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## STALL MARGINS AND NORMAL OPERATING SPEEDS

$V_2$ : Takeoff speed – from  $1.23 V_S$  to  $1.40 V_S$  for takeoff configuration ( $V_S$ : stall speed).

### FLAP RETRACTION SPEED

Corresponds to  $V_2+5$  with flaps at  $11^\circ$  and  $V_2+15$  with flaps at  $15^\circ$ .

### SLAT RETRACTION SPEED

Corresponds to  $1.20 V_S$  in clean configuration (UP/RET).

### MANEUVERING SPEED

$V_{MAN}$ : Corresponds to  $1.50 V_S$  with no flaps and  $1.40 V_S$  with fully extended flaps.

### FINAL CLIMB SPEED

Corresponds to  $1.33 V_S$  in clean configuration.

### FLAP/SLAT EXTENSION SPEED

The minimum speed for FLAP/SLAT extension is the  $V_{MAN}$  of the present configuration. During normal operations flaps/slats extension should be performed at or below the followings “Normal Operating Speeds”:

FLAP / SLAT	NORMAL OPERATING SPEEDS (KIAS)
0/EXT	250
15/EXT	210
28/EXT	180
40/EXT	160

Only if required by specific operational condition, higher extension speeds may be used provided maximum allowable speeds are not exceeded.


$V_{TH}$ : Threshold speed:

$1.30 V_S +5$  in normal landing configuration.

bank angle limits are:

$30^\circ$  (normal  $25^\circ$ ) above maneuvering speed

$15^\circ$  below maneuvering speed.

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## **SPEED ADDITIVE**

The speed to add must be calculated as half of head wind (HWC Head wind Component) plus the total gust factor. The total additive should not exceed 20 KIAS. Since the  $V_{TH}$  already includes 5 KIAS, maximum speed additive must be 15 KIAS.

## **FINAL APPROACH SPEED/TARGET SPEED**

During final approach in normal configuration, target speed must be  $V_{TH} +$  additive speed (calculated according to the wind).

## **WIND CORRECTIONS**

To correct wind effects during visual and circling approaches:

- add or subtract 1 sec for each two knots of frontal component or tail.
- apply 1 degree of correction for each knot of XWC cross wind component.

Due to very short extension time in circling approaches, the above drift correction should be started before runway end (about 45 secs before base turn).


## **BEST ANGLE SPEED**

Best angle speed (two engines) is:

- 1.33  $V_S$  in clean configuration (UP/RET) to FL180.
- 1.54  $V_S$  over FL180.

## **BEST RATE SPEED (two engines)**

best rate speed is 270 KIAS (average value).

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## PITCH ATTITUDES AND THRUST SETTINGS FOR STANDARD CONFIGURATIONS

Condition	Configuration	Required Parameter
Holding	FLAPS/SLATS = UP/RET (CLEAN) $V = V_{MAN}$ $V_z = 0$ gear up	EPR ~ 1.20
Initial Approach	FLAPS/SLATS = 15/EXT $V = V_{MAN}$ $V_z = 0$ gear up	$A \sim 8^\circ$ $EPR_2 \sim 1.25$ $EPR_1 \sim 1.54$
Final Approach	FLAPS/SLATS = 28/EXT $V = V_{TH}$ $V_z = -700 \text{ ft/min}$ gear down	$A \sim 5^\circ$ $EPR_2 \sim 1.16$ $EPR_1 \sim 1.37$
	FLAPS/SLATS = 40/EXT $V = V_{TH}$ $V_z = -700 \text{ ft/min}$ gear down	$A \sim 3.5^\circ$ $EPR_2 \sim 1.22$

Note:

$EPR_2$  = 2 Engines

$EPR_1$  = 1 Engine

**EPR values are based on**


**For each**

**Compensate with:**

Temp = Standard  
 Weight = 55 ton  
 PA = Sea level  
 Slope =  $3^\circ$   
 Wind = 0

±2000 kg  
 ±2000 ft  
 ±0.5° Slope  
 ±10 knots

TWO ENG	ONE ENG
~ .01 EPR	.02 EPR
~ .01 EPR	.02 EPR
~ .02 EPR	.04 EPR
~ .01 EPR	.02 EPR

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## GENERAL INFORMATION

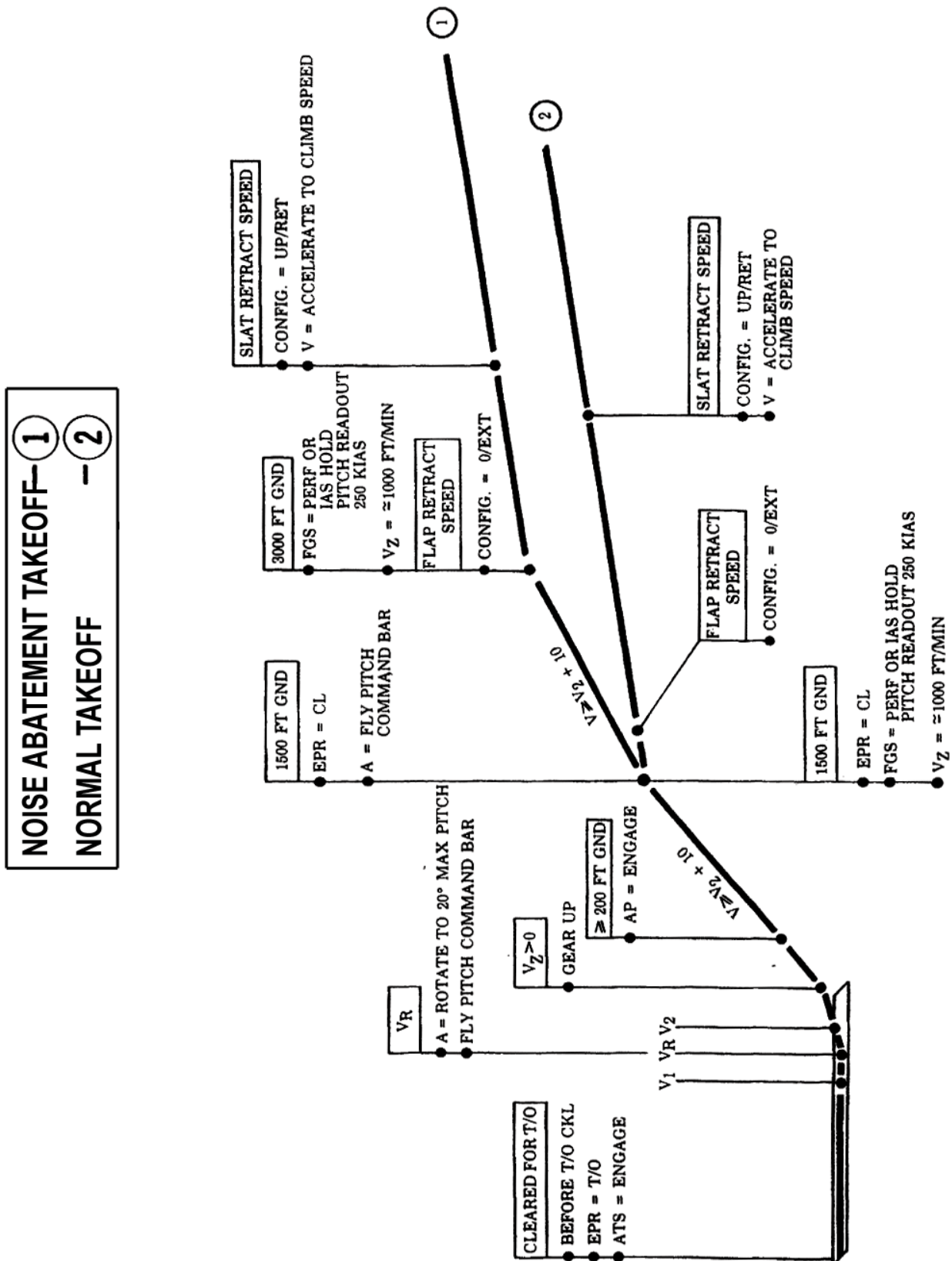
Approaching procedures with one engine are the same as with two engines. Maximum flaps extension for landing with one engine is 28/EXT.

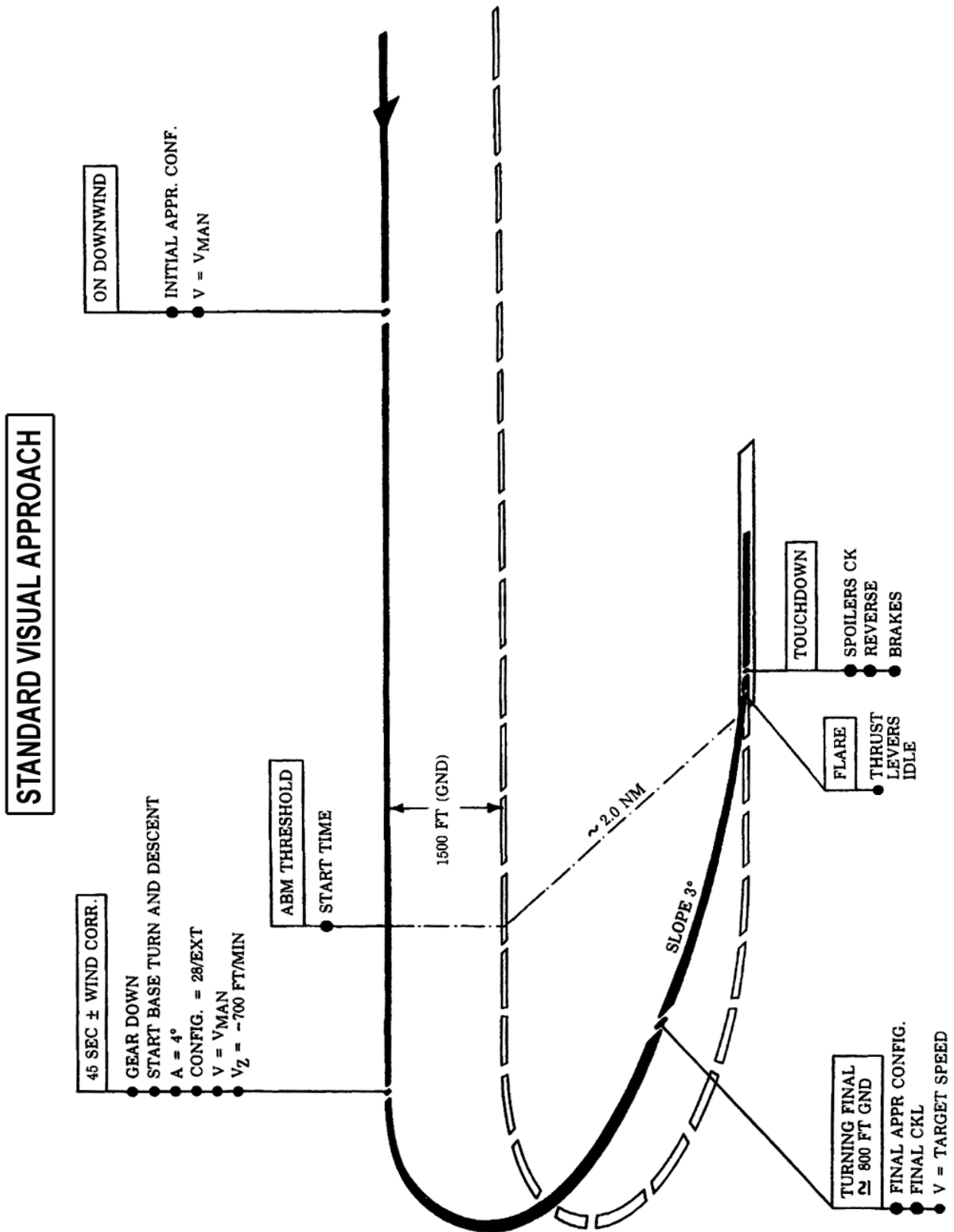
To fly any configuration with one engine it is necessary to increase speed from .20 to .30 EPR.

A turn of 25° bank made at the  $V_{MAN}$  creates a descent rate ( $V_z$ ) of about - 250 ft/min or requires a power increase of about .05 EPR for two engines or .15 EPR for one engine.

Gear retraction at  $V_{MAN}$  and 15/EXT creates a  $V_z$  of -150 ft/min or requires a power increase of about .05 EPR for two engines and 0.07 for one engine.

Auto throttle can be used in every phase of approach, and can be used even with one single engine, in this case throttle must be allineated.







## CIRCLING APPROACH TWO ENGINE / ONE ENGINE

