



Comparison of ILS / T-VASIS / PAPI Aim Points with 1000ft / 300m VISUAL Aim Point for B737 and Similar Size Aircraft

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Source data derived from ERSA Amendment 13 Mar 2008 and JEPPESEN

DISCLAIMER

This comparative study guide is believed to be accurate at the time of preparation, but no warranty of accuracy or reliability is given and no liability is accepted for errors or omissions, (of the source data - ERSA and Jeppesen - or of the calculations based on the source data) or loss or damage (including but not limited to special, incidental, consequential, or other damages) suffered as a result of a person acting in reliance thereon.

This guide is intended to clarify the effects of varying TCH's and MEHT's in relation to the Company nominated 1000ft / 300m visual aim point, which should take precedence below 300ft. (Refer FAM Vol 2 Visual Approach Slope Guidance.)

While all attempts have been made to ensure the accuracy of these notes, please refer to Company Manuals, ERSA, Jeppesen and current Notams to ensure compliance with current QANTAS procedures.

(Please note that the calculations of runway distance in both of these presentations are deliberately approximate. The reason is that to enable the spreadsheet to work simply, the means of calculating the effect of runway slope on TCH or MEHT had to be simplified. The resulting figures are within approximately 5% of the correct figures, and in terms of vertical height are negligible.)

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Vertical TCH / MEHT is virtually unusable for pilots without some consideration of their longitudinal effect in relation to the nominated visual aim point for a given aircraft. Simply flying a navaid glideslope without this consideration may mislead the pilot into following a path which is at odds with the correct visual path required.

Method of Use

Enter the Port and Runway required. Note that a positive (uphill) slope reduces the effective TCH / MEHT (Threshold Crossing Height / Minimum Eye Height at Threshold), while a negative slope increases the effective TCH / MEHT. This applies to all three nav aids.

ILS

The effective ILS TCH is multiplied by 19.08 (the cotangent of 3°). This indicates the ILS Glideslope intercept with the runway. A further 40ft is added here. (See note below.*) Subtracting 1000ft from this figure positions the ILS Glideslope intercept in relation to the required 1000ft visual aim point. A negative figure indicates short of the 1000ft aim point, while positive indicates beyond it.

*** Note:** The pilot's eyepath intercept, or aim point has now been included. In the B737, the pilot's line of sight is approximately 2ft above the glideslope antenna. Therefore the pilot's visual aim point, if he/she follows the ILS Glideslope indication, will be approximately + 40 ft further down the runway from the ILS Aim Point. (This has been added.)

PAPI

The effective MEHT is multiplied by 21.21 (the cotangent of 2.75° - the lowest eye path angle where two red / two white PAPI lights are visible. This figure can vary.) Once again a reduction of 1000ft is made to compare the PAPI aimpoint with the 1000ft visual aim point. **Remember only one aim point is available.** Flying "three reds and a white" will prescribe a lower (flatter) path to the same aimpoint.

Note PAPI's are set up for the largest regular aircraft type operating into a given runway. They will therefore usually be too high / deep for aircraft such as the B737 which use the 1000ft visual aim point. Ultimately a path variation will be required to avoid a long touchdown. Sometimes an alternative such as an ILS G/S is available.

T-VASIS

The effective MEHT is again multiplied by 19.08 (the cotangent of 3°). This is the height at which only the "wing-bars" are visible. However this is the lower limit of the wing-bars "window", therefore 150ft must be added to this figure to ascertain the actual wing-bars' location down the runway. (See The 'Jacobson Flare' for further detail.) The beauty of the T-VASIS is that a range of seven different aim points are available for tailoring to a nominated aimpoint, as well as providing a 3° path angle. The guides of "STD +/-" mean the upper/lower limit of visibility for the "on-slope" indications, so fly until the one light high/low, respectively, is visible, then correct to extinguish it. This will place the pilot's eye on the correct path to the visual aim point.

PORT	RWY	RWY SLOPE (%)	ILS MIN TCH (ft)	ILS EFF TCH (ft)	ILS VISUAL AIM POINT= (EFF TCH x 19.08) + 40 (ft)	ILS AIM POINT c.f. 1000ft AIM POINT	PAPI MEHT (ft)	PAPI EFF MEHT (ft)	PAPI AIM POINT= (EFF MEHTx 21.21) (ft)	PAPI AIM POINT c.f. 1000ft AIM POINT	T-VASIS MEHT (ft)	T-VASIS EFF MEHT (ft)	T-VASIS AIM POINT= (EFF MEHT x19.08) +150 (ft)	T-VASIS AIM POINT c.f. 1000ft AIM POINT	T-V AIM POINT GUIDE: FLY CONST VASIS INDIC
YPAD	05	0.10					61	60	1273	273					
ADL	23	-0.10	50	51	1013	13	59	60	1273	273					
	12						51	51	1082	82					
	30						51	51	1082	82					
YPED	18	-0.11	51	52	1034	34					51	52	1144	144	1 LOW
ED	36	0.11									49	48	1064	64	STD -
YABA	14	-0.10	50	51	1013	13	39	40	848	-152					
ABA	32	0.10					41	40	848	-152					
YMAY	07	-0.20					52	54	1137	137					
ABY	25	0.20					51	49	1048	48					
YBAS	12	-0.30	47	50	994	-6					39	42	951	-49	STD
ASP	30	0.30									39	36	837	-163	1 HIGH
YAMB	15	-0.11	50	51	1015	15					51	52	1144	144	1 LOW
AMB	33	-0.08									30	31	740	-260	1 HIGH +
YARG	01	-0.20									41	43	970	-30	STD
ARG	19	0.20									41	39	894	-106	STD +
NZAA	05R	0.07	50	49	981	-19	73	72	1533	533					
AKL	23L	-0.07	50	51	1007	7	73	74	1563	563					
YMAV	18	0.03	56	56	1103	103									
AV	36	-0.03									42	42	957	-43	STD
YAYE	13	0.26									40	37	864	-136	STD +
AYE	31	-0.26									43	46	1020	20	STD -
YBHI	05	0.62									41	35	814	-186	1 HIGH
BHI	23	-0.62									41	47	1051	51	STD -

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YBBN	01		50	50	994	-6					50	50	1104	104	STD -
BNE	19		53	53	1051	51					50	50	1104	104	STD -
	14										50	50	1104	104	STD -
	32										50	50	1104	104	STD -
YBRM	10						53	53	1124	124					
BME	28	0.50					47	42	880	-120					
YBCS	15		50	50	994	-6	53	53	1124	124					
CNS	33						68	68	1442	442					
YSCB	17										39	39	894	-106	STD +
CBR	35		56	56	1108	108					44	44	990	-10	STD
YCAR	04	0.10									32	31	741	-259	1 HIGH +
CAR	22	-0.10									34	35	818	-182	1 HIGH
NZCH	02	-0.28	60	63	1238	238	73	76	1608	608					
CHC	20	0.28	50	47	941	-59	73	70	1489	489					
	11	-0.35					59	63	1326	326					
	29	0.35					58	55	1156	156					
YPXM	18	-1.50									42	57	1238	238	1 LOW -
XMV	36	1.50									42	27	665	-335	1 HIGH +
YPCC	15										41	41	932	-68	STD -
CCK	33										39	39	894	-106	STD
YSCH	03	0.10					51	50	1061	61					
CFS	21	-0.10					51	52	1103	103					
YBCG	14	-0.10									39	40	913	-87	STD
OOL	32	0.10									39	38	875	-125	STD +

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YCIN	11	-0.46									50	55	1192	192	1 LOW -
CIN	29	0.46									51	46	1035	35	STD -
YPDN	11	-0.20					57	59	1251	251					
DRW	29	0.20	75	73	1433	433	59	57	1209	209					
WRRR	09	0.10													
DPS	27	-0.10	60	61	1204	204									
YDPO	06	0.10									43	42	951	-49	STD
DPO	24	-0.10									41	42	951	-49	STD
YSDU	05	-0.60									39	45	1009	9	STD
DBO	23	0.60									39	33	780	-220	1 HIGH +
NZDN	03	0.02	50	50	990	-10	58	58	1226	226					
DUD	21	-0.02	50	50	998	-2	58	58	1234	234					
YMES	04	-0.70													
ESL	22	0.70	50	43	860	-140									
	09	-0.12									36	38	867	-133	1 HIGH
	27	0.12									29	27	671	-329	1 HIGH +
YGEL	03	0.30					53	50	1061	61					
GET	21	-0.30					57	60	1273	273					
YPGV	13	-0.20									39	41	932	-68	STD
GOV	31	0.20									39	37	856	-144	1 HIGH
YGTE	10	0.30									39	36	837	-163	1 HIGH
GTE	28	-0.30									39	42	951	-49	STD
NZHN	18	-0.12									45	46	1031	31	STD -
HLZ	36	0.12									45	44	986	-14	STD

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YBHM	14										41	41	932	-68	STD
HTI	32										41	41	932	-68	STD
YMHB	12		45	45	899	-101					44	44	990	-10	STD
HBA	30										38	38	875	-125	STD +
NZNV	04						47	47	997	-3					
IVC	22						47	47	997	-3					
WIII	07L	-0.10	51	52	1032	32									
JKT	07R	-0.10	51	52	1032	32									
	25L	0.10	49	48	956	-44									
	25R	0.10	52	51	1013	13									
YPKG	11	-0.80									48	57	1238	238	1 LOW -
KGI	29	0.80									48	39	894	-106	STD +
YPKA	08	-0.16					44	46	967	-33					
KTA	26	0.16					44	42	899	-101					
YPTN	14		51	51	1013	13					51	51	1123	123	1 LOW
KTR	32										34	34	799	-201	1 HIGH
YPKU	12	0.10									39	38	875	-125	STD +
KUN	30	-0.10									41	42	951	-49	STD
YMLT	14R	-0.30									36	39	894	-106	STD +
LST	32L	-0.30	52	55	1089	89					74	77	1619	619	2 LOW -
YPLM	18	0.06					50	49	1048	48					
LM	36	-0.06					50	51	1073	73					
YBMK	14										39	39	894	-106	STD +
MKY	32										39	39	894	-106	STD +

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YMMC	18						45	45	954	-46					
MCY	36						50	50	1061	61					
YMML	09	-0.10					74	75	1591	591					
MEL	27		57	57	1128	128	74	74	1570	570					
	16	-0.90	50	59	1166	166	74	83	1760	760					
	34	0.90					74	65	1379	379					
YMIA	09	-0.10									45	46	1028	28	STD
MIA	27	0.10									41	40	913	-87	STD
YOOM	12	-0.34					50	53	1133	133					
OOM	30	0.34					50	47	988	-12					
YBMA	16	0.15					51	50	1050	50					
ISA	34	0.10					50	49	1039	39					
NFFN	02	0.20	53	51	1013	13									
NAN	20	-0.20													
YWLM	12	-0.16					50	52	1094	94					
NTL	30	0.16					50	48	1027	27					
YNWN	05	-0.10									39	40	913	-87	STD
NWN	23	0.10									39	38	875	-125	STD +
YSNF	11	0.70					50	43	912	-88					
NLK	29	-0.70					50	57	1209	209					
NWWW	11	0.20	50	48	956	-44	50	48	1018	18					
NOU	29	-0.20					60	62	1315	315					
YSNW	03	-0.90					52	61	1294	294					
NWA	21	-0.50	50	55	1089	89	50	55	1167	167					

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YSNW	08	-2.40					57	81	1718	718					
NWA	26	-1.00					52	62	1315	315					
NZPM	07	0.48													
PMR	25	-0.48													
YPBO	06	0.50									39	34	799	-201	1 HIGH
PBO	24	-0.50									39	44	990	-10	STD
YPEA	18L	0.40	47	43	860	-140	47	43	912	-88					
PEA	36R	0.50					68	63	1336	336					
YPPH	03	-0.20	50	52	1032	32	71	73	1548	548					
PER	21	0.20	51	49	975	-25	71	69	1463	463					
	06	-0.10					65	66	1400	400					
	24	-0.10	51	52	1032	32	71	72	1527	527					
YPPD	14	0.10									41	40	913	-87	STD
PHE	32	-0.10									45	46	1028	28	STD -
AYPY	14L														
POM	32R														
NVVS	11	0.20					50	48	1018	18					
VLI	29	-0.20					60	62	1315	315					
YBPN	11	-0.20									41	43	970	-30	STD
PPP	29	0.20									41	39	894	-106	STD +
NZQN	05	0.18					48	46	980	-20					
ZQN	23	-0.18					47	49	1035	35					
YSRI	10	0.09					47	46	978	-22					
RIC	28	0.06					48	47	1005	5					

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YBRK	15	-0.10					71	72	1527	527	* SUGGESTION: USE 1500 ft AIM POINT				
ROK	33	0.10					70	69	1463	463	* SUGGESTION: USE 1500 ft AIM POINT				
WSSS	02L						66	66	1400	400					
SIN	20R						66	66	1400	400					
	02R						67	67	1421	421					
	20L						67	67	1421	421					
WRSJ	10														
SBY	28														
YSSY	07	0.10	49	48	956	-44	64	63	1336	336					
SYD	25	-0.10	50	51	1013	13	64	65	1379	379					
	16L	-0.08	50	51	1009	9	53	54	1141	141					
	34R	0.08	50	49	979	-21	53	52	1107	107					
	16R	0.20	52	50	994	-6	64	62	1315	315					
	34L	0.10	50	49	975	-25	64	63	1336	336					
TSTW	12L										42	42	951	-49	STD
TMW	30R	-0.80	46	54	1070	70					32	40	913	-87	STD
YTNK	07	0.40									41	37	856	-144	1 HIGH
TCA	25	-0.40									37	41	932	-68	STD
YBTL	01	-0.10	49	50	994	-6	49	50	1061	61	NOTE: PAPI TL 01 3.0°				
TSV	19	0.10					49	48	916	-84	NOTE: PAPI TL 19 3.3°				
YSWG	05	-0.20			59						38	40	913	-87	STD
WG	23	0.20									39	37	856	-144	1 HIGH
NZWN	16	-0.30	42	45	899	-101					45	48	1066	66	STD -
WLG	34	0.30	50	47	937	-63					42	39	894	-106	STD +