Commercial Flight Systems
Minneapolis Operation

Honeywell

Honeywell

COMMERCIAL FLIGHT SYSTEMS
MINNEAPOLIS OPERATION
CAGE CODE 65507

SPECIFICATION NUMBER ES 32496-04

PART ______ OF ______

TYPE:

- [ ] SYSTEM
- [ ] TEST
- [ ] DEVELOPMENT
- [ ] PRODUCT
- [ ] MATERIAL
- [ ] PROCESS
- [X] ENGINEERING

TITLE: Nav Algorithm Spec - LASEREF SW

	SIGNATURES		TITLE	DATE
PREPARED BY	D. Neverman	D. Neverman		9-29-88
CHECKED BY	K. Broen	K. Broen		9-28-88
APPROVED BY	D. Colby	D. Colby		9-28-88

- [ ] CUSTOMER FUNDED — CONTRACT NUMBER
- [X] HONEYWELL FUNDED — PROJECT NUMBER 1274

REVISIONS

LTR	DESCRIPTION	DATE	APPROVAL	LTR	DESCRIPTION	DATE	APPROVAL
–	CONTROL/EO 88-30550	88-10-31	HG1095A001				

PAGE	1	Thru 102	
REVISION	–	–	–
PAGE			
REVISION			

-695 REV 7/88

CONTROL C

CONTENTS

NM26	10	79
NM17	10	80
NM43	10	81
NM42	10	82
NM31	5	83
NM64	5	85
SM70	1	86
SM72	1	87
NM55	1	88
NM65	1	89
NM28	1	90
NM29	1	91
NM30	1	92
NM46	1	93
NM53	1	94
NM35	1	95
NM36	1	97
NM37	1	98
NM38	1	100
NM40	1	101
SUBR	--	102

NM47	57	COMP BODY ACCEL	
NM49	59	COMP TKRT	
NM52	42	COMP ACCEL INCR. OUTPUTS	
NM53	95	COMP MAG DEVIATION	
NM54	65	COMP PSIC, DRIFT, GAMI	
NM55	88	FILTER GYRO TEMP	
NM57	46	ACCEL SIG. CORR FOR IRU MTG	1
NM58	50	GYRO SIG. CORR FOR IRU MTG	
NM59	56	COMP BODY RATES ROLL AND PITCH RATES	1
NM62	62	FILTER & SCALE 50 HZ OUTPUTS	
NM63	68	FILTER & SCALE 25 HZ OUTPUTS	
NM64	85	FILTER 5HZ OUTPUTS	
NM65	89	FILTER ACCEL TEMP	
NM66	45	COMP BW FILTERED ACCEL	
NM67	72	DET ANG. VEL OF EARTH FIXED RAME WRT INERTIAL	
NM68	74	DET ANG. ROT OF LOCAL VERT FRAME WRT INERTIAL	
SUBR	102	SUBROUTINES REQUIRED	

SYMBOL	DEFINITION
A(I)	INTERMEDIATE PARAMETER FOR WALKING WINDOW AND BUTTERWORTH FILTERED ACCELERATIONS
A11,A12,...A33	ELEMENTS OF INDREMENTAL ROTATION MATRIX
AAT	ALONG-TRACK HORIZONTAL ACCELERATION
AATO	ALONG-TRACK HORIZONTAL ACCELERATION OUTPUT
ABW(I)	BUTTERWORTH FILTERED ACCELERATIONS
ABWI1,...ABWI3	COMPENSATED BUTTERWORTH FILTER ACCEL SIGNALS
ACRDXX,ACRDYY, ACRDXY	INTERMEDIATE PARAMETERS FOR LOCAL EARTH RATE
ACT	CROSS-TRACK HORIZONTAL ACCELERATION
ACTO	CROSS-TRACK HORIZONTAL ACCELERATION OUTPUT
AERX,AERY,AERZ	CALIBRATION MODE OUTPUTS
AFPTH	FLIGHT-PATH HORIZONTAL ACCELERATION
AFPTHO	FLIGHT-PATH HORIZONTAL ACCELERATION OUTPUT
AL	INTERMEDIATE PARAMETER FOR ROTATION MATRIX
ALAT	BODY LAT.ACCELERATION
ALATO	BODY LAT. ACCELERATION OUTPUT
ALDP	INTERMEDIATE PARAMETER FOR ROTATION MATRIX
ALFA	WANDER ANGLE (AZIMUTH ANGLE OF LOCAL VERTICAL COMPUTATIONAL FRAME RELATIVE TO NORTH)
ALFAB	BUFFERED WANDER ANGLE
ALONG	BODY LONG.ACCELERATION
ALONGO	BODY LONG. ACCELERATION OUTPUT
ANORM	BODY NORMAL ACCELERATION
ANORMC	BODY NORMAL ACCELERATION CORRECTED FOR G BIAS
ANORMO	BODY NORMAL ACCELERATION OUTPUT
ARXED,ARYED, ARZED	ANGULAR VELOCITIES OF EARTH FRAME WITH RESPECT TO INERTIAL FRAME
ATFICFLG	ACCEL TEMP FILTER INIT COMPLETE FLAG
AVERT	VERTICAL ACCELERATION
AVERTO	VERTICAL ACCELERATION OUTPUT
AVX,...AVZ	AVERAGE VELOCITIES IN LOCAL VERTICAL FRAME
AWW(I)	WALKING WINDOW FILTERED ACCELERATION
AX,AY,AZ	NET ACCELERATION COMPONENTS IN LOCAL VERTICAL F
BG1,BG2,BG3	CONSTANT FOR ALTITUDE STABILIZATION COMPUTATION
BT	INTERMEDIATE PARAMETER FOR ROTATION MATRIX
BWS1(I),BWS2(I)	SYNCHRONIZED BUTTERWORTH FILTERED ACCELERATION
C10	INTERMEDIATE PARAMETER FOR SYSTEM ACCELERATION ERROR COMPUTATION
C11,C12,...C33	DIRECTION COSINES OF A/C WITH RESPECT TO LOCAL
C11C,C12C,....	DIRECTION COSINES OF A/C CORRECTED FOR SYSTEM MOUNT MISALIGNMENTS
C11CB,C21CB	BUFFERED DIRECTION COSINE OF A/C CORRECTED FOR SYSTEM MOUNT MISALIGNMENTS
CA	CONSTANT EQUAL TO COMPUTATION CYCLE FREQUENCY (
CALF	COSINE OF WANDER ANGLE

CALFB	BUFFERED COSINE OF WANDER ANGLE	
CDVX,CDVY,CDVZ	VELOCITY CORRECTIONS FOR GRAVITY,CORIOLIS,AND ALTITUDE STABILIZATION ACCELERATIONS	
CDVZO	VELOCITY CORRECTION IN Z AXIS FOR GRAVITY AND CORIOLIS. USED FOR OUTPUT COMPUTATIONS	210 210
CHF	FILTER COEFICIANT FOR TRUE HEADING PARAMETERS	
CLAT	INTERMEDIATE PARAMETER FOR COSINE LATITUDE	
CLAT2	INTERMEDIATE PARAMETER FOR COSINE LATITUDE (POLAR NAV IMPROVEMENT FIX)	
CLATI	INTERMEDIATE PARAMETER FOR COSINE LATITUDE	
CLATL	LIMITED CLATI	
CLATX	COSINE OF COMPUTED LATITUDE	
CLOND	COSINE OF COMPUTED LONGITUDE	
CLONX	COSINE OF LONGITUDE CHANGE COMPUTED FROM D-MATRIX	
CONSM1,CONSM2, CONSM3	CONING SUMS	
CQ	GYRO QUANTIZATION/DEADBAND CONSTANT	
CRDXX,CRDYY,CRDZZ	INTERMEDIATE PARAMETERS FOR LOCAL LEVEL EATH RATE	
CS1,CS2,CT2	BODY ACCELERATION FILTER CONSTANTS	
D11,D12,...D33	DIRECTION COSINES OF LOCAL VERTICAL FRAME WITH RESPECT TO EARTH FIXED FRAME	
D21R,D22R,D23R	ELEMENTS OF D MATRIX ROUNDED TO 16 BITS	
D21SQ	D21 SQUARED	
D22SQ	D22 SQUARED	
D23SQ	D23 SQUARED	
DEGPIRAD	CONSTANT TO CONVERT DEGREES TO PIRADS	
DEL1	INTEGRATION INTERVAL	
DELT	COMPUTER MAJOR ITERATION INTERVAL	
DLAT	DIFFERENTIAL CHANGE IN LATITUDE	
DLON	DIFFERENTIAL CHANGE IN LONGITUDE	
DNCT	PLC RESET PULSE LIMIT REDUCTION CONSTANT	
DR1C,DR2C,DR3C	CONING CORRECTIONS TO 3 GYROS	
DR1I,DR2I,DR3I	INPUT CHANNEL CORRECTIONS TO 3 GYROS	
DR1Q,DR2Q,DR3Q	QUANTIZATION CORRECTIONS TO 3 GYROS	
DR1S,DR2S,DR3S	GYRO START UP AND TEMPERATURE DEPENDENT CORRECTIONS	
DR1SI	GYRO CORRECTION (STARTUP+TEMP DEPENDENT) PARAMETERS	
DR1SIP,...DR3SIP	INTERMEDIATE PAST VALUE OF GYRO CORRECTION (START UP+TEMP.DEP.) PARAMETERS	
DR1T,DR2T,DR3T	SYSTEM LEVEL GYRO CORRECTIONS	
DR1TO	INTERMEDIATE VARIABLE	
DRIFT	DRIFT ANGLE	
DRIFTF	FILTERED DRIFT ANGLE OUTPUT	
DRIFTP	PAST VALUE OF DRIFT ANGLE	
DRKXX,DRKYY,DRKZZ	GYRO ROTATIONS DUE TO CASTING DISTORTIONS	
DRX,DRY	ANGULAR ROTATIONS OF THE LOCAL VERTICAL FRAME WITH RESPECT TO THE EARTH FIXED FRAME	
DRXL,DRYL,DRZL	ANGULAR ROTATIONS OF THE LOCAL VERTICAL FRAME WITH RESPECT TO THE INERTIAL FRAME	

DRXL1,DRYL1,DRZL1	INTERMEDIATE VALUES
DRXL1P,..,DRZL1P	PAST VALUES OF INTERMEDIATE VALUES
DSMAG	MAGNETIC CORRECTION TO TRUE HEADING
DVX,DVY,DVZ	INCREMENTAL VELOCITIES RESOLVED INTO LOCAL VER
DVXC,DVYC	INCREMENTAL VELOCITIES IN LOCAL FRAME CORRECTI FOR GRAVITY ,CORIOLIS AND ALTITUDE STABILIZA ACCELERATIONS
DVXP,DVYP,DVZP	PAST VALUES OF INCREMENTAL VELOCITIES RESOLVED INTO LOCAL VERTICAL FRAME
E	ELLIPTICITY OF EARTH
E11,E12,E22	ELEMENTS OF ORTHOGONALITY CORRECTION MATRIX
E3,E4	NORMALIZATION CORRECTORS
ELATX	VALUE OF LATITUDE COMPUTED FROM D MATRIX
ELATXF	FILTERED LATITUDE OUTPUT
ELATXP	PAST VALUE OF LATITUDE CALCULATED FROM D-MATRI
ELFLG	EXTREME LATITUDE FLAG
ELOND	DISPLAYED VALUE OF LONGITUDE
ELONO	INITIAL VALUE OF LONGITUDE (INPUT)
ELONX	VALUE OF LONGITUDE CHANGE COMPUTED FROM D MATR
ELONXF	FILTERED LONGTITUDE OUTPUT
ELONXP	PAST VALUE OF LONGTITUDE CALCULATED FROM D-MATI
F1,F2,F3	GYRO STARTUP TRANSIENT FUNCTIONS
F05IFLG	FIRST PASS FLAG FOR FILTER INIT.(05 HZ)
F10IFLG	FIRST PASS FLAG FOR FILTER INIT.(10 HZ)
F25IFLG	FIRST PASS FLAG FOR FILTER INIT.(25 HZ)
F50IFLG	FIRST PASS FLAG FOR FILTER INIT.(50 HZ)
FCFLG	FIRST CYCLE FLAG FOR NM68
FCYLFG	FIRST CYCLE FLAG FOR NM40
FICFLG	GYRO TEMP FILTER INIT COMPLETE FLAG
FSC(I)	FLAGS FOR ACCEL WW/BUTTERWORTH FILTER SYNCHRONI
FTS2G	CONSTANT TO CONVERT FT/SEC2 TO G'S
FTSFTM	CONSTANT TO CONVERT FT/SEC TO FT/MIN
G1,G2,G3	GRAVITY COMPUTATION CONSTANTS
GAMI	INERTIAL FLIGHT PATH ANGLE
GAMIF	FILTERED INERTIAL FLIGHT PATH ANGLE OUTPUT
GAMIP	PAST VALUE OF INERTIAL FLIGHT PATH ANGLE
GRID1,...GRID4	GRID CORNER VALUES (USED IN SUBR MAGNUM)
GD	DOWN COMPONENT OF GRAVITY(MASS ATTRACTION PLUS CENTRIPETAL)
H	AIRCRAFT ALTITUDE
H1,H2	SIN AND COSIN OF FILTERED TRUE HEADING COMPONENTS
H3	RECIPROCAL OF PRODUCT OF CLATX WITH CTHT
H4	FIRST ESTIMATE OF TRUE HEADING
HD	ALTITUDE RATE
HERR	H MINUS H0
HESW	ALTITUDE LOOP HYSTERISIS SWITCH FLAG
HFSC(I)	FLAG FOR ACCEL WW/BUTTERWORTH FILTER SYNCHRONIZ

HO	BITE COMPENSATED REFERENCE ALTITUDE
IADD	INTERMEDIATE PARAMETER USED IN MAGNETIC DEVIATION
IGRID	MAGNETIC DEVIATION CONSTANT
ILAT	INTERMEDIATE LATITUDE PARAMETER
IPI	RECIPROCAL OF PI
IVRTACL	INTEGRATED VERTICAL ACCEL
JLONG	INTERMEDIATE PARAMETER USED IN MAGNETIC DEVIATION
JXM,JYM,JZM	SYSTEM MISALIGNMENT PARAMETERS
KT	GYRO TEMPERATURE FILTER CONSTANT
KTAS	KNOTS TRUE AIRSPEED
KTASB	BUFFERED KNOTS TRUE AIRSPEED
KT05,..,KT50, KT25H	OUTPUT FILTER CONSTANTS
KXA1,KYA2,KZA3	GYRO TRANSIENT AMPLITUDE COEFFICIENTS
KXB,KYB,KZB	GYRO BIAS CALIBRATION COEFFICIENTS
KXBI,KYBI,KZBI	GYRO INITIAL BIAS COEFFICIENTS
KXBSI,...KZBSI	GYRO SYSTEM BIAS COEFFICIENTS
KXBT,KYBT,KZBT	GYRO BIAS TEMPERATURE COEFFICIENTS (BLOCK TEMP)
KXBT1,KYBT1,KZBT1	GYRO BIAS TEMPERATURE COEFFICIENTS
KXBT2,KYBT2,KZBT2	GYRO BIAS TEMPERATURE COEFFICIENTS
KXBT3,KYBT3,KZBT3	GYRO BIAS TEMPERATURE COEFFICIENTS
KXBT4,KYBT4,KZBT4	GYRO BIAS TEMPERATURE COEFFICIENTS
KXGTR,KYGTR,KZGTR	GYRO BLOCK GRADIENT RATE TEMPERATURE BIAS COEFFICIENTS
KXPT,KYPT,KZPT	GYRO PICKOFF TEMPERATURE COEFFICIENTS
KXX,KYY,KZZ	GYRO SCALE FACTOR CALIBRATION COEFFICIENTS
KXXA1,KYYA1,KZZA1	GYRO CASTING G-SENSITIVE ROTATION DISTORTION COEFFICIENTS
KXXA2,KYYA2,KZZA2	GYRO CASTING G-SENSITIVE ROTATION DISTORTION COEFFICIENTS
KXXA3,KYYA3,KZZA3	GYRO CASTING G-SENSITIVE ROTATION DISTORTION COEFFICIENTS
KXXI,KYYI,KZZI	GYRO INITIAL SCALE FACTOR COEFFICIENTS
KXXR,KYYR,KZZR	GYRO ROTATIONS DUE TO NET CASTING DISTORTION
KXXRP,...KZZRP	PAST VALUE OF GYRO ROTATIONS DUE TO CASTING DISTORTIONS
KXXSI,...KZZSI	GYRO SYSTEM S.F. COEFFICIENTS
KXXT,KYYT,KZZT	GYRO TEMPERATURE DEPENDENT SCALE FACTOR COEFFICIENT
KXYA1,KXYA2,....	GYRO ACCELERATION EFFECT MISALIGNMENT COEFFICIENTS
KXYI,KYZI,KZXI KXZI,KYXI,KZYI	GYRO INITIAL MISALIGNMENT COEFFICIENTS
KZYP,KZXP,KYZP KYXP,KXZP,KXYP	GYRO PRESSURE DEPENDENT MISALIGNMENT COEFFICIENTS
LATL	ELATX LIMITED TO 72 DEG
LXB,LYB,LZB	ACCELEROMETER BIAS CALIBRATION COEFFICIENTS
LXBCA	
LYBCA,LZBCA	L(X)B*CA
LXBD,LYBD,LZBD	SCALED ACCELEROMETER BIAS CALIBRATION COEFFICIENTS
LXBI,LYBI,LZBI	ACCELEROMETER INITIAL BIAS COEFFICIENTS

LXBSI,...LZBSI LXBSID,	ACCELEROMETER SYSTEM BIAS COEFFICIENTS	
LYBSID,LZBSID	SCALED ACCELEROMETER INITIAL BIAS COEFFICIENTS	1L
LXBT,LYBT,LZBT	ACCELEROMETER TEMPERATURE DEPENDENT BIAS COEFFICIENTS	
LXBT1,LYBT1,LZBT1 LXBT2,LYBT2,LZBT2 LXBT3,LYBT3,LZBT3 LXBT4,LYBT4,LZBT4	ACCELEROMETER TEMPERATURE EFFECT BIAS COEFFICIENTS	
LXX,LYY,LZZ	ACCELEROMETER SCALE FACTOR CALIBRATION COEFFICIENTS	
LXXD,LYYD,LZZD	ACCELEROMETER DIGITIZER S.F. COEFFICIENTS	
LXXDI,...LZZDI	ACCELEROMETER DIGITIZER INITIAL S.F. COEFFICIENTS	
LXXI,LYYI,LZZI	ACCELEROMETER INITIAL SCALE FACTOR COEFFICIENTS	
LXXSI,...LZZSI	ACCELEROMETER SYSTEM S.F. COEFFICIENTS	
LXXT,LYYT,LZZT	ACCELEROMETER TEMPERATURE DEPENDENT SCALE FACTOR COEFFICIENTS	
LXXT1,LYYT1,LZZT1 LXXT2,LYYT2,LZZT2 LXXT3,LYYT3,LZZT3 LXXT4,LYYT4,LZZT4	ACCELEROMETER TEMPERATURE EFFECT SCALE FACTOR COEFFICIENTS	
LXY,LYZ,LZX LXZ,LYX,LZY	ACCELEROMETER MISALIGNMENT CALIBRATION COEFFICIENTS	
LZYP,LZXP,LYZP LYXP,LXZP,LXYP	ACCELEROMETER PRESSURE DEPENDENT MISALIGNMENT COEFFICIENTS	
LXYA1,LXYA2 LXYA3,.....	ACCELEROMETER ACCELERATION EFFECT MISALIGNMENT COEFFICIENTS	
LXYI,LXZI,....	ACCELEROMETER INITIAL MISALIGNMENT COEFFICIENTS	
LXYT,LXZT,...	ACCELEROMETER SENSOR TEMPERATURE DEPENDENT MISALIGNMENT COEFFICIENTS	
LXYTXX,LYZTYY LZXTZZ,LXZTXX, LYXTYY,LZYTZZ	ACCELEROMETER TEMPERATURE EFFECT MISALIGNMENT COEFFICIENTS	
NACCL1..NACCL3	ACCELEROMETER COUNTS	
NACCSF	NOMINAL ACCELEROMETER SCALE FACTOR	
NCONE1..NCONE3	CONING CORRECTION WORDS	
NCT(X)	PLC RESET PULSE COUNT LIMIT	
NCTO	INITIAL VALUE OF NCT(X)	
NGYRO1..NGYRO3	GYRO COUNTS	
NGYRO1A,NGYRO2A ...NGYRO3A	GYRO COUNT FOR PLC RESET DATA LOSS (PREVIOUS PAST VALUE)	
NGYRO1B,NGYRO2B NGYRO3B	PAST VALUES OF GYRO COUNTS FOR PLC CORRECTION	
NLIM	MAXIMUM VALUE OF NCT(X)	
NP1,...NP4	MAGNETIC MAP GRID CORNER LOCATIONS(SAME AS NP(I))	
NRESA1,...NRESA3	ACCELEROMETER DIGITIZER INTERGRATER RESIDUALS	
OFFLAT	MAGNETIC DEVIATION CONSTANT	
ORIENT	BOX ORIENTATION STATUS WORD	
PCRDXX,PCRDYY, PCRDXY	PAST VALUES OF CRDXX,CRDYY,CRDXY	

PHI	TRUE A/C ROLL ANGLE	
PHI1,PHI2,PHI11	GYRO STARTUP TIME CONSTANT COEFFICIENTS	
PHID	AIRCRAFT INERTIAL ROLL RATE	
PHIDF	FILTERED INERTIAL ROLL RATE OUTPUT	
PHIF	FILTERED A/C ROLL ANGLE	
PHIP	PAST VALUE OF A/C ROLL ANGEL	
PHISTD	PAST ROLL ANGEL VALUE FOR HIGH PITCH CORRECTION	
PLCCMDX,PLCCMDY, PLCCMDZ	GYRO PLC COUNTERS	
PLCCTRX,PLCCTRY, PLCCTRZ	GYRO PLC RESET COMMANDS	
PLCREQX,PLCREQY, PLCREQZ	PLC RESET REQUEST SIGNAL	
P,Q,R	BODY RATES	
PO,QO,RO	BODY RATE OUTPUTS	
PP,QP,RP	PAST BODY RATE VALUES	
PPP,QPP,RPP	PAST-PAST BODY RATE VALUES	
PPPP	PRESSURE AT PRESENT POSITION	
PR1,PR2,PR3	GYRO INCREMENTAL ROTATIONS OVER PREVIOUS COMP INTER	
PRV1,PRV2,PRV3	PAST VALUES OF RESIDUAL VELOCITIES	
PRXED,PRYED,PRZED	PAST VALUES OF RXED,RYED,RZED	
PSI	TRUE HEADING ANGLE	
PSIC	PLATFORM HEADING	
PSICF	FILTERED PLATFORM HEADING OUTPUT	
PSICP	PAST VALUE OF PLATFORM HEADING	
PSIF	FILTERED TRUE HEADING ANGLE	
PSIM	MAGNETIC HEADING	
PSIMF	FILTERED MAGNETIC HEADING OUTPUT	
PSIMP	PAST VALUE OF MAGNETIC HEADING OUTPUT	
PSIP	PAST VALUE OF TRUE HEADING ANGLE	
PSISTDD	HIGH PITCH ANGLE HEADING CORRECTION INTERMEDIATE VARIABLE	
PSIT	AIRCRAFT TRACK ANGLE RELATIVE TO NORTH	
PSITO	INTRMEDIATE TRUE TRACK ANGLE VARIABLE	
PSITF	FILTERED A/C TRACK ANGLE RELATIVE TO NORTH OUTPUT	
PSITH	PRECISION TRUE HEADING	37
PSITM	MAGNETIC TRACK ANGLE	
PSITMF	FILTER MAGNETIC TRACK ANGLE OUTPUT	
PSITMP	PAST VALUE OF MAGNETIC TRACK ANGLE	
PSITP	PAST VALUE OF A/C TRACK ANGLE RELATIVE TO NORTH	
PSIW	WIND DIRECTION IN LOCAL VERTICAL FRAME	
PSIWF	FILTERED WIND DIRECTION OUTPUT	
PSIWP	PAST VALUE OF WIND DIRECTION	
PTH1,PTH2	COS AND SIN OF TRUE HEADING COMPONENTS	37
PTH1F,PTH2F	FILTERED COS AND SIN OF TRUE HEADING COMPONENTS	37
PTH1P,PTH2P	PASSED VALUE OF COS AND SIN OF TRUE HEADING COMPONENTS	37

PVS	POTENTIAL VERTICAL SPEED
PVXD,...PVZD	PAST VALUE OF CORIOLIS PLUS GRAVITY PLUS ALTI STABILIZATION ACCELERATIONS
PVZDO	PAST VALUE OF VZDO. USED FOR OUTPUT COMPUTATI
QQ	INTERMEDIATE GRAVITY COMPONENT VARIABLE
QX,QY,QZ	INTERMEDIATE PARAMETER FOR GYRO BIAS PULSE WE
R1,R2,R3	GYRO INCREMENTAL ROTATIONS
R1C,R2C,R3C	CORRECTED GYRO INCREMENTAL ROTATIONS
R1CR,R2CR,R3CR	ORTHOGONAL ROTATION ANGLES
R1P,...R3P	PAST VALUE OF GYRO INCREMENTAL ROTATIONS
R1PP,...R3PP	PAST-PAST VALUES OF R1,R2,R3
R1R1,R2R2,R3R3	ROUNDED PRODUCTS OF CORRECTED GYRO INCREMENTAL ROTATIONS (R1C,ETC.)
R1R2,R1R3,R2R3	ROUNDED PRODUCTS OF CORRECTED GYRO INCREMENTA ROTATIONS (R1C, ETC.)
RADDEG	CONSTANT TO CONVERT RADIANS TO DEGREES
RADEG50	CONSTANT EQUAL TO RADDEG*50
RCLATL	RECIPROCAL OF CLATL
RG1	RECIPROCAL OF G1
RLAT,RLONG	INTERMEDIATE PARAMETER USED IN MAGNETIC DEVIA
RQX,RQY,RQZ	INTERMEDIATE PARAMETERS DERIVED FROM RQX1,... FOR GYRO PULSE WEIGHTS
RQX1,RQY1,RQZ1	RECIPROCAL OF QX,QY,QZ
RRE	RECIPROCAL OF EARTHS EQUATORIAL RADIUS
RUX,RUY,RUZ	RECIPROCALS OF UX,UY,UZ
RUX1,RUY1,RUZ1	RECIPROCAL OF UX,UY,UZ (INTERMEDIATE VALUE)
RUXNACC, RUYNACC,RUZNACC	RU(X)*NACCSF
RUXWTR, RUYWTR,RUZWTR	RU(X)*WTR
RV1,RV2,RV3	RESIDUAL VELOCITIES
RVG	RECIPROCAL GROUND SPEED
RVGSQ	RECIPROCAL OF GROUND SPEED SQUARED
RVG1,RVG2	INTERMEDIATE PARAMETER FOR RVG COMPUTATION
RVSPD	RECIPROCAL TOTAL SPEED
RVSPD1,RVSPD2	INTERMEDIATE PARAMETER FOR RVSPD COMPUTATION
RXD1,RYD1	FIRST LEVEL LOCAL VELOCITY COMPONENTS
RXD2,RYD2	SECOND LEVEL LOCAL VELOCITY COMPONENTS
RXED,RYED,RZED	ATTITUDE LOCAL LEVEL COMPONENTS OF EARTH RATE
S12,S13,S23	ROTATION PRODUCT SUMS FOR ROTATION ANGLE COMPUTATIONS
SALF	SINE OF WANDER ANGLE
SALFB	BUFFERED SINE OF WANDER ANGLE
SECTHT	SECANT OF PITCH ANGLE
SLATX	SINE OF COMPUTED LATITUDE
SLONX	SINE OF LONGITUDE CHANGE COMPUTED FROM D-MATR
SPHI,CPHI	SINE AND COSINE OF A/C ROLL ANGLE
SPSI,CPSI	SINE AND COSINE OF A/C HEADING ANGLE

STHT,CTHT	SINE AND COSINE OF A/C PITCH ANGLE
SX,SY,SZ	CUMULATIVE VELOCITIES USED TO COMPUTE SYSTEM ACELLERATION ERRORS
T1,T2	CALIBRATION MODE TIME INTERVAL CONSTANTS
TAS	AIRCRAFT TRUE AIR SPEED
TASB	BUFFERED AIRCRAFT TRUE AIRSPEED
TSREQX,TSREQY, TSREQZ	GYRO PATH LENGTH CONTROL TIMER
THBTO	TIMER MAXIMUM VALUE
THT	TRUE A/C PITCH ANGLE
THTD	AIRCRAFT INERTIAL PITCH RATE
THTDF	FILTERED INERTIAL PITCH RATE OUTPUT
THTF	FILTERED A/C PITCH ANGLE
THTP	PAST VALUE OF A/C PITCH ANGLE
TKRT	TRACK ANGLE RATE
TKRTF	FILTERED TRACK ANGLE RATE OUTPUT
TKRTP	PAST VALUE OF TRACK ANGLE RATE
TM	TIME VATIABLE DURING CALIBRATION MODE
TXBAV,TYBAV,TZBAV	SCALED TXBAVI,...
TXBT,TYBT,TZBT	GYRO BIAS TEMPERATURE (BLOCK TEMP)
TXC,TYC,TZC	GYRO PICKOFF TEMPERATURES
TXD,TYD,TZD	ACCELEROMETER TEMPERATURES
TXDI,TYDI,TZDI	ACCELEROMETER TEMPERATURE VOLTAGE
TXDIN,TYDIN,TZDIN	ACCELEROMETER NEGATIVE TEMPERATURE VOLTAGE
TXDIP,...TZDIP	PAST VALUE OF ACCELEROMETER TEMPERATURE VOLTAGE
TXVBI,...TZVBI	GYRO A (DS1) BLOCK LEG FILTERED TEMPERATURE VOLTAGE
TXVBII,...TZVBII	GYRO A (DS1) BLOCK LEG TEMPERATURE VOLTAGE
TXVBIIN,TYVBIIN TZVBIIN	GYRO A (DS1) BLOCK LEG NEGATIVE TEMPERATURE VOLTAGE
TXVBIIP,TYVBIIP, TZVBIIP	PAST VALUE OF GYRO A (DS1) BLOCK LEG TEMPERATURE VOLTAGE
TXVCI,...TZVCI	GYRO FILTERED PICKOFF TEMPERATURE VOLTAGE
TXVCII,...TZVCII	GYRO PICKOFF TEMPERATURE VOLTAGE
TXVCIIN,TYVCIIN, TZVCIIN	GYRO PICKOFF NEGATIVE TEMPERATURE VOLTAGE
TXVCIIP,TYVCIIP, TZVCIIP	PAST VALUE OF GYRO PICKOFF TEMPERATURE VOLTAGE
UX,UY,UZ	=(1+LXX),(1+LYY),(1+LZZ)
VA	DOT PRODUCT OF VELOCITY AND ACCELERATION VECTORS IN LOCAL VERTICAL FRAME
V1,V2,V3	ACCELEROMETER INCREMENTAL VELOCITIES (SAME AS VCI)
V1C,V2C,V3C	INCREMENTAL VELOCITIES
V1CO,V2CO,V3CO	CORRECTED ACCELEROMETER OUPUTS
V1COO	INTERMEDIATE VARIABLE
VEF	FILTERED EAST A/C VELOCITY OUTPUT
VEP	PAST VALUE OF FILTERED EAST A/C VELOCITY OUTPUT
VG	AIRCRAFT GROUND SPEED
VGF	FILTERED AIRCRAFT GROUND SPEED OUTPUT

VGP	PAST VALUE OF AIRCRAFT GROUND SPEED OUTPUT
VGSQ	AIRCRAFT GROUND SPEED SQUARED
VN,VE	NORTH AND EAST AIRCRAFT VELOCITY COMPONENTS
VNF	FILTERED NORTH A/C VELOCITY OUTPUT
VNP	PAST VALUE OF FILTERED NORTH A/C VELOCITY OUTI
VP(I)	PAST VALUE OF ACCELEROMETER INCREMENTAL VELOCI
VPP(I)	PREVIOUS PAST VALUE OF ACCELEROMETER INCREMENT VELOCI
VSPD	TOTAL SPEED
VSPSQ	TOTAL SPEED SQUARED
VW	WIND SPEED
VWF	FILTERED WIND SPEED OUTPUT
VWP	PAST VALUE OF WIND SPEED OUTPUT
VWX,VWY	WIND SPEED COMPONENTS IN LOCAL VERTICAL FRAME
VX,VY,VZ	AIRCRAFT VELOCITY COMPONENTS IN LOCAL VERTICAI
VXB,VYB,VZB	BUFFERED AIRCRAFT VELOCITY COMPONENTS IN LOCAI VERTICAL FRAME
VXD,VYD,VZD	CORIOLIS PLUS GRAVITY PLUS ALTITUDE STABILIZAT ACCELERATIONS
VXP,VYP,VZP	PAST VALUE OF LOCAL LEVEL VELOCITY COMPONENTS
VZDO	CORIOLIS PLUS GRAVITY. USED FOR OUTPUT COMPUTATIONS
VZF	FILTERED LOCAL LEVEL VERTICAL VELOCITY COMPONI
VZM	AIRCRAFT VERTICAL VELOCITY IN FT/MIN
VZMP	PAST VALUE OF AIRCRAFT VERTICAL VELOCITY
VZPP	PAST VALUE OF VZ IN NM16
W2R	GRAVITY COMPUTATION CONSTANT (EARTH RATE SQUAI TIMES EARTH'S EQUATORIAL RADIUS)
WE	ROTATIONAL RATE OF EARTH
WTAX,WTAY,WTAZ	ACCELEROMETER SOFTWARE PULSE WEIGHTS
WTAXYC,WTAZC	NOMINAL ACCELEROMETER PULSE WRIGHTING CONSTANS
WTAXO,WTAYO, WTAZO	ACCELEROMETER PULSE WEIGHTING COFFICIENTS
WTC	CONING CONVERSION CONSTANT
WTG	NOMINAL GYRO PULSE WEIGHT CONSTANT
WTGX,WTGY,WTGZ	GYRO SOFTWARE PULSE WEIGHTS
WTR	NOMINAL ACCEL RESIDUAL CONVERSION CONSTANT
WWS1(I),WWS2(I)	SYNCHRONIZED WALKING WINDOW FILTERED ACCELERATION COMPONENTS
ZBIAS	ACCELEROMETER BIAS USED TO FORCE A/D TO CENTER OF RANGE AT APPROX 1G.

32 BIT WORDS

A11,A12,A13,A21,A22,A23,A31,A32,A33
ACRDXX,ACRDYY,ACRDXY
AERX,AERY,AERZ
ALDP
ARXED,ARYED,ARZED
AVX,AVY,AVZ
C10
C11,C12,C13,C21,C22,C23,C31,C32,C33
CDVX,CDVY,CDVZ
CLAT,CLAT2
CONSM1,CONSM2,CONSM3
CRDXX,CRDYY,CRDXY
D11,D12,D13,D21,D22,D23,D33
D23SQ,D22SQ,D21SQ
DLAT,DLON
DR1C,DR2C,DR3C,DR1T,DR2T,DR3T
DR1I,DR2I,DR3I,DR1Q,DR2Q,DR3Q
DR1S,DR2S,DR3S,DR1SI,DR2SI,DR3SI,DR1SIP,DR2SIP,DR3SIP
DRX,DRY,DRXL,DRYL,DRZL
DV1S,DV2S,DV3S
DVX,DVY,DVZ,DVXP,DVYP,DVZPZ
DVXC,DVYC
E11,E12,E22
ELATX,ELONX,ELOND,ELONO
F1,F2,F3,F4
GD
H,HD
KXB,KYB,KZB
NCONE1,NCONE2,NCONE3
PCRDXX,PCRDYY,PCRDXY
PRXED,PRYED,PRZED
QX,QY,QZ
R1,R2,R3
R1C,R2C,R3C
R1P,R2P,R3P,R1PP,R2PP,R3PP
R1R1,R2R2,R3R3,R1R2,R1R3,R2R3
RUX,RUY,RUZ,RQX,RQY,RQZ
RXD1,RYD1,RXD2,RYD2
RXED,RYED,RZED
S12,S13,S23
SLATX,CLATX,SLONX,CLONX
SX,SY,SZ
TM
TXVBI,TYVBI,TZVBI
TXVCI,TYVCI,TZVCI,TXD,TYD,TZD
U

UX,UY,UZ
V1,V2,V3
V1C,V2C,V3C
V1CO,V2CO,V3CO
VX,VY,VZ,VXD,VYD,VZD
VXB,VYB,VZB
VXP,VYP,VZPZ
WTAX,WTAY,WTAZ,WTGX,WTGY,WTGZ

VARIABLES

SYMBOL	UNITS	MAXIMUM VALUE	REQUIRED ACCURACY	
A(I)	FT/SEC2	256.	1.6 E-2	94
A11,A12,...A33	RAD	.25	1.75E-8	
AAT	FT/SEC2	256.	7.8 E-3	
AATO	G'S	4.0	2.44E-4	
ABW1,ABW2	FT/SEC2	104.	.015630	213
ABW3	FT/SEC2	220.	.015630	213
ABWI1,...,ABWI3	VOLTS	8.0	3.05E-3	
ACRDXX..ACRDXY		.015	1.5 E-11	
ACT	FT/SEC2	256.	7.8 E-3	
ACTO	G'S	4.0	2.44E-4	
AERX,AERY,AERZ	FT/SEC2	20.		
AFPTH	FT/SEC2	256.	7.8 E-3	
AFPTHO	G'S	4.0	2.44E-4	
AL	NONE	.0154	2.37E-7	
ALAT	FT/SEC2	256.	7.8 E-3	
ALATO	G'S	4.0	2.44E-4	
ALDP	NONE	.0154	E-10	
ALFA	PIRAD	1.0	3.8 E-5	
ALFAB	PIRAD	1.0	3.8 E-5	
ALONG	FT/SEC2	256.	7.8 E-3	
ALONGO	G'S	4.0	2.44E-4	
ANORM	FT/SEC2	256.	7.8 E-3	
ANORMC	FT/SEC2	256.	7.8 E-3	
ANORMO	G'S	4.0	2.44E-4	
ARXED,ARYED,ARZED	RAD/SEC	7.3 E-5	2(-43)	
ATFICFLG	NONE	1.0		
AVERT	FT/SEC2	256.	7.8 E-3	
AVERTO	G'S	4.0	2.44E-4	
AVX,AVY	FT/SEC	4096.	3.8 E-6	
AVZ	FT/SEC	1024.	3.8 E-6	
AWW(I)	FT/SEC2	256.	1.6 E-2	94
AX,AY,AZ	FT/SEC2	256.	7.8 E-3	
BG1	1/SEC2	7.5 E-3	2(-15)	
BG2	1/SEC3	1.25 E-4	2(-15)	
BG3	1/SEC	1.5 E-1	2(-15)	
BT	NONE	.0077	2.37 E-7	
BWS1(I)	FT/SEC	20.	2.5 E-3	94
BWS2(I)	FT/SEC2	4.0	5.0 E-4	94
C10	1/SEC	2 E-4		
C11,C12,...C23	NONE	1.0	1.0 E-9	
C31,C32,C33	NONE	1.0	1.2 E-6	
C11C,C21C..C33C	NONE	1.0	6.1 E-5	
C11CB,C21CB	NONE	1.0	6.1 E-5	
CALF	NONE	1.0	1.0 E-4	
CALFB	NONE	1.0	1.0E-4	

CDVX,CDVY	FT/SEC	.04	1.9 E-6	
CDVZ	FT/SEC	4.0	E-6	
CDVZO	FT/SEC	4.0	E-6	210
CLAT	NONE	1.0	3.05 E-5	
CLAT2	NONE	.03125	1.49 E-8	
CLATI	NONE	1.0	E-4	
CLATX	NONE	1.0	5.0 E-9	
CLOND	PIRAD	1.0	2.0 E-5	
CLONX	NONE	1.0	5.0 E-9	
CONSM1..CONSM3	NONE	2(+31)	1.0 E+0	
CPHI	NONE	1.0	4.0 E-4	
CPSI	NONE	1.0	4.0 E-4	
CRDXX,CRDYY	NONE	1.5 E-2	1.5 E-11	
CRDXY	NONE	7.5 E-3	3.7 E-12	
CTHT	NONE	1.0	4.0 E-4	
D11,D12,..D33	NONE	1.0	1.5 E-8	
D21R,D22R,D23R	NONE	1.0	2(-16)	
D23SQ,D22SQ,D21SQ	NONE	1.0	1.9 E-9	
DLAT	PIRAD	1.0	3.5 E-9	
DLON	PIRAD	1.0	2.0 E-8	
DR1C,DR2C,DR3C	RAD	.00035	E-11	
DR1I,DR2I,DR3I	RAD	.0039	1.0 E-7	
DR1Q,DR2Q,DR3Q	RAD	.00001	E-11	
DR1S,DR2S,DR3S	RAD	.000975	3.0 E-11	213
DR1SI,DR2SI,DR3SI	RAD	.000975	E-11	
DR1SIP,DR2SIP DR3SIP	RAD	.000975	E-11	
DR1T,DR2T,DR3T	RAD	.005	E-11	
DRIFT	PIRAD	1.0	8.0 E-5	
DRIFTF	PIRAD	0.5	7.6 E-6	
DRIFTP	PIRAD	1.0	8.0 E-5	
DR1TO	RAD	.005	E-11	
DRX,DRY	RAD	.062	1.2 E-10	
DRXL,DRYL,DRZL	RAD	.062	1.2 E-10	
DRXL1P	RAD	.062	1.2 E-10	
DRXL1,..,DRZL1	RAD	.062	1.2 E-10	
DSMAG	PIRAD	0.96	5.6 E-5	
DVX,DVY,DVZ	FT/SEC	22.1	E-7	
DVXC,DVYC	FT/SEC	22.2	E-7	
DVXP,DVYP	FT/SEC	256.	1.9 E-6	
DVZP	FT/SEC	256.	1.9 E-6	
E11,E12,E22	NONE	2(-15)	2(-29)	
E3	NONE	1.0	2(-30)	37
ELATX	PIRAD	0.5	9.5 E-7	
ELATXF	PIRAD	0.5	6.0 E-8	
ELATXP	PIRAD	0.5	3.2 E-6	
ELFLG	NONE	1.0		
ELOND	PIRAD	1.0	3.2 E-6	

ELONDF	PIRAD	1.0	3.2 E-6	
ELONDP	PIRAD	1.0	3.2 E-6	
ELONO	PIRAD	1.0	3.2 E-6	
ELONX	PIRAD	1.0	3.2 E-6	
F1,F2,F3,F4	RAD	1.0	E-7	
F05IFLG	NONE	1.0		
F10IFLG	NONE	1.0		
F25IFLG	NONE	1.0		
F50IFLG	NONE	1.0		
FCFLG	NONE	1.0		
FCYLFG	NONE	1.0		
FICFLG	NONE	1.0		
FSC(I)	NONE	1.0		
GAMI	PIRAD	0.5	5.5 E-5	
GAMIF	PIRAD	0.5	3.8 E-6	
GAMIP	PIRAD	0.5	5.5 E-5	
GD	FT/SEC2	35.53	9.0 E-8	
GRID1,...,GRID4	DEG	173.	1.5625 E-2	
H	FT	131072.	E-2	
H1,H2,H3,H4	NONE	1.0	2(-31)	37
HD	FT/SEC	1024.	E-2	
HF	FEET	131072.	E-2	
HFSC(I)	FT/SEC2	8.0	7.8 E-3	
HERR	FT	2048.	E-2	
HESW	NONE	1.0		
HO	FEET	131072.	E-2	
HP	FT	131072	E-2	
HREF	FT	131072	E-2	
IADD	NONE	224.0	0.	
IVRTACL	FT/SEC	256	E-7	
ILAT	NONE	12.0	0.	
JLONG	NONE	16.0	0.	
KTAS	KT	2048	6.25 E-2	1
KTASB	KT	2048	6.25 E-2	
KXB,KYB,KZB	RAD	1.03E-3	1.2 E-7	
KXBT,KYBT,KZBT	RAD/VOLT	1.49E-8	4.553-13	
LATL	PIRAD	0.4	9.5 E-7	
LXB,LYB,LZB	FT/SEC	.0154	9.54 E-7	
LXBCA, LYBCA,LZBCA	FT/S2	.77	2.35E-5	1
LXBD,LYBD,LZBD	FT/SEC	.0154	4.7 E-7	1N
LXBT,LYBT,LZBT	FT/SEC	.0039	3.9 E-7	
LXX,LYY,LZZ	NONE	.499	1.53E-5	
LXXT,LYYT,LZZT	NONE	.125	1.14E-5	
LXY,LXZ,...	NONE	.0156	4.76 E-7	
LXYT,LXZT,....	NONE	.005	9.5 E-7	
NP1,...,NP4	NONE	447.	0.	
NACCL1..NACCL3	COUNTS	280.	PERFECT	
NCONE1..NCONE3	NONE	7445000.		

NCT(X)	COUNTS	3036.	5.0 E-1
NGYRO1..NGYRO3	COUNTS	12804.	
NGYRO1A,NGYRO2A NGYRO3A	COUNTS	12804.	
NGYRO1B,NGYRO2B NGYRO3B	COUNTS	12804.	
NRESA1,NRESA2, NRESA3	VOLTS	8.0	3.9 E-3
ORIENT	NONE	3.0	
P,Q,R	RAD/SEC	4.0	1.22 E-4
PCRDXX,PCRDYY	NONE	1.5 E-2	1.5 E-11
PCRDXY	NONE	7.5 E-3	7.3 E-12
PHERR	FT	2048.	E-2
PHID	RAD/SEC	4.0	1.2 E-4
PHIDF	DEG/SEC	128.0	4.0 E-3
PHI	PIRAD	1.0	E-4
PHIF	PIRAD	1.0	6.1 E-4
PHIP	PIRAD	1.0	3.31 E-5
PHISTD	PIRAD	1.0	3.31 E-5
PLC(I)	NONE	1.0	
PLCCMDX,PLCCMDY, PLCCMDZ	NONE	1.0	
PLCCTRX,PLCCTRY, PLCCTRZ	NONE	4.0	
PO,QO,RO	DEG/SEC	128.0	7.8 E-3
PP,QP,RP	RAD/SEC	2.24	3.5 E-5
PPP,QPP,RPP	RAD/SEC	2.24	3.5 E-5
PPPP	LBS/IN2	15.0	1.0
PR1,PR2,PR3	RAD	.125	1.16E-10
PRV1,PRV2,PRV3	FT/SEC	.125	2(-19)
PRXED,PRYED,PRZED	RAD/SEC	7.3 E-5	2(-43)
PSI	PIRAD	1.0	3.05 E-5
PSIC	PIRAD	1.0	3.05 E-5
PSICF	PIRAD	1.0	3.05 E-5
PSICP	PIRAD	1.0	3.05 E-5
PSIF	PIRAD	1.0	3.05 E-5
PSIM	PIRAD	1.0	3.05 E-5
PSIMF	PIRAD	1.0	3.05 E-5
PSIMP	PIRAD	1.0	3.05 E-5
PSIP	PIRAD	1.0	3.05 E-5
PSISTDD	PIRAD	1.0	3.05 E-5
PSIT	PIRAD	1.0	3.05 E-5
PSITF	PIRAD	1.0	3.05 E-5
PSITH	NONE	1.0	2(-30)
PSITM	PIRAD	1.0	3.05 E-5
PSITMF	PIRAD	1.0	3.05 E-5
PSITMP	PIRAD	1.0	3.05 E-5
PSITO	PIRAD	1.0	3.05 E-5

37

PSITP	PIRAD	1.0	3.05 E-5	
PSIW	PIRAD	1.0	3 E-4	
PSIWF	PIRAD	1.0	3 E-4	
PSIWP	PIRAD	1.0	3 E-4	
PTH1,PTH2	NONE	1.0	2(-31)	37
PTH1F,PTH2F	NONE	1.0	2(-31)	37
PTH1P,PTH2P	NONE	1.0	2(-31)	37
PVXD,PVYD	FT/SEC2	2.0	E-5	
PVS	FT/MIN	32768.	1.0	
PVZD	FT/SEC2	256.	5.0 E-4	
PVZDO	FT/SEC2	256.	5.0 E-4	210
QQ	NONE	1.10	9.0 E-10	
QX,QY,QZ	NONE	1.0072	7.18 E-7	
R1,R2,R3	RAD	.125	3.0 E-10	
R1C,R2C,R3C	RAD	.14	1.16E-10	
R1CR,R2CR,R3CR	RAD	.14	7.6 E-6	94
R1P,...,R3P	RAD	.125	4.65 E-10	
R1PP,..R3PP	RAD	0.125	9.31 E-10	
R1R1,R2R2,...	RAD	.01	2.2 E-11	94
R1R2,R1R3,R2R3	RAD	.01	2.2 E-11	94
RCLATL	NONE	100.	3.9 E-3	
RLAT,RLONG	NONE	1.0	3.05 E-5	
RQX,RQY,RQZ	NONE	1.05	7.2 E-7	
RQX1,RQY1,RQZ1	NONE	1.05	6.1 E-5	
RUXNACC, RUYNACC,RUZNACC	(FT/S2)/V	12.85		1
RUXWTR, RUYWTR,RUZWTR	(FT/S2)/V	1.534 E-2		1
RUX,RUY,RUZ	NONE	1.996	1.86 E-9	
RUX1,RUY1,RUZ1	NONE	1.996	6.1 E-5	
RVG	SEC/FT	.031	4.8 E-7	
RVG1	SEC/FT	.031	4.8 E-7	
RVGSQ	(S/FT)2	9.2 E-4	4.8 E-7	
RVG2	SEC/FT	.031	4.8 E-7	
RVSPD	SEC/FT	.031	4.8 E-7	
RVSPD1	SEC/FT	.031	4.8 E-7	
RVSPD2	SEC/FT	.031	4.8 E-7	
RV1,RV2,RV3	FT/SEC	.125	2(-19)	
RXD1,RYD1	RAD/SEC	2.0 E-4	1.2 E-13	
RXD2,RYD2	RAD/SEC	6.0 E-6	7.2 E-15	
RXED,RYED,RZED	RAD/SEC	7.3 E-5	2(-43)	
S12,S13,S23	RAD	.02	1.6 E-11	94
SALF	NONE	1.0	1.0 E-4	
SALFB	NONE	1.0	1.0 E-4	
SECTHT	NONE	11.494	4.9 E-4	
SLATX	NONE	1.0	5.0 E-9	
SLONX	NONE	1.0	5.0 E-9	
SPHI	NONE	1.0	4.0 E-4	

SPSI	NONE	1.0	4.0 E-4	
STHT	NONE	1.0	4.0 E-4	
SX,SY	FT/SEC	1 E+5	5.0 E-2	94
SZ	FT/SEC	5 E+6	5.0 E-2	94
T1	SEC	50.		
T2	SEC	150.		
TAS	FT/SEC	4000.	1.2 E-1	
TASB	FT/SEC	4000.	1.2 E-1	
TSREQX,TSREQY TSREQZ	SEC/50	9000.	1.0	
THT	PIRAD	0.5	E-4	
THTD	RAD/SEC	4.0	1.2 E-4	
THTDF	DEG/SEC	128.0	4.0 E-3	
THTF	PIRAD	0.5	6.1 E-4	
THTP	PIRAD	1.0	3.31 E-5	
TKRT	DEG/SEC	32.	.005	
TKRTF	DEG/SEC	32.0	.005	
TKRTP	DEG/SEC	32.	.005	
TM	SEC	240.	5.0 E-3	
TXBT,TYBT,TZBT	VOLTS	10.0	4.8828E-3	
TXC,TYC,TZC	VOLTS	10.0	4.88 E-3	
TXD,TYD,TZD	VOLTS	10.0	4.9 E-3	
TXDI,TYDI,TZDI	VOLTS	10.0		
TXDIN,TYDIN,TZDIN	VOLTS	10.0	4.9 E-3	
TXDIP,TYDIP,TZDIP	VOLTS	10.0		
TXVBI,TYVBI,TZVBI	VOLTS	10.0		
TXVBII,..,TZVBII	VOLTS	10.0	4.9 E-3	
TXVBIIN,TYVBIIN, TZVBIIN	VOLTS	10.0	4.9 E-3	
TXVBIIP,TYVBIIP TZVBIIP	VOLTS	10.0	4.9 E-3	
TXVCI,TYVCI,TZVCI	VOLTS	10.0	4.9 E-3	
TXVCII,...,TZVCII	VOLTS	10.0		
TXVCIIN,TYVCIIN, TZVCIIN	VOLTS	10.0	4.9 E-3	
TXVCIIP,TYVCIIP TZVCIIP	VOLTS	10.0	4.9 E-3	
U	FT/SEC	128.	E-2	
UX,UY,UZ	NONE	1.50	1.53 E-5	
V1,V2,V3	FT/SEC	8.	1.5 E-8	
V1C,V2C,V3C	FT/SEC	11.6	E-7	
V1CO,V2CO,V3CO	FT/SEC	10.1	E-7	
V1COO	FT/SEC	10.1	E-7	
VA	FT2/SEC3	1048576.	1.2 E-3	210
VG	FT/SEC	4096.	5.0 E-1	
VGF	KNOTS	2427.	.125	
VGP	FT/SEC	4096.	5.0 E-1	
VGSQ	FT2/SEC2	16.777216 E6	4.88 E+2	

VN,VE	FT/SEC	4096.	2.5 E-1	
VNF,VEF	KNOTS	2427.	.125	
VNP,VEP	FT/SEC	4096.	2.5 E-1	
VP(I)	FT/SEC	8.	1.5 E-8	94
VSPD	FT/SEC	4096.	0.5	
VSPSQ	FT2/SEC2	16.777216E6	4.88 E+2	
VW	FT/SEC	512.	.12	
VWF	KNOTS	256.	.12	
VWP	FT/SEC	512.	.12	
VWX,VWY	FT/SEC	512.	.12	
VX,VY	FT/SEC	4096.	1.9 E-6	
VXB,VYB	FT/SEC	4096.	1.9 E-6	
VZ	FT/SEC	1024.	1.9 E-6	
VZB	FT/SEC	1024.	1.9 E-6	
VXD,VYD	FT/SEC2	2.0	E-5	
VXP,VYP,VZP	FT/SEC	4096.	1.9 E-6	
VZPP	FT/SEC	1024.	1.9 E-6	
VZD	FT/SEC2	256.	5.0 E-4	
VZDO	FT/SEC2	256.	5.0 E-4	210
VZF	FT/MIN	32768.	1.0E0	
VZM	FT/MIN	32768.	1.0 E0	
VZMP	FT/MIN	32768.	1.0 E0	
WTAX,WTAY,WTAZ	FT/SEC/PULSE	.0558	5.8 E-11	
WTAXO,WTAYO,WTAZO	FT/SEC/PULSE	2.795352174 E-2	1.5 E-11	
WTGX,WTGY,WTGZ	RAD/PULSE	1.02 E-5	7.0 E-12	
WWS1(I)	FT/SEC	32.	2.5 E-3	94
WWS2(I)	FT/SEC2	4.	1.3 E-4	94

CONSTANTS

SYMBOL	UNITS	PREC-	ORIGIN	NOMINAL VALUE		MAXIMUM VALUE	
BG1C	1/SEC2	SP	C	7.5	E-3		
BG2C	1/SEC3	SP	C	1.25	E-4		
BG3C	1/SEC	SP	C	1.5	E-1		
CA	1/SEC	SP	C	50.0			
CHF	NONE	DP	C	2.44	E-2	1.0	E-0
CQ	RAD	DP	C	1.212034203	E-6		
CS1	NONE	SP	C	2.0	E-02	8.0	E-02
CS2	NONE	SP	C	2.8	E-02	6.0	E-02
CS3	NONE	SP	C	1.4	E0		
CS4	NONE	SP	C	.972	E0		
CT2	NONE	SP	C	1.66667	E+01		
DEGPIRAD	PIRAD/DEG	SP	C	5.55556	E-03		
DEL1	SEC	DP	C	1.00000	E-01		
DEL2	SEC	DP	C	.4	E-1		
DELT	SEC	DP	C	2.00000	E-02		
DNCT	PULSES	SP	C	6.25000	E+01		
E	NONE	DP	C	3.35233	E-03		
FTS2G	G'S/FT/SEC2	SP	C	3.1082	E-02		
FTSKNT	KNOTS/FT/SEC	SP	C	5.9241706	E-01		
G1	FT/SEC2	DP	C	3.214655000	E+01		
G2	NONE	DP	C	5.21880	E-02		
IGRID	1/PIRAD	SP	C	1.6	E+01		
IPI	NONE	DP	C	3.183098862	E-01		
KNTFTS	FT/SEC/KT	SP	C	1.68800			
KT	NONE	SP	C	4.77	E-02	1.0000	E-0
KT05	NONE	SP	C	4.2080778	E-01		
KT10	NONE	SP	C	4.2081	E-01		
KT25	NONE	SP	C	2.0430	E-01		
KT25H	NONE	SP	C	6.1176	E-01		
KT50	NONE	SP	C	3.5474	E-01		
KZYC	NONE	SP	C	-0.498	E-06		
KZXC	NONE	SP	C	-1.129	E-06		
KYZC	NONE	SP	C	-0.498	E-06		
KYXC	NONE	SP	C	-3.037	E-06		
KXZC	NONE	SP	C	-1.129	E-06		
KXYC	NONE	SP	C	-3.037	E-06		
LZYC	NONE	SP	C	3.403	E-06		
LZXC	NONE	SP	C	-3.138	E-06		
LYZC	NONE	SP	C	-0.95	E-06		
LYXC	NONE	SP	C	-4.898	E-06		
LXZC	NONE	SP	C	-7.079	E-06		
LXYC	NONE	SP	C	-5.716	E-06		
NACCSF	FT/SEC2/VOLT	SP	C	6.4376			

NCTO	PULSES	SP	C	3.60000	E+01	
OFFLAT	PIRAD	SP	C	4.0623	E-01	
NLIM	PULSES	SP	C	1800		
RADDEG	DEG/RAD	SP	C	5.72957795	E+01	
RADEG50	DEG/RAD/SEC	SP	C	2.8648	E+03	
RG1	SEC2/FT	DP	C	3.11075	E-02	
RRE	1/FT	DP	C	4.77882	E-08	
THBTO	SEC	SP	C	6.0	E+01	1.8000 E+03
W2R	FT/SEC2	DP	C	1.11086	E-01	
WE	RAD/SEC	DP	C	7.292115000	E-05	
WTAXYC	FT/SEC/PULSE	DP	C	2.795352174	E-02	
WTAZC	FT/SEC/PULSE	DP	C	2.795352174	E-02	
WTC	RAD	DP	C	4.686844005	E-11	
WTG	RAD/PULSE	DP	C	9.681780833	E-06	
WTR	FT/SEC/VOLT	SP	C	7.6862	E-03	
ZBIAS	VOLTS	SP	C	6.209		

$$\left(\frac{1}{FTS26}\right) * .3048 = 9.8063$$

FTS26 converts $ft/sec^2 \rightarrow G's$

So 9.8063 converts G's to m/sec^2

CALIBRATION CONSTANTS

SYMBOL	UNITS	PREC-	ORIGIN	NOMINAL VALUE	MAXIMUM VALUE	
JXM,JYM,JZM	RAD	SP	D		1.2500	E-01
KXA1,KYA2,KZA3	RAD	SP	D		4.0	E-4
KXBI,KYBI,KZBI	RAD	SP	D		9.5000	E-07
KXBSI,KYBSI,KZBSI	RAD	SP	D		9.5000	E-07
KXBT1,KYBT1,KZBT1	RAD/VOLT	SP	D		3.7253	E-09
KXBT2,KYBT2,KZBT2	RAD/VOLT2	SP	D		2.3283	E-10
KXBT3,KYBT3,KZBT3	RAD/VOLT3	SP	D		2.9104	E-11
KXBT4,KYBT4,KZBT4	RAD/VOLT4	SP	D		3.6380	E-12
KXPT,KYPT	RAD/VOLT	SP	C	-9.4901 E-06	5.0	E-5
KZPT	RAD/VOLT	SP	C	9.4901 E-06	5.0	E-5
KXXI,KYYI,KZZI	NONE	SP	D		7.8125	E-3
KXXSI,KYYSI,KZZSI	NONE	SP	D		7.2	E-3
KXYI,KYXI,KZXI KXZI,KYZI,KZYI	NONE	SP	D		.01	
LXBI,LYBI,LZBI	FT/SEC	SP	D		.0115	
LXBSI,LYBSI,LZBSI	FT/SEC	SP	D		.015	
LXBSID, LYBSID,LZBSID	FT/SEC	DP	D		0.15	1
LXBT1,LYBT1,LZBT1	FT/SEC/VOLTS	SP	D		1.64	E-4
LXBT2,LYBT2,LZBT2	FT/SEC/VOLTS2	SP	D		6.0	E-6
LXBT3,LYBT3,LZBT3	FT/SEC/VOLTS3	SP	D		6.24	E-7
LXBT4,LYBT4,LZBT4	FT/SEC/VOLTS4	SP	D		1.03	E-7
LXXI,LYYI,LZZI	NONE	SP	D		.374	
LXXSI,LYYSI,LZZSI	NONE	SP	D		.10	
LXXT1,LYYT1,LZZT1	VOLT(-1)	SP	D		1.54	E-3
LXXT2,LYYT2,LZZT2	VOLT(-2)	SP	D		3.3	E-4
LXXT3,LYYT3,LZZT3	VOLT(-3)	SP	D		2.41	E-5
LXXT4,LYYT4,LZZT4	VOLT(-4)	SP	D		5.24	E-6
LXYI,LYXI,LZXI LXZI,LYZI,LZYI	NONE	SP	D		.011	
LXYTXX,LYXTYY LZXTZZ,LXZTXX LYZTYY,LZYTZZ	VOLTS(-1)	SP	D		.0005	
PHI1,PHI2,PHI11	NONE	DP	D		1.0000	E+00

NOTE--THE ORIGIN CODE A,B,C,D IS DEFINED AS FOLLOWS

A=SENSOR PROMS
B=SYSTEM PROMS
C=SYSTEM MEMORY
D=ALIGN MODE,OR INITILIZATION MODE ZERO HZ CALCULATION

(****MAGNETIC VARIATION TABLE (1980 MODEL)****
(
(LOOKUP TABLE COORDINATE POSITION
(

(WORD NO.		MAGNETIC CORRECTION (DEG)	LATITUDE (DEG)	EAST LONGITUDE (DEG)	
MV0	DATA	-19.9635	-73.125	0.00	
	DATA	-20.2936	-61.875	0.00	
	DATA	-22.9763	-50.625	0.00	
	DATA	-25.8638	-39.375	0.00	
	DATA	-24.8484	-28.125	0.00	
	DATA	-19.6726	-16.875	0.00	
	DATA	-13.1526	-5.625	0.00	
	DATA	-8.3074	5.625	0.00	
	DATA	-5.6196	16.875	0.00	
	DATA	-4.4475	28.125	0.00	
	DATA	-4.5266	39.375	0.00	MV10
	DATA	-5.9269	50.625	0.00	
	DATA	-8.3755	61.875	0.00	
	DATA	-11.5383	73.125	0.00	
	DATA	-27.6164	-73.125	11.25	
	DATA	-25.6313	-61.875	11.25	
	DATA	-25.3729	-50.625	11.25	
	DATA	-25.2337	-39.375	11.25	
	DATA	-21.8913	-28.125	11.25	
	DATA	-15.1190	-16.875	11.25	
	DATA	-8.6528	-5.625	11.25	MV20
	DATA	-4.6002	5.625	11.25	
	DATA	-2.4733	16.875	11.25	
	DATA	-1.3703	28.125	11.25	
	DATA	-0.9394	39.375	11.25	
	DATA	-1.2237	50.625	11.25	
	DATA	-1.9648	61.875	11.25	
	DATA	-3.1455	73.125	11.25	
	DATA	-35.6901	-73.125	22.50	
	DATA	-31.8144	-61.875	22.50	
	DATA	-29.2975	-50.625	22.50	MV30
	DATA	-25.9989	-39.375	22.50	
	DATA	-18.7929	-28.125	22.50	
	DATA	-10.3334	-16.875	22.50	
	DATA	-4.8443	-5.625	22.50	
	DATA	-1.9650	5.625	22.50	
	DATA	-0.3661	16.875	22.50	
	DATA	0.7877	28.125	22.50	
	DATA	1.8190	39.375	22.50	
	DATA	2.8109	50.625	22.50	
	DATA	3.9949	61.875	22.50	MV40

```
DATA   4.9073        73.125      22.50
DATA   -44.2407      -73.125     33.75
DATA   -39.0430      -61.875     33.75
DATA   -35.2599      -50.625     33.75
DATA   -29.7858      -39.375     33.75
DATA   -18.8465      -28.125     33.75
DATA   -7.8290       -16.875     33.75
DATA   -2.3929       -5.625      33.75
DATA   -0.1819       5.625       33.75
DATA   0.9994        16.875      33.75     MV50
DATA   2.0718        28.125      33.75
DATA   3.5575        39.375      33.75
DATA   5.9415        50.625      33.75
DATA   9.3220        61.875      33.75
DATA   12.4665       73.125      33.75
DATA   -53.2248      -73.125     45.00
DATA   -46.9327      -61.875     45.00
DATA   -42.2028      -50.625     45.00
DATA   -35.5758      -39.375     45.00
DATA   -23.2508      -28.125     45.00     MV60
DATA   -9.9658       -16.875     45.00
DATA   -2.8764       -5.625      45.00
DATA   -0.1398       5.625       45.00
DATA   1.1453        16.875      45.00
DATA   2.3213        28.125      45.00
DATA   4.3160        39.375      45.00
DATA   8.1412        50.625      45.00
DATA   13.7831       61.875      45.00
DATA   19.2682       73.125      45.00
DATA   -62.5390      -73.125     56.25     MV70
DATA   -54.7758      -61.875     56.25
DATA   -48.3759      -50.625     56.25

DATA   -40.2486      -39.375     56.25
DATA   -27.6032      -28.125     56.25
DATA   -13.9527      -16.875     56.25
DATA   -5.6306       -5.625      56.25
DATA   -1.9521       5.625       56.25
DATA   -0.0462       16.875      56.25
DATA   1.6893        28.125      56.25
DATA   4.4174        39.375      56.25     MV80
DATA   9.4679        50.625      56.25
DATA   16.9844       61.875      56.25
DATA   24.8486       73.125      56.25
DATA   -72.1013      -73.125     67.50
DATA   -61.9691      -61.875     67.50
DATA   -52.5675      -50.625     67.50
DATA   -41.8296      -39.375     67.50
DATA   -28.3659      -28.125     67.50
```

```
DATA   -15.4832        -16.875        67.50
DATA   -7.5172         -5.625         67.50     MV90
DATA   -3.6664         5.625          67.50
DATA   -1.4505         16.875         67.50
DATA   0.6928          28.125         67.50
DATA   3.9614          39.375         67.50
DATA   9.6210          50.625         67.50
DATA   18.1867         61.875         67.50
DATA   28.3863         73.125         67.50
DATA   -81.9313        -73.125        78.75
DATA   -68.1766        -61.875        78.75
DATA   -54.1892        -50.625        78.75     MV100
DATA   -39.8002        -39.375        78.75
DATA   -25.1443        -28.125        78.75
DATA   -13.4401        -16.875        78.75
DATA   -6.7615         -5.625         78.75
DATA   -3.6175         5.625          78.75
DATA   -1.9136         16.875         78.75
DATA   -0.1645         28.125         78.75
DATA   2.8258          39.375         78.75
DATA   7.9974          50.625         78.75
DATA   16.2605         61.875         78.75     MV110
DATA   28.4451         73.125         78.75
DATA   -92.2141        -73.125        90.00
DATA   -73.1555        -61.875        90.00
DATA   -52.4553        -50.625        90.00
DATA   -33.6804        -39.375        90.00
DATA   -18.4379        -28.125        90.00
DATA   -8.6310         -16.875        90.00
DATA   -3.8047         -5.625         90.00
DATA   -1.9089         5.625          90.00
DATA   -1.2484         16.875         90.00     MV120
DATA   -0.5709         28.125         90.00
DATA   1.0913          39.375         90.00
DATA   4.2760          50.625         90.00
DATA   10.1700         61.875         90.00
DATA   22.8772         73.125         90.00
DATA   -103.3789       -73.125        101.25
DATA   -76.3365        -61.875        101.25
DATA   -45.4739        -50.625        101.25
DATA   -23.2579        -39.375        101.25
DATA   -9.9246         -28.125        101.25    MV130
DATA   -3.1636         -16.875        101.25
DATA   -0.5142         -5.625         101.25
DATA   0.0277          5.625          101.25
DATA   -0.3625         16.875         101.25
DATA   -0.9549         28.125         101.25
DATA   -1.2879         39.375         101.25
```

```
DATA  -1.1775        50.625      101.25
DATA  0.5553         61.875      101.25
DATA  10.6247        73.125      101.25
DATA  -116.2735      -73.125     112.50   MV140
DATA  -75.8897       -61.875     112.50
DATA  -30.9119       -50.625     112.50
DATA  -11.0522       -39.375     112.50
DATA  -2.7478        -28.125     112.50
DATA  0.5886         -16.875     112.50
DATA  1.4017         -5.625      112.50
DATA  0.8802         5.625       112.50
DATA  -0.4016        16.875      112.50
DATA  -2.1758        28.125      112.50
DATA  -4.4018        39.375      112.50   MV150
DATA  -7.0425        50.625      112.50
DATA  -8.9333        61.875      112.50
DATA  -3.4617        73.125      112.50
DATA  -132.5393      -73.125     123.75
DATA  -64.6239       -61.875     123.75
DATA  -11.0404       -50.625     123.75
DATA  -0.8296        -39.375     123.75
DATA  1.9643         -28.125     123.75
DATA  2.6236         -16.875     123.75
DATA  2.2952         -5.625      123.75   MV160
DATA  1.0588         5.625       123.75
DATA  -1.0435        16.875      123.75
DATA  -3.8258        28.125      123.75
DATA  -7.2692        39.375      123.75
DATA  -11.2155       50.625      123.75
DATA  -14.4756       61.875      123.75
DATA  -12.0550       73.125      123.75
DATA  -155.0250      -73.125     135.00
DATA  -13.2088       -61.875     135.00
DATA  6.0406         -50.625     135.00   MV170
DATA  6.5713         -39.375     135.00
DATA  5.5593         -28.125     135.00
DATA  4.5744         -16.875     135.00
DATA  3.5820         -5.625      135.00
DATA  1.9133         5.625       135.00
DATA  -0.7541        16.875      135.00
DATA  -4.2003        28.125      135.00
DATA  -8.1540        39.375      135.00
DATA  -12.1908       50.625      135.00
DATA  -15.2963       61.875      135.00   MV180
DATA  -14.0217       73.125      135.00
DATA  174.2379       -73.125     146.25
DATA  34.4077        -61.875     146.25
DATA  17.0728        -50.625     146.25
```

```
DATA   12.0864        -39.375      146.25
DATA   9.0331         -28.125      146.25
DATA   7.1312         -16.875      146.25
DATA   5.7490         -5.625       146.25
DATA   4.0068         5.625        146.25
DATA   1.2823         16.875       146.25   MV190
DATA   -2.3685        28.125       146.25
DATA   -6.3669        39.375       146.25
DATA   -9.9961        50.625       146.25
DATA   -12.5131       61.875       146.25
DATA   -11.4860       73.125       146.25
DATA   141.7481       -73.125      157.50
DATA   45.7981        -61.875      157.50
DATA   23.6609        -50.625      157.50
DATA   16.2760        -39.375      157.50
DATA   12.1720        -28.125      157.50   MV200
DATA   9.7582         -16.875      157.50
DATA   8.3009         -5.625       157.50
DATA   6.9067         5.625        157.50
DATA   4.6340         16.875       157.50
DATA   1.2338         28.125       157.50
DATA   -2.4669        39.375       157.50
DATA   -5.5091        50.625       157.50
DATA   -7.3824        61.875       157.50
DATA   -6.2438        73.125       157.50
DATA   117.1215       -73.125      168.75   MV210
DATA   48.2591        -61.875      168.75
DATA   27.3180        -50.625      168.75
DATA   19.1630        -39.375      168.75
DATA   14.5045        -28.125      168.75
DATA   11.7578        -16.875      168.75
DATA   10.3487        -5.625       168.75
DATA   9.5021         5.625        168.75
DATA   8.1482         16.875       168.75
DATA   5.6341         28.125       168.75
DATA   2.6768         39.375       168.75   MV220
DATA   0.3948         50.625       168.75
DATA   -0.7892        61.875       168.75
DATA   0.6374         73.125       168.75
DATA   100.4848       -73.125      180.00
DATA   47.9599        -61.875      180.00
DATA   28.8600        -50.625      180.00
DATA   20.6551        -39.375      180.00
DATA   15.7876        -28.125      180.00
DATA   12.7638        -16.875      180.00
DATA   11.1858        -5.625       180.00   MV230
DATA   10.6191        5.625        180.00
DATA   10.3497        16.875       180.00
```

```
DATA   9.4634          28.125         180.00
DATA   8.0019          39.375         180.00
DATA   6.9109          50.625         180.00
DATA   6.6232          61.875         180.00
DATA   8.5155          73.125         180.00
DATA   88.7159         -73.125        191.25
DATA   46.6954         -61.875        191.25
DATA   29.0397         -50.625        191.25   MV240
DATA   20.9462         -39.375        191.25
DATA   16.0475         -28.125        191.25
DATA   12.7982         -16.875        191.25
DATA   10.8910         -5.625         191.25
DATA   10.2494         5.625          191.25
DATA   10.7630         16.875         191.25
DATA   11.7022         28.125         191.25
DATA   12.3826         39.375         191.25
DATA   13.1275         50.625         191.25
DATA   14.2173         61.875         191.25   MV250
DATA   16.9318         73.125         191.25
DATA   79.6925         -73.125        202.50
DATA   45.2843         -61.875        202.50
DATA   28.7256         -50.625        202.50
DATA   20.6680         -39.375        202.50
DATA   15.7445         -28.125        202.50
DATA   12.3320         -16.875        202.50
DATA   10.2468         -5.625         202.50
DATA   9.6186          5.625          202.50
DATA   10.6297         16.875         202.50   MV260
DATA   12.8424         28.125         202.50
DATA   15.3998         39.375         202.50
DATA   18.2149         50.625         202.50
DATA   21.2845         61.875         202.50
DATA   25.4802         73.125         202.50
DATA   72.2057         -73.125        213.75
DATA   44.0650         -61.875        213.75
DATA   28.6115         -50.625        213.75
DATA   20.4812         -39.375        213.75
DATA   15.4639         -28.125        213.75   MV270
DATA   11.9037         -16.875        213.75
DATA   9.7746          -5.625         213.75
DATA   9.3138          5.625          213.75
DATA   10.6866         16.875         213.75
DATA   13.5569         28.125         213.75
DATA   17.1838         39.375         213.75
DATA   21.6623         50.625         213.75
DATA   27.1184         61.8750
DATA   27.1184         61.875         213.75
DATA   33.7380         73.125         213.75
```

```
DATA   65.5063      -73.125      225.00    MV280
DATA   42.9463      -61.875      225.00
DATA   28.9242      -50.625      225.00
DATA   20.6027      -39.375      225.00
DATA   15.3056      -28.125      225.00
DATA   11.5142      -16.875      225.00
DATA   9.2617       -5.625       225.00
DATA   8.8309        5.625       225.00
DATA   10.3604      16.875       225.00
DATA   13.5721      28.125       225.00
DATA   17.7197      39.375       225.00    MV290
DATA   23.2014      50.625       225.00
DATA   31.0158      61.875       225.00
DATA   41.1589      73.125       225.00
DATA   59.0863      -73.125      236.25
DATA   41.5155      -61.875      236.25
DATA   29.4360      -50.625      236.25
DATA   20.9564      -39.375      236.25
DATA   15.1717      -28.125      236.25
DATA   11.1406      -16.875      236.25
DATA   8.8634       -5.625       236.25    MV300
DATA   8.4325        5.625       236.25
DATA   9.8240        16.875       236.25
DATA   12.8660       28.125       236.25
DATA   16.9247       39.375       236.25
DATA   22.5441       50.625       236.25
DATA   31.9807       61.875       236.25
DATA   46.6670       73.125       236.25
DATA   52.6066      -73.125      247.50
DATA   39.2508      -61.875      247.50
DATA   29.6086      -50.625      247.50    MV310
DATA   21.4498      -39.375      247.50
DATA   15.2900      -28.125      247.50
DATA   11.2255      -16.875      247.50
DATA   9.1099       -5.625       247.50
DATA   8.5833        5.625       247.50
DATA   9.3875        16.875       247.50
DATA   11.4840       28.125       247.50
DATA   14.5285       39.375       247.50
DATA   19.0022       50.625       247.50
DATA   27.9125       61.875       247.50    MV320
DATA   46.6112       73.125       247.50
DATA   45.8752      -73.125      258.75
DATA   35.7275      -61.875      258.75
DATA   28.6552      -50.625      258.75
DATA   21.6324      -39.375      258.75
DATA   15.5852      -28.125      258.75
DATA   11.6271      -16.875      258.75
```

```
DATA   9.4476          -5.625        258.75
DATA   8.3539          5.625         258.75
DATA   8.0921          16.875        258.78    MV330
DATA   8.6720          28.125        258.75
DATA   9.7869          39.375        258.75
DATA   11.3445         50.625        258.75
DATA   14.5728         61.875        258.75
DATA   18.0255         73.125        258.75
DATA   38.8315         -73.125       270.00
DATA   30.7553         -61.875       270.00
DATA   25.6948         -50.625       270.00
DATA   20.2504         -39.375       270.00
DATA   14.7280         -28.125       270.00    MV340
DATA   10.7549         -16.875       270.00
DATA   8.1875          -5.625        270.00
DATA   6.2905          5.625         270.00
DATA   4.8436          16.875        270.00
DATA   3.6734          28.125        270.00
DATA   2.1624          39.375        270.00
DATA   -0.8645         50.625        270.00
DATA   -9.4297         61.875        270.00
DATA   -52.8777        73.125        270.00
DATA   31.5214         -73.125       281.25    MV350
DATA   24.4525         -61.875       281.25
DATA   20.1752         -50.625       281.25
DATA   15.7408         -39.375       281.25
DATA   10.6673         -28.125       281.25
DATA   6.5231          -16.875       281.25
DATA   3.5991          -5.625        281.25
DATA   1.2521          5.625         281.25
DATA   -0.9849         16.875        281.25
DATA   -3.6232         28.125        281.25
DATA   -7.4848         39.375        281.25    MV360
DATA   -14.3609        50.625        281.25
DATA   -29.8137        61.875        281.25
DATA   -63.9547        73.125        281.25
DATA   24.0580         -73.125       292.50
DATA   17.2462         -61.875       292.50
DATA   12.3561         -50.625       292.50
DATA   7.5686          -39.375       292.50
DATA   2.5312          -28.125       292.50
DATA   -1.5436         -16.875       292.50
DATA   -4.29930        -5.625        292.50    MV370
DATA   -6.39997        5.625         292.50
DATA   -8.6807         16.875        292.50
DATA   -11.7324        28.125        292.50
DATA   -16.1770        39.375        292.50
DATA   -23.6908        50.625        292.50
```

```
DATA  -37.9658      61.875      292.50
DATA  -60.8497      73.125      292.50
DATA  16.5706       -73.125     303.75
DATA  9.7516        -61.875     303.75
DATA  3.4138        -50.625     303.75    MV380
DATA  -2.8114       -39.375     303.75
DATA  -7.9051       -28.125     303.75
DATA  -11.0906      -16.875     303.75
DATA  -12.7654      -5.625      303.75
DATA  -13.8485      5.625       303.75
DATA  -15.2108      16.875      303.75
DATA  -17.3190      28.125      303.75
DATA  -20.7153      39.375      303.75
DATA  -26.9415      50.625      303.75
DATA  -38.1745      61.875      303.75    MV390
DATA  -54.2313      73.125      303.75
DATA  9.1571        -73.125     315.00
DATA  2.5437        -61.875     315.00
DATA  -5.1196       -50.625     315.00
DATA  -12.6788      -39.375     315.00
DATA  -17.2688      -28.125     315.00
DATA  -18.8683      -16.875     315.00
DATA  -18.9537      -5.625      315.00
DATA  -18.4932      5.625       315.00
DATA  -18.1785      16.875      315.00    MV400
DATA  -18.6197      28.125      315.00
DATA  -20.6433      39.375      315.00
DATA  -25.5417      50.625      315.00
DATA  -34.3506      61.875      315.00
DATA  -46.2674      73.125      315.00
DATA  1.8536        -73.125     326.25
DATA  -4.0380       -61.875     326.25
DATA  -12.1583      -50.625     326.25
DATA  -20.0634      -39.375     326.25
DATA  -23.4926      -28.125     326.25    MV410
DATA  -23.3727      -16.875     326.25
DATA  -21.7585      -5.625      326.25
DATA  -19.6012      5.625       326.25
DATA  -17.6138      16.875      326.25
DATA  -16.6129      28.125      326.25
DATA  -17.6062      39.375      326.25
DATA  -21.5183      50.625      326.25
DATA  -28.5569      61.875      326.25
DATA  -37.7132      73.125      326.25
DATA  -5.3698       -73.125     337.50    MV420
DATA  -9.9217       -61.875     337.50
DATA  -17.3123      -50.625     337.50
DATA  -24.4340      -39.375     337.50
```

```
DATA  -26.4048       -28.125      337.50
DATA  -24.6070       -16.875      337.50
DATA  -21.1369       -5.625       337.50
DATA  -17.4157       5.625        337.50
DATA  -14.4506       16.875       337.50
DATA  -12.8423       28.125       337.50
DATA  -13.3021       39.375       337.50   MV430
DATA  -16.3965       50.625       337.50
DATA  -21.9239       61.875       337.50
DATA  -28.9407       73.125       337.50
DATA  -12.5989       -73.125      348.75
DATA  -15.2343       -61.875      348.75
DATA  -20.7036       -50.625      348.75
DATA  -26.0718       -39.375      348.75
DATA  -26.5840       -28.125      348.75
DATA  -23.1095       -16.875      348.75
DATA  -17.7975       -5.625       348.75   MV440
DATA  -13.0461       5.625        348.75
DATA  -9.9395        16.875       348.75
DATA  -8.4599        28.125       348.75
DATA  -8.7514        39.375       348.75
DATA  -11.0590       50.625       348.75
DATA  -15.0868       61.875       348.75
DATA  -20.1696       73.125       348.75
```

NOTE--ROUND(X) IS DEFINED AS FOLLOWS

IF X IS TO BE RESCALED BY SHIFTING TO THE RIGHT

A 1 BIT IS ADDED IMMEDIATELY TO THE RIGHT OF THE LAST BINARY BIT TO APPEAR AFTER THE RIGHT SHIFT. THE WORD IS THEN SHIFTED TO THE RIGHT.

IN ALL OTHER CASES

A 1 BIT IS ADDED TO THE LOWEST BIT POSITION. THE WORD IS THEN SHIFTED TO THE RIGHT ONE BIT AND IS THEN SHIFTED TO THE LEFT ONE BIT.

NOTE: SIGN(X) IS DEFINED AS FOLLOWS

INPUT : DOUBLE PRECISION VALUE IN (A,B)

OUTPUT: = -1 IF INPUT IS NEGATIVE
  0 IF INPUT IS ZERO
 +1 IF INPUT IS POSITIVE

+++SM20. INPUT GYRO INCREMENTAL ROTATION PULSE COUNTS AND CONING CORRECTION WORDS (50 HZ)

GYRO COUNTS=NGYRO1,NGYRO2,NGYRO3
CONING CORRECTOR WORDS =NCONE1,NCONE2,NCONE3

```
+++SM22.  GYRO PATH LENGTH CONTROL (PLC)LOOP (50 HZ)

   IF TT GE 4100 (82 SEC)
   THEN
 2 IF FIRST PASS THROUGH MODULE
 2 THEN
      PLCCMD(X)=1, (X)=X,Y,Z
 2 ELSE

     DO FOR (I)=1,2,3 ; (X)=X,Y,Z

 3 IF PLCREQ(X)=1.0 (RESET REQUEST RECEIVED)
 3 THEN
 4 IF REQCTR(X) GE 5
 4 THEN
     REQCTR(X) = 5
 5 IF TSCMD(X) GE 3 (60 MSEC)
 5 THEN
 6 IF TSCMD(X) GE 500 (10 SEC)
 6 THEN
 7 IF TSREQ(X) LT 9000 (3 MINUTES)
 7 THEN
      TSREQ(X)=TSREQ(X)+1

 8 IF TSREQ(X) LT 6000 (2 MINUTES)
 8 THEN
      NCT(X)=NCTO

 8 ELSE
      NCT(X)=TSREQ(X)-6000+NCTO
 8 ENDIF

 8 IF ABS(NGYRO(I)) LESS THAN NCT(X) AND PLCCTR(X)= 0.0
   THEN
      PLCCMD(X)=0   (RESET COMMAND WORD)
 8 ENDIF

 7 ELSE
      PLCCMD(X)=0   (RESET COMMAND WORD)
 7 ENDIF
 6 ENDIF
      TSREQ(X) = TSREQ(X)+1
 5 ELSE
      TSREQ(X) = 0
 5 ENDIF
 4 ELSE
      REQCTR(X) = REQCTR(X)+1
      TSREQ(X) = 0
```

```
 4 ENDIF
 3 ELSE
      TSREQ(X)=0   (RESET TIMER)
      NCT(X)=NCT0
 3 ENDIF

      OUTPUT PLCCMD(X)    (PLC RESET COMMAND WORD)

 3 IF PLCCTR(X) GREATER THAN 0.0
 3 THEN
      PLCCTR(X)=PLCCTR(X)-1
 3 ENDIF

 3 IF PLCCMD(X)=0.0
 3 THEN
      PLCCMD(X)=1.0    (PLC RESET COMMAND OFF)
      TSCMD(X) = 1.0
      PLCCTR(X)=4.0
 3 ELSE
 4 IF TSCMD(X) LT 500 (10 SEC)
 4 THEN
     TSCMD(X) = TSCMD(X)+1
 4 ENDIF

   CASEENTRY

   CASE 1, FOR PLCCTR(X)=3.0
      NGYRO(I)A=NGYRO(I)

   CASE 2, FOR PLCCTR(X)=2.0
      NGYRO(I)B=NGYRO(I)

   CASE 3, FOR PLCCTR(X)=1.0
 4 IF ABS((NGYRO(I)B-NGYRO(I))-0.5*(NGYRO(I)A-NGYRO(I))) .GT. 30.0
 4 THEN
     NGYRO(I)=NGYRO(I)+0.5*(NGYRO(I)A-NGYRO(I))+(NGYRO(I)-NGYRO(I)B)
 4 ENDIF

   CASE 4, FOR PLCCTR(X)=0.0
       CONTINUE
   ENDCASE

 3 ENDIF

   ENDDO
       OUTPUT PLC RESET COMMAND WORD
 2 ENDIF
   ENDIF
```

+++SM21. INPUT ACCELEROMETER INCREMENTAL PULSE COUNTS, DIGITIZER INTEGRATOR
RESIDUALS AND BUTTERWORTH FILTERED SIGNALS (50 HZ)

ACCELEROMETER COUNTS = NACCL1,NACCL2,NACCL3
ACCELEROMETER DIGITIZER INTEGRATOR RESIDUALS =
NRESA1,NRESA2,NRESA3
BUTTERWORTH FILTERED SIGNALS = ABWI1,ABWI2,ABWI3

+++NM1. COMPUTE GYRO INCREMENTAL OUTPUTS (50 HZ)

COMPUTE R1,R2,AND R3:

```
R1=ROUND(WTGX*NGYRO1)-KXB                    1K
R2=ROUND(WTGY*NGYRO2)-KYB                    1K
R3=ROUND(WTGZ*NGYRO3)-KZB                    1K
```

+++NM52. COMPUTE ACCELEROMETER INCREMENTAL OUTPUTS (50 HZ)

COMPUTE V1,V2,AND V3:

```
    V1=WTAX*NACCL1-LXBD                                    1N
    V2=WTAY*NACCL2-LYBD                                    1N
    V3=WTAZ*NACCL3-LZBD                                    1N
```

COMPUTE RV1,RV2, AND RV3:

```
    RV1=NRESA1*RUXWTR                                      1N
    RV2=NRESA2*RUYWTR                                      1N
    RV3=NRESA3*RUZWTR                                      1N
```

CORRECT FOR RESIDUALS:

```
    V1=V1-RV1+PRV1                                         84
    V2=V2-RV2+PRV2                                         84
    V3=V3-RV3+PRV3                                         84
    PRV1=RV1
    PRV2=RV2
    PRV3=RV3
```

+++NM11. COMPUTE CORRECTED ACCELEROMETER OUTPUTS (50 HZ) 1

```
V1CO=V1-(LXBSID+LXXSI*V1+LXY*V2+LXZ*V3)+(LXS1*2*R3R3)   1L,
V2CO=V2-(LYBSID+LYX*V1+LYYSI*V2+LYZ*V3)+(LYS2*2*R3R3)   1L,
V3CO=V3-(LZBSID+LZX*V1+LZY*V2+LZZSI*V3)                 1L,
```

```
+++NM14. COMPUTE ACCELEROMETER ROTATION CORRECTIONS                    1
      AND INCREMENTAL VELOCITIES (50 HZ)                              1


      R1C=R1+ROUND(DR1T)                                              1
      R1CR=ROUND(R1C)                                                 1

      R2C=R2+ROUND(DR2T)                                              1
      R2CR=ROUND(R2C)                                                 1

      R3C=R3+ROUND(DR3T)                                              1
      R3CR=ROUND(R3C)                                                 1

      V1C=V1CO+(V3CO*R2CR-V2CO*R3CR)/2.                               1
      V2C=V2CO+(V1CO*R3CR-V3CO*R1CR)/2.                               1
      V3C=V3CO+(V2CO*R1CR-V1CO*R2CR)/2.                               1

         NOTE--THE TRUNCATED VALUES OF V1CO,V2CO,V3CO SHOULD BE       1
               USED IN MULTIPLICATION BY R1CR,R2CR,R3CR.              1
```

+++NM66. COMPENSATE BUTTERWORTH FILTERED ACCELERATIONS (50 HZ)

```
ABW(1)=RUXNACC*ABWI1-LXBCA                                    1N
ABW(2)=RUYNACC*ABWI2-LYBCA                                    1N
ABW(3)=RUZNACC*(ABWI3-ZBIAS)-LZBCA+GD                         1N
```

+++NM57. ACCELEROMETER SIGNAL CORRECTION FOR IRU MOUNTING (50 HZ)

```
CASEENTRY

FOR CONNECTOR RIGHT IRU (ORIENT = 2)

   V1COO=V1C
   V1C=-V2C
   V2C= V1COO
   V1O=V1
   V1=-V2
   V2=V1O

   ABWO=ABW(1)
   ABW(1)=-ABW(2)
   ABW(2)=ABWO

FOR CONNECTOR LEFT IRU (ORIENT = 0)

   V1COO=V1C
   V1C=V2C
   V2C=-V1COO
   V1O=V1
   V1=V2
   V2=-V1O

   ABWO=ABW(1)
   ABW(1)=ABW(2)
   ABW(2)=-ABWO

FOR CONNECTOR AFT IRU (ORIENT = 1)

   V1C=-V1C
   V2C=-V2C
   V1=-V1
   V2=-V2

   ABW(1)=-ABW(1)
   ABW(2)=-ABW(2)
ENDCASE
```

+++NM15. RESOLVE INCREMENTAL VELOCITIES INTO LOCAL VERTICAL FRAME (50 HZ)

```
DVX=C21*V1C+C22*V2C+C23*V3C
DVY=C11*V1C+C12*V2C+C13*V3C
DVZ=-C31*V1C-C32*V2C-C33*V3C
IVRTACL=IVRTACL+DVZ
```

+++NM16. INCREMENT A/C LOCAL VERTICAL VELOCITY COMPONENTS AND COMPUTE AVERAGE VELOCITIES OVER 10 HZ INTERVAL (50 HZ)

```
VZPP=VZ
VX=VX+DVX+CDVX
VY=VY+DVY+CDVY
VZ=VZ+DVZ+CDVZ
DVXP=VX-VXP+DVXP
DVYP=VY-VYP+DVYP
DVZP=VZ-VZP+DVZP
```

NOTE--LIMIT VX,VY AND VZPP TO THEIR MAX VALUES

+++NM4. COMPUTE GYRO CORRECTIONS (50 HZ)

```
  COMPUTE GYRO SYSTEM INPUT CHANNEL CORRECTIONS                          1

  DR1I=KXBSI+KXXSI*R1+(KXYI+KXYP)*R2+(KXZI+KXZP)*R3                     1
  DR2I=KYBSI+(KYXI+KYXP)*R1+KYYSI*R2+(KYZI+KYZP)*R3                     1
  DR3I=KZBSI+(KZXI+KZXP)*R1+(KZYI+KZYP)*R2+KZZSI*R3                     1


      COMPUTE QUANTIZATION CORRECTIONS

      DR1Q=CQ*(SIGN(R1)-SIGN(PR1))
      DR2Q=CQ*(SIGN(R2)-SIGN(PR2))
      DR3Q=CQ*(SIGN(R3)-SIGN(PR3))

      PR1=R1
      PR2=R2
      PR3=R3


      COMPUTE CONING CORRECTIONS


      DR1C=WTC*NCONE1
      DR2C=WTC*NCONE2
      DR3C=WTC*NCONE3

      CONSM1=CONSM1+NCONE1
      CONSM2=CONSM2+NCONE2
      CONSM3=CONSM3+NCONE3


         NOTE: CONSM1,2,3 ARE FOR TEST ONLY


      COMPUTE TOTAL GYRO SYSTEM CORRECTIONS


      DR1T=-DR1I+DR1Q+DR1C
      DR2T=-DR2I+DR2Q+DR2C
      DR3T=-DR3I+DR3Q+DR3C
```

```
+++NM58. GYRO SIGNAL CORRECTIONS FOR IRU MOUNTING (50 HZ)

   CASEENTRY

   FOR CONNECTOR RIGHT IRU (ORIENT = 2)

      DR1TO=DR1T
      DR1T=-DR2T
      DR2T=DR1TO

      R1O=R1
      R1=-R2
      R2=R1O

   FOR CONNECTOR LEFT IRU (ORIENT = 0)

      DR1TO=DR1T
      DR1T=DR2T
      DR2T=-DR1TO

      R1O=R1
      R1=R2
      R2=-R1O

   FOR CONNECTOR AFT IRU (ORIENT = 1)

      DR1T=-DR1T
      DR2T=-DR2T

      R1=-R1
      R2=-R2
   ENDCASE
```

+++NM7. PROCESS ORTHOGONAL ROTATION ANGLES (50 HZ)

```
R1C=R1+ROUND(DR1T)
R2C=R2+ROUND(DR2T)
R3C=R3+ROUND(DR3T)

R1R1=ROUND((1.0/2.0)*R1C*R1C)
R2R2=ROUND((1.0/2.0)*R2C*R2C)
R3R3=ROUND((1.0/2.0)*R3C*R3C)
R1R2=ROUND((1.0/2.0)*R1C*R2C)
R1R3=ROUND((1.0/2.0)*R1C*R3C)
R2R3=ROUND((1.0/2.0)*R2C*R3C)

S12=R1R1+R2R2
S13=R1R1+R3R3
S23=R2R2+R3R3

R1CR=ROUND(R1C)
R2CR=ROUND(R2C)
R3CR=ROUND(R3C)
```

+++NM8. COMPUTE ELEMENTS OF ROTATION MATRIX (50 HZ)

```
ALDP=(2./3.)*((1./2.)*R1R1+(1./2.)*R2R2+(1./2.)*R3R3)

BT=-(1./2.)*ROUND(ALDP)

AL=ROUND(ALDP-1.2*BT*BT)

A11=S23+BT*S23
A12=-R1R2-AL*R3CR-BT*R1R2
A12=R3C+ROUND(A12)
A13=-R1R3+AL*R2CR-BT*R1R3
A13=-R2C+ROUND(A13)

A21=-R1R2+AL*R3CR-BT*R1R2
A21=-R3C+ROUND(A21)
A22=S13+BT*S13
A23=-R2R3-AL*R1CR-BT*R2R3
A23=R1C+ROUND(A23)

A31=-R1R3-AL*R2CR-BT*R1R3
A31=R2C+ROUND(A31)
A32=-R2R3+AL*R1CR-BT*R2R3
A32=-R1C+ROUND(A32)
A33=S12+BT*S12
```

NOTE--USE TRUNCATED VALUES OF R1R2,R1R3,ETC IN PRODUCTS WITH BT
NOTE--THE (2./3.) CONSTANT IN THE ALDP CALCULATION SHOULD BE CARRIED TO DOUBLE PRECISION. THE (1.2) CONSTANT SHOULD BE SINGLE PRECISION IN ALL CALCULATIONS.

+++NM9. UPDATE A/C DIRECTION COSINE MATRIX AND COMPUTE 3RD ROW OF DIRECTION COSINE MATRIX (50 HZ)

A/C DIRECTION COSINE MATRIX:

```
C11=C11-ROUND(C11*A11+C12*A21+C13*A31)
C12=C12-ROUND(C11*A12+C12*A22+C13*A32)
C13=C13-ROUND(C11*A13+C12*A23+C13*A33)

C21=C21-ROUND(C21*A11+C22*A21+C23*A31)
C22=C22-ROUND(C21*A12+C22*A22+C23*A32)
C23=C23-ROUND(C21*A13+C22*A23+C23*A33)
```

NOTE--THE SUM OF PRODUCTS TERMS FOR EACH ROW OF COSINES SHOULD BE COMPUTED BEFORE THAT ROW OF COSINES IS UPDATED.
NOTE--THE DIRECTION COSINES SHOULD BE LIMITED AT THEIR MAX VALUES

3RD ROW OF DIRECTION COSINE MATRIX:

```
C31=C12*C23-C13*C22
C32=C13*C21-C11*C23
C33=C11*C22-C12*C21
```

NOTE--THE DIRECTION COSINES SHOULD BE LIMITED AT THEIR MAX VALUES

+++NM19. COMPUTE A/C ROLL AND PITCH ANGLES AND COMPUTE HIGH PITCH ANGLE CORRECTION LOGIC FOR ROLL (50 HZ)

COMPUTE A/C ROLL AND PITCH ANGLES:

```
    STHT=-C31C
    CTHT=SQRT(1.0-STHT*STHT)

 IF CTHT GREATER THAN OR EQUAL TO .087
 THEN
    EPFLG=CLEAR
    SECTHT=1.0/CTHT
    SPHI=C32C*SECTHT
    CPHI=C33C*SECTHT
    PHI=ARCTAN(SPHI,CPHI)
 ELSE
    EPFLG=SET
 ENDIF

    THT=ARCTAN(STHT,CTHT)

       NOTE--PHI SHOULD BE EXPRESSED AS ANGLE BETWEEN -1 AND +1
             PIRADS, THT AS ANGLE BETWEEN -0.5 AND +0.5 PIRADS
       NOTE--STHT,CTHT,SPHI AND CPHI SHOULD BE LIMITED AT THEIR MAX
             VALUE
```

+++NM59. COMPUTE BODY RATES, ROLL AND PITCH RATES (50 HZ) 1

```
P=16.66666*(R1+R1P+R1PP)
Q=16.66666*(R2+R2P+R2PP)
R=16.66666*(R3+R3P+R3PP)
R1PP=R1P
R2PP=R2P
R3PP=R3P
R1P=R1
R2P=R2
R3P=R3
```

NOTE--USE TRUNCATED VALUES OF R1,R2,R3,R1P,R2P,R3P,R1PP,R2PP, AND R3PP IN FORMING P,Q, AND R

NOTE--P,Q,R SHALL BE LIMITED TO THEIR MAXIMUM VALUES.

```
IF EPFLG CLEAR  (ABS(THT) LE 85 DEG)                    1
THEN                                                    1
    PHID=P+ROUND(Q*SPHI+R*CPHI)*(STHT/CTHT)             1
ELSE                                                    1
    PHID=0
ENDIF                                                   1

THTD=ROUND(Q*CPHI-R*SPHI)                               1
```

NOTE--PHID AND THTD SHALL BE LIMITED TO THEIR MAXIMUM VALUES. 1 1

+++NM47. COMPUTE BODY ACCELERATIONS (50 HZ)

CALCULATE WALKING WINDOW FILTERED ACCELERATIONS:

```
DO FOR I=1,2,3

    AWW(I)=CT2*(V(I)+VP(I)+VPP(I))
    VPP(I)=VP(I)
    VP(I)=V(I)
ENDDO
```

NOTE--V(1), V(2) AND V(3) ARE IDENTICALLY V1, V2 AND V3

OFFSET Z-AXIS DIGITAL ACCELERATION:

```
    AWW(3)=AWW(3)+GD
```

CALCULATE SYNCHRONIZED WALKING WINDOW FILTERED ACCELERATIONS AND COMPUTE SYNCRONIZED BUTTERWORTH FILTERED ACCELERATIONS:

```
DO FOR I=1,2,3

IF(ABS(ABW(I))+HFSC(I)) IS GREATER THAN OR EQUAL TO 38.64
THEN
    WWS1(I)=WWS1(I)+WWS2(I)*DELT
    WWS2(I)=WWS2(I)*CS4-WWS1(I)*CS1
    A(I)=AWW(I)+WWS2(I)
    BWS2(I)=A(I)-ABW(I)
    BWS1(I)=-CS3*BWS2(I)
    HFSC(I)=6.44
ELSE
    BWS1(I)=BWS1(I)+BWS2(I)*DELT
    BWS2(I)=BWS2(I)*CS4-BWS1(I)*CS1
    A(I)=ABW(I)+BWS2(I)
    WWS2(I)=A(I)-AWW(I)
    WWS1(I)=-CS3*WWS2(I)
    HFSC(I)=0
ENDIF

ENDDO
    NOTE: CS3=CS2/CS1
          CS4=1-CS2
```

SET BODY ACCELERATIONS:

```
ALONG=A(1)
ALAT=A(2)
ANORM=-A(3)
```

CORRECT VERTICAL ACCELERATION FOR G BIAS:

```
ANORMC=A(3)-GD
```

NOTE: A(I),AWW(1),AWW(3),WWS1(I),BWS2(I), AND WWS2(I) SHALL BE LIMITED TO THEIR MAXIMUM VALUES.

+++NM49. COMPUTE TRACK ANGLE RATE (50 HZ)

```
DVXC=DVX+CDVX
DVYC=DVY+CDVY
TKRT=(DVXC*VY-DVYC*VX)*RVGSQ*RADEG50
```

NOTE--TKRT SHALL BE LIMITED TO ITS MAXIMUM VALUE

+++NM45. ALONG-TRACK, CROSS-TRACK, FLIGHT-PATH HORIZONTAL, VERTICAL ACCELERATION (50 HZ)

```
IF IN CALMODE                                                    21
THEN                                                             21
   VZDO = -GD                                                    21
ELSE                                                             21
   VZDO = VZD+BG1*HERR+U                                         21
ENDIF                                                            21
   CDVZO = (VZDO+PVZDO)*DELT/2.                                  21
   PVZDO = VZDO                                                  21

      NOTE: CDVZO AND VZDO SHALL BE LIMITED                      21
            TO THEIR MAX VALUES.                                 21

   AX=C21*ALONG+C22*ALAT+C23*ANORMC+CA*CDVX
   AY=C11*ALONG+C12*ALAT+C13*ANORMC+CA*CDVY
   AZ=-C31*ALONG-C32*ALAT-C33*ANORMC+CA*CDVZO
   AVERT=AZ
   AAT=(VX*AX+VY*AY)*RVG
   ACT=(VY*AX-VX*AY)*RVG
   VA=(VX*AX+VY*AY+VZ*AZ)
   AFPTH=VA*RVSPD

      NOTE: AX,AY,AZ,VA,AAT,ACT AND AFPTH SHALL BE LIMITED TO THEIR
            MAXIMUM VALUES
```

+++NM39. MEASURE SYSTEM ACCELERATION ERRORS (50 HZ)

NOTE--THIS COMPUTATION IS ONLY UTILIZED DURING SYSTEM CALIBRATION MODE

```
  INCREMENT TM:

      TM=TM+DELT

   IF TM IS GREATER THAN OR EQUAL TO T1
   THEN                                                    7

 2 IF TM IS LESS THAN 0.5*(T1+T2)
   THEN                                                    7
      SX=SX-ROUND(VX)
      SY=SY-ROUND(VY)
      SZ=SZ-ROUND(VZ)
   ELSE

 3 IF TM IS LESS THAN T2
   THEN                                                    7
      SX=SX+ROUND(VX)
      SY=SY+ROUND(VY)
      SZ=SZ+ROUND(VZ)

      AERX=C10*SX
      AERY=C10*SY
      AERZ=C10*SZ
 3 ELSE
      CALFLG=0
 3 ENDIF

 2 ENDIF
   ELSE
      SX = 0
      SY = 0
      SZ = 0
      CALFLG=-1

   ENDIF
```

```
+++NM62. FILTER AND SCALE 50 HZ OUTPUTS (50 HZ)

      VZM=VZ*60

   IF NOT FIRST PASS
   THEN
      PHIF=PHIF+KT50*2.0*((PHI-PHIP)/2.0+PHIP-PHIF)

      THTF=THTF+KT50*2.0*((THT-THTP)/2.0+THTP-THTF)

      VZF=VZF+KT50*(VZM+VZMP-2.0*VZF)
      TKRTF=TKRTF+KT50*((TKRT+TKRTP)-2.0*TKRTF)

   ELSE
      PHIF=PHI
      THTF=THT
      VZF=VZM
      TKRTF=TKRT
   ENDIF
      PHIP=PHI
      THTP=THT
      VZMP=VZM
      TKRTP=TKRT
      PVS=60*VA*RG1+VZF
      PHIDF=RADDEG*PHID
      THTDF=RADDEG*THTD

      AATO=FTS2G*AAT
      ALATO=FTS2G*ALAT
      ALONGO=FTS2G*ALONG
      ANORMO=FTS2G*ANORM
      ACTO=FTS2G*ACT
      AFPTHO=FTS2G*AFPTH
      AVERTO=FTS2G*AVERT
      PO=RADDEG*P
      QO=RADDEG*Q
      RO=RADDEG*R


         NOTE--CALCULATIONS FOR VZM,PVS,PHIDF,THTDF,AATO,ALATO,ALONGO,
               ANORMO,ACTO,AFPTHO,AVERTO,PO,QO,RO SHALL BE
               PERFORMED IN LIMITED MODE TO PREVENT OVERFLOW.
```

+++NM41. COMPUTE A/C HEADING ANGLE ,HIGH PITCH ANGLE AND MAGNETIC HEADING 3 CORRECTION LOGIC FOR HEADING (25HZ (CALLED IN ALIGN,NAV,ATT.)
IN ALIGN MODES, NM41 SHALL BE CALLED ONLY DURING LAB TEST)

A/C HEADING ANGLE:

```
IF EPFLG=CLEAR            (ABS(THT) LESS THAN OR EQUAL 85 DEG)
THEN
   SPSI=ROUND(C21C*CALF-C11C*SALF)*SECTHT
   CPSI=ROUND(C11C*CALF+C21C*SALF)*SECTHT
   PSI=ARCTAN(SPSI,CPSI)
ENDIF

   PSIM=PSI+DSMAG                                              31
```

NOTE--USE TRUNCATED VALUES OF DIRECTION COSINES IN THE ABOVE CALCULATIONS
NOTE--PSI SHOULD BE EXPRESSED AS ANGLE BETWEEN -1.0 AND +1.0 PIRAD
NOTE--SPSI AND CPSI SHOULD BE LIMITED AT THEIR MAX VALUES

+++NM32. COMPUTE TRACK ANGLE RELATIVE TO NORTH , MAGNETIC TRACK ANGLE 31

```
PSITO=ARCTAN(VX,VY)
PSIT=PSITO-ALFA
PSITM=PSIT+DSMAG                                        31
```

+++NM54. COMPUTE PLATFORM HEADING, DRIFT ANGLE AND INERTIAL FLIGHT PATH ANG (25 HZ)

NOTE--THE FOLLOWING CALCULATION SHOULD NOT BE INTERRUPTED

COMPUTE PLATFORM HEADING:

```
IF EPFLG=CLEAR                (ABS(THT) LESS THAN OR EQUAL 85 DEG)
THEN
   PSIC=ARCTAN(C21C,C11C)
ENDIF
```

COMPUTE DRIFT ANGLE AND INERTIAL FLIGHT PATH ANGLE:

```
DRIFT=PSITO-PSIC
GAMI=ARCTAN(VZ,VG)
```

NOTE: VZ AND VG SHALL BE LIMITED TO 1024 IN THIS COMPUTATION ONLY.

NOTE: GAMI SHALL BE LIMITED TO ITS MAXIMUM VALUE

+++NM27. UPDATE ALTITUDE,ALTITUDE RATE AND ALTITUDE STABILIZATION SIGNAL (25 HZ) (IN ATT MODE ONLY AFTER TATT .GE. 1000)

```
      HERR=H-HO
   IF IN CALMODE
   THEN
      HD=VZPP
   ELSE
 2 IF HERR GREATER THAN OR EQUAL TO 500.
   THEN
      HESW=1.0
   ELSE
 3 IF HERR GREATER THAN OR EQUAL TO 0.0
   THEN
 4 IF HESW=-1.0
   THEN
      HESW=0.0
 4 ENDIF
 3 ELSE
 4 IF HERR GREATER THAN OR EQUAL TO -500.
   THEN
 5 IF HESW=1.0
   THEN
      HESW=0.0
 5 ENDIF
 4 ELSE
      HESW=-1.0
 4 ENDIF
 3 ENDIF
 2 ENDIF
 2 IF HESW=0.0
   THEN
      HD=VZPP-.5*BG3*(HERR+PHERR)
      BG1=.0075
      BG2=.000125
   ELSE
      HD=-300*SIGN(HESW)
      BG1=0
      BG2=0
      U=0
 2 ENDIF
   ENDIF
      H=H+HD*DEL2
      U=U+(HERR+PHERR)*BG2*DEL2/2.0
      PHERR=HERR
```

NOTE--U,HERR,HD AND H SHOULD BE LIMITED AT THEIR MAX VALUES

+++NM33. COMPUTE Z-AXIS CORRECTIONS TO A/C VELOCITY COMPONENTS DUE TO GRAVITY, CORIOLIS AND ALTITUDE STABILIZATION ACCELERATIONS (25 HZ)

```
IF IN CALMODE
THEN
   VZD=-GD
ELSE
   VZD=-GD-BG1*HERR-U
  .    -(RXD1+RXD2+2.0*WE*D21)*AVY+(RYD1+RYD2+2.0*WE*D22)*AVX
ENDIF
   CDVZ=(VZD+PVZD)*DELT/2.0
   PVZD=VZD
```

NOTE--CDVZ SHOULD BE LIMITED TO ITS MAX VALUE

+++NM63. FILTER 25 HZ OUTPUTS (25 HZ)

```
   IF ELFLG=SET                                                    31
   THEN                                                            31
      PSIMF=PSIM                                                   31
      PSIMP=PSIM                                                   31
      PSITMF=PSITM                                                 31
      PSITMP=PSITM                                                 31
   ENDIF                                                           31
   IF NOT FIRST PASS
   THEN
      GAMIF=GAMIF+KT25*2.0*((GAMI-GAMIP)/2.0+GAMIP-GAMIF)
      DRIFTF=DRIFTF+KT25*2.0*((DRIFT-DRIFTP)/2.0+DRIFTP-DRIFTF)
      PSICF+PSICF+KT25*2.0*((PSIC-PSICP)/2.0+PSICP-PSICF)
      PSITMF=PSITMF+KT25*2.0*((PSITM-PSITMP/2.0+PSITMP-PSITMPF)
      PSITF=PSITF+KT25*2.0((PSIT-PSITP)/2.0+PSITP-PSITF)
      PSIMF=PSIMF+KT25*2.0((PSIM-PSIMP)/2.0+PSIMP-PSIMF)
      PSIF=PSIF+KT25*2.0*((PSI-PSIP)/2.0+PSIP-PSIF)
   ELSE
      GAMIF=GAMI
      DRIFTF=DRIFT
      PSICF=PSIC
      PSITMF=PSITM
      PSITF=PSIT
      PSIMF=PSIM
      PSIF=PSI
   ENDIF

      GAMIP=GAMI
      DRIFTP=DRIFT
      PSICP=PSIC
      PSITMP=PSITM
      PSITP=PSIT
      PSIMP=PSIM
      PSIP=PSI


   IF NOT FIRST PASS
   THEN
      HF=HF+KT25H*(H+HP-2.0*HF)
   ELSE
      HF=H
   ENDIF

      HP=H
```

NOTE--HF CALCULATION SHALL BE PERFORMED
IN LIMITED MODE TO PREVENT OVERFLOW.

1

+++SM64. INPUT TRUE AIRSPEED AND CONVERT TO FT/S (10 HZ) 1M

TAS=KTAS*KNTFTS 1M

+++NM10. BUFFER 10 HZ INPUTS (10 HZ)

```
ALFAB=ALFA
C11CB=C11C
C21CB=C21C
SALFB=SALF
CALFB=CALF
KTASB=KTAS
VXB=VX
VYB=VY
VZB=VZ
TASB=TAS
```

+++NM20. DETERMINE ANGULAR VELOCITIES OF LOCAL VERTICAL FRAME WITH RESPECT TO THE EARTH FIXED FRAME (10 HZ)

```
AVX=VXP+ROUND((1.0/5.0)*(DVXP+(1.0/2.0)*(VXP-VX)))
AVY=VYP+ROUND((1.0/5.0)*(DVYP+(1.0/2.0)*(VYP-VY)))
AVZ=VZP+ROUND((1.0/5.0)*(DVZP+(1.0/2.0)*(VZP-VZ)))

VXP=+VX
VYP=+VY
VZP=+VZ

DVXP=0.0
DVYP=0.0
DVZP=0.0

RYD1=+RRE*AVX
RXD1=-RRE*AVY

CRDYY=+H*RRE+E*(1.0-3.0*D21*D21-D22*D22)
CRDXX=+H*RRE+E*(1.0-3.0*D22*D22-D21*D21)
CRDXY=+E*D21*D22

ACRDYY=+(1.0/2.0)*(CRDYY+PCRDYY)
ACRDXX=+(1.0/2.0)*(CRDXX+PCRDXX)
ACRDXY=+CRDXY+PCRDXY

PCRDYY=+CRDYY
PCRDXX=+CRDXX
PCRDXY=+CRDXY

RYD2=-RYD1*ACRDYY-RXD1*ACRDXY
RXD2=-RXD1*ACRDXX-RYD1*ACRDXY
```

NOTE--AVX,AVY SHOULD BE LIMITED TO THEIR MAX VALUE

+++NM67. DETERMINE ANGULAR VELOCITIES OF EARTH FIXED FRAME WITH RESPECT TO INERTIAL FRAME (10 HZ)

```
RXED=+WE*D22
RYED=+WE*D21
RZED=-WE*D23

ARXED=+(1.0/2.0)*(RXED+PRXED)
ARYED=+(1.0/2.0)*(RYED+PRYED)
ARZED=+(1.0/2.0)*(RZED+PRZED)

PRXED=+RXED
PRYED=+RYED
PRZED=+RZED
```

+++NM21. DETERMINE ANGULAR ROTATIONS OF THE LOCAL VERTICAL FRAME WITH RESPECT TO THE EARTH FIXED FRAME (10 HZ)

```
DRX=ROUND((RXD1+RXD2)*DEL1)
DRY=ROUND((RYD1+RYD2)*DEL1)
```

+++NM68. DETERMINE ANGULAR ROTATIONS OF THE LOCAL VERTICAL FRAME WITH RESPECT TO INERTIAL FRAME (10 HZ)

```
IF (NOT CALMODE) OR (CALMODE AND FCFLG<2.0)
THEN
   DRXL1=ROUND((RYD1+RYD2+ARXED)*DEL1)
   DRYL1=ROUND((RXD1+RXD2+ARYED)*DEL1)
   DRZL1=ROUND(ARZED*DEL1)

   DRXL=DRXL1+0.5*(DRXL1-DRXL1P)
   DRYL=DRYL1+0.5*(DRYL1-DRYL1P)
   DRZL=DRZL1+0.5*(DRZL1-DRZL1P)

   DRXL1P=DRXL1
   DRYL1P=DRYL1
   DRZL1P=DRZL1

   FCFLG=FCFLG+1
ENDIF
```

+++NM22. UPDATE DIRECTION COSINE MATRIX FOR ROTATION OF LOCAL VERTICAL FRAME (10 HZ NAVMODE, 50 HZ ALIGN MODE)

NOTE--THE FOLLOWING COMPUTATIONS SHOULD NOT BE INTERRUPTED

```
C11=C11+ROUND(C21*DRZL-C31*DRYL)
C12=C12+ROUND(C22*DRZL-C32*DRYL)
C13=C13+ROUND(C23*DRZL-C33*DRYL)
C21=C21+ROUND(C31*DRXL-C11*DRZL)
C22=C22+ROUND(C32*DRXL-C12*DRZL)
C23=C23+ROUND(C33*DRXL-C13*DRZL)
```

NOTE--ALL SUM OF PRODUCT TERMS FOR THE COSINE ELEMENTS SHOULD BE COMPUTED BEFORE ANY COSINES ARE UPDATED:
NOTE--THE DIRECTION COSINES SHOULD BE LIMITED AT THEIR MAX VALUES

+++NM23. UPDATE DIRECTION COSINES OF LOCAL VERTICAL FRAME RELATIVE TO THE EARTH FIXED FRAME (10 HZ)

```
D11=D11-ROUND(D13*DRY)
D12=D12+ROUND(D13*DRX)
D13=D13+ROUND(D11*DRY-D12*DRX)
D21=D21-ROUND(D23*DRY)
D22=D22+ROUND(D23*DRX)
D23=D23+ROUND(D21*DRY-D22*DRX)
```

NOTE--THE DIRECTION COSINES SHOULD BE LIMITED AT THEIR MAX VALUES

NOTE--ALL SUM OF PRODUCT TERMS FOR THE COSINE ELEMENTS SHOULD BE COMPUTED BEFORE ANY COSINES ARE UPDATED

+++NM24. FILTER PRECISION TRUE HEADING COMPONENTS (10HZ)

```
PTH1=C21*D22-C11*D21
PTH2=C11*D22+C21*D21

PTH1F=PTH1F+CHF*(PTH1+PTH1P-2*PTH1F)
PTH2F=PTH2F+CHF*(PTH2+PTH2P-2*PTH2F)

PTH1P=PTH1
PTH2P=PTH2
```

+++NM25. COMPUTE CORIOLIS,GRAVITY,AND ALTITUDE STABILIZATION ACCELERATIONS (10 HZ)

```
VXD=-(RYD1+RYD2+2.0*WE*D22)*AVZ+2.0*WE*D23*AVY
VYD=+(RXD1+RXD2+2.0*WE*D21)*AVZ-2.0*WE*D23*AVX
```

+++NM26. COMPUTE CORRECTIONS TO A/C VELOCITY COMPONENTS DUE TO GRAVITY, CORIOLIS AND ALTITUDE STABILIZATION ACCELERATIONS (10 HZ)

```
IF IN CALMODE
THEN
   CDVX=0
   CDVY=0
ELSE
   CDVX=(VXD+PVXD)*DELT/2.0
   CDVY=(VYD+PVYD)*DELT/2.0
ENDIF

   PVXD=VXD
   PVYD=VYD
```