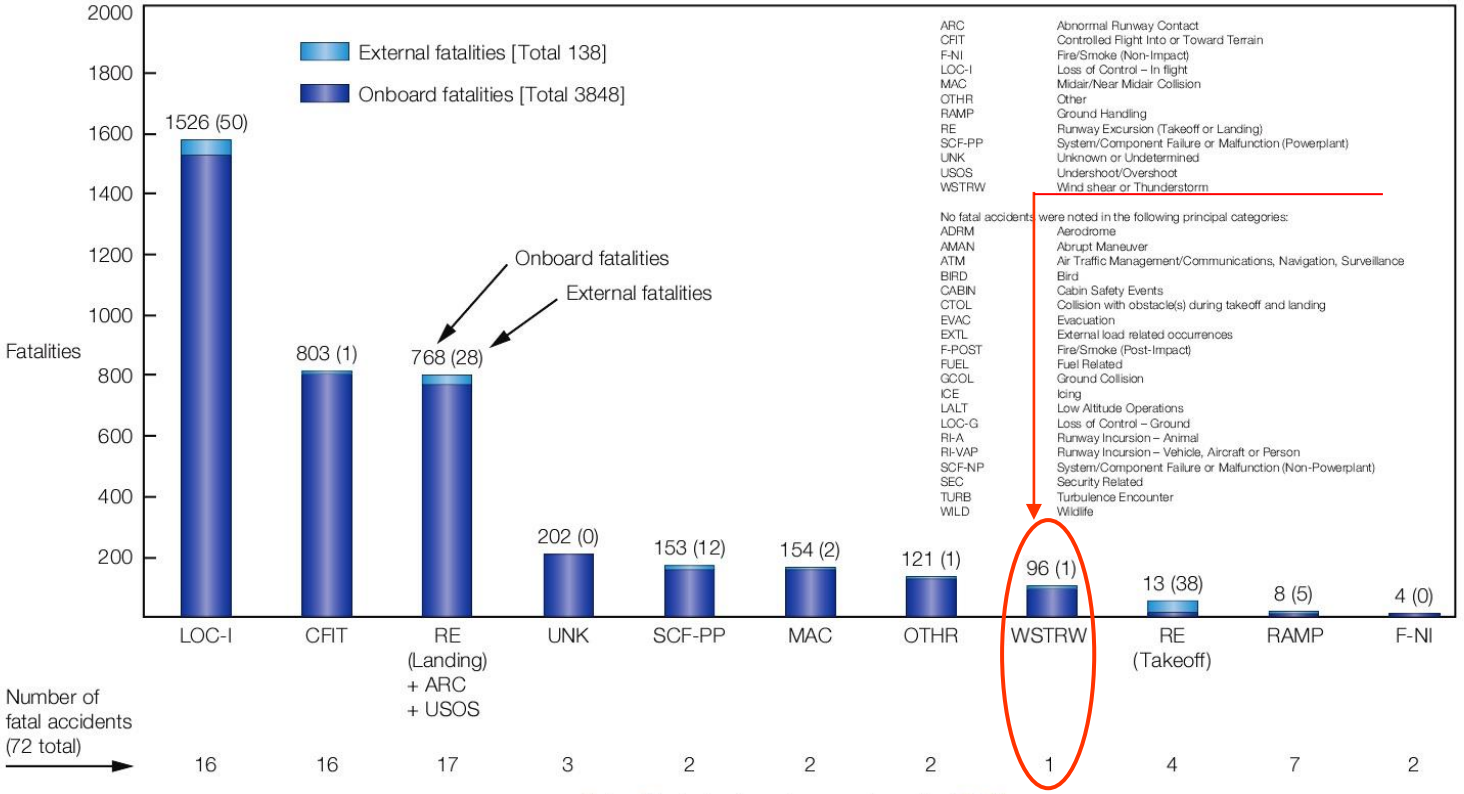
WSTRW Wind Shear or Thunderstorm

Fatalities by CICTT Aviation Occurrence Categories

Fatal Accidents | Worldwide Commercial Jet Fleet | 2004 through 2013

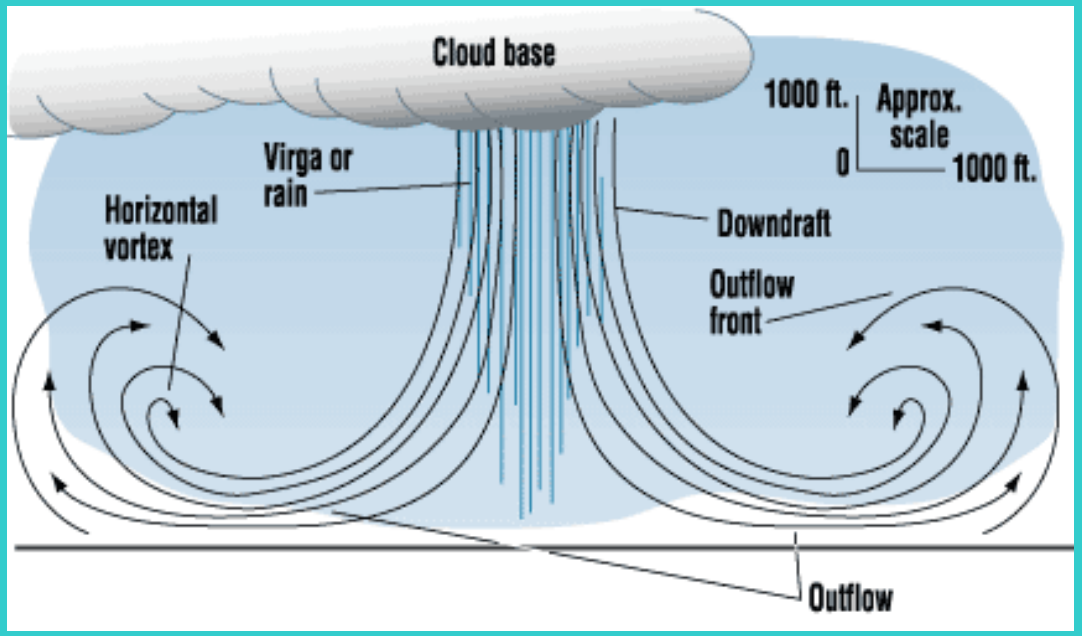


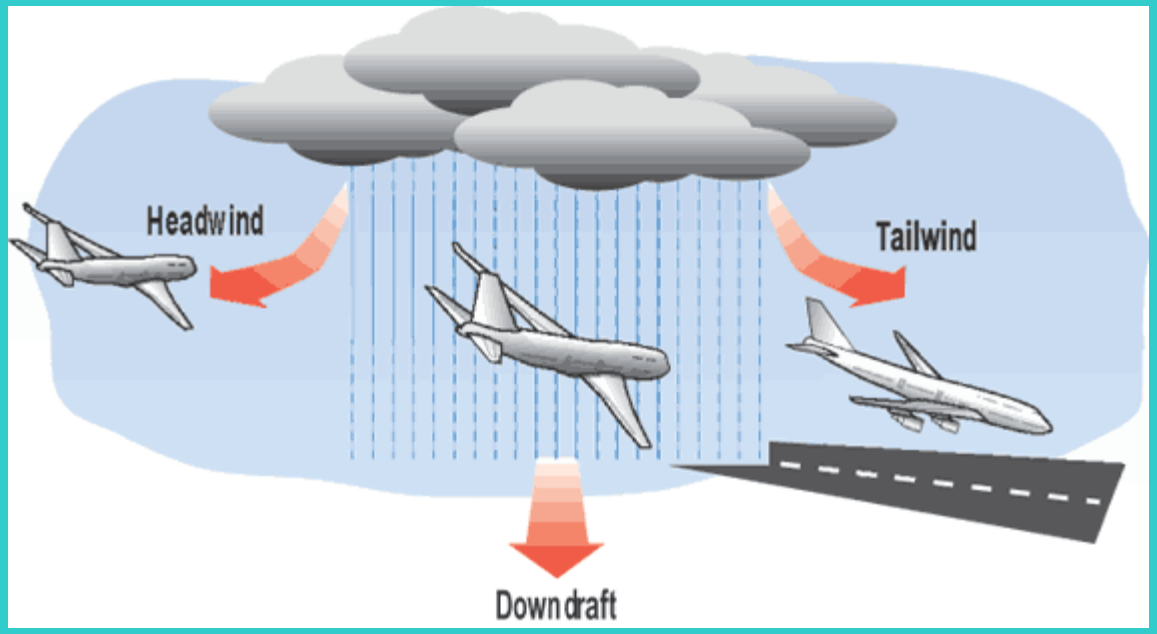
Note: Principal categories as assigned by CAST.

For a complete description of CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories go to http://www.intlaviationstandards.org/

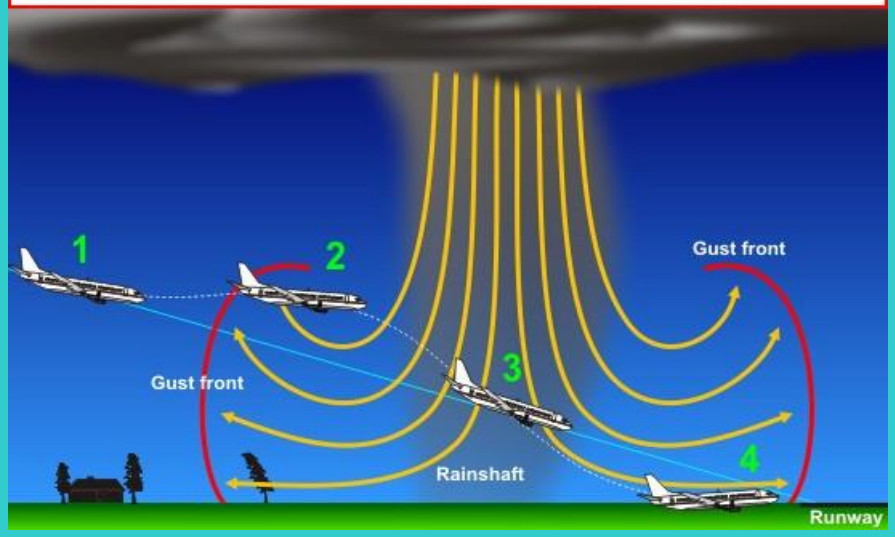
Wind Shear

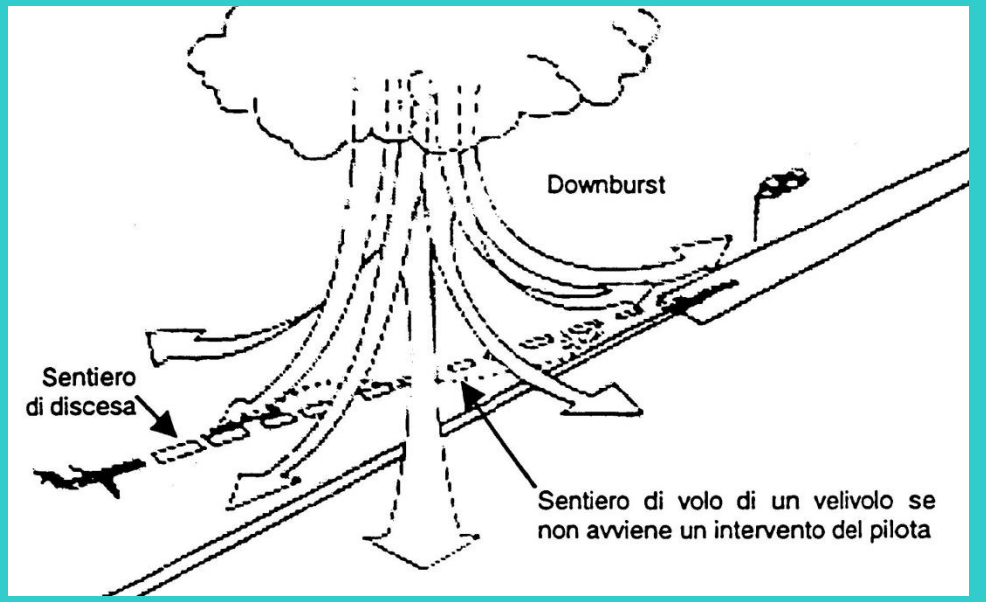
E’ un qualunque cambiamento della direzione ed intensità del vento con un elevato gradiente. Esso può essere provocato dall’orografia o da fenomeni meteorologici come nel caso tipico dei microburst in Nord America.


Cloud base
1000 ft.
Approx. scale
0
1000 ft.
Virga or rain
Horizontal vortex
Downdraft
Outflow front
Outflow

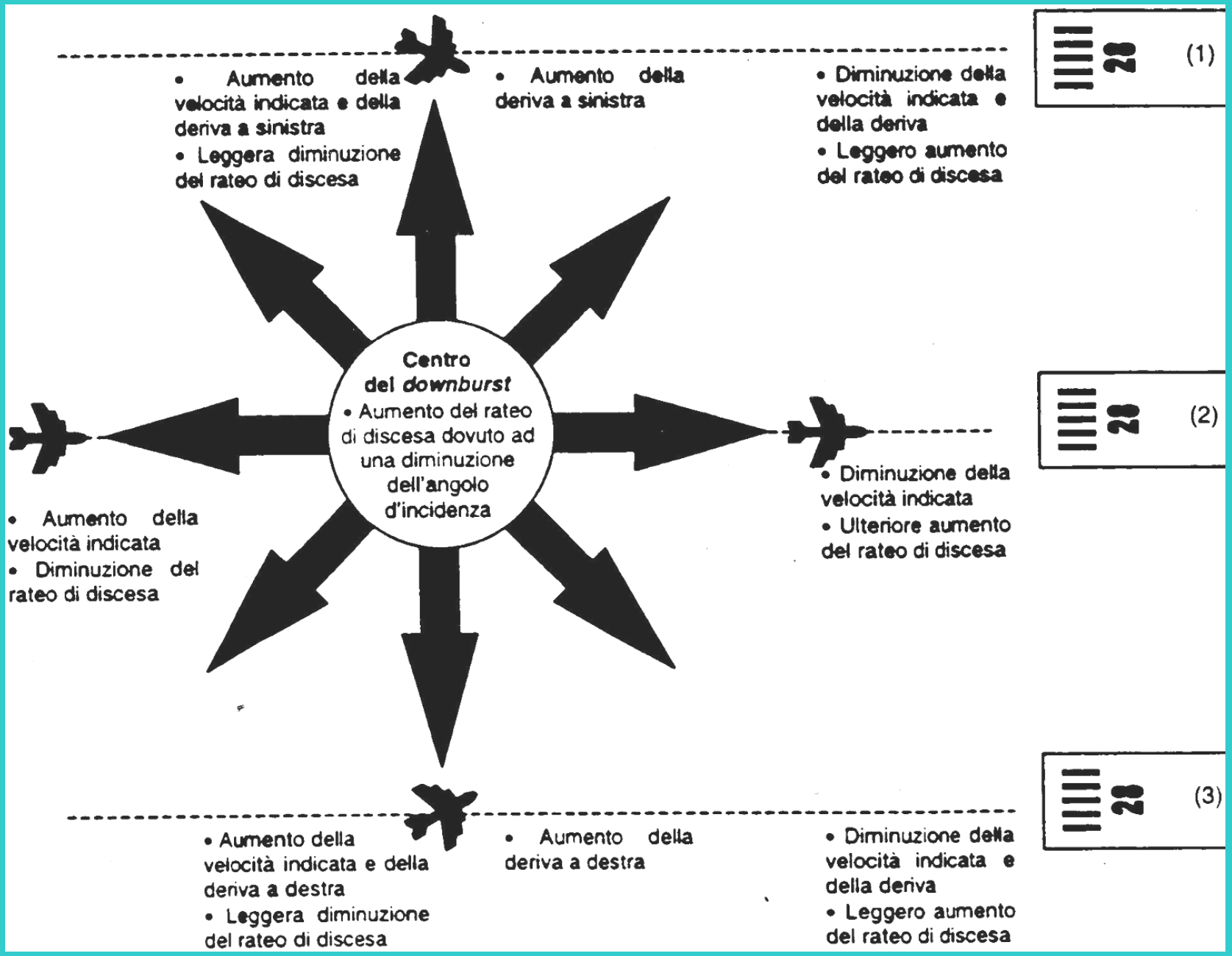

Headwind
Tailwind
Downdraft

Le raffiche discendenti che dilagano al suolo insieme ai rovesci





Il velivolo sperimenta un continuo mutamento della velocità del vento che si tramuta in una continua variazione della portanza cui il pilota può reagire, in assenza di qualunque conoscenza del fenomeno, con manovre che aggravano la situazione.


• Aumento della velocità indicata e della deriva a sinistra
• Leggera diminuzione del rateo di discesa
• Aumento della deriva a sinistra
• Diminuzione della velocità indicata e della deriva
• Leggero aumento del rateo di discesa
Centro del *downburst*
• Aumento del rateo di discesa dovuto ad una diminuzione dell'angolo d'incidenza
• Aumento della velocità indicata
• Diminuzione del rateo di discesa
• Diminuzione della velocità indicata
• Ulteriore aumento del rateo di discesa
• Aumento della velocità indicata e della deriva a destra
• Leggera diminuzione del rateo di discesa
• Aumento della deriva a destra
• Diminuzione della velocità indicata e della deriva
• Leggero aumento del rateo di discesa
28
(1)
28
(2)
28
(3)

Sistemi di rilevamento a bordo

Radar a microonde

Le gocce di pioggia trasportate dal vento di fronte danno un eco con lunghezza d'onda minore

Le gocce di pioggia trasportate dal vento di coda danno un eco con lunghezza d'onda maggiore

LIDAR

Il LIDAR (LIght Detection And Ranging) impiega le onde di un raggio laser e sfrutta l'effetto Doppler per misurare la velocità delle particelle di aerosol o di polvere che l'aria porta con sé per segnalare i cambiamenti della velocità del vento. Le velocità del vento sono dell'ordine da 10 a 30 m/s e danno uno spostamento della frequenza da 1 a 3 MHz per laser ad anidride carbonica da 10-µm. Un sistema LIDAR, utile anche nel caso di **turbolenze in aria chiara**, può dare un preavviso sino a 10 km davanti all'aeroplano, cioè qualche diecina di secondi in termini di tempo.

Sistema agli infrarossi

Un apparato piccolo e relativamente poco costoso usato per misurare la radiazione all'infrarosso. Un sensore misura i mutamenti di temperatura di fronte all'aereo. Essi possono essere sintomo della presenza di raffiche. Si accende una spia in cabina.

Sistemi collocati al suolo

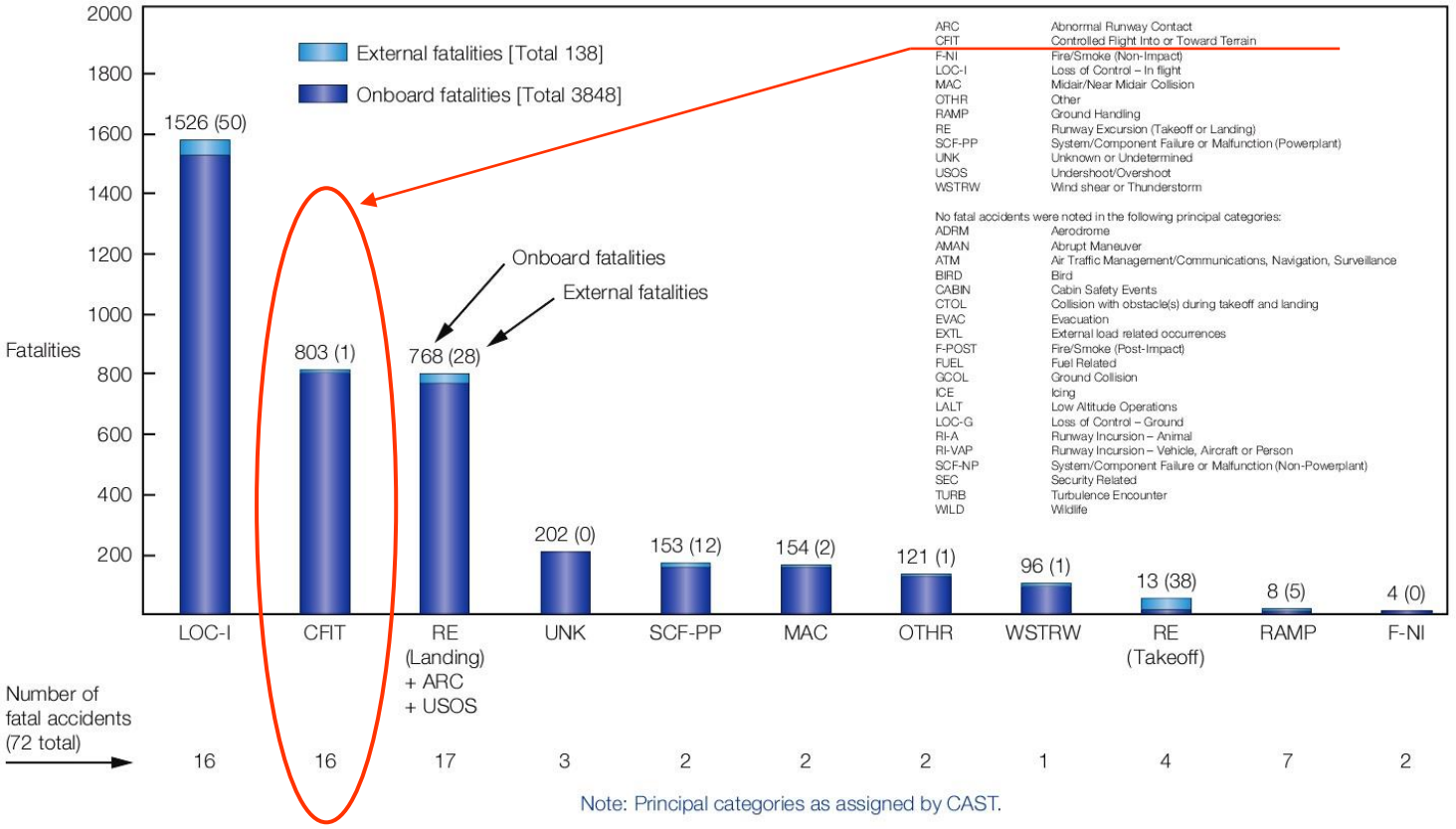
LLWAS Low Level Wind Shear Alert System
In esso si mappa, nell'ambito del sedime aeroportuale, la **direzione del vento** misurata in stazioni remote. Le informazioni vengono poi rielaborate da un sistema informatico centrale.

TDWR Terminal Doppler Weather Radar
Vengono prodotti avvisi comunicati ai piloti assieme ad altre informazioni meteo.

CFIT Controlled Flight Into or Toward Terrain

Fatalities by CICTT Aviation Occurrence Categories

Fatal Accidents | Worldwide Commercial Jet Fleet | 2004 through 2013



Note: Principal categories as assigned by CAST.

For a complete description of CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories go to http://www.intlaviationstandards.org/

CFIT Controlled Flight Into or Toward Terrain

Inflight collision or near collision with terrain, water, or obstacle without indication of loss of control

Usage Notes:

- CFIT is used only for occurrences during airborne phases of flight.
- CFIT includes collisions with those objects extending above the surface (for example: towers).
- CFIT can occur during either Instrument Meteorological Conditions (IMC) or Visual Meteorological Conditions (VMC).
- Includes instances when the cockpit crew is affected by visual illusions (e.g., black hole approaches) that result in the aircraft being flown under control into terrain, water, or obstacles.
- If control of the aircraft is lost (induced by crew, weather or equipment failure), do not use this category; use Loss of Control – Inflight (LOC-I) instead.
- For an occurrence involving intentional low altitude operations (e.g., crop dusting) use the Low Altitude Operations (LALT) code instead of CFIT.
- Do not use this category for occurrences involving intentional flight into/toward terrain. Code all suicides under Security Related (SEC) events.
- Do not use this category for occurrences involving runway undershoot/overshoot, which are classified as Undershoot/Overshoot (USOS).

FAA PART135

OPERATING REQUIREMENTS: COMMUTER AND ON DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

Subpart C – Aircraft and Equipment

§ 135.153 Ground proximity warning system.

(a) No person may operate a turbine-powered airplane having a passenger seat configuration of 10 seats or more, excluding any pilot seat, unless it is equipped with an approved **ground proximity warning system**.

Ground Proximity Warning System

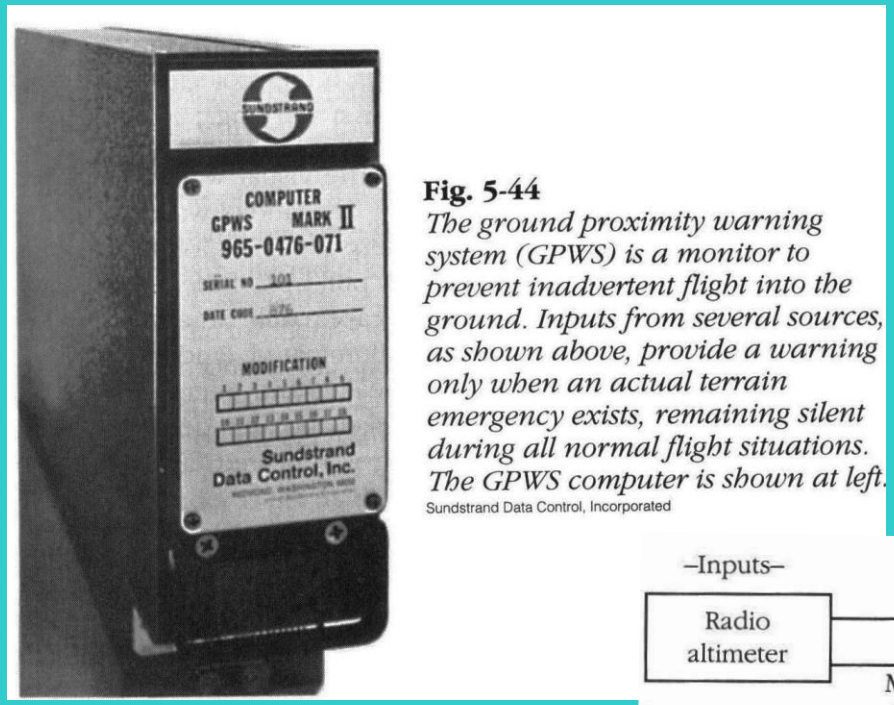
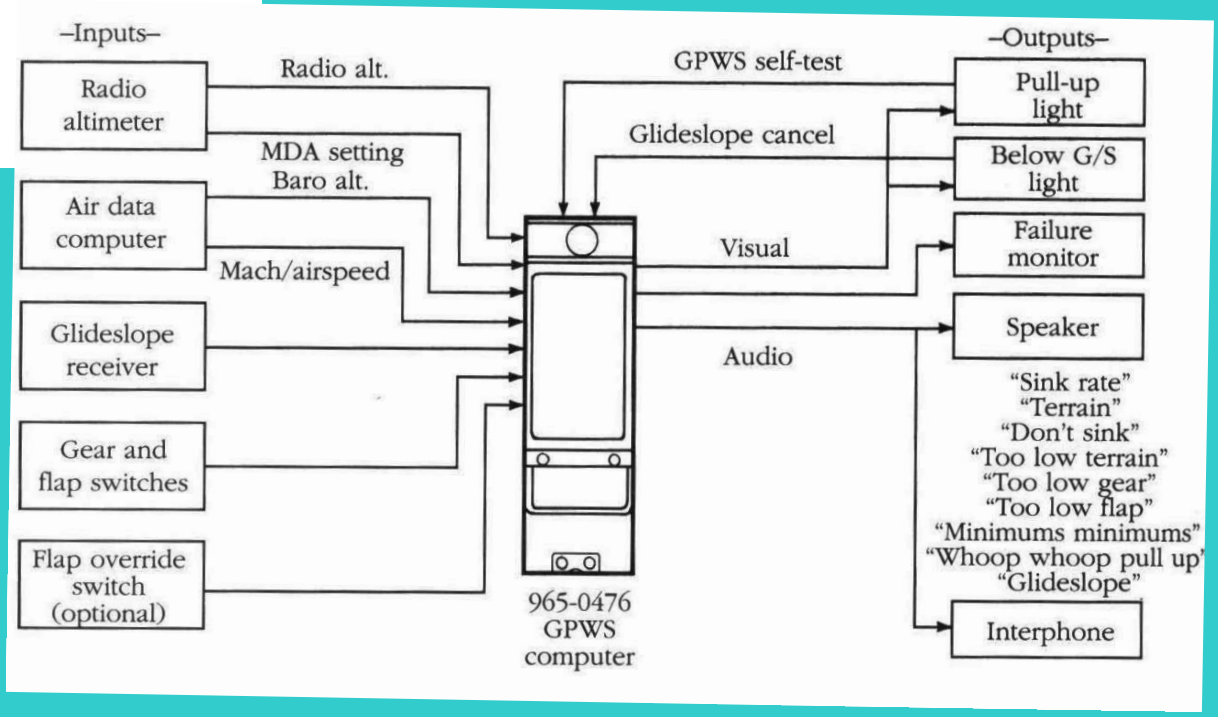


Fig. 5-44
The ground proximity warning system (GPWS) is a monitor to prevent inadvertent flight into the ground. Inputs from several sources, as shown above, provide a warning only when an actual terrain emergency exists, remaining silent during all normal flight situations. The GPWS computer is shown at left.
Sundstrand Data Control, Incorporated



MDA = Minimum Descent Altitude
G/S = Glide Slope

Enhanced Ground Proximity Warning System
Terrain Awareness and Warning System

Mode 1
Excessive rates of descent

Mode 2
Excessive closure rate to terrain

Mode 3
Negative climb rate or altitude loss after take off

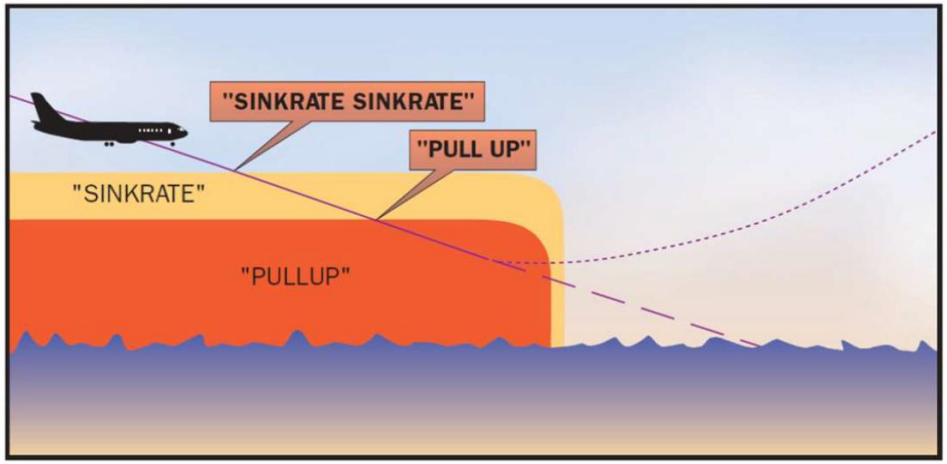
Mode 4
Flight into terrain when not in landing configuration

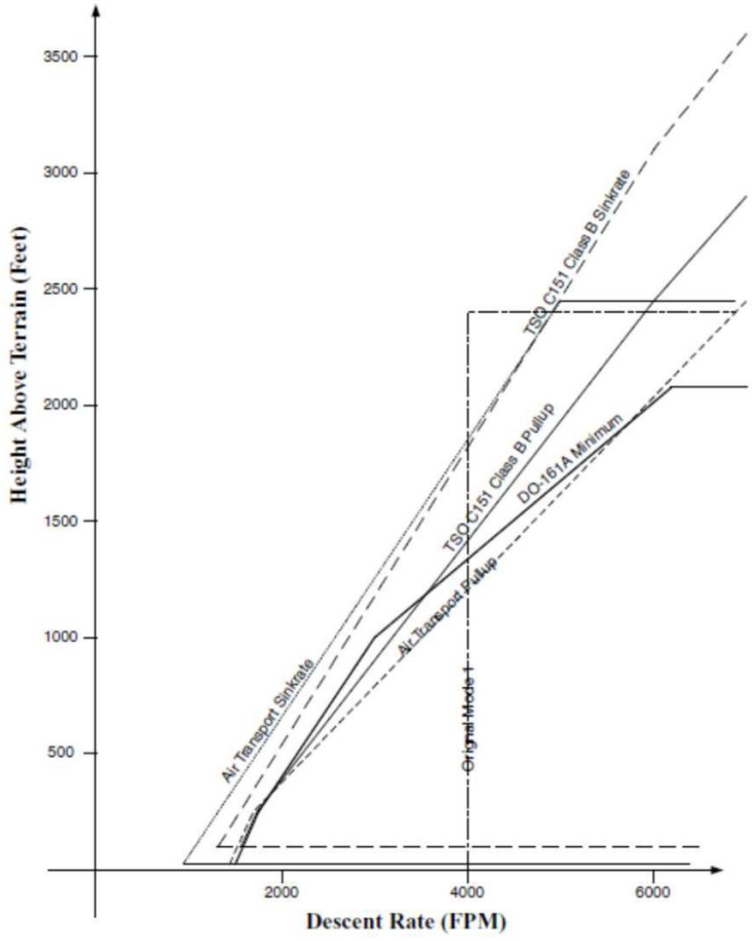
Mode 5
Excessive downward deviation from an ILS (Instrument Landing System) glideslope

A Forward Looking Terrain Avoidance (FLTA) function
The FLTA function looks ahead of the aircraft along and below the aircraft lateral and vertical flight path and provides suitable alerts if a potential terrain threat exists. The FLTA function on the T2CAS is based on a worldwide terrain database.

A Premature Descent Alert (PDA) function
The PDA function of the TAWS uses the aircraft's current position and flight path information, determined from a suitable navigation source and airport database, to determine if the aircraft is hazardously below the normal approach path for the nearest runway as defined by the alerting algorithm, visual and aural discretes signal for both caution and warning alerts, (a specific visual and aural discrete signal is sent to the flight crew for each type of alert, either caution or warning).

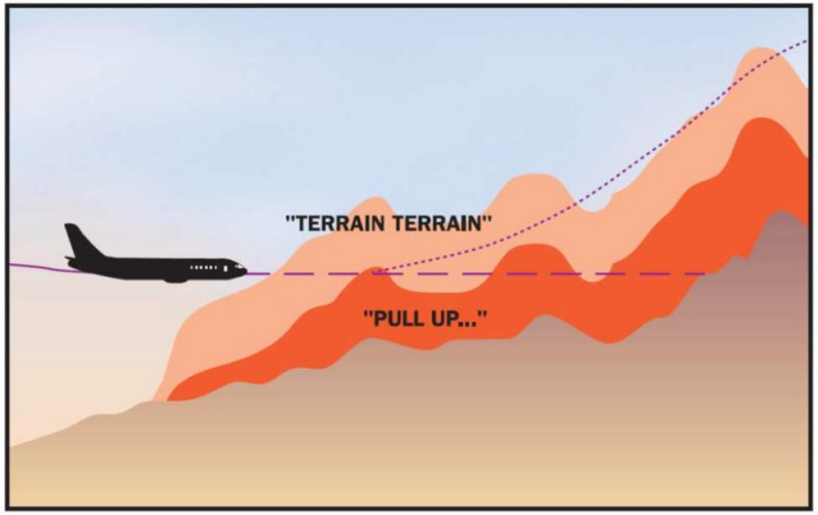
Mode 1 – Excessive descent rate

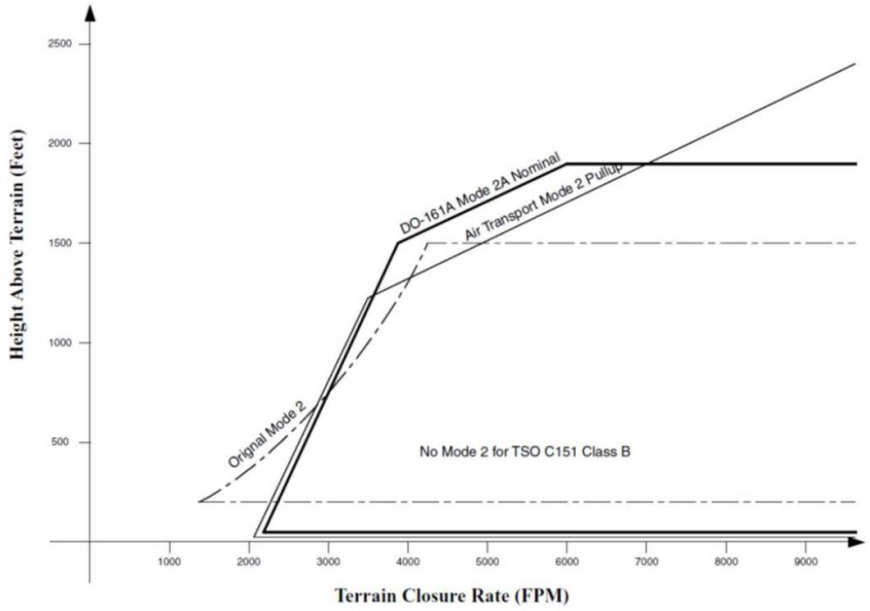




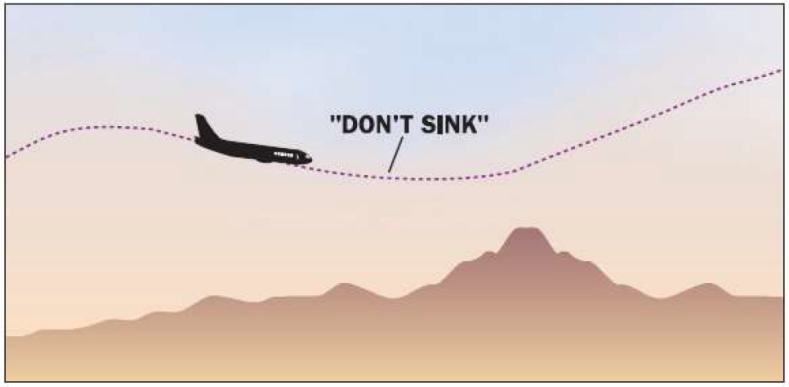
RADIOLOCATION

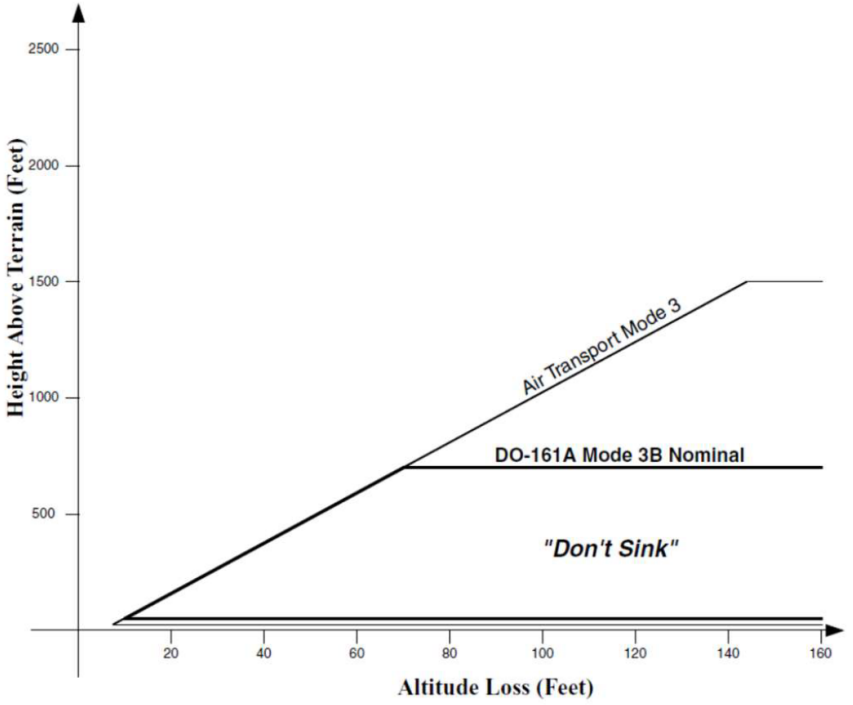
Mode 2 – Excessive Closure Rate





Mode 3 – Accelerating Flight Path Back into the Terrain after Take-off

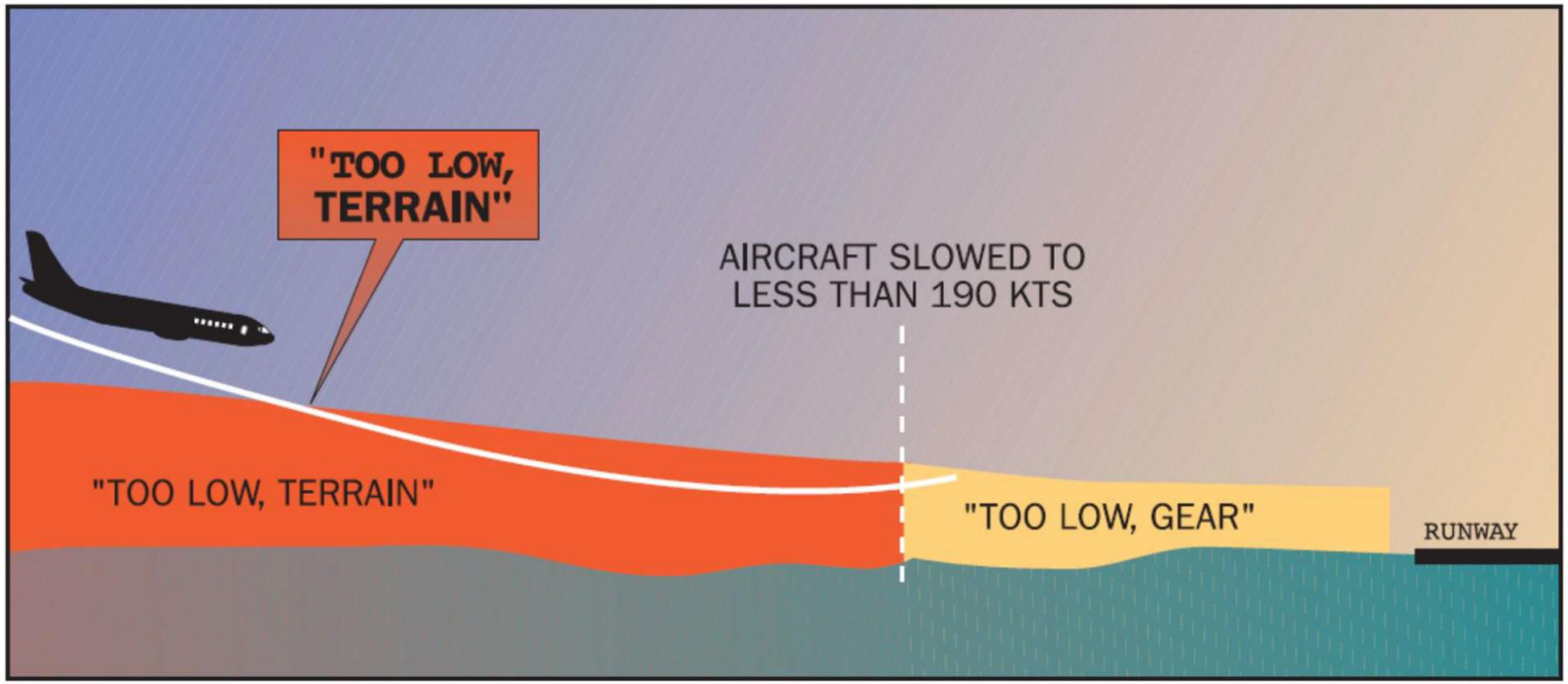




Mode 4 – Unsafe Terrain Clearance Based on Aircraft Configuration

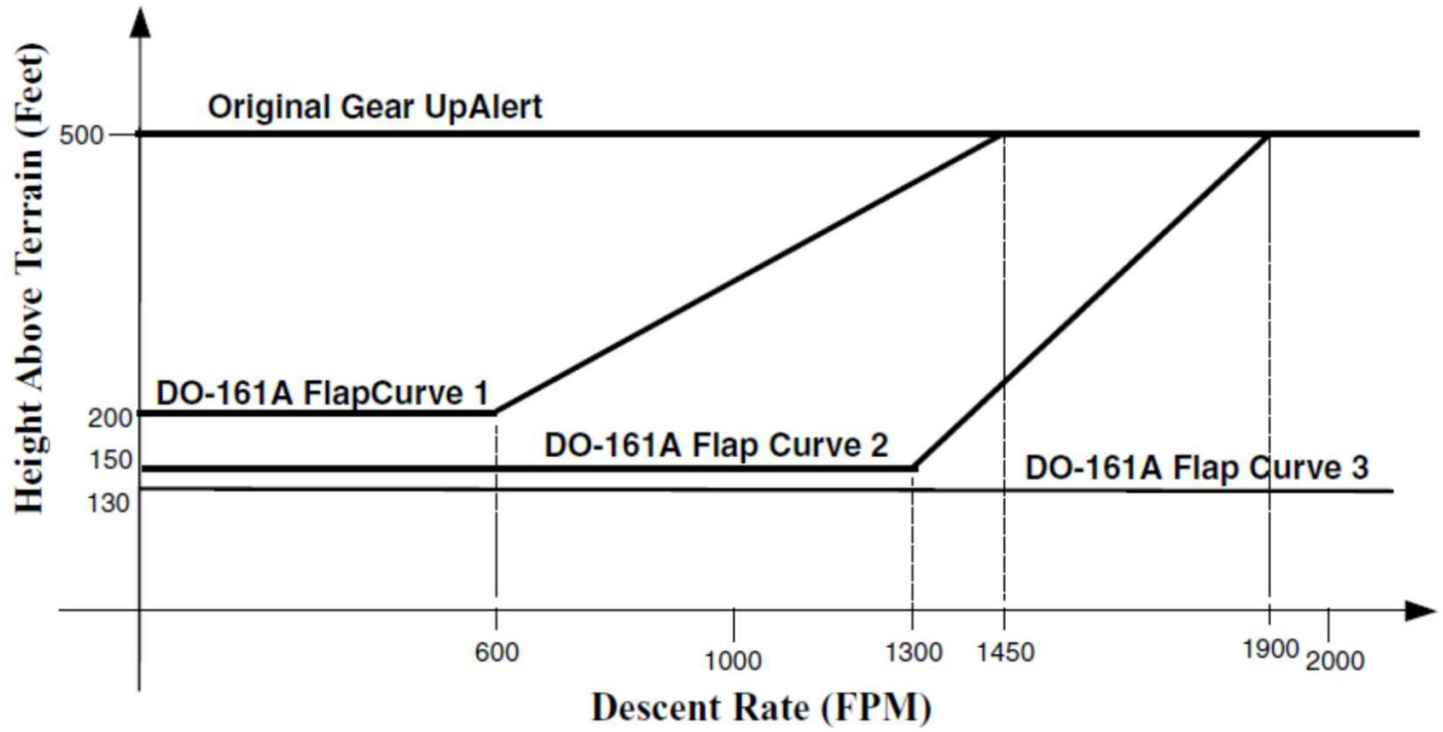
- Three types of warnings:
  - Mode 4A: TOO LOW GEAR
    - In terms of the altitude AGL.
  - Mode 4B: TOO LOW FLAPS
    - Depending of the airspeed (Mach).
  - Mode 4C: TOO LOW TERRAIN
    - Depending of the aircraft configuration (Flaps, etc.)

Mode 4A – Unsafe Terrain Clearance Based on Aircraft Configuration

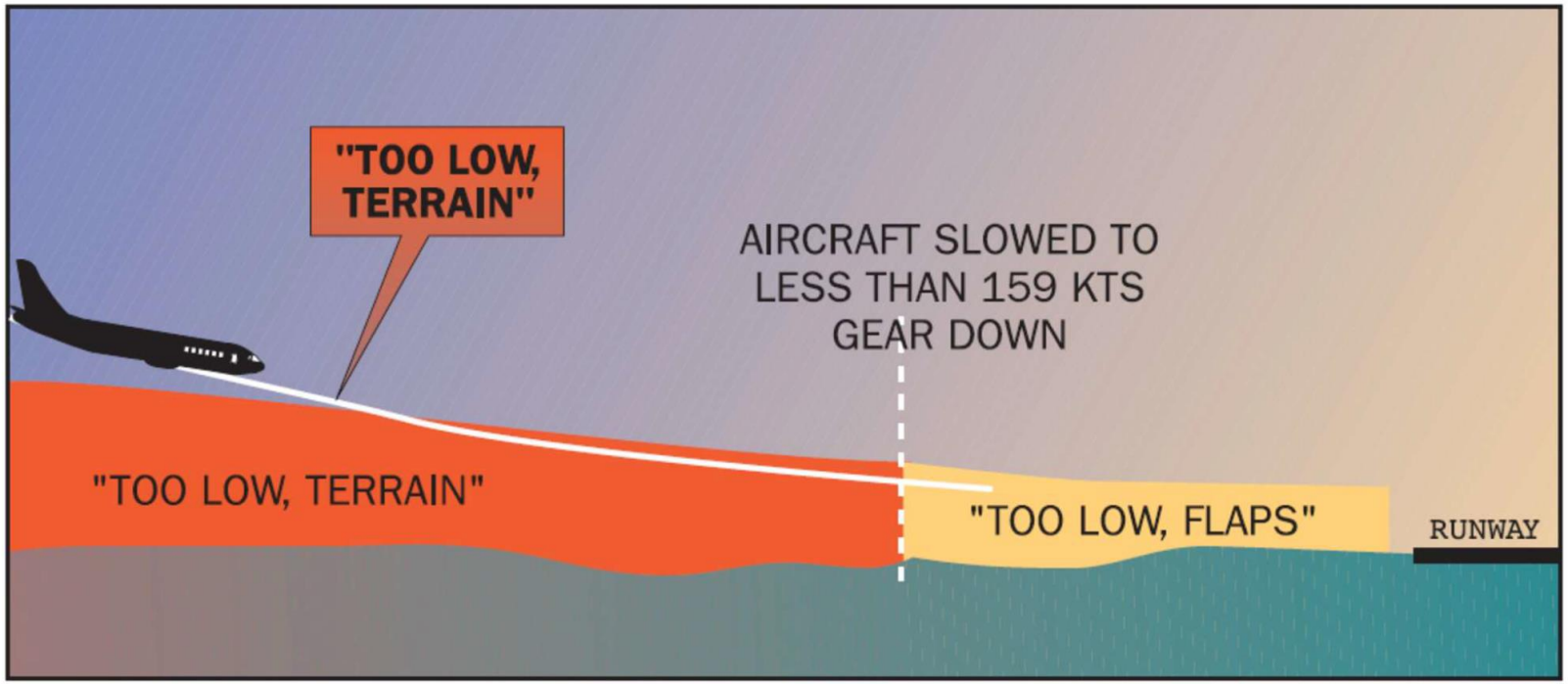


Mode 4 – Unsafe Terrain Clearance Based on Aircraft Configuration

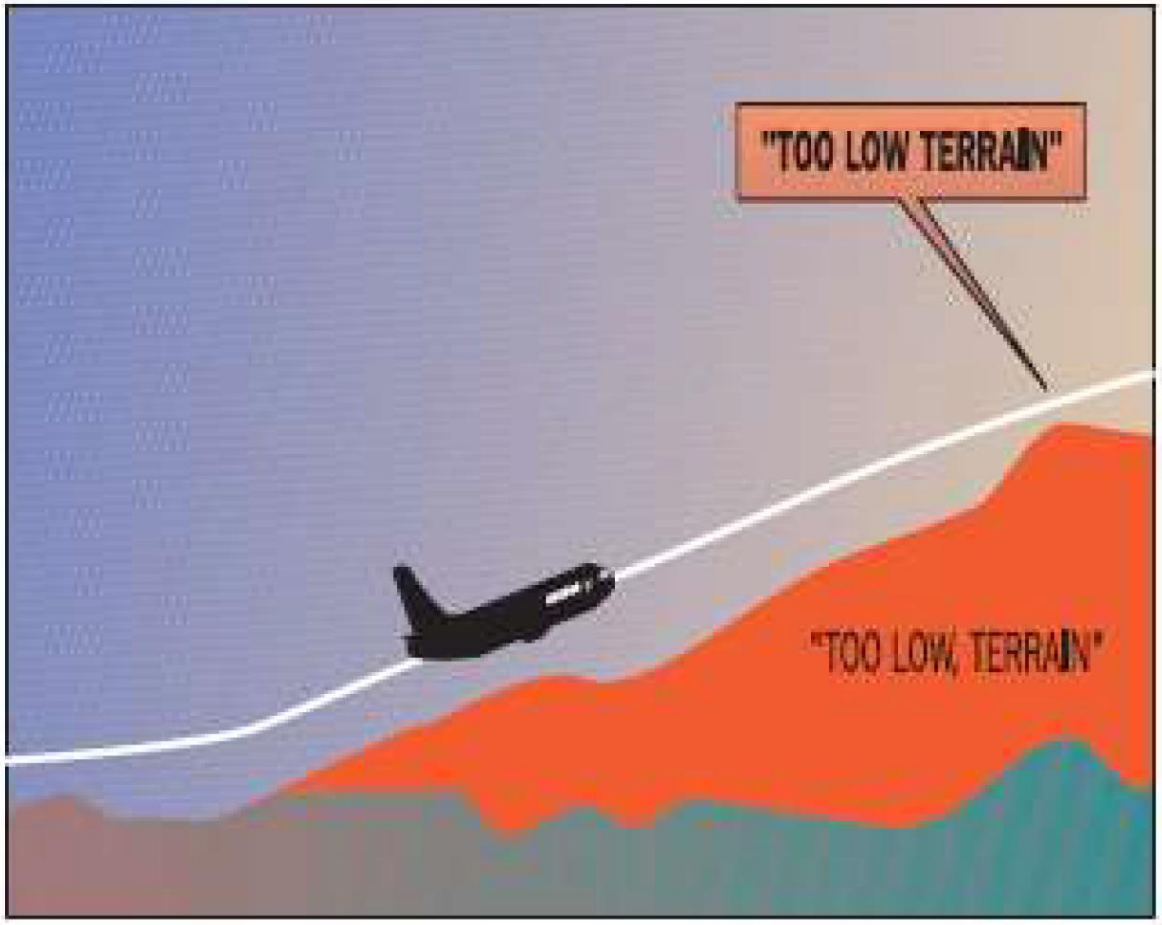
Old GWPS mode 4



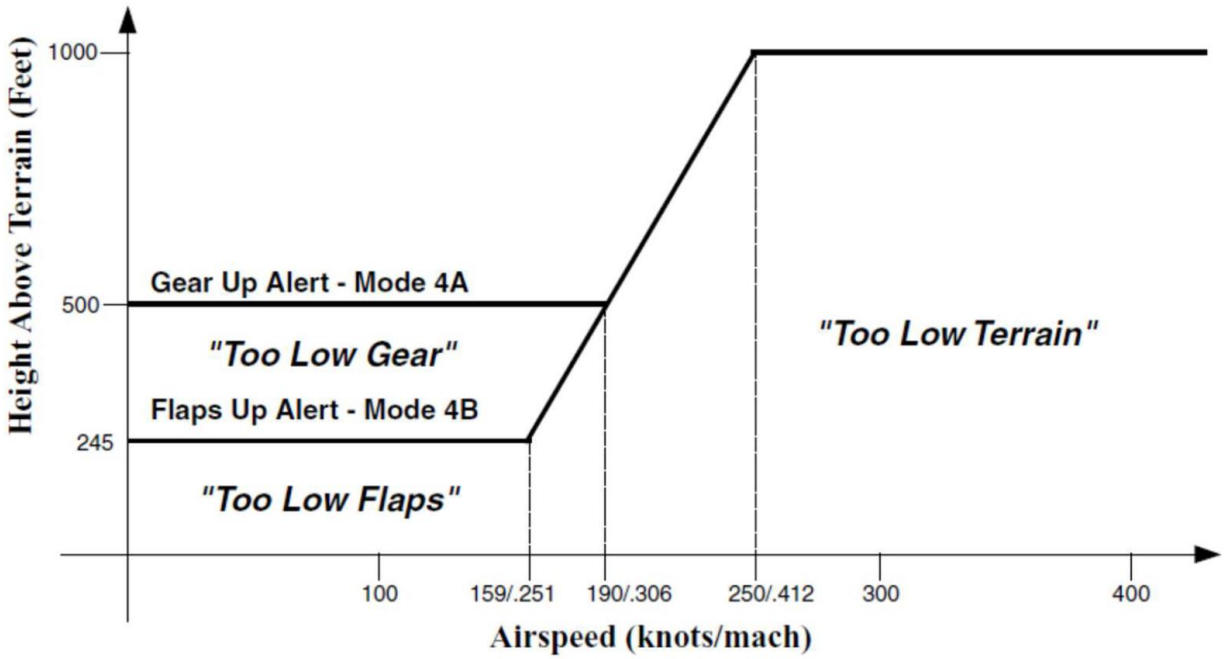
Mode 4B


"TOO LOW, TERRAIN"
AIRCRAFT SLOWED TO LESS THAN 159 KTS GEAR DOWN
"TOO LOW, TERRAIN"
"TOO LOW, FLAPS"
RUNWAY

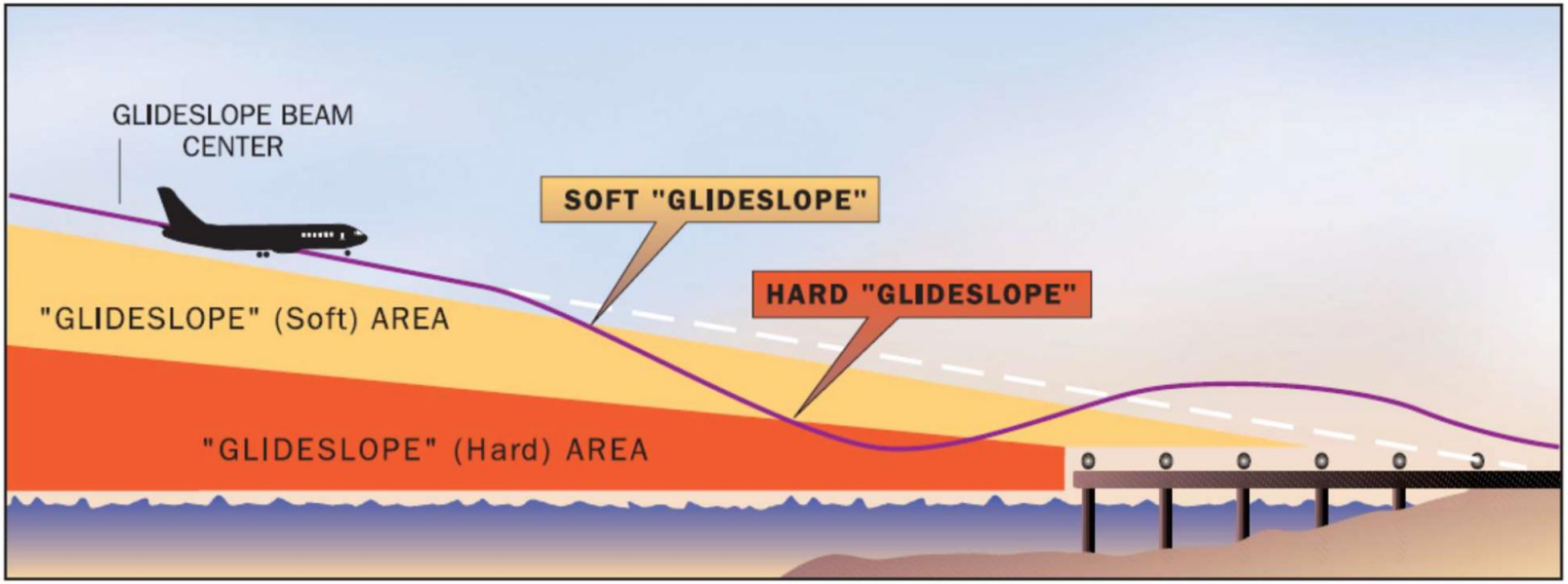
Mode 4C



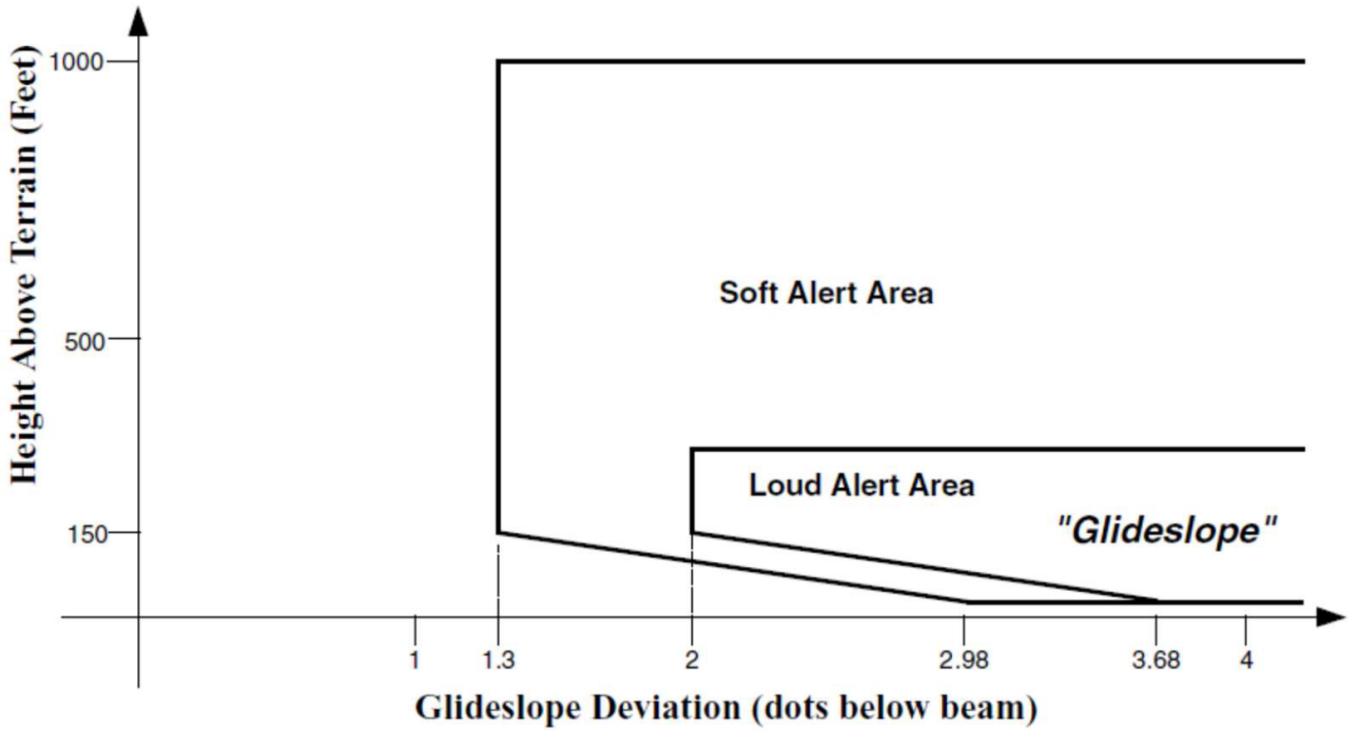
Mode 4 – Unsafe Terrain Clearance Based on Aircraft Configuration



Mode 5 – Significant Descent Below the ILS Landing Glide Path Approach Aid



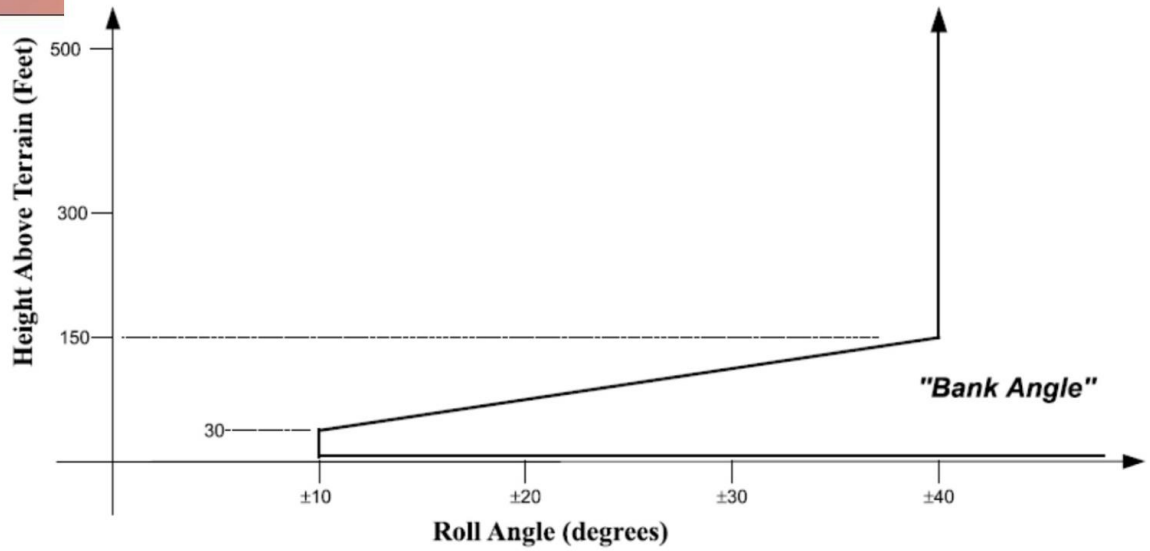
Mode 5 – Significant Descent Below the ILS Landing Glide Path Approach Aid



Mode 6 – Miscellaneous Callouts and Advisories

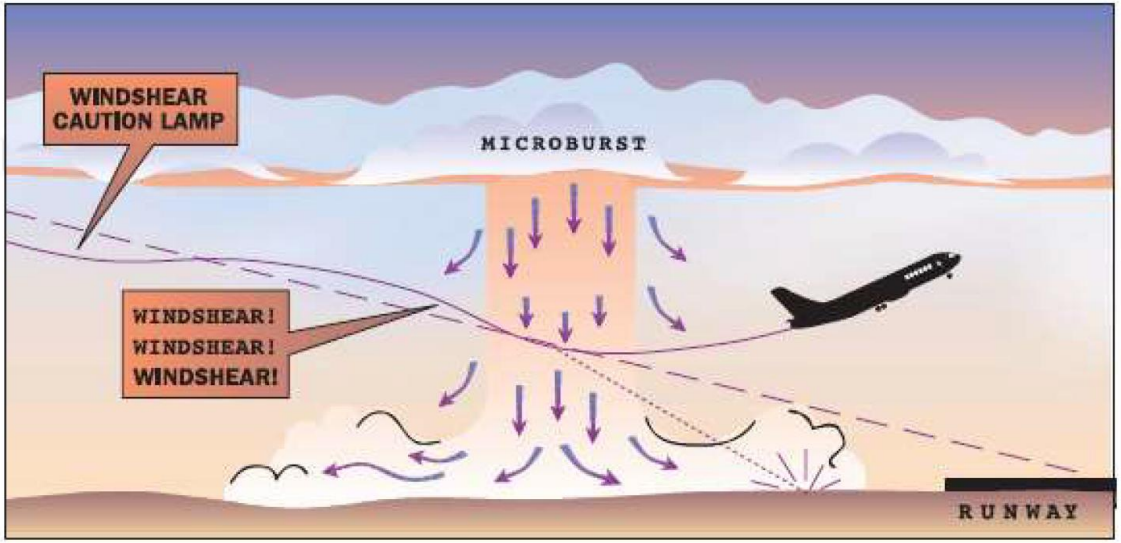
Callout Voice	Description
Radio Altimeter	Activates at 2500 feet as radio altimeter comes into track
Twenty five hundred	(alternate to Radio Altimeter)
One Thousand	Activates at 1000 feet AGL
Five Hundred (smart)	Activates at 500 feet AGL for non-precision approaches only
One Hundred	Activates at 100 feet AGL
Fifty	50 feet AGL
Forty	40 feet AGL
Thirty	30 feet AGL
Twenty	20 feet AGL
Ten	10 feet AGL
Approaching Minimums	100 feet above the selected decision height
Minimums	At pilot selected decision height – may be AGL or barometric
Decision Height	(alternate to Minimums)

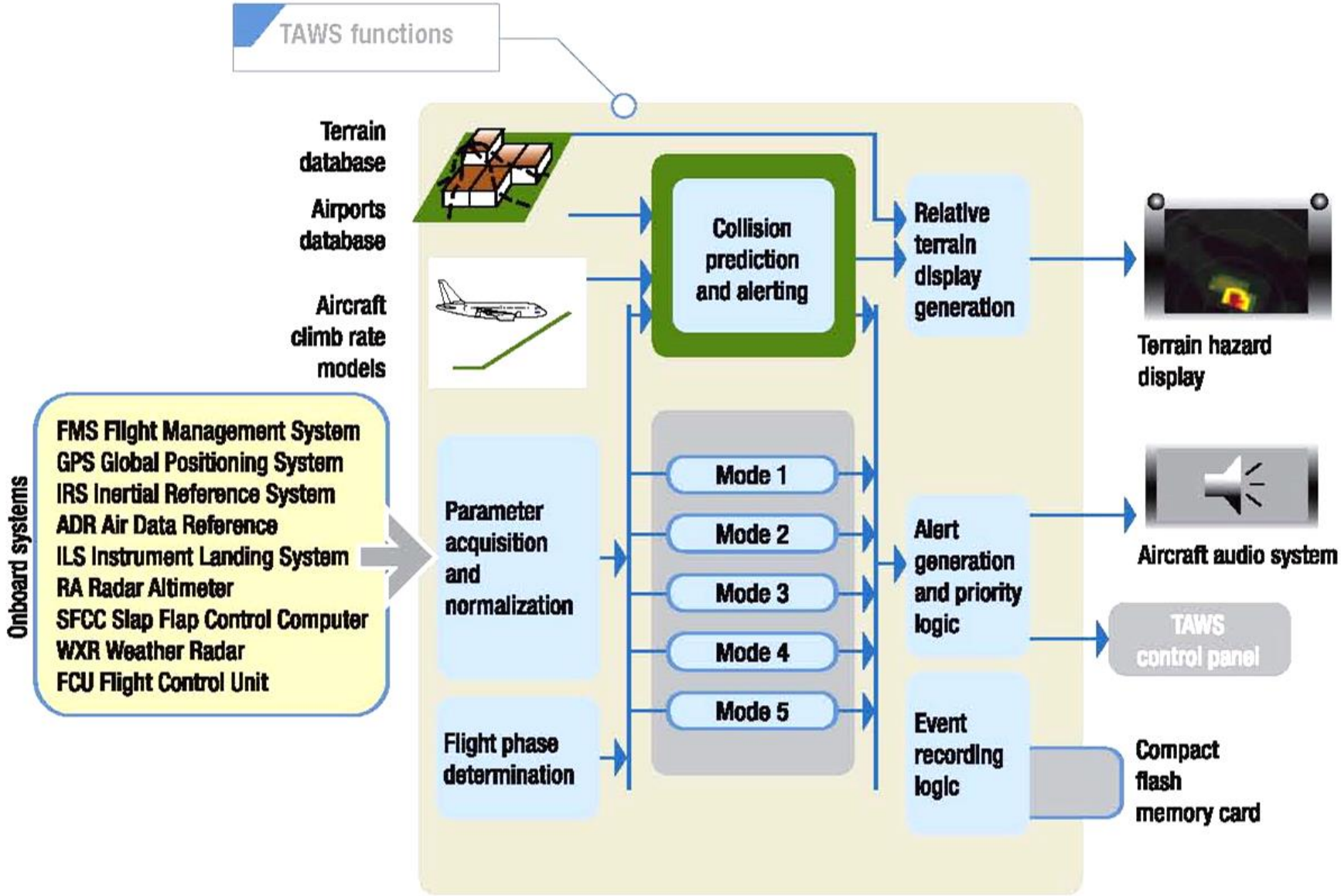
Mode 6 – Miscellaneous Callouts and Advisories

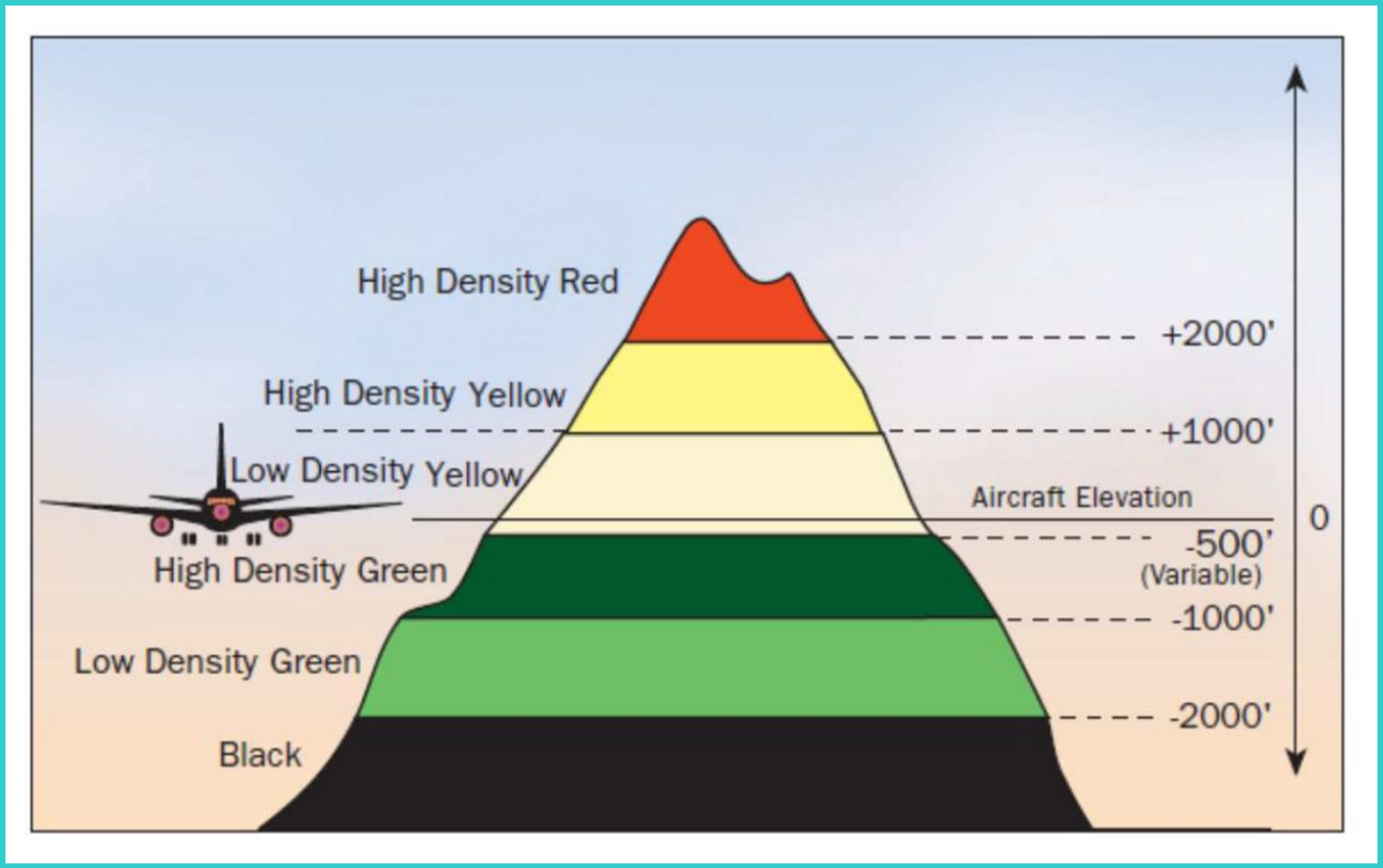


Mode 7 – Flight into Windshear Conditions

- Notifies to the crew the presence of wind shear




TAWS functions
Terrain database
Airports database
Aircraft climb rate models
Collision prediction and alerting
Relative terrain display generation
Terrain hazard display
Onboard systems
FMS Flight Management System
GPS Global Positioning System
IRS Inertial Reference System
ADR Air Data Reference
ILS Instrument Landing System
RA Radar Altimeter
SFCC Slap Flap Control Computer
WXR Weather Radar
FCU Flight Control Unit
Parameter acquisition and normalization
Mode 1
Mode 2
Mode 3
Mode 4
Mode 5
Alert generation and priority logic
Aircraft audio system
TAWS control panel
Flight phase determination
Event recording logic
Compact flash memory card


High Density Red
+2000'
High Density Yellow
+1000'
Low Density Yellow
Aircraft Elevation
0
-500'
(Variable)
High Density Green
-1000'
Low Density Green
-2000'
Black


GS217 TAS217
---°/---
TRK 301 MAG
30
27
33
5
ARPT
STA
WXR
TERR
072
020
TCAS
OFF