HEWLETT-PACKARD

HP-67/HP-97

Users' Library Solutions

Aircraft Operation



INTRODUCTION

In an effort to provide continued value to it's customers, Hewlett-Packard is introducing a unique service for the HP fully programmable calculator user. This service is designed to save you time and programming effort. As users are aware, Programmable Calculators are capable of delivering tremendous problem solving potential in terms of power and flexibility, but the real genie in the bottle is program solutions. HP's introduction of the first handheld programmable calculator in 1974 immediately led to a request for program solutions — hence the beginning of the HP-65 Users' Library. In order to save HP calculator customers time, users wrote their own programs and sent them to the Library for the benefit of other program users. In a short period of time over 5,000 programs were accepted and made available. This overwhelming response indicated the value of the program library and a Users' Library was then established for the HP-67/97 users.

To extend the value of the Users' Library, Hewlett-Packard is introducing a unique service—a service designed to save you time and money. The Users' Library has collected the best programs in the most popular categories from the HP-67/97 and HP-65 Libraries. These programs have been packaged into a series of low-cost books, resulting in substantial savings for our valued HP-67/97 users.

We feel this new software service will extend the capabilities of our programmable calculators and provide a great benefit to our HP-67/97 users.

A WORD ABOUT PROGRAM USAGE

Each program contained herein is reproduced on the standard forms used by the Users' Library. Magnetic cards are not included. The Program Description I page gives a basic description of the program. The Program Description II page provides a sample problem and the keystrokes used to solve it. The User Instructions page contains a description of the keystrokes used to solve problems in general and the options which are available to the user. The Program Listing I and Program Listing II pages list the program steps necessary to operate the calculator. The comments, listed next to the steps, describe the reason for a step or group of steps. Other pertinent information about data register contents, uses of labels and flags and the initial calculator status mode is also found on these pages. Following the directions in your HP-67 or HP-97 **Owners' Handbook and Program Listing I** and Program Listing I and Program Listing indicates on which calculator the program was written (HP-67 or HP-97). If the calculator indicated differs from the calculator you will be using, consult Appendix E of your **Owner's Handbook** for the corresponding keycodes and keystrokes converting HP-67 to HP-97 keycodes and vice versa. No program conversion is necessary. The HP-67 and HP-97 are totally compatible, but some differences do occur in the keycodes used to represent some of the functions.

A program loaded into the HP-67 or HP-97 is not permanent—once the calculator is turned off, the program will not be retained. You can, however, permanently save any program by recording it on a blank magnetic card, several of which were provided in the Standard Pac that was shipped with your calculator. Consult your **Owner's Handbook** for full instructions. A few points to remember:

The Set Status section indicates the status of flags, angular mode, and display setting. After keying in your program, review the status section and set the conditions as indicated before using or permanently recording the program.

REMEMBER! To save the program permanently, **clip** the corners of the magnetic card once you have recorded the program. This simple step will protect the magnetic card and keep the program from being inadvertently erased.

As a part of HP's continuing effort to provide value to our customers, we hope you will enjoy our newest concept.

TABLE OF CONTENTS

AIRCRAFT FLIGHT PLAN WITH WIND	•	9	. 1
FLIGHT MANAGEMENT	ı	ı	. 8
PREDICTING FREEZING LEVELS	•	·	.12
GENERAL AIRCRAFT WEIGHT AND BALANCE	•	•	.16
PILOT UNIT CONVERSIONS	•	•	.20
TURN PERFORMANCE	I		.24
RATE OF CLIMB AND DESCENT Helps you to be sure you'll clear the mountain.	1	•	.29
HEAD WINDS AND CROSS WINDS	•	•	,33
FLIGHT PLANNING AND FLIGHT VERIFICATION	•	•	.37
DETERMINING IN-FLIGHT WINDS.	ı	•	.43
STANDARD ATMOSPHERE. Estimates atmospheric conditions from pressure altitude.	•	ı	.47
MACH NUMBER AND TRUE AIRSPEED	•	•	, 53
TRUE AIR TEMPERATURE AND DENSITY ALTITUDE	•		, 58
LOWEST USABLE FLIGHT LEVEL	•		•62

Program Title	Aircraft Flight Plan With Wind	
ontributor's Name	Hewlett-Packard	
ddress	1000 N.E. Circle Blvd.	
ity Corval	lis State Oregon Zip C	odo 97330
		ode <u>97330</u>
rogram Descriptior	n, Equations, Variables	
	and the second	
	This program is used when making a flight plan which includes	·····
	winds. It solves the wind triangle, giving correct values for magnetic	
	heading and ground speed. It works for multiple leg lengths,	
	computing time for each leg, cumulative time, and fuel consumed	·····
and the construction	for each leg. The program corrects reported winds from true direction	
	to magnetic direction before using them in a calculation. The winds,	
	true airspeed, fuel consumption, and magnetic variation can be	
	altered on each leg of the flight. The equations used to compute the	
	heading (HDG) and ground speed (GS) of the aircraft are	
	W	
	$HDG = C + \sin^{-1} \frac{W}{TAS} \sin (D - C)$	
Andres and a company constant and an	TAS	
	$GS = TAS \cos (HDG-C) - W \cos (D-C)$	
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	where W is wind velocity, D is wind direction (magnetic), C is the magnetic course and TAS is the true airspeed.	
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	ind must be less than 100 knots. Wind speed must not exceed true	
ai	rspeed.	
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NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

Program Description II

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Program Description II

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Program Description 11

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Fuel Tas	Wind V	C→HDG → 6S	Leg→t → TTLt	→ Leg Fuel	5

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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program					
2	Initialize		<u>f</u> <u>E</u>	4		
3	Input fuel consumption	FC (gal/hr)	A	FC		·
	then input true airspeed	TAS	A	TAS		
4	Input wind*	DDD.KK	В	кк		
	then magnetic variation					
	(+E, _W)	·v	В	v		
5	Input course and calculate					
	heading	С	С	HDG		
	then calculate ground speed		С	GS		
6	Input leg length and compute					
	leg time	leglength (n.m.)	D	H.MMSS**		
	then display total time		D	H.MMSS		
7	Calculate fuel used on leg		E	fuel (gal)		
8	For next leg with same					
	fuel, TAS, wind, and					
	magnetic variation go to					
	step 5. To change fuel					
	go to step 3 and input new					
	value. To change wind go to					
	step 4 and input new value.					
	To change true air speed					
	go to step 3 input fuel					
	consumption then true air					
	speed. To change magnetic					
	variation go to step 4 input					
	wind then input magnetic					·
	variation. For new case go					
	to step 2.					
*DDD.K directio	K means direction, decimal point, n of 325 degrees and a speed of 8 knot	wind speed. 325.0 s.	08 means a			

direction of 325 degrees and a speed of 8 knots. **H.MMSS means hours, decimal point, minutes, seconds. 2.0355 is 2 hours

3 minutes and 55 seconds.

97 Program Listing I

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STUVI	VEYENTR		CO	MMENTS	STEP	KE	YENTRY	KEY CODE	COMMENTS
001		21 16 15	1		1	957	RTN	24	·····
0 02	CLRG	16-53				058	#LBLC	21 13	
003		-63 02				959	R↓	-31	
804	RTN	24				960	RCL2	36 02	
005	≭LBL A	21 11				961	x	-35	
006	ST01	35 01				362	X≠Y	-41	
007	RTN	24				963	-	-45	
008	*LBLA	21 11				364	RTN	-45 24	
00 9	ST02	35 02				965	*LBLD	21 14	
010	RTH	24				965 966			
011	#LBLB	21 12					X≠Y	-41	
012	ENTT	-21				367	÷	-24	
013	INT	16 34				368	STO7	35 07	
014	ST03	35 03				<i>169</i>	ST+6	35-55 06	
015	-	-45				970	DSP4	-63 04	
016	EEX	-23				971	→HMS	16 35	
017	2	0 2				72	RTN	24	
018	x	-35				973	*LBLD	21 14	
019	STOR	35 08				974	RCL6	36 0 6	
015	RTN	24				75	→HMS	16 35	
						976	RTN	24	
0 21	*LBLB	21 12				977	<i>*LBLE</i>	21 15	
022 027	ST04	35 84				978	RCL7	36 0 7	
0 23	RTN	24				179	RCL1	36 0 1	
8 24	*LBLC	21 13			8	180	х	-35	
0 25	DSPØ	-63 00			9	81	DSP1	-63 01	
026	ST05	35 05			8	182	RTH	24	
027	RCL3	36 03							4
028	RCL4	36 04				-			4
029	-	-45							1
030	X≠Y	-41							1
031	-	-45							l i
032	RCL8	36 0 8							
033	÷₽	44	t.						1
034	X≠Y	-41			090				
03 5	RCL2	36 0 2							
036	÷	-24							j
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0 38	COS	42							
039	LSTX	16-63							
040	RCL5	36 05							
841	+	-55							
042	1	01							
843	÷R	44							
844	÷₽	34			100				
845	CLX	-51							
045	X> Y?	16-34							
847	GT01	22 01							
048	CLX	-51							
849	+	-55					FLAGS		SET STATUS
850	RTN	24				0		FLAGS	TRIG DISP
8 51	*LBL1	21 01				1,		ON OFF	
852	CLX	-51				<u> </u>	_		DEG 🛛 FIX 🖪
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0	1 7	2	3 -	4	5	F		⁷ Leg Time	8 9
	Fuel	TAS	DDD	v	C		otal t		Wind -
S0	S1	S2	S3	S4 5	35	5	6	S7	S8 S9
	L								
A		В	С	ľ	D		E	Ξ	I
							1		1

Program Description I

Program `	Program Title Flight Management											
Contribute	or's Name HP- 1000 N.E	67/97			Hewlet	t-Packard (Company					
City	Corvallis				State	OR	Zip Code	97330				

Program Description, Equations, Variables This program calculates either time flown, distance flown or ground speed using the other two variables as inputs. Since the equations are analogous, fuel consumed, fuel consumption or time flown can also be calculated if two of the values are known. The program is very useful in calculating ETA and fuel reserves from in-flight data.

TIME = DIST/GS DIST = GS x TIME GS = DIST/TIME FUEL = FC x TIME FC = FUEL/TIME TIME = FUEL/FC

where

DIST is distance flown, GS is ground speed, and FC is fuel consumption.

Operating Limits and Warnings Fuel consumption and fuel must be in compatible units; i.e., gal/hr and gal, or liters/hr and liters. GS and DIST must be in compatible units; i.e., knots and nautical miles, or miles/hr and miles.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description 11

Sketch(es)	
	· · · · · · · · · · · · · · · · · · ·
From the second seco	· · · · · · · · · · · · · · · · · · ·
	e e e e e e e e e e e e e e e e e e e
	· · · · · · · · · · · · · · · · · · ·
	·····
Sample Problem(s) A 380 nautical mile flight wi	
speed of 105 knots. The fuel consumption is 8 ga	al/hr. Find the estimated time for
the flight and fuel consumed.	· · · · · · · · · · · · · · · · · · ·
	· · · ·
	· · · · · · · · · · · · · · · · · · ·
	· · · · · · · · · · · · · · · · · · ·
Solution(s) Time = 3 hrs, 37 min, 8 seconds	
Fuel Consumed = 28.95 gal	
	· · · · · · · · · · · · · · · · · · ·
Keystrokes:	See Displayed:
380 [B] 105 [C] [A]	2 2700
8 [C] [B]	28.95
	20.75
Reference (s)	
This program is a direct translation of	of a program from the HP-65
Aviation Pac.	
- Magazi	

FLIGHT M	IANAGEMENT			
			RCL	S
TIME	DST (FUEL)	GS (FC)	ABC	

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	For time-distance calculations go to step 5			
3	Input two of the following			
	time (H.MMSS)*	time	A []	
	fuel consumed	fuel	B	
	fuel consumption per hr.	FC	C	
4	Compute the remaining value**			
	time (H.MMSS)		A] [time
_	or fuel consumed		B	fuel
	or fuel consumption		[C] []	FC
5	Input two of the following			
	time (H.MMSS)	time	A] []	
	distance	DIST	B	
	ground speed	GS	[C]	
6	Compute the remaining value			
	time (H.MMSS)		A	time
	or distance		B	DIST
	or ground speed			GS
7	For new case change appropriate inputs in step			
	3 or 5.			
8	To recall values in the order they appear on		D [(time)
	card			(fuel or DIST)
				(FC or GS)
				· · · · · · · · · · · · · · · · · · ·
	*H.MMSS means hours, decimal points, minutes,			
	seconds. 2.0355 is 2 hours 3 minutes and			
	55 seconds.			
	,			
 				
 				
 				
	· · · · · · · · · · · · · · · · · · ·			

97 Program Listing I

<u>eten</u>		TOV		91		usia			ang i			11
STEP	KEY EN		KEY CODE		COMN	MENTS		STEP	KEY ENTRY	KEY CODE	СОМ	MENTS
	101 *LB		21 11				\vdash				4	
	102 HM		16 36				⊢				4	
	103 ST		35 01				6	60	······	∤ ····	4	
			16 23 03				F			-	4	
		TN	24	1			⊢			ł	-	
	106 DS		-63 04				⊢				4	
	107 RC		36 02 36 07	ľ			- F				4	
	108 RC. 109		36 03	ł			⊢				4	
	109 110 sti	÷ 01	-24 75.61								4	
	10 31 11 3 H		35 01 16 35								4	
		ns TN	24				⊢				4	
	12 R 13 *LB		21 12				- F			<u> </u>	4	
	13 * LB		-63 02				6	70			4	
	14 DS		35 02				F				4	
			16 23 03								4	
		TN	24				F		· · · · · · · · · · · · · · · · · · ·		4	
	17 K 18 RCI		24 36 01								1	
	18 RCI 19 RCI		36 03	1			⊢		·	†	1	
	19 KU 20 -		36 83 -35							f	1	
	20 21 ST		-33 35 02							<u>†</u>	1	
		TN	24								1	
	22 R 23 ¥LBI		21 13				F			1	1	
	24 DSI		-63 02				O.	80			1	
	25 STI		35 03	1					· · · · ·	1		
			16 23 03				-					
		TN	24									
	28 RCI		36 02									
	29 RCI		36 01							1		
	30		-24							1		
	31 STI		35 03						· · · · · ·			
		TN	24]								
	33 *LBI		21 14				E					
	34 RCI		36 01]			0	90				
	35 →HI		16 35	l								
	36 DSI		-63 84				L	_				
	37 PS		16 51	1								
0	38 RCI	2	36 02									
8	39 DSI	°2	-63 02									
9	40 PS	5E	16 51									
8	41 RCI	3	36 03	ļ							4	
8	42 PS	SE	16 51	Į						ļ	-	
		TN	24				L				4	
	L		+	4			10	00		ļ	4	
 			l	4			F				4	
			ļ	1							4	
<u> </u>				4			_				4	
<u> </u>			·	1			⊢		FLAGS		SET STATUS	
050			t	1			⊢		0			
			<u>+</u> .	1			⊢		-	FLAGS	TRIG	DISP
├ ───┤			<u> </u>	ſ					-1'	0 0 0FF	DEG 🗆	FIX 🛛
h			1	1					2		GRAD	sci 🗖
				1			11	10		2 0 0	RAD 🗆	ENG
]					_ _	3 🗆 🗆		n_ <u>2</u>
						R	EGIST	ERS		7	8	9
0	Т	ime	² Fuel o Dist.	FC	or GS	4	5		6	ľ	Ö	3
S0	S1		S2	- S 3	J. 44	S4	S	5	S6	S7	S8	S9
A	.		B		С		D			E	I	
				<u>. </u>								

Program Description I

Program Title Predict	ing Freezing Levels				
	IP-67/97 Users' Libr Circle Boulevard	ary Hev	wlett-Packar	d Company	
City Corvallis		State	OR	Zip Code	97330
		······································		·····	
Program Description, Equ	ations, Variables		· · · · · · · · · · · · · · · · · · ·	an - an an and an	
	The program computes the mean sea level, from altitud or Celsius and computes the rate of 1.5 degrees Celsius lapse rate of 2 degrees Celsius	le and temperati e freezing level i per 1000 feet) an	ures in either fah n both clouds (we nd in clear weath	renheit et lapse	anno 11 in 11 a anna - Anna anna an anna an anna an anna an anna an an
	This program computes the	freezing level fro	m		
	FLD = Alt + 1000 (T/ FLW = Alt + 1000 (T/			, , — — — i nyany, i nya maga	nana ata aman aman aman aman aman a sa a a a a a a a a a a a a a a a a
· · · · · · · · · · · · · · · · · · ·	where temperature (T) is in feet or	1 degrees Celsius	and altitude (Al	t) is in	
· · · · · · · · · · ·	$FLD = Alt + 1000 \left(\frac{T}{3}\right)$	$\left(\frac{-32}{3.6}\right)$			
	$FLW = Alt + 1000 \left(\frac{T}{2}\right)$	$\left(\frac{-32}{2.7}\right)$			
a a service and a s	where temperature (T) is in	legrees fahrenhe	it.		
Operating Limits and War	ninas				
	Limits and Warnings			THE REPORT OF	
	The actual lapse rate may this program. This is espe- where inversions are com- correct answer when the level contains layers of cl and dry freezing levels and	cially true withir mon. Also, the p atmosphere betw louds. When in	n 2000 feet of the program does not yeen you and the doubt compute b	e ground give the freezing	

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Program Description II

	Keystrokes 9 Cl	HS A 8000 C E	2000		
	Solution Altitude = 200) feet	See Dis		
Solution(s)					
	the wet freezin				
Sample Problem		erature is -9 de	grees centigrade	e at 8000 feet	. how

					5
C°	F°	ALT	→FLD	 →FLW	_ /

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program.			
2	Input altitude	feet	C	
	and corresponding temperature			
	in C°	C°		
	or F°	F°	B	
3	Calculate either or both			
	Dry freezing level		D []	feet
	or wet freezing level	1	E	feet
4	For new case, go to step 2.			
	· · · · · · · · · · · · · · · · · · ·			

97 Program Listing I

					7/	IIU	gran		31 1	ng i						15
S	TEP K	EY ENTRY	/ H	EY CODE		СОММІ	ENTS	STEP	KE	YENTRY	ĸ	EY CODE		CON	MENTS	10
	601	*LBLA		21 11	T				057	RCL7		36 07		<u> </u>		
	A B 2	ST07		35 07					558	1		01				
	2 83	SF1	16	21 01				;	ê59			-62				
	@ 84	RTN		24					660	5		<i>0</i> 5				
	8 85			21 12				Ì	ē 51	÷		-24				
	P 0 6	STC7		35 07					P52	EEX		-23				
	<i>3</i> 97		16	22 01	1				8 63	3		03				
	608	RTN		24					<i>6</i> 64	Х		-35	i			
	A 0 9	*LBLC		21 13					<i>6</i> 65	RCL8		36 08				
	010	ST08		35 08					6 66	+		-55				
	ē11	ETN		24	1				ē67	RTN		24				
	812	*LBLD		21 14				—					4			
	<i>3</i> 13	F1?		23 01				070			╉──		4			
	£14	GTCa		16 11				0/0			+	- <u></u>	4			
	ē15	RCL7		36 07				<u> </u>	╂───		<u> </u>		4			
	816 817	3 2		<i>83</i> 83	1					_			4			
				02 . 45					+		+		ł			
	618 919	- 3		-45 03				<u> </u>			+		ł			
	~19 620			03 -62					+		+		1			
	-20 021	$\frac{1}{6}$		-62 06					1		1		1			
	-21 322	÷		-24					† –		1		1			
	A23	EEX		-23							1		1			
	624	3		03				080					1			
	025	x		-35							T					
	A25	RCLS		36 08							1					
	P27	+		-55	•						I					
	328.	ETN		24							[
	. 829		21	16-11												
	63 8	RCL7		36 07												
	831	2		0 2				ļ					1			
	~ 32	÷		-24							I					
	ð 33	EEX		-23				000	 		 					
	034	3		03				090					ł			
	ê 3 5	X		-35					<u> </u>		ł					
	ē36	PCL8		36 08				<u></u>	┣──		 					
	237 2 3 2	+ 570		-55				<u> </u>					ł			
	838	RTN N DI F		24									1			
	639 548			21 15							<u> </u>					
	040 341			23 01 16 12				<u> </u>					1			
	542	RCL7		16 12 36 07							<u>†</u>		1			
	∂ 43			03 03												
	344	3 2		02				100								
	ē45	-		-45												
	64E	2		02												
	P47	•		-62												
	549	7		07												
	49	÷		-24				_	$H_{\overline{o}}$	FLAGS			SET S	TATUS		
	-350	EEX		-23				·	┠╌┨┈┈			FLAGS	TR	llG	DISF	<u></u>
	751	3		03					1			ON OFF			EIV.	
	852	X		-35				ļ	2		⊣⁰			G ⊠ AD ⊡	FIX SCI	
	<i>6</i> 53	RCL8		36 08				110	H_{-}						ENG .	$\overline{\Box}$
	654	+		-55					-3				=		ENG,	<u> </u>
	ē55	RTN	.	24					┝┶━╸						-	
L	°56	*LBLb	21 .	16 12			REGIS	STERS	L					<u></u>		
0		1		2	3	14		5	6	;	7	τ	8	A 1 +	9	
		-										Temp		Alt		
S0		S1		S2	S3	5	54	S5	S	6	S	7	S8		S9	1
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^			В			С		U			E		1	I		
										1				1		

6	Program I	Descri	ption		
Program Title	General Aircraft Wei	ght and Ba	lance		
	me Hewlett-Packard 000 N.E. Circle Blvd. vallis	State 0re	qon	Zip Code	97330
	·····		.		
Program Descrip	tion, Equations, Variables			· · ·	
- · ·	The program calculates the final values or gross weight and center of gravity that position in the weight-balance envelope The program will accept either weights moment arms for inputs. The program changes in loading without restarting fro	at are used to deten furnished with yo and moments or w is written to acc	rmine your ur aircraft. veights and		1 - 14 - 1 1
	The center of gravity is computed moments by the gross weight.	by dividing the s	um of the		
	···· · · · · · · · · · · · · · · · · ·				
					· · · · ·
	Martine -				
1					
n de stange e ant de la comme					
Operating Limits	and Warnings				· · · · · · · · · · · · · · · · · · ·
	ng ng mananan an				
· · · · ·					
e anter				¹	

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Sketch(es)				- p		
						•
						- · · · · · · · ·
						· · · ·
						х
Sample Problem(s)						
	Sample Problem					
	The following table giv	es weight and	balance dat	a for an aircraft.		
	Item	Weight	Arm	Moment		
	Empty plane	1200		15000		
	Pilot Passenger	180 110	11.25 41			
	Oil	15	41	-500		
	Fuel	120	25			
	Find the gross weight, t			, Branky .		
Solution(s)	Solution	<u> </u>			······································	
Keystro				e Displayed	1 -	
	E]1200 A 15000 C 1				-	
18	[A] 41 [B] 15 [A	.] 500 [<u>CH</u>			·	
f 🗛				25		
fB				.79		
f 🖸			24	035		
		•				
Reference(s) This pr <u>Aviatio</u>	ogram is a direc	ct transla	tion of	a program f	rom the HP	-65



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program			
2.	Initialize		_ <u>f_</u> E	
	Turnut underha	weight		Sum Wt.
3.	Input weight	weight		
4.	Input either the moment arm or the moment	arm	B	Sum. Mt.
•		mom	C	Sum. Mt.
		· · · · · · · · · · · · · · · · · · ·		
5.	Repeat steps 3,4 until all weights and moments			
	have been input			
6.	Calculate the following sum of weights or			Sum Wt.
0.			f B	c.g.
	center of gravity or sum of moments		f C	Sum Mt.
7.	To delete the last set of weight-arm or			
ļ	weight-moment data points		R/S	
8.	To delete any set of data points press [E], then perform steps 3 and 4 inputing the data			
	is to be deleted. ([E] must be pressed			
	before each data pair to be deleted.)			
·				
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		· · · · · · · · · · · · · · · · · · ·		ļ
<u> </u>				
L		1		

97 Program Listing I

	9/ 1 rugi an				19
STEP KEY ENTRY KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *LELA 21 11		1		1	
002 F20 16 23 02			057 RTN	24	
00 3 GT01 22 01				21 16 15	
004 ST+1 35-55 01			0 59 CLRG	16-53	
			060 RTN	24	
005 ST03 35 83			061 R/S	51	
006 GT09 22 03					
007 *LEL1 21 01					
008 CHS -22					
009 ST+1 35-55 01					
010 STO3 35 03]
011 RCL1 36-01					
01 2 GTO9 22 05					1
013 ≭LBLa 21 16 11				1	1
014 RCL1 36 01		070			1
015 RTN 24					1
016 *LBLP 21 12					-
017 F2? 16 23 62					4
018 GT02 22 02		— —	+	· · · · · · · · · · · · · · · · · · ·	-
019 RCL3 36 03		<u> </u>		 	4
					4
					4
021 ST+2 35-55 02					
022 ST04 35 04					<u> </u>
023 RCL2 36 02		<u> </u>			
024 GTO9 22 09		080			
025 *LBL2 21 02					
8 26 ST-2 35-45 62					1
027 RTN 24					1
028 *LBL& 21 16 12			1		1
029 RCL2 36-02			1		1
03 0 RCL1 36-01			· • · · · · · · · · · · · · · · · · · ·		1
031 ÷ -24			+	· · · · · · · · · · · · · · · · · · ·	1
03 2 GTO9 22 09					f
033 *LBLC 21 13			+	······	4
034 F29 16 23 02		090	1		4
035 GTO3 22 03		030			4 1
036 ST+2 35-55 02					4
037 STO4 35 64					4 4
038 RCL2 36 02					4
					4 1
]
040 *LBL3 21 03		_			
041 ST-2 35-45 02]
042 *LELc 21 16 13	1				
043 RCL2 36 02					
044 RTN 24		100	1		
045 *LBL9 21 0 9					1
04 6 R/S 51			<u> </u>		
04 7 RCL3 36 03			<u> </u>		
048 ST-1 35-45 01					
049 RCL4 36 04			FLAGS		SET STATUS
050 ST-2 35-45 02			0		
051 CLX -51		<u>}</u>	╆┨ _┲ ╍╍╍╍╍╍	FLAGS	TRIG DISP
05 2 STO3 35 03			<u>+</u> -1'		DEG 🛛 FIX 🕰
05 3 sto4 35 04			2		GRAD 🗆 🛛 SCI 🗆
054 GTO9 22 09		110	┥ <u>╴</u>		RAD ENG n
855 *LBLE 21 15			-3		n <u>2</u>
. 056 SF2 16 21 02		<u> </u>	<u> </u>		ł
	RFGI	L STERS	L		
0 1 ZW6 2 ZME	3 4	5	6	7	8 9
200 2116	Ut mt				
S0 S1 S2	S3 S4	S5	S6	S7	S8 S9
АВ	С	D	E	Ē	I
		1			

Program Description I

Program Title	Pilot Unit Conversions
	u se la character de la charac
Contributor's Name	Hewlett-Packard
Address 1000	N.E. Circle Blvd.
City Corval	lis State Oregon Zip Code 97330
Program Description	n, Equations, Variables
	This program performs unit conversions commonly encountered by
	pilots. Included are conversions between Fahrenheit and Celsius
And an an an an an an	degrees, statute miles and nautical miles, liters and gallons, and
11 	gallons of gasoline and pounds of gasoline.
	Equations:
	°F = 1.8 °C + 32
	$^{\circ}C = (^{\circ}F - 32)/1.8$
	statute miles = nautical miles/0.868978
	gallons = liters/0.2642 pounds gasoline = gallons gasoline × 6
2	
2 /2 /2 /2 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /	
· · · · · · · · · · · · · · · · · · ·	
a an	
The party sector and the transmission of the sector of the	
Operating Limits and	d Warnings
	•
, y ayay	
1.111.111.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	

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Program Description 11

Sketch(es)		ու ու որ արդարդություններին ու որ արդարդություններին համարդություններին համարդու	
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National Action of the second se		· · · · · · · · · · · · · · · · · · ·	
Anno ann an			
i in the second se		: <u></u>	i
	i ne i j	· · · · · · · · · · · · · · · · · · ·	
	• . •	· · · · · · · · · · · · · · · · · · ·	
new en presidente de la companya de	· • •	ال : سطر	
	·	······································	
Sample Problem(s)	·		
		··· ····	
Sa	mple Problems		
	Convert 10 pounds of	gasoline to gallons of gasoline.	
2.	Convert 40 gallons to		
3.	Convert 100 statute m	niles to nautical miles.	
4.	Convert 212 degrees F	Fahrenheit to degrees Celsius.	
· · · · · · · ·			
		and the second se	
		· · · · · · · · · · · · · · · · · · ·	
мая наложно наложно т		en e	
Solution(s) Sol	utions		
1. 2.	1.67 gallons 151.40 liters		
- 3.	86.90 nautical miles		
4.	100°C	· · · ·	· · · -
	······································		
Key	strokes	See Display	
1.	10 [f] [d]	1.67	
2.	40 [f] [C]	151.40	
3	100 [B]	86.90	
4. 8		100.00	
Reference (s)			
	• • •		
	is a direct trans	lation of a program from the HP-65	
<u>Aviation Pac</u> .			
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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program			
2.	Convert from			
	Fahrenheit to Celsius	° F		°C
	or statute miles to nautical miles	s.m.		n.m.
	or liters to gallons	liters		gallons
	or gallons gasoline to pounds	gal/(gas)		<u>lbs(gas)</u>
3.	Convert from			
	Celsius to Fahrenheit	°C	f A	°F
	or nautical miles to statute miles	n.m.	f B	s.m.
	or gallons to liters	gallons		liters
	or pounds gasoline to gallons	lbs(gas)		gal(gas)
4.	For next conversion go to step 3 or 4			
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					9 ,	Pr	ogram		sti	ng I				_
STEP	-	EY ENTRY	/	KEY CODE		СОМ	MENTS	STEP	KE	Y ENTRY	KEY CODE	C	OMMENTS	2
	301 302	≉lbla 3		21 11 .03	1				8 57	Х	-35			
	30Z	2		02	1			1	0 58 0 59	RTN #LBLa	24 21 16 14			
	304	-		-45	}			I	060	6	06			
	905	1		01	Ì				861	÷	-24			
	306	•		-62					062	RTN	24			
	907 200	8 ÷		8 8 34	1						 			
	108 109	- RTN		-24 24	ł									
	10	*LBLa	21	16 11	1				+		· · · · · · · · · · · · · · · · · · ·			
	911	1		01						<u>-</u>	<u> </u>	-		
	112			-62										
	13	8		0 8										
	114	<i>x</i> _		-35				070						
	915 916	3 2		03 02				┣	+		+			
	10 117	+		-55					+		<u>+</u>			
	118	RTN		24	1				+		<u> </u>	-1		
	19	*LBLB		21 12	1					· · · · · · · · · · · · · · · · · · ·		-1		
	20			-62										
	21	8		08				<u> </u>						
	22	6 8 9		0 6										
	123 124	ຽ 0		08 09				080			<u>+</u>			
	25	7		03 07							<u>†</u>			
	26	8		08										
0	27	х		-35										
	28	RTN		24				L				_		
	29	*LBLЬ	21	16 12								_		
	30 31			-62				<u> </u>	+					
	32	8 6		08 06					1					
	33	8		8 8	1									
	34	9 7		0 9				090		-				
	35			07				ļ	ļ					
	36	8		08								_		
	37 20	÷		-24						·				
	38 39	RTN *LBLC		24 21 13						·				
	40	<i>+LDLC</i>		-62								-1		
	41	ź		02										
0	42	6		86				ļ						
	43	4		84				100						
	44	.2		82				100	<u> </u>			-4		
	45 46	× RTN		-35 24								-1		
	47 47		21	24 16 13							<u></u>	-		
	48	+2020		-62										
	49	2		02					\mathbf{H}	FLAGS		SET STATU	<u>IS</u>	
	50	6		06					┝┟╧		FLAGS	TRIG	DISP	
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	55	*LBLD		21 14							3 🗆 🗗	1	n_ ~	
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0		1		2	3			5	6		7	8	9	-1
S0		S1		S2	S3		S4	S5	s	6	S7	S8	S9	\neg
A		L	в		<u> </u>	с	l	D]E				
<u> </u>			_		_	C		0			1			

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Program Description I

Program Title Turn Performance
Contributor's NameHP-67/97 Users' LibraryHewlett-Packard CompanyAddress1000 N. E. Circle BoulevardCityCorvallisStateORZip Code97330
Program Description, Equations, Variables This program calculates the G-force, turn diameter, time required to complete a 360° turn, and stall speed for an airplane as a function of an aircraft's bank angle, airspeed and normal stall speed.
$G = \frac{1}{\cos(bank)}$
Diameter = TAS ² 34208 tan (bank)
$time = \frac{0.0055 \text{ TAS}}{\tan (\text{bank})}$
stall = (normal stall) ✔ G
Operating Limits and Warnings All values assume coordinated turns and no vertical accelerations. Gusty conditions will alter the calculated results significantly.
This program has been verified only with respect to the numerical example given in <i>Program Description II</i> . User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description 11

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Sketch(es)			· · · · · · · · · · · · · · · · · · ·		
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		• • • • • • • • • • • • • • • • • • •			
Sample Problem(s)				f turn, time required fo	
a 360° turn, and s	tall speed	for an aircraf	t in a 30° a	nd 45° bank with a cruis	ing
speed of 115 knots	and a stal	1 speed of 60	knots.	a and an and an	
		······································		. An	
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	anan an		a waxware an angela a sa		
		·······			
Solution(s) Bank	G	<u>stall</u>	Diameter	time	
30°	1.15	64.47 Knots	0.67 n.m.	1 min 5 sec	
45°	1.41	71.35 Knots	0.39 n.m.	38 sec	
		••••	••••		
Keystrokes:				See Displayed:	
	[0] 00 [C]	ן ען נ			
[f] [a] 115 [A] 60	[D] ON [C]	ן [ח]		1.15	
[f] [d]	A A A A A A A A A A A A A A A A A A A			64.47	
[E]				0.67	
[f] [e]				1.05	
Reference (s)					
This pro	gram is a	direct translat	ion of a pro	ogram from the HP-65	
Aviation			-	-	
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and the second of the second sec					

Program Description 11

Sketch(es)			
Sample Problem(s)			
		CONTRACTOR CONTRACTOR CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A	ана сторина сторина и на на стори стали стали устаните на стали сталини на на на стали на на на на на на на на На постати на
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			11 - Walter and a final distribution of the second strength of the s
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		·····	
Solution(s)			
Solution(s) 45 [C] [D]		1.41	
45 [C] [D]		1.41	
45 [C] [D]			
45 [C] [D] [f] [d]		71.35	
45 [C] [D] [f] [d] [E]	· · · · · · · · · · · · · · · · · · ·	71.35 0.39	
45 [C] [D] [f] [d] [E]	· · · · · · · · · · · · · · · · · · ·	71.35 0.39	
45 [C] [D] [f] [d]	· · · · · · · · · · · · · · · · · · ·	71.35	
45 [C] [D] [f] [d] [E]	· · · · · · · · · · · · · · · · · · ·	71.35 0.39	
45 [C] [D] [f] [d] [E]	· · · · · · · · · · · · · · · · · · ·	71.35 0.39	
45 [C] [D] [f] [d] [E]	· · · · · · · · · · · · · · · · · · ·	71.35 0.39	
45 [C] [D] [f] [d] [E]		71.35 0.39	
45 [C] [D] [f] [d] [E]		71.35 0.39	
45 [C] [D] [f] [d] [E]		71.35 0.39	
45 [C] [D] [f] [d] [E]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	
45 [C] [D] [f] [d] [E] [f] [e]		71.35 0.39	

				<u></u>		
1 INITIALIZE			→Kno	ots	→M.SS*	5
TAS	STALL	BANK	∎ →G		→n.m.	_

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6.

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS	
1	Enter program				
2	Initialize		fa		
3	Input all of the following				
	true airspeed	knots		knots	
	normal stall speed	knots	B	knots	
	degrees of bank	degrees	C []	degrees	
4	Calculate acceleration		D	G	
	then turn stall speed		f d	knots	
	Calculate turn diameter			n.m.	
	then time of turn		fle	M.SS*	
5	For new case go to step 3 and change				
	appropriate inputs				
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				· · · · · · · · · · · · · · · · · · ·	
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or Program Listing I

28			71		Siam		ning i				
STEP K	EY ENTRY	KEY CODE		COMME	ENTS	STEP	KEY ENTRY	KEY CODE	СОМ	MENTS	
001	*LBLa	21 16 11							_		
002	DEG	16-21					<u></u>				
003	DSP2	-63 02				060			-		
864		24					 		-		
005	*LBLA	21 11				-			-		
006	ST01	35 01							-		
007		24							4		
008		21 12					i		4		
009	ST02	35 <i>02</i>							4		
010	RTN	24							4		
011	*LBL C	21 13					_		-		
012	ST03	35 0 3									
013	RTN	24				070					
014	*LB LD	21 14				070	· · · · · · · · · · · · · · · · · · ·		4		
015	RCL3	36 03							_		
016	COS	42	1						4		
017		52	1				}	+	4		
018	RTN	24	1			 	}		4		
019		21 16 14	1				 		4		
020	GSBD	23 14	1			 	 	+	4		1
021	٩X	54	1				 	+	4		
022	RCL2	36 02	4			 	ł		4		
023	х	-35	-			080	ļ	+	-		
824	RTN	24	4				 		-		1
025		21 15				-	l		4		
826	RCL1	36 01							4		
827	χ2	53	1					+	4		
028	3	83	-						4		
829	4	84	-						4		
030	2	02	1						4		
031	2 0	80							4		
8 32	8	0 8	1				ļ	+	4		
033	÷	-24				090	_	+	4		
834	RCL3	36 03				090		+	4		
035	TAN	43	-						4		
836	÷	-24	-						-		
837	RTN	24	-						4		-
038	≭LB Le	21 16 15					 		4		
039	RCL1	36 01	1						4		
040		-62	1		Γ	4		LABE	LS		1
041	0	00	1		A TAS	В	STALL			Ē n.m.	-
042	0	88				,	STALL	DAIR	<u> </u>		_
843	5	0 5	{		а	Þ	c	c a	KNOTS	e M.SS	
844	5	05	1		0	1	2	2 3	1	4	-
045	x	-35	1		5	6	7	, 8		9	-
046	RCL3	36 03	1		<u> </u>	<u>0</u>	/	C		3	
047	TAN	43	1								
048	÷	-24	1			 	FLAGS		SET STATUS	;	1
849	→HĦS	16 35	1				0		TRIG	DISP	1
050	RTN	24	1				†-	ON OFF			-
		1	1				†1'		DEG 🛛	FIX 🛛	
		1	1				2	1 🗆 🛛	GRAD 🗆	SCI 🗆	
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S0	S1	S2	S3		S4	S5	S6	S7	S8	S9	
	_				L	<u> </u>		T=-	<u> </u>	1	
A		В		С		D		E	I		
		I		1		1		1			1

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Program Description I

Program Title Rate of Climb and Descent	
Contributor's Name HP-67/97 Users' Library Hewlett-Packard Compa Address 1000 N. E. Circle Boulevard City Corvallis State OR	any Zip Code 97330
Program Description, Equations, Variables The inputs of this program are true airspeed (TAS), elevation and either rate-of-climb (ROC) or the distance (DIST) over we change is to occur. Outputs are rate-of-climb required to of in the specified distance or, conversely, the distance required rate-of-climb is specified.	which the elevation
$ROC = \frac{TAS (\Delta ALT)}{60 \sqrt{DIST^{2} + (\Delta ALT)^{2}}}$ $D = \frac{TAS \Delta ALT}{60 ROC}$ $DIST = \sqrt{D^{2} - (\Delta ALT)^{2}}$	
Operating Limits and Warnings Constant airspeed must be maintained throughout change of al correction is made for decreased aircraft performance at inc Inputs for ROC and TAS should be conservative, average value	creased altitude.
This program has been verified only with respect to the numerical example given in <i>Program Descrip</i> this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program upon any representation or description concerning the program material. NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY H PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERC FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR IN TIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFOR MATERIAL.	Material and without reliance KIND WITH REGARD TO THIS CHANTABILITY AND FITNESS

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Program Description II

Sketch(es)	
Sample Problem(s) 1. 15 n.m. west of Las Vegas (El. 2600 ft) lie	s a mountain pass having an
elevation of 6600 ft. Assuming a climbout	
minimum ROC that you must maintain if you w	TSI to creat the pass by 1000
feet?	
2. Assume that a different aircraft climbs out	
an airspeed of 120 knots. How far from the	pass will it be when it is
at 7600 ft?	
	···· ······· ·························
Solution(s)	a a anna anna anna anna anna anna anna
<u>1. 443.79 ft/min</u>	, <u>-</u>
2. 2.47 n.m.	
Keystrokes:	See Displayed:
1. 80 [A] 5000 [B] 15 [C] [D]	443.78
2, 120 [A] 5000 [B] 800 [D] [C]	12.47
[CHS] 15 [+]	2.53
	and the second
Reference (s)	
This program is a direct translation of	
<u>Aviation Pac</u> .	

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	z
→DIST →ROC TAS _ △ ALT _ DIST _ ROC	
S TAS △ ALT DIST ROC	. /

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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS	
1	Enter program				
	· · · · · · · · · · · · · · · · · · ·			0.00	
2	Input the following:				
_	true airspeed	TAS (knots)		TAS	
	and altitude change	△ALT (ft)	B	∆ALT	
	and either distance	DIST (n.m.)		DIST	
				ROC	
3	or rate-of-climb/descent	ROC (ft/min)	,		
	Calculate either distance			DIST (n.m.	
	or rate-of-climb/descent			ROC (ft/mi	
.4	Go to step 2 to change any values for				
	recomputation in step 3.				
				-	
		·····			
				· · · · · · · · · · · · · · · · · · ·	

97 Program Listing I

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STEP	К	EY ENTRY	KEY CODE	(- -	COMMENTS	STEP				KEY CODE	со	MMENTS	
	001			1			057	Ø		86			
	001 002	≭LBLA STO6	21 11 35 06			[058	7		07			
	<i>002</i>	RTN	24			l I	8 59	6		0 6			
	004	*LBLE	21 12			L	060	x		-35			
	<i>004</i>	ST04	35 04	1		L	061	ST05		35 05			
	006	6	06			ŀ	062	RTN		24			
	007	ē	86			ŀ	063	≭LBL a		16 14			
	008	7	0 7			Ļ	064	ST05		35 05			
	009	6	06			l	065	RTH	-	24	n		
	010	÷	-24			<u> </u>			_		4		
	011	ST07	35 07			ļ					-		
	012	RCL4	36 04			L					4		
	013	RTN	24			070	_				4		1 1
	014	*LBLC	21 13			070				· · · · · · · · · · · · · · · · · · ·	-		'
	015	F3?	16 23 03			 					-		
	016	GTOc	22 16 13			<u> </u>			_		-		1
	017	RCL6	36 86	1		<u> </u>			+		-		
	018	RCL7	36 07			J			+		4		
	019	×	-35			<u> </u>			+		-		1
	020	6	86								4		
	821	Ø	00			<u> </u>	+		+	<u> </u>	4		
	022	÷	-24				+		+		4		
	023	RCL5	36 05			080	+		-		4		
	024	÷	-24	ł					-		-		
	025	6	8 6						-		-		1
	026	Û	00				+		+		4		1
	0 27	7	0 7						+		1		
	028	6	06	1			+		1		-		
	029	x	-35	1							1		Δī ha
	030	X۵	53	1			- +		+		1		W
	031	RCL7	36 0 7	1							1		
	032	χ2	53								1		
	033	-	-45	1		090			-		1		
	034	₹X	54	1					-		1		
	035	ST03	35 03	1							1		
	036	RTN	24	1									
	037			1]		
	038	ST03	35 03										
	039	RTN	24										_
	040 011	*LBLD	21 14							LABE		Te	_
	041	F3?	16 23 83		A TAS	В	∆AL [·]	ΓĽ	C I	DIST 🛛	, KOC	E	
	042	GTOd DCL C	22 16 14 36 06		а	b			<u>د</u> 0	DIST	^I →ROC	e	
	043 044	RCL6 RCL7	36 06 36 07	1	0				2	5151		4	
	845 845	KUL7 X	-35	1		Ľ.							
	045 046	[^] 6	-35 86	1	5	6		7	7	8	3	9	
	040 047	0	00 00	1				<u> </u>			<u> </u>		-
	047 048	÷	-24	4		 	-+- r	FLAGS	1		SET STATU	IS	Ξi ,
	040 049	RCL3	-24 36 03	1		<u> </u>	- 10-	. 1403					-1 '
	050	X020 X2	50 53	-		<u> </u>	- <u> </u>			FLAGS	TRIG	DISP	
	051	RCL7	36 07	}			$+1^{1}$				DEG 🗵	FIX 🗹	
	<i>051</i> <i>052</i>	X2	50 07	1			- 2			1 🗆 🖄	GRAD	I SCI 🗆	
	053	+	-55	1		110	3			2 🗆 🗹	RAD 🗆	ENG 🗆	
	<i>0</i> 54	۶X	54	1			ΤĽ			3 🗆 🛛		<u>n_2</u>	
	055	÷	-24	1									
	056	`6	06		REGI	STERS							
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					DIST USED	RO		TAS	5	∆ALT (n.			_ ●
S0		S1	S2	S3	S4	S5		S6		S7	S8	S9	
		<u> </u>				<u> </u>			T	<u>l</u>			
A			В		С	D			E		I		
			<u> </u>			L			1				l

Program Description I

Program Title Hea	d Winds and Cross Wi	nas	· · · · · · · · · · · · · · · · · · ·
Contributor's Name	ewlett-Packard		
	E. Circle Blvd.		
City Corvallis	E. GITCLE DIVE.	State Onegon	Zip Code 97330
		State Oregon	
Program Description, E	quations, Variables		
······································	···· ·· ·· ·· ·· ·· ·· ·	• · · · · · · · · · · · · · · · · · · ·	
14.1.W 4441 1.1.1.1.1.1.	This program calculates both th	ne head wind and cross wind con	
	ponents from the aircraft headin	ig and reported winds. The program	n
	works both at altitude, where	magnetic variation must be con)-
	sidered, and at landing and tak magnetic directions rather than to	ceoff, where winds are reported i	n
	computed from	cross wind (RCW) components ar	e
	the second s		
	$HW = K \cos (D - HDG - V)$)	anda a a a a sharefu bilandanin nakanin yana a a a a a a a a a a a a a a a a a
The second s	$RCW = K \sin (D - HDG - V)$	/)	
	where		
det e su			······································
	K = the reported wind veloc D = the reported wind direc	nty tion	
	HDG = the aircraft heading		
16 · · · · · · · · · · · · · · · · · · ·	V = the magnetic variation		
an an ann an Annaichte an Annaichte an ann an ann an ann an ann an ann an a			
Operating Limits and W	arnings		
	Limits and Warnings		
	Reported winds must be less than	100 knots.	
2721.221 1	Wind directions reported by the	control tower are magnetic and the	e
	variation need not be input when	n using the program for takeoff and	d
		are reported in true directions and	d
	variation must be included to find	i me wind components.	

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Sketch(es)

Sample Problem(s)	
	Sample Problems	
	 At takeoff on runway 28 the winds are reported as 240° at 25 knots. What are the head wind and cross wind components? 	
	 At altitude the wind is reported as 160° and 40 knots. Your magnetic heading is 270°. What are the head wind and cross wind components if the magnetic variation is 15° east? 	
Solution(s)	Solutions	
	1. 19.15 knots (head wind); - 16.07 knots (left cross wind)	
	222.94 knots (tail wind); -32.77 knots (left cross wind)	
	Keystrokes See Display	'ed
	1. [f] [E] 280 [B] 240.25 [C] [D] 19.15 [E] -16.07	
	2. [f] [E] 270 [B] 160.40 [C] 15 [A] [D] -22.94 [E] -32.77	·
(Petersec (a)		
	his program is a direct translation of a program from the HP-65 viation Pac.	· · · · · · · · ·

The second second

					→Head	Intl. →Rt Crs	2
۷	Н	D	G	DDD.KK	→Head (+↓,-↑)	→Rt Crs (++,→-)	

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program			
2.	Initialize		<u></u> [E]	0.00
-				
3.	If winds are surface winds, go to			
	<pre>step 4; if not, input variation (+E,-W)</pre>	V(deg)		V
4.	Input both airplane heading and	HDG(deg)	B	HDG
	reported winds	DDD.KK*		DDD.KK
	Teported Willias	DDD KK		
5.	Calculate either or both of the			
	following: headwind		D	knots
	right crosswind		[_ E _]	knots
	.			
	NOTE: negative answers mean tailwind			
	or left crosswind			
6.	To change any inputs go to step 3 and change only the variables affected.			
	change only the variables affected.			
*	DDD.KK means direction, decimal point,			
	wind speed. 325.08 means a direction			
	of 325 degrees and a speed of 8 knots.			

STEP KEY ENTRY KEY CODE COMMENTS STEP KEY ENTRY KEY CODE COMMENTS 081 4.6.4 21 12 000	36			97ľ	'rogram		sing I				
082 ST(1) 35 01 083 FIN 24 084 FIN 24 085 ST03 35 02 086 ST03 35 02 087 FELC 21 13 088 ST03 35 02 089 ST03 35 02 0816 FEC 16 44 0817 FEC 16 44 0 0818 FEC 16 44 0 0819 EEX -23 082 2 62 2 62 082 2 62 2 62 082 16 21 0 082 FEC 16 21 0 082 FEC 16 21 0 082 FEC 16 21 0 083 FEC 16 21 0 083 FEC 16 21 0<		KEY ENTRY						KEY CODE	COM	MENTS	
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000 000 000 000 000 000 000 000 000 001 110 113 000 000 000 011 RCL2 214 011 RCL2 214 011 RCL2 3683 012 INT 15 013 RCL3 3683 014 RCL2 3683 015 + -55 016 - - 016 - - 016 - - 017 - - 018 RCL 3683 019 RCL 2115 020 + - 021 × - 022 + 44 023 RCL 2115 024 K1 16-51 025 SP2 -63 62 026 RA2 16-51 026 RA1 16-51 027 RL6 21									-		
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087 *LLC 21 13 088 \$STO3 35 83 089 RTM 24 011 RLD 21 14 011 RLD 21 14 011 RLD 21 14 011 RLD 35 83 012 INT 16 34 013 RCL1 36 82 014 RCL3 36 82 015 + -55 016 - -45 017 RCL3 36 83 018 FRC 16 44 019 EEX -23 020 2 82 021 X -35 022 X -44 023 F27 16 23 024 X -44 025 DSP2 -63 82 026 FX 16 027 rLBLE 21 16 028 GSP2 -63 82 029 GTO0 22 14 023 DEC DEC 024	005	ST02	35 0 2								
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000 FIN 24 011 RELB 21 011 RCL3 36 03 012 INT 16 34 013 RCL1 36 03 014 RCL3 36 02 015 + -55 016 - -45 017 RCL3 36 03 018 RCL3 36 02 017 RCL3 36 03 018 FE -45 070 019 FE -45 070 019 FE -45 070 021 F2 16 16 022 F2 16 16 023 REL 21 15 024 LX -51 000 025 RFN 24 000 026 GF 16 16 033 REG 16-21 000 033 REG 16-21 000 043 GE									-		
e16 $eLL3$ 22 14 $e11$ $RL1$ 36 34 $e11$ $RL1$ 36 34 $e13$ $RL1$ 36 61 70 $e14$ $RL2$ 36 61 70 $e14$ $RL2$ 36 61 70 $e15$ 45 70 41 900 $e20$ 2 $e2$ $e3$ e				1					-		
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Program Description I

Program 1	Title Flight Planning an	nd Flight Verificat	cion		
Contributo Address	or's Name Hewlett-Packa 1000 N. E. Circle Bo	ard Company, HP-67/ oulevard	'97 Users'	Library	
City	Corvallis	State	OR	Zip Code	97330
updatin speeds	ng the flight plan as it , cumulative distance flo	own, actual times f	The program For each le	computes ETA's	, ground
flown.	The ground speeds can l	be changed for each	n leg.	· · · · · · · · · · · · · · · · · · ·	
	ETA = DIST/GS + - GS = DIST/(ATA -		· · · · · ·	· · · · · · · · · · · · · · · · · · ·	
where					
	ETA = estimated t DIST = distance	time of arrival		· · · · ·	
	GS = ground speed TO = take off tin	d me (or time over la	st checkpo	int)	
	and the second sec	current checkpoint			
·· · · ·					
<u> </u>					
and can be a set of a second sec					
n.m., o whole o Flight plannio	G Limits and Warnings Distand or mph and miles). Groun unit. They are carried planning and flight ver ng usually assumes that s the calculated ETA as	nd speeds are round internally to full ification are ident the take-off time i	ded in the significan tical excep is 0.00, an	display to the ace. at that: (1) f	nearest light
this progr	ram has been verified only with respec ram material AT HIS OWN RISK, in rel representation or description concerni	iance solely upon his own in	iven in <i>Program</i> spection of the	Description II. User acc program material and w	cepts and uses vithout reliance

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Program Description 11

Sketch(es)		in a state of the		· · · · · · · · · · · · · · · · · · ·
		n and a consideration of the second sec		· · · · · · · · · · · · · · · · · · ·
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	2	: 		:
			1	
Sample Problem(s) Part 1 - Flig	ht Plan	A flight	consists of the	following 3
Sample Problem(s) Part I - Flig		legs:		101104119
		10951		
······································	Ground spee	<u>ed</u>	Distance	
Leg l	80K		20 n.m.	
Leg 2	105K		53 n.m.	
Leg 3	105K	at transformer	41 n.m.	
Make a flight plan showing the	individual leg	, times, cur	nulative times, a	and distances
at the end of each leg.				
	Distance	Total Time	e Leg Time	
Leg 1	20	:15:00	:15:00	
Leg 2	73	:45:17	:30:17	ann an
	114	1:08:43	:23:26	
······································			See Displayed:	
Solution(s) Keystrokes: 1. [f] [a] 0 [A] 80 [C	7 20 [n]		20	
[E]			0.1500	
[2] [A]			0.1500	
105 [C] 53 [D]			73	
	 a a service de la constructive de la constructive 			
[E]		0.4517		
			0.3017	
105 [C] 41 [D]		waayoo da ba da da da da da da da aa aa aa aa aa	114	
[E]			1.0843	
Reference (s)				
This program is a d	irect translat	ion of a pr	ogram from the H	łP-65
Aviation Pac.				
Aviacion rac.				

Program Description II

Sketch(es)	· · · · · · · · · · · · · · · · · · ·	
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	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
		······································
<u> </u>		
Sample Pro	blem(s) Part 2 - Flight Verification	
issume t	hat the actual flight was flown with a tal	ke off time of 10:17:00. Assume
that the	actual times of arrival at the checkpoint	ts were 10:31:10, 11:01:10 and
1:23:50	. Find the ETA's at each checkpoint using	g 80 knots as the ground speed for
the firs	t leg. After finding the actual ground sp	peed for the first leg, assume tha
the diff	erence between actual and estimated speeds	s is the wind velocity. Add the
	erence between actual and estimated speeds the 105 knots assumed GS for leg 2. Use	
winds to		
winds to	the 105 knots assumed GS for leg 2. Use	
winds to assumed	the 105 knots assumed GS for leg 2. Use	the GS calculated for leg 2 as th
winds to assumed Compute	the 105 knots assumed GS for leg 2. Use GS for leg 3.	the GS calculated for leg 2 as th
winds to assumed Compute	the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time	the GS calculated for leg 2 as th
winds to assumed Compute	the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time	the GS calculated for leg 2 as th
winds to assumed Compute	the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time	the GS calculated for leg 2 as th
vinds to assumed Compute ground s	the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A]	the GS calculated for leg 2 as th
vinds to assumed Compute ground s	the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight.	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32
vinds to assumed Compute ground s	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A]</pre>	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32 0.1410
vinds to assumed Compute ground s	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A] [R/S]</pre>	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32
winds to assumed Compute ground s	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A]</pre>	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32 0.1410
winds to assumed Compute ground s	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A] [R/S]</pre>	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32 0.1410 0.1410
winds to assumed Compute ground s	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A] [R/S] [B]</pre>	the GS calculated for leg 2 as th es, cumulative time and actual 0.2326 10.32 0.1410 0.1410 85
winds to assumed Compute	<pre>the 105 knots assumed GS for leg 2. Use GS for leg 3. ETA's for each checkpoint, actual leg time peed for the flight. [A] [f] [a] 10.17 [A] 80 [C] 20 [D] [E] 10.3110 [A] [R/S] [B] 110 [C] 53 [D]</pre>	the GS calculated for leg 2 as the es, cumulative time and actual 0.2326 10.32 0.1410 0.1410 85 73

Reference (s)		
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Program Description 11

Sketch(es)			· · · · ·	
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and a second second				
Sample Problem(s)				
Solution ETA	Actual leg time	Cumulative	Calculated ground speed	ř
Leg 1 10:32:00	14:10	14:10	85	
Leg 2 11:00:05	30:00	44:10	106	
Leg 3 11:24:22	22:40	1:06:50	109	
Solution(s) [B]		106		
[C] 41 [D]		114		
[E]		11:2422		
11.2350 [A]		0.2240		
[R/S]		1.0650		
ГоЛ		109		
	• • • waxaan	· · · · · · · · · · · · · · · · · · ·		A
Reference (s)			· · · · · · · · · · · · · · · · · · ·	
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1 TO,ATA					5
€ →LEG t	→GS	GS	 DIST	→ETA	_`/

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS	
1	Enter program				
2	Initialize		fa		
3	Input take off time (usually 0 for flight				
	planning)	H.MMSS*			
4	Input ground speed			GS	
5	Input leg length and read cumulative distance	GS (knots) eg length (n.m.)		total dist	 (n m
6	Calculate ETA			H.MMSS	\(!
7	Input ATA and read leg time.	H.MMSS			
	(for flight planning do not input ETA,	11.1403		H.MMSS	
	just press [A]).				
8	To read out total elapsed time to checkpoint				
	press [R/S]		R/S	H.MMSS	
9	To calculate GS on the last leg				
10	To use calculated GS for the next leg press			GS (knots)	
	[C] and go to step 5				
11	If you wish to change the GS for the next leg				
	go to step 4.				
12	To use the same ground speed for the next leg				
	as you used on the last leg, go to step 5				
	as you used on the fust feg, go to step 5	· · · · · · · · · · · · · · · · · · ·			
	*H.MMSS means hours, decimal point, minutes,			· · · · · · · · · · · · · · · · · · ·	
	seconds. 2.0355 is 2 hours 3 minutes and				
	55 seconds.				
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4	2

97 Program Listing I

42			97		ugram		9411	ng i				
STEP	KEY ENTRY	KEY CODE		COM	MENTS	STEP	KE	Y ENTRY	KEY CODE		COM	MENTS
00		21 16 11				[0 57	*LBLB	21 12			
00		-51	}				0 58	RCL4	36 84			
00		16-53					059	RCL1	36 01			
06		16 21 01					060	RCL2	36 02			
86		21 00 -63 00					061 060	CHS	-22			
00 00		-63 88 51					062 867	HMS+	16-55			
		22 00	1				063 064	HMS→	16 36 -21			
06		21 11	1				064 065	ENT† CLX	-21 -51			
01		36 01	1				065 866	X>Y?	16-34			
81		35 02	1				067 067	GSBb	23 16 12			
01		-41					068	+	-55			
01		35 01					069	÷	-24			
01		16 23 01					878	GTOØ	22 00			
81		22 0 4					071	*LBL6	21 16 12			
01		-41					072	2	02			
01	17 CHS	-22					073	4	64			
01	le HMS+	16-55					074	RTN	24			
01		-21					<u> </u>			1		
82		-51	{				 		ļ	4		
82		16-34					<u> </u>			4		
82		23 16 12					ł —			-		,
02		16-55				080			+	1		
8 2		36 05								1		
82		-41								1		
02		16-55 75 85								1		
02 01		35 85	1			<u> </u>				1		
02 02		16-63 21 04								1		
03		16 22 01										
03 03		-63 04	1							1		
03		51					1			1		
83		36 05										
83		22 84	Į			090	1					
03		21 13	1						ļ	1		
83		35 8 3						-		1		
8 3		22 00	1				ļ		Į	4		
03	38 ¥LBLD	21 14					<u> </u>		l	4		
03		35 04								4		
84		35-55 0 6			<u>г</u>	1			LABE	LS		
04		36 06			A USED	В	→GS		GS D		ст	E
04		22 00										e
84		21 15			ÎNITIAL	IZE	USE	D	u		t	e
84		36 8 4			^o USED	1		2	3		4	⁴ USED
04		36 03			5	6			8			9
84 84		-24 16 35										
04		36 01				L						
84		16-55						FLAGS		SET S	STATUS	
85		10 55 02					П°		FLAGS	T	RIG	DISP
05		04					\square		ON OFF		· · · · · · · · · · · · · · · · · · ·	
85		16-34				ļ	12				G ⊠ RAD □	FIX ⊠ SCI □
05		-51				110	₽-I			RA		
05		-22					- 3		3 🗆 🖾		_	n2
05		16-55					┟╌┕━					
85		22 84	L		REGIS	STERS	I		.			1
0.	1 +	2 +	3	GS		5 TOT.		6 TOT /	AL 7	8		9
	¹ t _{new}	^t old		<u>u</u>	DIST	TIM	E	DIS	Г	_		
S0	\$1	S2	S3		S4	S5	T:	S6	S7	S8		S9
		<u> </u>		10								J
Α		В		С		D			E		I	
		l										

Program Description 1

Program Title Determining In-Flight Winds	S			
Contributor's Name HP-67/97 Users' Library Address 1000 N. E. Circle Boulevard	y Hewlet	t-Packard C	ompany	
City Corvallis	State	OR	Zip Code	97330
Program Description, Equations, Variables This protection TAS, course of aircraft, ground speed and calculated from time-distance inputs. We or true. The latter must be used when the bureau. The program allows continuous of this program solves the wind triangle states.	nd heading Winds can verifying updating c	. Ground s be computed wind foreca of winds.	peed is automa as either mag	tically netic
À W	OR	$\vec{A} + (\vec{w}) = \vec{G}$ $\vec{w} = \vec{G} - \vec{A}$		
\vec{W} , \vec{A} and \vec{G} are all vector quantities reparts and heading; and ground speed and course			tion and speed	; TAS
Since both \vec{A} and \vec{G} use magnetic direction It must be corrected to true heading by				rection.
True wind direction = magnetic wind dire	ection + \	1		
Operating Limits and Warnings			·	
		· · · · · · · · · · · · · · · · · · ·		

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description 11

Sketch(es)	
	······································
Sample Problem(s) After passing over a checkpoint at course of 150° finds that he must apply 15° right of maintain his ground course. He passes over his nex 3:40:20. The TAS of his airplane is 110 knots and the local FSS asked him to report the winds, what w	correction; i.e., steer 165° to (t checkpoint 70 n.m. away at the variation is 7.5° east. If
Solution(s) 273° at 32 knots.	
Keystrokes:	See Displayed:
[f] [a] 7.5 [A] 150.110 [B] 3.0520 [C] 70 [D]	
3.4020 [C] 165 [E]	273.032
Reference (s)	
	a second se
This program is a direct translation of	a program from the HP-65
	a program from the HP-65
This program is a direct translation of <u>Aviation Pac</u> .	a program from the HP-65
	a program from the HP-65

1	INITIALIZE			STEER	5
	V (deg) MC.TAS	t1, t2	DIST	→D	. /

a date in the late

and the second second

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	Initialize		f A	0.0000
3	To obtain true winds rather than magnetic			
	winds input variation (+E, -W)	V(deg)		V
4	Input all of the following:			
	MAG course and TAS	DDD.KKK*	B	TAS
	and time at first checkpoint t_1 ,	(H.MMSS**)	C	H.MMSS
	and distance to next checkpoint	n.m.	D	H.MMSS
	and time at 2nd checkpoint t	2,(H.MMSS)	C	H.MMSS
5	To calculate wind, input heading of airplane			
	required to fly course	steer(deg)	E	DDD.KKK
6	To change any variable except time over first			
	checkpoint change the variable(s) and go to			
	step 5.			
7	To change time over first checkpoint go to			
	step 2.			
	*DDD.KK K means direction, decimal point, wind			
	speed. 325.080means a direction of 325			
	degrees and a speed of 8 knots.			
	**H.MMSS means hours, decimal point, minutes,			
	seconds. 2.0355 is 2 hours 3 minutes and			
	55 seconds.			
	······································			
		L I		

97

PPAOPAM LISHING I

46			97	rrogram	LIS	ing I			
STEP	KEY ENTR	Y KEY CODE		COMMENTS		KEY ENTRY	KEY CODE	COM	IMENTS
1001 #		21 16 11			. 05	57 ENT†	-21		
E	002 CLRG	16-53	4		05		-51		
	903 SF1	16 21 01	1		05		16-34		
	04 DSP4	-63 04	1		8 6		23 16 15		
	105 CLX	-51	1		06 06		-62	1	
	906 RTN 907 ¥lbla	24 21 11	•		8 6		05 -55		
	307 ¥LBLH 308 ST01	35 01	1		86		-33 16 34		
	00 RTN	24			06		-55		
	10 *LBLB	21 12			8 6		-63 03		
	911 INT			1	0 6		24		
	312 STO2	35 02			06		21 16 15	4	
	13 LSTX				<i>06.</i>		-51		
	014 FRC	16 44	1		87 87		03	1	ľ
	915 EEX	-23	1		07. 07.		0 6	1	
	816 3 817 ×	03 -35	1		07. 07.		00 -55	1	
	917 × 3		1		074		-55	1	
	918 3183 919 RTN	33 8 3 24			l_		<u></u>		
	320 *LBLC	21 13							
	921 ST05				┝		ļ		
	922 F1?							-	
	123 STO4	35 04			080			1	
	024 CF1	16 22 01	ł					1	
	925 RTN	24						1	
	026 *LBLD		1					1	
	827 STO6 328 RTN]	
	928 KIN 929 ¥LBLE	21 15]	
	130 RCL 3								
	931 +R						·····		
	932 ST07						+	4	
	933 X≠Y	-41			090			1	
	934 STO8	35 0 8					1	1	
	835 RCL2						1		
	036 RCL6	36 06 36 05	1					1	
	937 RCL5 938 RCL4	36 05 36 04						I	
	938 KUL4 939 CHS						L		
	840 HMS+				_		LABE	<u>ا</u>	<u> </u>
	041 HMS÷			A	В	C. TAS			E
	842 ÷	-24		V (dea	$) h^{m\alpha}$		$t_1 t_2$	DIST	STEER (DEG)
	943 →R			a	^D	с	a		e
	844 ST-7			0	1	2	3		4
	945 CLX			5	6	7	8		9
	946 RCL8 947 -	36 08 -45				i			
	047 CHS					FLAGS	۰ <u>ــــــــــــــــــــــــــــــــــــ</u>	SET STATUS	
	040 CL7					0			
	950 ÷P					-	FLAGS	TRIG	DISP
	951 EEX					1	0 ON OFF	DEG 🗹	FIX 🗹
	95 2 3					2	<u> </u>	GRAD 🗆	SCI 🗆
	953 ÷	-24			110	3		RAD 🗆	ENG n_2
	054 X≓Y						3 🗆 🗹		
	055 RCL1	36 01							
	956 +	-55	- I3	REGIS		6	7	8	9
0	VARIAT	-	-		5 t_	PIST	Έx	⁸ E _y	
SO	S1	S2	S3	S4	S5	S6	S7	S8	S9
				I				_ _	
A		В		с	D		E	I	
1		1		1 1					

Program Description I

Program Title	e Standa	ard Atmosphere				· · · ·
Contributor's	Name Hew	/lett-Packard				
Address		Circle Blvd.				
City (Corvallis		State	Oregon	Zip Code	97330
Program Des	cription, Equation	ons, Variables				
		Thisprogramconditions from pressurethat this is only an approx	altitude (PA	sed to estimate LT). It should be ed on average cond	remembered	
		The outputs, with the standard sea level condit (P/P_0) is found to be 0 inches of mercury the p 0.7375 or 22.07 inches o tion commonly used by pi	ions. For in .7375 and s ressure (P) f mercury. S	nstance, if the pr standard condition is the product of	essure ratio is are 29.92 § 29.92 and	·····
		Pressure → $P_0 = 29.9$	2 in Hg = 14	.696 psi		
		Speed of Sound $\rightarrow a_0$	= 661.51 kn	nots = 1116.4 ft/see	2	
		Density $\rightarrow \rho_0 = 0.002$.378 lb sec ² /	/ft ⁴		·····
		From 0 to 36089 feet the	following rel	ations hold	-	
		T(°C) = 15-1.981 x 1	0 ⁻³ h			····· · · ····· · · · · · · · · · · ·
		$a/a_0 = \sqrt{T/T_0} ; T_0$	= 288.15 K			• · · · · · · · · · · · · · · · · · · ·
		$P/P_0 = \int \frac{T_0 - 1.981}{T_0}$		5.2563		1 10 1 0 1 10 10 10 10 10 10 10
			٢			·
ач х — ,		$\rho/\rho_0 = \frac{P}{P_0} \frac{T_0}{T}$				· · · · · · · · · · · · · · · · · · ·
perating Lim	its and Warning					
	- x .					
					a a construction and a second se	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
					· · · · · · · · · · · · · · · · · · ·	
					· · · · · · · · · · ·	

this program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description I

ddress ity State Zip Code	rogram Title			
Sity State Zip Code Program Description, Equations, Variables For altitudes between 36,089 feet and 82,000 feet, the following relations hold $T = -56.5 ^{\circ}C$ $a/a_0 = 0.8671$ $P/P_0 = 0.2234 e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_0 = \frac{P}{P_0} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density	contributor's Name			
Program Description, Equations, Variables For altitudes between 36,089 feet and 82,000 feet, the following relations hold $T = -56.5 \ ^{\circ}C$ $a/a_{0} = 0.8671$ $P/P_{0} = 0.2234 \ e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density	Address			
relations hold $T = -56.5 \ ^{\circ}C$ $a/a_{0} = 0.8671$ $P/P_{0} = 0.2234 \ e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} - \frac{288.15}{216.65}$ where $T \text{ is temperature in degrees centigrade}$ $a \text{ is speed of sound}$ $P \text{ is pressure}$ $\rho \text{ is density}$	City	State	Zip Code	
For altitudes between 36,089 feet and 82,000 feet, the following relations hold $T = -56.5 \ ^{\circ}C$ $a/a_{0} = 0.8671$ $P/P_{0} = 0.2234 \ e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure \rho is density				\leq
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relations hold $T = -56.5 \ ^{\circ}C$ $a/a_{0} = 0.8671$ $P/P_{0} = 0.2234 \ e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} - \frac{288.15}{216.65}$ where $T \text{ is temperature in degrees centigrade}$ $a \text{ is speed of sound}$ $P \text{ is pressure}$ $\rho \text{ is density}$				
$a/a_{0} = 0.8671$ $P/P_{0} = 0.2234 e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure $\rho \text{ is density}$	For altitudes between 36, relations hold	,089 feet and 82,00	00 feet, the following	
$P/P_{0} = 0.2234 e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure $\rho \text{ is density}$	$T = -56.5 \ ^{\circ}C$			
$P/P_{0} = 0.2234 e^{-\left(\frac{h-36089}{20804.9}\right)}$ $\rho/\rho_{0} = \frac{P}{P_{0}} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure $\rho \text{ is density}$	$a/a_0 = 0.8671$			
$\rho/\rho_0 = \frac{P}{P_0} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density				
$\rho/\rho_0 = \frac{P}{P_0} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density		(1, 2, 0, 0)	· · · · · · · · · · · · · · · · · · ·	
$\rho/\rho_0 = \frac{P}{P_0} \frac{288.15}{216.65}$ where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density	$P/P_0 = 0.223$	$34 e^{-\left(\frac{n-36089}{20804.9}\right)}$		
where T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density				
T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density	$\rho/\rho_0 = \frac{1}{P_0}$	216.65	· · · · · · · · · · · · · · · · · · ·	
T is temperature in degrees centigrade a is speed of sound P is pressure ρ is density	where			
a is speed of sound P is pressure ρ is density	T is temperat	ture in degrees centi-	arada	
ρ is density	a is speed of a	sound		
h is pressure altitude	ρ is density			
	h is pressure a	altitude		
Program is valid from 0 to 82,000 feet.				
Program is valid from 0 to 82,000 feet. There is disagreement among reference sources above		2000 1000.	· · · · · · · · · · · · · · · · · · ·	
Program is valid from 0 to 82,000 feet.		· · · · · · · · · · · · · · · · · · ·		
Program is valid from 0 to 82,000 feet. There is disagreement among reference sources above				
Program is valid from 0 to 82,000 feet. There is disagreement among reference sources above			and the second	

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Sketch(es)

Sample Problem(s)	
	Carriela De 14
	Sample Problems 1. What is the temperature and speed of sound at 27,000 feet
	1. What is the temperature and speed of sound at 27,000 feet assuming a standard atmosphere?
	2. What is the density at 70,000 feet assuming a standard atmosphere?
Solution(s) $]$. $T = -$	38.49°C
	= 0.90 which yields 596.97 knots for the speed of sound.
	= 0.06 which yields a density of 1.38 x 10^{-4} lb sec ² /ft ⁴
Keystroke	s: Display:
1. 27000 [A]	Foi 00.45
661.51	[C]> 0.90 [x]> 596.97
	[E]> 0.06] [SCI]> 1.38 x 10 ⁻⁴
Reference(s) Chemica	al Rubber Company Handbook, of Chemistry and Physics,
	dition, 1966-1967, page F-120.
	norman is a diment two-lation of the second states of
Aviatio	rogram is a direct translation of a program from the HP-65 on Pac.



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program			
2.	Input pressure altitude	Palt		PALT
3.	Compute any or all of the following:			
			B	T(C°)
	Temperature Speed of sound ratio		C	a/a P/P 0
	Pressure ratio		D	P/P ⁰
	Density natio			ρ/ρο
	For new case go to step 2			
	Tot new case go to step 2			
				•
	······			

97 Program Listing I

			7/ 1-19	ogram		ing i				51
STEP	KEY ENTRY	KEY CODE	COMI	MENTS	STEP K	EY ENTRY	KEY CODE		COMME	
00		21 11			857	RTN	24			
88	2 3	83			058	*LBLC	21 13			
66	3 6	âE			0 59	F0?	16 23 00			
00	4 6	66			060	GTUc	22 16 13	1		
68	5 8	0E			861	GSBB	23 12			
80		65			062	2	02			
00		35 85			063	7	67			
06	8 X£Y?	16-35			064	3	03	1		
00	9 ETO a	22 16 11			865		-62			
01		16 22 80			066	1	01			
01		-31			067	5	85 ·			
01	2 STO1	35 ēi			968	+				
81		82			069	RCL3	36 03			
01	4 E	ē5			070	÷	-24			
01	5 E	88			071	1%	54	1		
019	6.	-62			072	RTN	24	1		
01	7 1	ei			073	*LBLc	21 16 13	1		
01	8 5	65			074	******	-62			
Ø1:	9 STOZ	35 03			075		02 08	t		
02	0 RCL1	36 01			076	8 6	00 00			
62	1 RTH	24			0 77	7	07			
02.		Zi 16-11			078	1	ēi			
82		16 21 68			079	RTN	24			
Ø2-	4 R.I	-31			080	*LBLD	21 14			
82.		35 01	ł		081 081	FØ?	16 23 00			
<i>62</i> :	62	ΘZ			081	GTOd	22 16 14			
02		Ø 8			083 083	RCL3	36 03			
02-	8 8	ēΞ			084	RCL1	36 61	1		
02.		-62			085 085	1	01			
03		01			085 086	1 Q	85			
63		05			0 87	9 8	05 08			
03		35 83			088 088	o 1	81 81	1		
03		36 01			000 089	EEX	-23			
03		24			003 090	CHS	-20 -22	1		
03		21 12	1		090 091	спз 6	68	1		
63		16 23 00			091 092	x	-35			
83		22 16 12			0 <i>32</i> 093	-	-45	-		
03		61	•		093 094	ST04	35 04	ł		
03		35			<i>0</i> 95	RCL3	36 03	1		
84		36 01			096	÷	-24	1		
04	1 1	8i			097	5	e5	1		
04	2 9	85			098 098	÷	-62	4		
04	29 38	08			0 99		02 02			
04	4 1	13			160	2 5 6	05 05	1		
<u>0</u> 4	5 EEX	-23			101	Ğ.	0E	1		
04	6 CHS	-22			102	3	03	1		
04		θE			103	γx	31			
84		-35			104	ST06	35 06	1		
Ø4		-45			105	RTN	24	1		
Ø5		24			106	*LBLd	21 16 14	1		
05		21 16 12			107	RCL1	36 61	1		
05		05			108	RCL5	36 05	1		
05		ē€			109	-	-45	1		
05		-62			110	2	ð2	1		
05		85			111	ē	0ē	1		
05	6 CHS	-22			. 112	ĕ	08	1		
					STERS					
0	1 h	2	³ 288.15		5 36089	6 D/D	7	8	9	
S0		S2	288.15 S3	T(k) S4	36089 S5	P/P_0 S6	S7		59	
	J [°]							_		
A		В	С		D		E		Ī	
]					1		1	

07 Dradman Listing II

50				<u>97 P</u>	rogran	n List i	ing 11			
52 STEP	KE	Y ENTRY	KEY CODE		COMMENTS	STEP	KEY ENTRY	KEY CODE	COMME	INTS
	113	0	63		······································					
	114	4	64 -67			170				
	115 116	9	-62 09						1	
ł	117	÷	-24]	
	118	CHS	-22 33						1	
ļ	119	e×	33						4	
	120 121	2	-62 02							
	122	2 2 3	02 02							
	123	3	02 03					· · · · ·		
	124	4	<u>ē</u> 4			180				1
	125 126	x ST06	-33 35 06						4	
	126 127	RTN	35 86 24						1	
	128	*LBLE	21-15					· ·]	
	129	F6?	16 23 00]	
	130	GT0e conn	22 16 15						4	
	131 132	GSBD RCL3	23 14 36 03						4	
	132	X	-35						1	
	134	RCL4	36 04			190			1	
	135	÷	-24						1	
	136	ETN.	24 21 16 15						4	
	137 138	*LBLe GSBd	21 16 15 23 16 14						4	
	139	RCL3	36 03						1	
	140	X	-35						1	
	141	2	0 2				· · · · · · · · · · · · · · · · · · ·]	1
	142	1 6	01 06						4	
	143 144	ь ,	-62			200			4	
	145	6	0 6						1	1
	146	5	05						1	
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	148 149	RTN R⁄S	24 51						4	
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			-						1	
			1	-1					1	
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A Pal	Lt.	B → T	C →	a/a _o	$D \rightarrow P/P_{O}$	E P/Po	0	FLAGS	TRIG	DISP
a		b	с	· 13		e	1		X	FIX L
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Program Description I



Program Description II

Sketch(es)	
	<u>· · · · · · · · · · · · · · · · · · · </u>
Sample Problem(s)	
1. For a pressure altitude of 25,500 feet	
350 knots, a recover factor of 0.8, an	d an indicated air
temperature of 5 degrees Celsius, what	
number and the true airspeed?	
2. For a pressure altitude of 40,000 feet	with all other data
-	
unchanged, what is the mach number and	the true airspeed?
Solution(s) Keystrokes	See Displayed
<u>1. 25500 [A] 350 [B]</u>	0.84
.8 [C] 5[D]	515.76
2. 40000 [A] 350 [B]	1.10
.8 [C] 5[D]	657.42
r	
Reference (s)	
	a program from the HD_65
This program is a direct translation of	a program from the HP-65
	a program from the HP-65
This program is a direct translation of	a program from the HP-65
This program is a direct translation of	a program from the HP-65



T (C°) →TAS

	-
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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program			
				_
2.	Input pressure altitude	PALT		P/P0
3.	Input calibrated airspeed in knots			
- - -	and calculate mach number	CAS	B	M
		043		М
4.	Input recovery coefficient			
	(.8 for most aircraft)	C _T		с _т
5.	Input indicated air temperature and			
	calculate true airspeed in knots	IT (°C)	D	TAS
6.	For same aircraft at same PALT go to			
	step 3. For different PALT go to step 2 and skip step 4. For totally new			
	case go to step 2.			
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Program Listing I

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STEP	K	EY ENTRY	KEY CODE		COMMENTS		STEP		Y ENTRY	KEY CO	DE	COM	MENTS
	901	*LBLA	21 11	1				57	*LBLB	21 12			
	002	3	03					58	6	0E			
	003	6	Ø6					59	6	06			
	904	Ø	00					60	1	01			
	005	8	08					61	•	-62			•
	996	9	09					62	5	05			
	907	X≰Y?	16-35					63	÷	-24			
0	888	GTŨa	22 16 11				0	64	χ2	53			
0	909	X≠Y	-41				8	65		-62			
0	910	3	03				8	66	2	02			
0	011	5	0 5				0	67	X	-35	5		
	912	6	06					68	i	01			
	913	6	06					69	+	-55			
	014	EEX	-23					70	3	03			
	915	CHS	-22					71	•	-62			
	916	6	0 6	1				72	5	05			
	817	x	-35	1				73	γx	31			
	918	CHS	-22	1				74	1	01			
	919 919	5	05	1				75	-	-45			
	919 820	1	01 01	1				75 76	RCLE	36 06			
	920 921		01 08	1				76 177	RULD ÷	-24			
		8		1									
	922		-62 az	1				78	1	01 			
	923	6	06 07	1				79	÷	-55			
	824	7	07	ł				80	•	-62			
	325	÷	-55					81	2 8	02			
	026	LSTX	16-63					82	8	08			
	827	÷	-24					83	6	Ūt			
	928	5	0 5					84	γ×	31			
	029		-62					85	1	0 i			
	230	2	02					186	-	-45			
0	931	5	05	1			6	87	5	05	5		
Ø	932	6	06	1			9	88	Х	-35	5		
0	033	3	03	1			0	89	₹X	54	ł		
0	934	γx	31				6	90	ST04	35 04	i i		
0	935	ST06	35 06				6	91	RTN	24			
	936	RTN	24					92	*LBLC	21 13			
	937		21 16 11					93	ST03	35 03			
	938	-						94	RTH	24			
	939	2	82						*LBLD	21 14			
	940	ē	00					96	2	02			
	041	8	88	1				197	7	07			
	942	6	80	I				98	3	03			
	943 943	4	00 Ū4	1				99	+	-55			
	943 944		-62	1				00 00	st05	35 05			
		9		1									
	945		8 9 - 24	1				01	RCL4	36 04			
	946 947	÷	-24	1				02 07	X۶	53			
	947	CHS	-22	1				03	2	-62			
	948	e×	33	1				04 05		02 71			
	949	2 2	-62	1				05	×.	-35			
	950	2	8 2	1				06	1	01			
	951		02	1				07	+	-55			
	952	3	83	1				0 8	÷	-24			
	953	4	84	1				8 9	RCL5	36 85			
	954	x	-35	1				10	-	-45			
0	955	ST06	35 06	1				11	RCL3	36 03			
0	956	RTN	24	L		REGI		12	х	-35			
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97 Program Listing II

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STE	P KE	Y ENTRY	KEY	CODE		COMMENTS		STEP	KEY ENTRY	KEY CODE	COM	MENTS
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Program Description I

Program 1	Title True	Air Temperat	ture and [Density Al	titude					
Contributor's Name Hewlett-Packard Company, HP-67/97 Users' Library Address 1000 N. E. Circle Boulevard										
City	Corvallis			State	OR	Zip Code	97330			
Program I	Description, Equa	ations, Variables	This pr	rogram acco	ounts for th	e compressibil	ity			

effects of high speed flight. Given the mach number (M) (which can be calculated using <u>Mach Number and True Airspeed</u>, page 53) and the aircraft recovery coefficient $(C_T = 0.8 \text{ for most aircraft})$, indicated air temperature (IT) is converted to true air temperature (T). True air temperature and pressure altitude are then converted to density altitude. For low flight mach numbers, compressibility effects are small. In such cases only temperature and pressure altitude (PALT) are needed to calculate density altitude (DALT).

$$T(k) = C_T \left(\frac{IT(K)}{0.205 M^2 + 1} - IT \right) + IT(K)$$

DALT = 145366
$$\left[1 - \left(\frac{\rho}{\rho_0}\right)^{0.235}\right]$$

where

$$\frac{1}{200} = \frac{288.15}{T(K)} \left[1 - 6.876 \times 10^{-6} \text{ PALT} \right]^{-5.256}$$

Operating Limits and Warnings The program is limited to altitudes under 36089 feet.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description 11

Sketch(es)				-
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A ANTANANAN A ANTANAN A ANTANA A ANTANA ANTANA A ANTANA A ANTANA A ANTANA A ANTANA ANTANA A ANTANA A ANTANA A ANTANA ANTAN		****		
Sample Probl	lem(s)			
	1. M = 0.87			
	$C_{T} = 0.80$			
	•			
	$IT = 8^{\circ}C$			
	PALT = 10,000 feet			
	FALT - TU,000 TEEL			
-	2. For a low speed aircraft			
	T = 12°C			
	PALT = 9,000 feet			
		· · · · · · · · · · · · · · · · · · ·		
Solution/e)	PALT = 9,000 feet	See Displayed		
Solution(s)	PALT = 9,000 feet Keystrokes:	See Displayed -22.21		
Solution(s)	PALT = 9,000 feet	-22.21	T	
Solution(s)	PALT = 9,000 feet Keystrokes:	· · · · · · · · · · · · · · · · · · ·	: T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes:	-22.21	T	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes:	-22.21	T	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E]	-22.21 7852.96	T DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E]	-22.21 7852.96	T DALT	
Solution(s)	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E]	-22.21 7852.96	T DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E]	-22.21 7852.96	T DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E]	-22.21 7852.96 10703.11	T DALT DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E] This program is a direct translation of a	-22.21 7852.96 10703.11	T DALT DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E]	-22.21 7852.96 10703.11	T DALT DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E] This program is a direct translation of a	-22.21 7852.96 10703.11	T DALT DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E] This program is a direct translation of a	-22.21 7852.96 10703.11	T DALT DALT	
	PALT = 9,000 feet Keystrokes: 187 [A] .8 [B] 8 [C] 10000 [E] 2. 12 [D] 9000 [E] This program is a direct translation of a	-22.21 7852.96 10703.11	T DALT DALT	

				-					
1					IT			PALT	5
	Μ	_	С _Т	_	→T	_	Т	_ →DALT	_ /
			•						

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	If you know the true air temperature go to			
	step 6			
3	Input the following:			
	mach number	M	A []	М
	recovery coefficient	C _T	B	Ст
4	Input indicated air temperature and calculate			
	true air temperature	IT (°C)	C 1	T (°C)
5	Go to step 7			
6	Input true air temperature	T (°C)	D	Т (К)
7	Input pressure altitude and calculate density			
	altitude	PALT	<u> </u>	DALT (ft)
8	For new case go to step 2			
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97 Program Listing I

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STEP K	EY ENTRY	KEY CODE	COM	MENTS	STEP	KE	Y ENTRY	KEY CODE	СОМ	MENTS
001	*LBLA	21 11		· · · · · · · · · · · · · · · · · · ·	T	857	6	06		
002	ST04	35 04				058	γx	31		
003	RTN	24				059	RCL6	36 06		
004	*LBLB	21 12				060	1	00 00 01		
005	ST03	35 03				061	5	05		
005						062 -				
	RTN	24					+	-55		
007	*LBLC	21 13				063	X	-35		
008	GSBD	23 14				064	RCL5	36 05		
809	RCL4	36 04				065	÷	-24		
810	χ2	53				066	•	-62		
011		-62				067	2 3	8 2	1	
012	2	0 2				068	3	03		
013	Ø	8 6				069	5	05		
014	5	85				070	$Y^{\mathbf{x}}$	31	1	
015	Х	-35				071	CHS	-22		
016	1	Ø1				072	1	Ø 1		
017	+	-55				073	+	-55		
018	÷	-24				074	1	01		
019	RCL5	36 05				075	4	04		
020	-	-45				076	5	85		
021	RCL3	36 03				077	7	03		-
022	X	-35				078	5 3 6	05 06		
023	RCL5	36 85				079	6	06		
024	+	-55				080	x	-35		
025	ST05	35 05				Ø81	RTH	24		·
026	RCL6	36 86				1	I	21		
. 027	-	-45]	
028	RTN	24							1	
	*LBLD	21 14				1			1	1
029	+LDLD 2	02							1	
030 031	7	07							1	,
031 032	3	07 03				1			1	
032 033						1				
033 034	• 1	-62			090				1	
034 035	5	01 05							1	
035 036	ST06								1	
030 037	5106	35 <i>06</i> -55							1	
037	\$T05	35 05							1	
039	RTN	24]	
03J 040	*LBLE	21 15							1	
040 041	+LBLE 6	21 15 06						LABE		
042	0	-62		A M	В	CT	c	IT D	T	E PALT
843	8	08		а	b		с	d	····· [e
043	7	07								
045	, 9	89		o	1		2	3	ľ	4
846	EEX	-23		5	6		7	8		9
047	CHS	-22		L	I			iiiiiiiii		
048	6	06				+		· ·	057 074700	
849	x	-35			L	10	FLAGS	1	SET STATUS	
050	CHS	-22				ΗĽ		FLAGS	TRIG	DISP
8 51	1	01			 	H^{-}		ON OFF		
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054	-	-62				-3		3 🗆 🛛		n_2_
05 5	2	02				┟┶━				
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A	I	В			D		E	<u> </u>	I	L
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Program Description I

Program Title Lowest Usable Flight	Level]
Contributor's Name Hewlett-Packard Con Address 1000 N. E. Circle Boule	vard			07220
City Corvallis	State	OR	Zip Code	97330
				flight
Program Description, Equations, Variables This level for aircraft flying above 18,00 altimeter setting.				
For flights operating at altitudes in				1
29.92 and aircraft are assigned fligh levels with true altitude above sea l at which a setting of 29.92 will plac	evel, the low	est usable	flight level	is found
The lowest usable flight level is 18 than or equal to 29.92 inches of merc		the altimet	er setting is	greater
For altimeter settings below 29.92		· · · · · · · · · · · · · · · · · · ·		
LUFL = 18,000 + 50	00 x INT (60.8	2 – 2 x ASE	Т)	
ASET = altimeter s	etting			
INT = integer func	tion			
Operating Limits and Warnings				

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description 11

Sketch(es)										. (
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Sample Proble	em(s)	For the	<u>e fol</u>	lowing	altimeter	r settings,	, find t	he lowest	t usable	
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		and a second statistics and an and a								
									1. 22 Warran	
Solution(s)	Keyst	rokes:					See Dis	played:		
Solution(s)			:1							
Solution(s)	29.92	[B] [C		• • • • • • • • • • • • • • • • • • •			18000			
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
Solution(s)	29.92 29.55	[B] [C	C]				18000		· · · · · · · · · · ·	
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500		•••••	
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
Solution(s)	29.92 29.55	[B] [C [B] [C	C]				18000 18500			
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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	Input altimeter setting	In Hg	B	in Hg
3	Calculate lowest usable flight level		C	LUFL (ft)
4	For new case go to step 3			
5	To recall altimeter setting		D	in Hg
5				
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			97 Prog	gram Li	sting I			65
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				REGISTERS				
0	1	2	3 4	5	6	7	⁸ ALT SET	9
SÓ	S1	S2	S3 S4	4 S5	S6	S7		S9
A	I	В	l c	D	I	 :	<u> </u>	

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