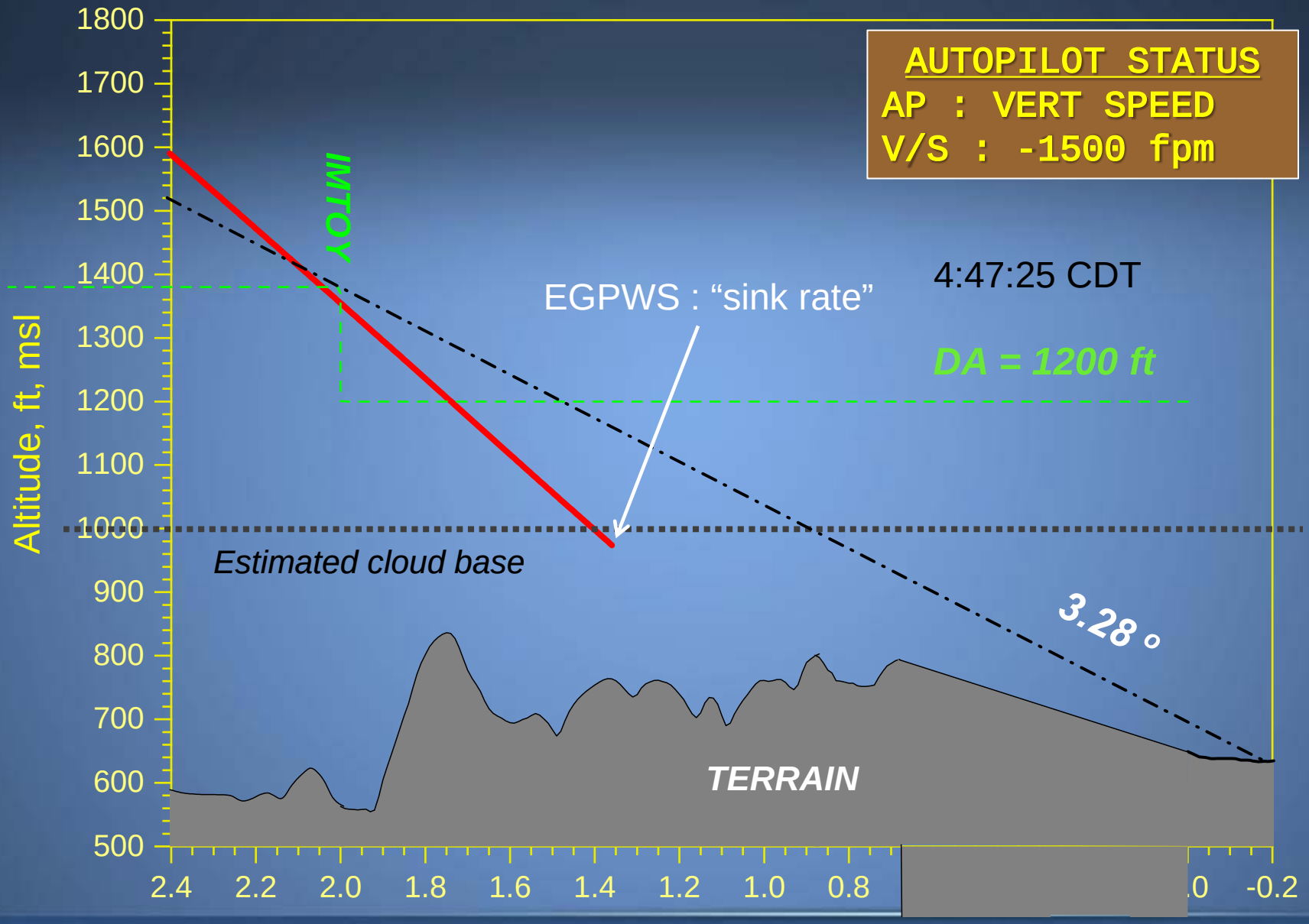
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
IMTOY
4:47:16 CDT
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

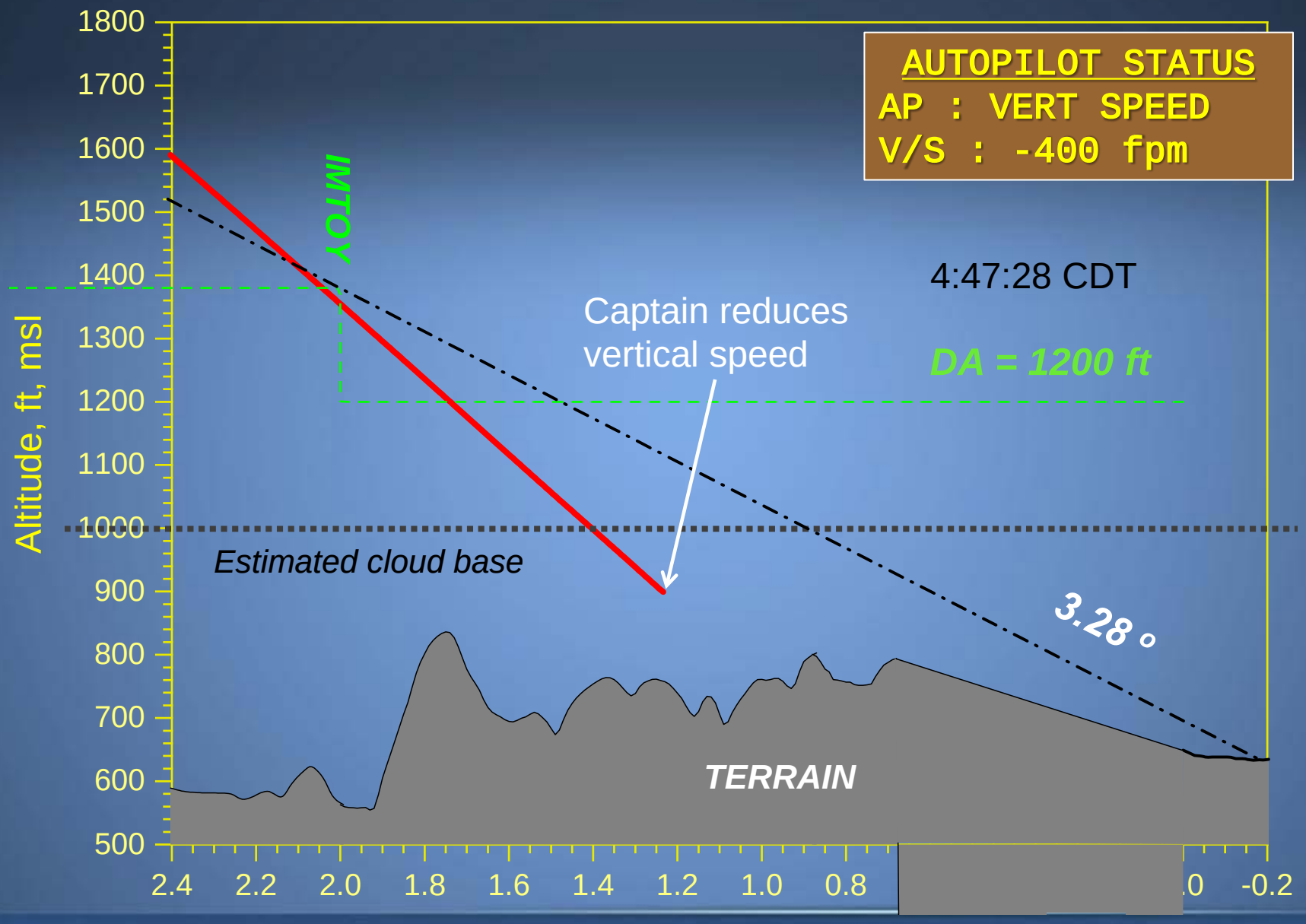
NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
IMTOY
First Officer : "it wouldn't happen to be actual"
4:47:19 CDT
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -1500 fpm
IMTOY
4:47:25 CDT
EGPWS : "sink rate"
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

NTSB


AUTOPILOT STATUS
AP : VERT SPEED
V/S : -400 fpm
4:47:28 CDT
IMTOY
Captain reduces vertical speed
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

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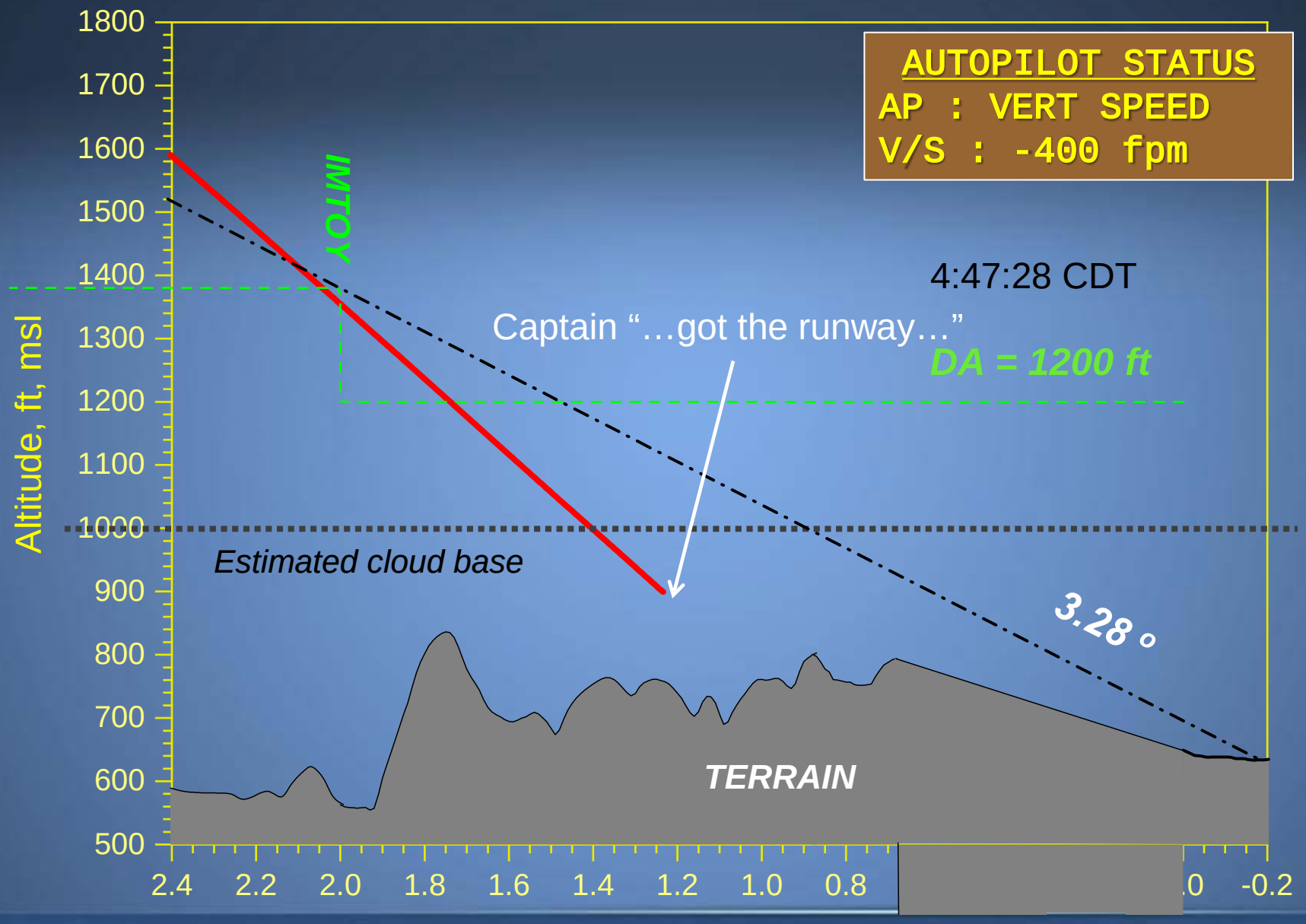
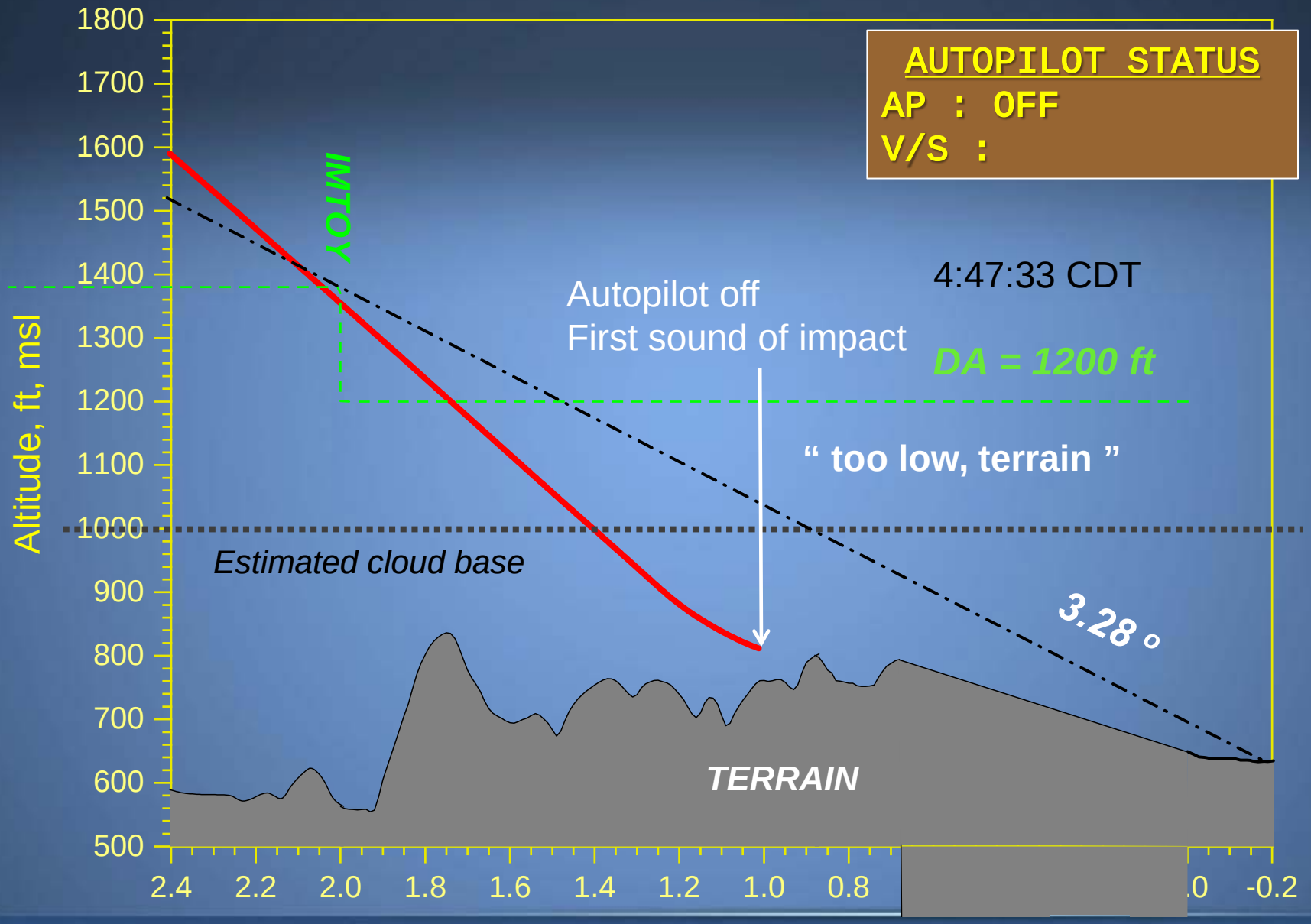

AUTOPILOT STATUS
AP : VERT SPEED
V/S : -400 fpm
IMTOY
4:47:28 CDT
Captain "…got the runway…"
DA = 1200 ft
Estimated cloud base
3.28 °
TERRAIN
Altitude, ft, msl
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
-0.2
Distance north of Birmingham runway 18 threshold, nm

NTSB



Distance north of Birmingham runway 18 threshold, nm

NTSB

runway 18 threshold
aft fuselage
engines and forward fuselage
rising terrain
ground contact
Tree strikes

Surveillance Video Still

Safety Issues

- Dispatch of accident flight
- Relevant weather information
- Flight crew communication
- Execution of nonprecision approaches
- Adherence to standard operating procedures

Safety Issues

- Flight crew monitoring
- Fatigue
- Off-duty time management
- Terrain awareness and warning system alerts

Parties to the Investigation

- Federal Aviation Administration
- Pratt and Whitney
- Honeywell
- Birmingham Airport Authority
- International Brotherhood of Teamsters
- Transport Workers Union

ICAO Annex 13 Participants

- Accredited Representative
  - Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA)
- Technical Advisors to BEA
  - Airbus
  - European Aviation Safety Agency

National Transportation Safety Board