This is the ARA Parameter list, produced at FAAM

The definitive version is a Microsoft Excel Spreadsheet managed by Guy Gratton, NCAS Head of Airborne Science and Technology

FAAM staff editing the R-drive version: please inform Guy Gratton of any changes you make so that they can be incorporated in the master

External users in possession of a PDF of this document: it is as up to date as was possible at the date of the file.

Please all be aware that this is a living document, some simplifications have taken place, and not all parameters are necessarily available on all flights. It should be regarded as indicative only.

Any queries please address to Dr. Guy Gratton; guy.gratton@ncas.ac.uk in the first instance or, if you know them, the owners and managers of individual instruments.

Data available from Core instrumentation

Name of Variable	UNITS	Full description	Aeronautical term	Source	Accuracy	Accuracy definition	Refresh rate (Hz)	Physical location	Notes
ACLD_GIN	m s-2	Acceleration along the aircraft vertical axis (GIN) (positive down)	Nz	ARA Core data				INS on GIN rack	
ACLF_GIN	m s-2	Acceleration along the aircraft longitudinal axis (GIN) (positive forward)	Nx	ARA Core data				INS on GIN rack	
ACLS_GIN	m s-2	Acceleration along the aircraft transverse axis (GIN) (positive starboard)	Ny	ARA Core data				INS on GIN rack	
ALT_GIN	m	Geopotential altitude from POS AV 510 GPS-aided Inertial Navigation unit	ShG	ARA Core data				GPS on GIN rack	
AOA	deg	Angle of attack from the turbulence probe (positive	α	ARA Core data				5 hole probe in radome	
AOSS	deg	Angle of sideslip from the turbulence probe (positive	β	ARA Core data				5 hole probe in radome	
GSPD_GIN	m s-1	Groundspeed from POS AV 510 GPS-aided Inertial Navigation unit	G/S	ARA Core data				INS on GIN rack	
HDGR_GIN	degree s-1	rate-of-change of GIN heading	dψ/dt	ARA Core data				INS on GIN rack	
HDG_GIN	degree	Heading from POSAV GPS-aided Inertial Navigation unit	ψ	ARA Core data				INS on GIN rack	
HGT_RADR	m	Radar height from the aircraft radar altimeter	h	ARA Core data				Aircraft radio altimeter on fuselage underside	
IAS_RVSM	m s-1	Indicated air speed from the aircraft RVSM (air data) system	IAS	ARA Core data				Aircraft primary pitot-static system	
LAT_GIN	degree_north	Latitude from POS AV 510 GPS-aided Inertial Navigation unit	Lat	ARA Core data				Science GPS on GIN rack	
LON_GIN	degree_east	Longitude from POS AV 510 GPS-aided Inertial Navigation unit	Long	ARA Core data				Science GPS on GIN rack	
LWC_JW_U	gram kg-1	Uncorrected liquid water content from the Johnson Williams instrument		ARA Core data				port side of nose	
NV_LWC_U	gram m-3	Uncorrected liquid water content from the Nevzorov probe		ARA Core data				starboard side of nose	
NV_TWC_U	gram m-3	Uncorrected total condensed water content from the Nevzorov probe.		ARA Core data				starboard side of nose	
P0_S10	hPa	Calibrated differential pressure between centre(P0) port and S10 static	q	ARA Core data				5 hole probe in radome	
P9_STAT	hPa	Static pressure from S9 fuselage ports	Ps	ARA Core data				below port cockpit window	
PALT_RVS	m	Pressure altitude from the aircraft RVSM (air data) system	ShP	ARA Core data	±245ft (75m)	As per FAA AC91-85		Aircraft primary pitot-static system	
PA_TURB	hPa	Calibrated differential pressure between turbulence probe vertical ports		ARA Core data				5 hole probe in radome	
PB_TURB	hPa	Calibrated differential pressure between turbulence probe horizontal ports		ARA Core data				5 hole probe in radome	
PITR_GIN	degree s-1	rate-of-change of GIN pitch angle	dθ/dt	ARA Core data				INS on GIN rack	
PSP_TURB	hPa	Pitot-static pressure from centre-port measurements corrrected for AoA and AoSS		ARA Core data				5 hole probe in radome	
PS_RVSM	hPa	Static pressure from the aircraft RVSM (air data) system	Ps	ARA Core data	±340 Pa	As per FAA AC91-85		Aircraft primary pitot-static system	
PTCH_GIN	degree	Pitch angle from POSAV GPS-aided Inertial Nav. unit (positive for nose up)	θ	ARA Core data				INS on GIN rack	
Q_RVSM	hPa	Pitot static pressure inverted from RVSM (air data) system indicated airspeed	q	ARA Core data	±340 Pa	As per FAA AC91-85		Aircraft primary pitot-static system	
ROLL_GIN	degree	Roll angle from POSAV GPS-aided Inertial Nav. unit (positive for left wing up)	ϕ	ARA Core data				INS on GIN rack	
ROLR_GIN	degree s-1	rate-of-change of GIN roll angle		ARA Core data				INS on GIN rack	

TAS	m s-1	True airspeed (dry-air) from turbulence probe	TAS	ARA Core data		5 hole probe in radome	
TAS_RVSM	m s-1	True air speed from the aircraft RVSM (air data) system and deiced temperature	TAS	ARA Core data		Aircraft primary pitot-static system plus TAT Rosemount on starboard side below cockpit	
TAT_DI_R	degK	True air temperature from the Rosemount deiced temperature sensor	T	ARA Core data		Rosemount on starboard side below cockpit	
TAT_ND_R	degK	True air temperature from the Rosemount non-deiced temperature sensor	T	ARA Core data		Rosemount on starboard side below cockpit	
TDEW_GE	degK	Dew point from the General Eastern instrument	DP	ARA Core data	4	Rosemount on starboard side below cockpit	
TRCK_GIN	degree	Aircraft track angle POSAV GPS-aided Inertial Navigation unit	True track	ARA Core data		GPS on GIN rack	+Ve bias below -25C and response time of several minutes below 40C
TWC_EVAP	gram kg-1	Total water specific humidity from the TWC avaporator instrument		ARA Core data			
TWC_TDEW	K	Dew-point derived from TWC probe specific humidity (valid in cloud-free air)	DP	ARA Core data			
U_C	m s-1	Eastward wind component from turbulence probe and GIN		ARA Core data			
U_NOTURB	m s-1	Eastward wind component derived from aircraft instruments and GIN		ARA Core data			
VELD_GIN	m s-1	Aircraft velocity down from POS AV 510 GPS-aided Inertial Navigation unit	dh/dt	ARA Core data		INS on GIN rack	
VELE_GIN	m s-1	Aircraft velocity east from POS AV 510 GPS-aided Inertial Navigation unit		ARA Core data		INS on GIN rack	
VELN_GIN	m s-1	Aircraft velocity north from POS AV 510 GPS-aided Inertial Navigation unit		ARA Core data		INS on GIN rack	
VMR_CR2	ppmv	Water vapour volume mixing ratio measured by the Buck CR2	RH	ARA Core data	1		
VMR_C_U	ppmv	Uncertainty estimate for water vapour volume mixing ratio measured by the Buck CR2		ARA Core data			
V_C	m s-1	Northward wind component from turbulence probe and GIN		ARA Core data		5 hole turbulence probe in radome and INS in GIN rack	
V_NOTURB	m s-1	Northward wind component derived from aircraft instruments and GIN		ARA Core data		5 hole turbulence probe in radome and INS in GIN rack	
WOW_IND	-	Weight on wheels indicator	WoW	ARA Core data		Undercarriage	
WVSS2F_VMR	ppmv	Water Vapour Measurement from Flush inlet WVSSII serial no. 4229 linearly interpolated to 1Hz		ARA Core data			
WVSS2R_VMR	ppmv	Water Vapour Measurement from Rosemount inlet WVSSII serial no. 0388 linearly interpolated to 1Hz		ARA Core data			
W_C	m s-1	Vertical wind component from turbulence probe and GIN		ARA Core data		5 hole turbulence probe in radome and INS in GIN rack	

Name of Variable	UNITS	Full description	Aeronautical term	Source	Accuracy	Accuracy definition	Refresh rate (Hz)	Physical location	Notes
AOA	deg	Angle of attack	α		Unknown	Unknown	Presented 1Hz --> 64Hz as required	vane below cockpit window	Green believed source data, amber believed derived data
AP Engaged	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP Heading Hold	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP LNAV Engaged	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP Mach Hold	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP Pitch Hold	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP Roll Hold	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
AP Warning	on/off binary				exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
APU Fire					exact	binary warning	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Forwards			Nx'				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Lateral			Ny				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Lateral Offset Raw							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Lateral Smoothed			Ny'				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Longitudinal			Nx				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Longitudinal Offset							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Normal			Nz				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Normal Fault	on/off binary						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Normal Offset Raw							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Sideways			Ny'				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Acceleration Vertical			Nz'				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron L							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron L Fault							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron R							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron R Fault							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aileron Trim Warning							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Aiming Point Range							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airbrake							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed	knots		IAS				Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Calibrated	knots		CAS (RAS)	Aircraft primary pitot-static system			Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Capture							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Fault	on/off binary						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed For Flight Phases							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airpseed Minus V2	knots						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Minus V2 for 3 seconds	knots						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Minus Vref	knots						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Minus Vref for 3 seconds	knots						Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed Relative							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Airspeed True	knots		TAS	Aircraft primary pitot-static + primary TAT			Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude AAL							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude AAL for flight phases							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Acquire Arm							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Baro	feet		sHp	Aircraft primary pitot-static system	1 ft	precision	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Baro (sign)							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Capture							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude High Level							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude High Level Fault							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Hold							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Low Level							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Low Level Fault							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Low Operations							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude QNH	feet		sHp'	Aircraft primary pitot-static system	1ft	precision	Presented 1Hz --> 64Hz as required	alongside cockpit	Green believed source data, amber believed derived data
Altitude Radio	feet			radio altimeter	1ft	precision	Presented 1Hz --> 64Hz as required	underside of fuselage	Green believed source data, amber believed derived data
Altitude Radio (B)					1ft	precision	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Radio Offset Removed							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude Rate							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude STD	feet				1ft	precision	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Altitude STD Smoothed	feet				1ft	precision	Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Approach Range							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data
Brake Green (L) Press							Presented 1Hz --> 64Hz as required		Green believed source data, amber believed derived data

Brake Green (R) Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Brake Yellow (L) Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Brake Yellow (R) Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Cabin Altitude Warning					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Climb for flight phases					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Computed Terrain Clearance					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Computed Terrain Clearance __(?)					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Date					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Day					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Daylight					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Distance for flight phases					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Distance flown					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Distance to landing					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Distance travelled					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator (L)					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator (L) Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator (R)					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator (R) Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator Trim Tab					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator Trim Tab Fault					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Elevator Trim Warning	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) All running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Any running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Fire					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Fuel Burn					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Fuel Flow					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Fuel Flow Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Fuel Flow Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Gas Temp Avg					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Gas Temp Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Gas Temp Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Avg					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Avg for 10 Sec					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Min for 5 Sec					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N1 Split					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N2 Avg					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N2 Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) N2 Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Press Avg					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Press Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Press Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Press Warning					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Temp Avg					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Temp Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Oil Temp Min					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (*) Vib N2 Max					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Fire	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Fuel Burn					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Fuel Flow					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Gas Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) N1	%	N1	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) N1 Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) N2	%	N2	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Oil Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Oil Press Low					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Oil Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Pylon overheat					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (1) Vib N2					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Fire	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Fuel Burn					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Fuel Flow					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data

Eng (2) Gas Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) N1	%	N1	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) N1 Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) N2	%	N2	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Oil Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Oil Press Low					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Oil Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Pylon overheat					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (2) Vib N2					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Fire	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Fuel Burn					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Fuel Flow					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Gas Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) N1	%	N1	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) N1 Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) N2	%	N2	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Oil Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Oil Press Low					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Oil Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Pylon overheat					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (3) Vib N2					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Fire	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Fuel Burn					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Fuel Flow					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Gas Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) N1	%	N1	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) N1 Fault	on/off binary				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) N2	%	N2	±0.1	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Oil Press					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Oil Press Low					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Oil Temp					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Pylon overheat					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Running					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Eng (4) Vib N2					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Event Marker					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
FMS NAV Mode					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Flap					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Flap Angle					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Flap Excluding Transition					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Flap Including Transition					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Flap Lever (Synthetic)					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Frame Counter					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Freight Door					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear (L) On Ground					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear (N) In Transit					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear (N) On Ground					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear (R) On Ground					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear Down					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear Down Selected					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear In Transit					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear On Ground					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear Up					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Gear Up Selected					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Geometric Altitude	feet		1 ft	precision	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Geometric Altitude (Sign)					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Groundspeed					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading	degrees				Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading Continuous					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading Increasing					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading Rate					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading True					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Heading True Continuous					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Headwind					Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data

Hour		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Hyd (Green) Low Press		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Hyd (Yellow) Low Press		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Glideslope		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Glideslope Capture		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Glideslope Deviation		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Inner Marker		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Lateral Distance		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Localizer		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Localizer Capture		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Middle Marker	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
ILS Outer Marker	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key HF	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key HF (1)	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key VHF	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key VHF (1)	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key VHF (2)	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key VHF (3)	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Key VHF-UHF	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Lateral Acceleration Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Latitude		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Latitude Prepared		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Latitude Smoothed		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Longitude		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Longitude Prepared		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Longitude Smoothed		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Longitudinal Acceleration Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
MMO Lookup		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Mach		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Magnetic Variation		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Magnetic Variation from Run(way?)		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Master Warning		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Minute		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Month		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
N1 Computer		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Pitch		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Pitch Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Pitch Rate		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Relief		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Roll		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Roll Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Roll Rate		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Roll Spoiler (L) Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Roll Spoiler (R) Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Rudder		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Rudder Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Rudder Pedal Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
SAT		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
SAT International Standard A(tmosphere?)		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Second		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Slope Angle to Landing		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Smoke Cargo Main Warning		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Smoke Electric Warning		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Spoiler (L)		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Spoiler (L1 and R1) Deployed		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Spoiler (L2 and R2) Deployed		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Spoiler (R)		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Stable Approach		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Stick Pusher	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Stick Shaker	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Sync Mode Engaged	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAT		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAT Fault		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Alert		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Alert Recorded	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data

TAWS Audio	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Don't Sink	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS General	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Inoperative	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Minimums	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Obstacle Warning	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Pull Up	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Sink Rate	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Terrain Caution	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Terrain Display On	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Terrain System Manua(l?)	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Too Low Flap	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Too Low Gear	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Too Low Terrain	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Unspecified	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TAWS Windshear Warning	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TCAS Combined Control	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TCAS Down Advisory	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TCAS RA	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TCAS Up Advisory	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
TCAS Vertical Control	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Tailwind		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Thrust Asymmetry		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Time		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Track Deviation From Runway		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Track True Continuous		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Turbulence		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Turbulence Warning		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
VMO Lookup		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
VOR Capture	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
VORLOC Capture	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Vertical Speed		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Vertical Speed for Flight Pha(?)		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Vertical Speed Inertial		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Vertical Speed Mode		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Vref Lookup	knots	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Across Landing Runway	knots	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Direction		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Direction Continuous	degrees	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Direction True	degrees	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Direction True Continuous	degrees	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Wind Speed	knots	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Yaw Damper (1) Engaged	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Yaw Damper (2) Engaged	on/off binary	Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data
Year		Presented 1Hz --> 64Hz as required	Green believed source data, amber believed derived data

Data available from Cloud Microphysics. Some variables are internal

Instrument	Name of Variable	UNITS	Full description	Aeronautical term	Data type	Accuracy	Accuracy definition	Refresh rate (Hz)	Physical location	Notes
CDP	Instrument number	integer	PADS Instrument number		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Instrument type		PADS Instrument string		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Cycle time	ms	Sampling period		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Enabled	binary	State of instrument at startup		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Port	integer	Communication port number		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Baud rate	s^-1	Baud rate		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	ADC Thresh	integer	Threshold ADC for sizing		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Transit reject	binary			Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Channel Count	integer	Number of channels used for sizing		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available. Range 1-->
CDP	DoF Reject	binary	Particles rejected when out of DOF		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Range				Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Avg transit time	ms			Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Avg transit time accept				Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Sample area	cm²	Average sample area as defined by instrument DOF		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Sizes	µm	Upper sizes for each bin		Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	IPT Thresholds				Metadata				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Notes		Notes taken during measurement		Metadata				Cloud physics operator station.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Time	s	Seconds past midnight, .	t	Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Laser Current	mA	Laser Current, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Dump Spot Monitor	V	Dump spot monitor voltage, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Wingboard Temp	°C	Ambient Temperature, ..	OAT	Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Laser Temp	°C	Laser Temperature, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Sizer Baseline	V	Instantaneous sizer voltage, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Qualifier Baseline	V	Instantaneous qualifier voltage, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	+5V Monitor	V	Difference from 5V, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Control Board T	°C	Board temperature, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	DOF Reject Cnt	integer	Number of reject flags as array of integer values		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Rej Transit	integer	Number of reject flags as array of integer values		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Avg Transit	ms	Mean time particles are illuminated, ..		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	ADC_Overflow	integer	Overflow flags, as array of integer values		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDP_PBP_Bin_*n*	integer	Counts in temporal bin n, as array of integer values.		Data				Cloud physics pylon station, as selected by FAAM.	30 similar variables, for bins 1-30. CDP = Cloud droplet probe. Additional internal variables also available.
CDP	Status	binary	Status flag		Data				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	GPS_Time	hh:mm:ss	GPS Time	t	Data				Cloud physics pylon station, as selected by FAAM.	Only present if GPS module is fitted.CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDP_TSPM	s	Time since midnight UTC from CDP		Processed				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDPCH	integer	CDP channel number		Processed				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDP_CONC	?	Total droplet concentration from CDP channels 1-30 inclusive		Processed				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDP_*n*	?	Droplet concentration in channel n		Processed				Cloud physics pylon station, as selected by FAAM.	bins 1-30. CDP = Cloud droplet probe. Additional internal variables also available
CDP	CDP_D_U_NOM	?	Nominal uncalibrated channel diameter upper limits as per instruction manual		Processed				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CDP	CDP_FLAG	binary	Flag for droplet concentration from CDP channels 2 -30 inclusive		Processed				Cloud physics pylon station, as selected by FAAM.	CDP = Cloud droplet probe. Additional internal variables also available.
CIP15	Instrument number	integer	PADS Instrument number		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Instrument type	integer	PADS instrument string		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Cycle time	ms	Sampling period		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Enabled	binary	State of instrument at startup		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Port	integer	Communication port number		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Baud rate	s^-1	Baud rate		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Minimum slice count	integer	Minimum size of image to save in multiples of resolution		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	DoF Reject	binary	Reject out of depth of field particles		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	N value	integer	Save every Nth image		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Divisor flag	binary			Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	End Diode Rej	binary	Do not size any particle touching an edge diode		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Use part width	binary	Use dimension parallel to array to calculate size		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	TAS Source	binary	Permission for probe to measure True Airspeed		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Image card#	integer	Image card number in use		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Use as Master TAS	binary	Use as source of true airspeed for PADS		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Arm width	mm	Distance between tips		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Probe res	µm	Resolution of probe		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Use as master ambient	binary	Use as source of ambient temperature for PADS		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Use as master press	binary	Use as source of ambient pressure for PADS		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Use as master hotwire	binary	Use as source of LWP hotwire for PADS		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Static slope	floating point	Parameter to calculate static pressure		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Static Yint	floating point	Parameter to calculate static pressure		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Dynamic slope	floating point	Parameter to calculate dynamic pressure		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Dynamic Yint	floating point	Parameter to calculate dynamic pressure		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Grayscale 1	%	Decrease in light intensity to register level 1		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Grayscale 2	%	Decrease in light intensity to register level 2		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Grayscale 3	%	Decrease in light intensity to register level 3		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	1D sizing thresh	integer	Level of particle used in sizing		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging Probe. Range 1-3
CIP15	Image thresh	integer	Level of particle used in images		Metadata				Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging Probe. Range 1-3

CIP15	Ambient Temp Sensor	integer	Type of temperature sensor installed		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	RH Slope	floating point	Parameter for RH calculations		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	RH Yint	floating point	Parameter for RH calculations		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Image Baud Rate	s^-1	Baud rate of image transfer over RS422 (if in use)		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Images over COM	binary	Permission to use RS422 comms for image transfer		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP15	Notes	text	Notes taken during measurement		Metadata	Cloud physics operator station.	CIP = Cloud Imaging probe.
CIP15	Time	s	Seconds past midnight, .	t	Data		CIP = Cloud Imaging probe.
CIP15	Over_rej_count	integer	number of oversize particles rejected		Data		CIP = Cloud Imaging probe.
CIP15	Bin_*n*		Count in bin n (size ~ 15µm).		Data		Bin numbers 1-28.
CIP15	DOF_ref_counts		Number of depth of field rejected particles, as array of integers.		Data		CIP = Cloud Imaging probe.
CIP15	End_ref_counts		Number of edge diode rejected particles, as array of integers.		Data		CIP = Cloud Imaging probe.
CIP15	Laser_Temp(C)	°C	Laser Temperature, ..		Data		CIP = Cloud Imaging probe.
CIP15	Diode_1_(V)	V	Voltage of diode 1 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP15	Diode_32_(V)	V	Voltage of diode 32 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP15	Diode_64_(V)	V	Voltage of diode 64 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP15	Press_Temp(C)	°C	Temperature of pressure transducer		Data		CIP = Cloud Imaging probe.
CIP15	Dynamic_Press(mBar)	hPa	Static pressure at combined pressure head.	Pd	Data		Unsure if this is absolute, or relative to static. CIP = Cloud Imaging probe.
CIP15	Static_Press(mBar)	hPa	Static pressure at combined pressure head.	Ps	Data		CIP = Cloud Imaging probe.
CIP15	8_Volts(V)	V	Pressure transducer calibration voltage ..		Data		CIP = Cloud Imaging probe.
CIP15	V_Ref_1.24(V)	V	Temperature sensor calibration voltage		Data		CIP = Cloud Imaging probe.
CIP15	Board_Temp(C)	°C	Power supply electronics board temperature		Data		CIP = Cloud Imaging probe.
CIP15	Laser_Current(mA)	mA	Laser Current, ..		Data		CIP = Cloud Imaging probe.
CIP15	LWC(V)	V	Liquid Water Content hotwire voltage, .		Data		CIP = Cloud Imaging probe.
CIP15	LWC_Slave(V)	V	Liquid Water Content slave end hotwire voltage, .		Data		CIP = Cloud Imaging probe.
CIP15	RH%	%	Relative Humidity	RH	Data		CIP = Cloud Imaging probe.
CIP15	Ambient_Temp(C)	°C	Ambient Temperature, ..	OAT	Data		CIP = Cloud Imaging probe.
CIP15	Particle_counter	integer	Total number of particles of all sizes, as array of integers		Data		CIP = Cloud Imaging probe.
CIP15	Seconds	s	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP15	Milliseconds	ms	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP15	Hours	Hrs	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP15	Minutes	min	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP15	Host_Sync_Counter				Data		CIP = Cloud Imaging probe.
CIP15	Reset_Flag				Data		CIP = Cloud Imaging probe.
CIP15	Instant_Illum_*n*		Peak illumination of diode n, as array of integers		Data		For diodes 1-64. CIP = Cloud Imaging probe.
CIP15	Dark_Current_*n*		Dark current of diode n, as array of integers		Data		For diodes 1-64. CIP = Cloud Imaging probe.
CIP15	True Air Speed	m/s	True Air Speed .	TAS	Data		CIP = Cloud Imaging probe.
CIP15	CIP_GS_Numb	cm^-3	Calculated number concentration .		Data		CIP = Cloud Imaging probe.
CIP15	CIP_GS_LWC	g.m^-3	Liquid water concentration from particles, .		Data		CIP = Cloud Imaging probe.
CIP15	CIP_GS_MVD	µm	Calculated median volume diameter ..		Data		CIP = Cloud Imaging probe.
CIP15	CIP_GS_ED	µm	Calculated effective diameter ..		Data		CIP = Cloud Imaging probe.
CIP15	Status	binary	Status flag as array of binary values		Data		CIP = Cloud Imaging probe.
CIP15	GPS_Time	hh:mm:ss	GPS Time	t	Data		Only present if GPS module is fitted.
CIP15	CIP15_TSPM	s	Time since midnight UTC from CIP15		Processed		CIP = Cloud Imaging probe.
CIP15	CDP15CH		CIP15 channel number		Processed		Variable name copied from notes at FAAM, but is this correct?
CIP15	CIP15_CONC	?	Total particle concentration from CIP15 channels 1 to 62 inclusive		Processed		CIP = Cloud Imaging probe.
CIP15	CIP15_*n*	?	Particle concentration in CIP15 channel n		Processed		Channels 1-62. CIP = Cloud Imaging probe.
CIP15	CIP15_D_U_NOM	?	Nominal uncalibrated channel diameter upper limits as per instruction manual		Processed		CIP = Cloud Imaging probe.
CIP15	CIP15_FLAG	binary	Flag for particle concentration from CIP15 channels 1 to 62 inclusive		Processed		CIP = Cloud Imaging probe.
CIP15	CIP15_P	?	Pitot tube pressure from the CIP15	Pd	Processed		CIP = Cloud Imaging probe.
CIP15	CIP15_RH	?	Relative Humidity from the CIP15	RH	Processed		CIP = Cloud Imaging probe.
CIP15	CIP15_TAS	?	True Air Speed from the CIP15	TAS	Processed		CIP = Cloud Imaging probe.
CIP100	Instrument number	integer	PADS Instrument number		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Instrument type	integer	PADS instrument string		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Cycle time	ms	Sampling period		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Enabled	binary	State of instrument at startup		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Port	integer	Communication port number		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Baud rate	s^-1	Baud rate		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Minimum slice count	integer	Minimum size of image to save in multiples of resolution		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	DoF Reject	binary	Reject out of depth of field particles		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	N value	integer	Save every Nth image		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Divisor flag	binary			Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	End Diode Rej	binary	Do not size any particle touching an edge diode		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Use part width	binary	Use dimension parallel to array to calculate size		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	TAS Source	binary	Permission for probe to measure True Airspeed		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Image card#	integer	Image card number in use		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Use as Master TAS	binary	Use as source of true airspeed for PADS		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Arm width	mm	Distance between tips		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Probe res	µm	Resolution of probe		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Use as master ambient	binary	Use as source of ambient temperature for PADS		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Use as master press	binary	Use as source of ambient pressure for PADS		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Use as master hotwire	binary	Use as source of LWP hotwire for PADS		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Static slope	floating point	Parameter to calculate static pressure		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Static Yint	floating point	Parameter to calculate static pressure		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Dynamic slope	floating point	Parameter to calculate dynamic pressure		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.

CIP100	Dynamic Yint	floating point	Parameter to calculate dynamic pressure		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Temp sensor	integer	Type of temperature sensor installed		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	RH Slope	floating point	Parameter for RH calculations		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	RH Offset	floating point	Parameter for RH calculations		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Image Baud Rate	s^-1	Baud rate of image transfer over RS422 (if in use)		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Images over COM	binary	Permission to use RS422 comms for image transfer		Metadata	Cloud physics pylon station, as selected by FAAM.	CIP = Cloud Imaging probe.
CIP100	Notes	text	Notes taken during measurement		Metadata	Cloud physics operator station.	CIP = Cloud Imaging probe.
CIP100	Time	s	Seconds past midnight, .	t	Data		CIP = Cloud Imaging probe.
CIP100	Over_rej_count	integer	number of oversize particles rejected		Data		CIP = Cloud Imaging probe.
CIP100	Bin_*n*		Count in bin n (size ~ 100µm).		Data		Bin numbers 1-28. CIP = Cloud Imaging probe.
CIP100	DOF_ref_counts		Number of depth of field rejected particles, as array of integers.		Data		CIP = Cloud Imaging probe.
CIP100	End_ref_counts		Number of edge diode rejected particles, as array of integers.		Data		CIP = Cloud Imaging probe.
CIP100	Diode_1_Volts	V	Voltage of diode 1 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP100	Diode_32_Volts	V	Voltage of diode 32 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP100	Diode_64_Volts	V	Voltage of diode 64 when fully illuminated, ..		Data		CIP = Cloud Imaging probe.
CIP100	Diff_Press	hPa	Combined pressure head (pitot tube) dynamic pressure	q	Data		CIP = Cloud Imaging probe.
CIP100	Static_Press	hPa	Static pressure at combined pressure head.	Ps	Data		CIP = Cloud Imaging probe.
CIP100	DSP_Board_Temp	°C	DSP electronics board temperature .		Data		CIP = Cloud Imaging probe.
CIP100	Board_Temp(C)	°C	Power supply electronics board temperature		Data		CIP = Cloud Imaging probe.
CIP100	Laser_Current	mA	Laser Current, ..		Data		CIP = Cloud Imaging probe.
CIP100	Laser Power (arb units)	Arbitrary	Laser power as array of integers				CIP = Cloud Imaging probe.
CIP100	LWC_Hotwire	V	Liquid Water Content hotwire voltage, .		Data		CIP = Cloud Imaging probe.
CIP100	LWC_Slave	V	Liquid Water Content slave end hotwire voltage, .		Data		CIP = Cloud Imaging probe.
CIP100	RH%	%	Relative Humidity	RH	Data		CIP = Cloud Imaging probe.
CIP100	Ambient_Temp	°C	Ambient Temperature, ..	OAT	Data		CIP = Cloud Imaging probe.
CIP100	Particle_counter	integer	Total number of particles of all sizes, as array of integers		Data		CIP = Cloud Imaging probe.
CIP100	Seconds	s	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP100	Milliseconds	ms	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP100	Hours	Hrs	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP100	Minutes	min	Time when probe gathered data, as array of integers		Data		CIP = Cloud Imaging probe.
CIP100	True Air Speed	m/s	True Air Speed .	TAS	Data		CIP = Cloud Imaging probe.
CIP100	CIP_Numb	cm^-3	Calculated number concentration .		Data		CIP = Cloud Imaging probe.
CIP100	CIP_LWC	g.m^-3	Liquid water concentration from particles, .		Data		CIP = Cloud Imaging probe.
CIP100	CIP_MVD	µm	Calculated median volume diameter ..		Data		CIP = Cloud Imaging probe.
CIP100	CIP_ED	µm	Calculated effective diameter ..		Data		CIP = Cloud Imaging probe.
CIP100	Status	binary	Status flag as array of binary values		Data		CIP = Cloud Imaging probe.
CIP100	GPS_Time	hh:mm:ss	GPS Time	t	Data		Only present if GPS module is fitted. CIP = Cloud Imaging probe.
CIP100	CIP100_TSPM	s	Time since midnight UTC from CIP100		Processed		CIP = Cloud Imaging probe.
CIP100	CDP100CH		CIP100 channel number		Processed		Variable name copied from notes at FAAM, but is this correct?
CIP100	CIP100_CONC	?	Total particle concentration from CIP100 channels 1 to 62 inclusive		Processed		CIP = Cloud Imaging probe. CIP = Cloud Imaging probe.
CIP100	CIP100_*n*	?	Particle concentration in CIP100 channel n		Processed		Channels 1-62. CIP = Cloud Imaging probe.
CIP100	CIP100_D_U_NOM	?	Nominal uncalibrated channel diameter upper limits as per instruction manual		Processed		CIP = Cloud Imaging probe.
CIP100	CIP100_FLAG	binary	Flag for particle concentration from CIP15 channels 1 to 62 inclusive		Processed		CIP = Cloud Imaging probe.
CIP100	CIP100_P	?	Pitot tube pressure from the CIP10	Pd	Processed		CIP = Cloud Imaging probe.
CIP100	CIP100_RH	?	Relative Humidity from the CIP10	RH	Processed		CIP = Cloud Imaging probe.
CIP100	CIP100_TAS	?	True Air Speed from the CIP10	TAS	Processed		CIP = Cloud Imaging probe.
CIP100	CIP_LWC		Liquid water content from the CIP LWC hotwire				CIP = Cloud Imaging probe.
LWC	Instrument number	integer	PADS Instrument number		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Instrument type	integer	PADS instrument string		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Cycle time	ms	Sampling period		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Enabled	binary	State of instrument at startup		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	LWC Source	integer	CIP instrument used as the source of data		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Length	?	Length of LWC wire in use		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Diameter	?	Diameter of LWC wire in use		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Wire Temp	°C	Target temperature of LWC wire		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Use as master hotwire	binary	Instruction to use LWC hotwire as system master		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Daq device		Address of data acquisition card		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	# of Avg	integer	Number of measurements from which mean is calculated		Metadata	Cloud physics pylon station, as selected by FAAM. Co-located CIP instrument	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Notes	text	Notes taken during measurement		Metadata	Cloud physics operator station.	LWC = Liquid Water Content (in this context, from Cloud Physics Suite, not main aircraft core data)
LWC	Time	s	Seconds past midnight, .	t	Data		
LWC	LWC hotwire(V)	V	Voltage on the main wire .		Data		

LWC	LWC Slave(V)	V	Voltage on the end or slave wire .		Data		
LWC	LWC raw (g/m^3)	g.m^-3	Calculated liquid water content assuming only vapourisation .		Data		
LWC	DAT Calculated (g/m^3)	g.m^-3	Calculated dry air term of heat loss due to convection .		Data		
LWC	DAT Observed (g/m^3)	g.m^-3	User specified dry air term of heat loss due to convection .		Data		
LWC	LWC-DAT Calc (g/m^3)	g.m^-3	Raw Liquid Water Content minus calculated Dry Air Term .		Data		
LWC	LWC-DAT Observed(g/m^3)	g.m^-3	Raw Liquid Water Content minus observed Dry Air Term .		Data		
LWC	Ambient Temp(C)	°C	Ambient Temperature, ..	OAT	Data		
LWC	Pressure(mB)	hPa	Static pressure.	Ps	Data		
LWC	Airspeed(m/s)	m/s	True Air Speed .	TAS	Data		
LWC	Air Density(kg/m^3)	kg.m^-3	Calculated Air Density .	ρ	Data		
LWC	Viscosity Dry(g/sec-cm)	g(s cm)^-1	Calculated dry air viscosity .		Data		Unclear if this is dynamic or kinematic?
LWC	Viscosity Wet(g/sec-cm)	g(s cm)^-1	Calculated moist air viscosity .		Data		Unclear if this is dynamic or kinematic?
LWC	Thermal Cond Dry (cal/sec-cm-K)	cal (s cm K)^-1	Calculated dry air thermal conductivity .		Data		
LWC	Thermal Cond Wet (cal/sec-cm-K)	cal (s cm K)^-1	Calculated moist air thermal conductivity .		Data		
LWC	Reynolds Number		Calculated Reynolds Number ..	Re	Data		Query - notes at FAAM say m², but Re is dimensionless. Also unclear whether calculated using dry or wet (presumably kinematic?) viscosity. Also unclear what reference length is used.
LWC	Pradtl Numb Dry		Calculated dry air Prandtl number .	Pr	Data		Query - notes at FAAM say g (s² cm² K)^-1, but should be dimensionless
LWC	Pradtl Numb Wet		Calculated moist air Prandtl number .		Data		Query - notes at FAAM say g (s² cm² K)^-1, but should be dimensionless
LWC	Boiling Point Water (K)	K	Calculated boiling point for water .		Data		
LWC	P Total (W)	W	Total power required to maintain wire temperature .		Data		
LWC	P Dry Calculated (W)	W	Calculated dry air term of heat loss due to convection .		Data		
LWC	DAT Observed (W)	W	User specified dry air term of heat loss due to convection .		Data		
LWC	Status	binary			Data		
LWC	GPS_Time	hh:mm:ss	GPS Time	t	Data		Only present if GPS module is fitted.
PCASP	Instrument number	integer	PADS Instrument number		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Instrument type	integer	PADS instrument string		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Cycle time	ms	Sampling period		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Enabled	binary	State of instrument at startup		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Port	integer	Communication port number		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Baud rate	s^-1	Baud rate		Metadata	Cloud physics pylon station, as selected by FAAM.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Threshold	integer	Threshold ADC for sizing		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Channel Count	integer	Number of channels used for sizing		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Range	?			Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Avg Transit Time	µs	Average particle time through beam		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Range	integer	Row of threshold table used for sizing		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Avg Transit Wt	integer	Number of particles used for calculating mean transit time		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Pump	binary	State of pump & heater at startup		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Threshold Tables	string	Path to sizing threshold tables		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Thresholds	list of integers	ADC threshold values for ech bin		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Sizes	list of floats	Upper sizes for each bin		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Notes	text	Notes taken during measurement		Metadata	Cloud physics operator station.	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Time	s	Time in seconds past midnight		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Hi_Gain_Baseline(V)	V	Mean voltage of high-gain stage		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Mid_Gain_Baseline(V)	V	Mean voltage of mid-gain stage		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Lo_Gain_Baseline(V)	V	Mean voltage of low-gain stage		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Sample_Flow(std cm^3/s)	cm^3/s	Standard mass sample flow rate		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Laser_Ref_Voltage	V	Laser reference voltage		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Sheath_Flow(std cm^3/s)	cm^3/s	Standard mass sheath flow rate		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Electronics_Temp(C)	°C	Electronics temperature		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Avg_Transit	ms	Mean time particles are illuminated, ..		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	FIFO_Full	integer	Number of times FIFO buffer was cleared		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	ADC_Overflow(cts)	integer	Number of particles not counted as oversize		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	SPP_200_OPC_ch*n*	integer	Counts in size bin *n*		Data		Bins no. 1-30. PCASP = Passive Cavity Aerosol Spectrometer Probe.
PCASP	Number_Conc(cts/cm^3)	cm^-3	Number concentration		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Volume_Conc(um^3/cm^3)	µ(m^3/cm^3)	Total volume of particles in unit volume of air		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe. Query - do we trust the units for this parameter?, they seem odd.
PCASP	SSP200_MVD(um)	µm	Calculated median volume diameter ..		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	SSP200_ED(um)	µm	Calculated effective diameter ..		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Sample Flow (vol cm^3/s)	cm^3/s	Calculated STP volumetric sample flow		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Sheath Flow (vol cm^3/s)	cm^3/s	Calculated STP volumetric sheath flow		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Pressure (mb)	hPa	Ambient Pressure (Static Pressure)	Ps	Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Ambient Temp (C)	°C	Ambient Temperature	OAT	Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	Status	binary	Status flag		Data		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	GPS_Time	hh:mm:ss	GPS Time	t	Data		Only present if GPS module is fitted. PCASP = Passive Cavity Aerosol Spectrometer Probe.
PCASP	READ_ME	text	Information and guidance on using PCASP data		Metadata		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1CH	integer	PCASP (SPP200) Channel Number		Processed		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1TSPM	s	Time since midnight UTC from PCASP2 (SPP200)		Processed		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1CON	?	Particle concentration from PCASP2 (SPP200) channels 2-30 inclusive		Processed		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1_FL	?	Volumetric sample flow rate through PCASP2 (SPP200)		Processed		PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1_FLAG	?	Flag for droplet concentration from PCASP channels 2 to 30 inclusive		Processed		What's being flagged? PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1_*n*	?	PCASP (SPP200) concentration in size channel *n*		Processed		n=1-30. PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS1_*n* _err	%	Errror in PCASP2 (SPP200) concentration in size channel *n*		Processed		n=1-30. PCASP = Passive Cavity Aerosol Spectrometer Probe

PCASP	PCAS2CH	integer	PCASP (SPP200) Channel Number		Processed	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCASP2TSPM	s	Time since midnight UTC from PCASP2 (SPP200)	t	Processed	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS2CON	?	Droplet concentration from PCASP2 (SPP200) channels 2 to 30 inclusive		Processed	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS2_FL	?	Volumetric sample flow rate through PCASP2 (SPP200)		Processed	PCASP = Passive Cavity Aerosol Spectrometer Probe
PCASP	PCAS2_FLAG		Flag for droplet concentration from PCASP2 (SPP200) channels 2 to 30 inclusive		Processed	What's being flagged? PCASP = Passive Cavity Aerosol Spectrometer Probe.
PCASP	PCAS2_*n*	?	PCASP2 (SPP200) concentration in size channel *n*		Processed	n=1-30. PCASP = Passive Cavity Aerosol Spectrometer Probe.
PCASP	PCAS2_*n* _err	%	Percentage error in PCASP2 (SPP200) concentration in size channel *n*		Processed	n=1-30. PCASP = Passive Cavity Aerosol Spectrometer Probe.

Data available from the MADRAS Flight Data Recorder. Parameters not available in flight, but can be downloaded.									
Name of Variable	**UNITS**	**Aeronautical term**	**Source**	**Precision**	**Accuracy**	**Accuracy definition**	**Min. Refresh rate (Hz)**	**Physical location**	**Notes**
Aileron position (Left)	degrees		Rotary potentiometer: Penny & Giles D15953 or D44059	0.1	(1) ±2, (2) ±1.12 RMS	(1) Calibration specification, (2) Design specification.	4	Port aileron	Control column position not seperately recorded. +Ve = roll right sense. Transport delay 176.5ms @ MADRAS. Reliable range ±22deg.
Aileron position (Right)	degrees		Rotary potentiometer: Penny & Giles D15953 or D44059	0.1	(1) ±2, (2) ±1.12 RMS	(1) Calibration specification, (2) Design specification.	4	Starboard aileron.	Control column position not seperately recorded. +Ve = roll right sense. Transport delay 176.5ms @ MADRAS. Reliable range ±22deg.
Airbrake position	degrees		Airbrake control amplifier, PCB HC921H0451		±1.2	±2% of full range	2		Transport delay 236.5ms @ MADRAS. Scale 0 (closed) to 60 (fully extended)
Altitude (pressure) 1013.25	feet	sHp	Penny & Giles D60299 transducer, then ARINC 429 from ADDU1 and RVSM ADDU (Altimeter No.1)	1 foot	±100ft at S/L to to ±600 ft @ ceiling	RVSM minima	1 (system updates @ 16, but records @ 1)	Transducer in fwd cargo compartment, LHS frames 22-23	Transport delay: 200ms @ LRU, 119.5ms @ MADRAS. RVSM compliant system.
Altitude (pressure) High Level	feet	sHp	Penny & Giles D60299 transducer, then ARINC 429 from ADDU1 and RVSM ADDU (Altimeter No.1)	9.2 ft	± 267.5ft @ 18,000ft bcmg ± 700.2ft @ 48,000 ft	RMS	2		Transport delay: 236.5ms @ MADRAS. Trustworthy to FL360. Working range 14,250ft to above aircraft ceiling.
Altitude (pressure) Low level	feet	sHp	Penny & Giles D60299 transducer, then ARINC 429 from ADDU1 and RVSM ADDU (Altimeter No.1)	1 foot	± 86.7ft @ -1000ft bcmg ± 282.4ft @ 19,000ft	RMS	2		Transport delay: 236.5ms @ MADRAS. Trustworthy to FL360. Working range -2500ft upwards
Altitude (pressure) QNH corrected	feet	Hp	Penny & Giles D60299 transducer, then ARINC 429 from ADDU1 and RVSM ADDU (Altimeter No.1)				1 (system updates @ 16, but records @ 1)		
Altitude acquire arm	binary		Autopilot						1 = not armed, 0 = armed
Altitude capture	binary		Autopilot						0=active, 1=not active
Altitude Rate	feet / minute	RoC	Arinc 429 from RVSM ADDU (Altimeter No.1)	16 ft/min	(1) ±2.5%, (2) ±16fpm	(1) Review of ground calibration data, (2) declared RMS by OEM	1 (system updates @ 16, but records @ 1)		There are no standards for this system, but historical calibration data indicates ±2.5%. This is not a validated accuracy. +Ve in climb. Range ±32,750fpm. System delay 40ms @ LRU, 119.5ms @ MADRAS.

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Name of Variable	UNITS	Aeronautical term	Source	Precision	Accuracy	Accuracy definition	Min. Refresh rate (Hz)	Physical location	Notes
Angle of attack	degrees	α	Stall ident signal summing unit No.1 Safeflight C-81606/2/3/4/5/6	0.1	(1) ±1.5, (2) ±1.2% RMS	(1) Worst error seen in ground calibration tests. (2) design spec.	4	left side of cockpit below window	Vane has operating range -15 to +45. System has known freeplay similar in magnitude to worst error. Right hand vane not believed to be recorded. Transport delay 176.5ms @ MADRAS. System range ±30deg. +Ve = nose-up.
APU fire	binary		APU					APU bay	0=no warning
Autopilot Aileron trim warning	binary		Autopilot						1=no warning, 0=warning
Autopilot disconnect	binary		Autopilot					Cockpit	0=no warning, 1=disconnect
Autopilot Elevator trim warning	binary		Autopilot						1=no warning, 0=warning
Autopilot engaged	binary		Autopilot					Cockpit	0=engaged, 1=off
Autopilot go-around	binary		Autopilot						1 = not engaged, 0=engaged
Autopilot heading select	binary		Autopilot						1=inactive, 0=active
Autopilot lateral navigation mode	binary		Autopilot						1=inactive, 0=active
Autopilot pitch attitude hold	binary		Autopilot					Cockpit	0=engaged, 1=not engaged
Autopilot roll attitude hold	binary		Autopilot					Cockpit	0=engaged, 1=not engaged
Autopilot sync mode	binary		Autopilot						1 = not engaged, 0=engaged
Autopilot turbulence	binary		Autopilot						1=inactive, 0=active
Autopilot vertical speed mode	binary		Autopilot						1=inactive, 0=active
Brake pressure left green	psi		Hydraulic pressure transducer	1	(1) ±200, (2) ±2.06% RMS	(1) Calibration specification, (2) Design specification	2		Range 0 to 4,000psi. Transport delay 236.5ms @ MADRAS.
Brake pressure left yellow	psi		Hydraulic pressure transducer	1	(1) ±200, (2) ±2.06% RMS	(1) Calibration specification, (2) Design specification	2		Range 0 to 4,000psi. Transport delay 236.5ms @ MADRAS.
Brake pressure right green	psi		Hydraulic pressure transducer	1	(1) ±200, (2) ±2.06% RMS	(1) Calibration specification, (2) Design specification	2		Range 0 to 4,000psi. Transport delay 236.5ms @ MADRAS.
Brake pressure right yellow	psi		Hydraulic pressure transducer	1	(1) ±200, (2) ±2.06% RMS	(1) Calibration specification, (2) Design specification	2		Range 0 to 4,000psi. Transport delay 236.5ms @ MADRAS.
Cabin high altitude warning	binary								1=warning, 0=no warning
Calibrated Airspeed	knots	CAS (RAS)	ARINC 429 from ADDU1 (Altimeter No.1)	1 knot			1 (system updates @ 16, but records @ 1)		RVSM compliant system . Range 0--> 1024kts. Transport delay 40ms @ LRU, 119.5ms @ MADRAS
Combined VHF PTT discrete	binary								0=transmit, 1=inactive
Date				1 day					Transport delay: 200ms @ LRU, 119.5ms @ MADRAS

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Name of Variable	UNITS	Aeronautical term	Source	Precision	Accuracy	Accuracy definition	Min. Refresh rate (Hz)	Physical location	Notes
EGPWS mode	binary						1		Complex refer to manuals. Based upon 2 x 12-bit words, multiple combinations for different modes and signals. All parameters have 40ms LRU transport delay plus 119.5ms at MADRAS.
Electrical smoke warning	binary		Avionics bay (?)						0=no warning
Elevator position (Left)	degrees		Peny & Giles potentiometer (D15953 or D44059)	0.1	(1) ±2, (2) ±1.12 RMS	(1) Calibration specification, (2) Design specification.	4	Top of vertical stabiliser, left hand side	Control column position not seperately recorded. +Ve trailing edge up. Transport delay 176.5ms at MADRAS. Reliable range ± 25deg.
Elevator position (Right)	degrees		Peny & Giles transducer (D15953 or D44059)	0.1	(1) ±2, (2) ±1.12 RMS	(1) Calibration specification, (2) Design specification.	4	Top of vertical stabiliser, right hand side	Control column position not seperately recorded. +Ve trailing edge up. Transport delay 176.5ms at MADRAS. Reliable range ± 25deg.
Elevator trim tab position	degrees		Peny & Giles rotary potentiometer (D15953 or D44059)	0.01	(1) ±1.17 deg, (2) ±1.12% RMS	(1) Calibration specification, (2) Design specification.	2	Left hand elevator, rib 8	+Ve trailing edge up. Transport delay 236.5ms @ MADRAS. Sensible range -31.5deg to +19deg.
Engine fire 1	binary		Engine 1					Engine 1	0=no warning
Engine fire 2	binary		Engine 2					Engine 2	0=no warning
Engine fire 3	binary		Engine 3					Engine 3	0=no warning
Engine fire 4	binary		Engine 4					Engine 4	0=no warning
Engine oil pressure Engine 1	psi	Oil.P(1)	Engine oil pressure transducer		±5%	Design specification, RMS.	1	Engine 1	Working range 0-120psi. Transport delay 357.4ms at MADRAS.
Engine oil pressure Engine 2	psi	Oil.P(2)	Engine oil pressure transducer		±5%	Design specification, RMS.	1	Engine 2	Working range 0-120psi. Transport delay 357.4ms at MADRAS.
Engine oil pressure Engine 3	psi	Oil.P(3)	Engine oil pressure transducer		±5%	Design specification, RMS.	1	Engine 3	Working range 0-120psi. Transport delay 357.4ms at MADRAS.
Engine oil pressure Engine 4	psi	Oil.P(4)	Engine oil pressure transducer		±5%	Design specification, RMS.	1	Engine 4	Working range 0-120psi. Transport delay 357.4ms at MADRAS.
Engine oil temperature Engine 1	degC	Oil.T(1)	Engine oil temperature probe	1	(1) -1 / +5, (2) ±7.5%	(1) Worst error seen during calibration at installation, (2) Design specification	1	Engine 1	Working range 0-200deg.C. Transport delay 357.4s at MADRAS.
Engine oil temperature Engine 2	degC	Oil.T(2)	Engine oil temperature probe	1	(1) -1 / +5, (2) ±7.5%	(1) Worst error seen during calibration at installation, (2) Design specification	1	Engine 2	Working range 0-200deg.C. Transport delay 357.4s at MADRAS.
Engine oil temperature Engine 3	degC	Oil.T(3)	Engine oil temperature probe	1	(1) -1 / +5, (2) ±7.5%	(1) Worst error seen during calibration at installation, (2) Design specification	1	Engine 3	Working range 0-200deg.C. Transport delay 357.4s at MADRAS.

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Name of Variable	UNITS	Aeronautical term	Source	Precision	Accuracy	Accuracy definition	Min. Refresh rate (Hz)	Physical location	Notes
Engine oil temperature Engine 4	degC	Oil.T(4)	Engine oil temperature probe	1	(1) -1 / +5, (2) ±7.5%	(1) Worst error seen during calibration at installation, (2) Design specification	1	Engine 4	Working range 0-200deg.C. Transport delay 357.4s at MADRAS.
Engine Turbine Gas Temperature Engine 1	degC		Smiths TGT Indicator thermocouple.	1	(1) -5 / +15, (2) ±1.12%	(1) Worst error seen during calibration at installation, (2) Design specification	2	Engine 1	Calibrated range 100 --> 910. Design range -55 --> 1104.34. Transport delay 236.5ms @ MADRAS.
Engine Turbine Gas Temperature Engine 2	degC		Smiths TGT Indicator thermocouple.	1	(1) -5 / +15, (2) ±1.12%	(1) Worst error seen during calibration at installation, (2) Design specification	2	Engine 2	Calibrated range 100 --> 910. Design range -55 --> 1104.34. Transport delay 236.5ms @ MADRAS.
Engine Turbine Gas Temperature Engine 3	degC		Smiths TGT Indicator thermocouple.	1	(1) -5 / +15, (2) ±1.12%	(1) Worst error seen during calibration at installation, (2) Design specification	2	Engine 3	Calibrated range 100 --> 910. Design range -55 --> 1104.34. Transport delay 236.5ms @ MADRAS.
Engine Turbine Gas Temperature Engine 4	degC		Smiths TGT Indicator thermocouple.	1	(1) -5 / +15, (2) ±1.12%	(1) Worst error seen during calibration at installation, (2) Design specification	2	Engine 4	Calibrated range 100 --> 910. Design range -55 --> 1104.34. Transport delay 236.5ms @ MADRAS.
Engine vibration Engine 1	inches / second		Engine vibration signal conditioner Endevco 6610M44	0.1	(1) ±0.2, (2) ±3.37%	(1) Calibration specification, (2) Design specification	1	Turbine stage.	Calibrated at 0 and 2. Value is product of amplitude and dominant frequency at sensor location. Transport delay 357.4ms @ MADRAS. Working range 0 -->3.
Engine vibration Engine 2	inches / second		Engine vibration signal conditioner Endevco 6610M44	0.1	(1) ±0.2, (2) ±3.37%	Design specification	1	Turbine stage.	Calibrated at 0 and 2. Value is product of amplitude and dominant frequency at sensor location. Transport delay 357.4ms @ MADRAS. Working range 0 -->3.
Engine vibration Engine 3	inches / second		Engine vibration signal conditioner Endevco 6610M44	0.1	(1) ±0.2, (2) ±3.37%	Design specification	1	Turbine stage.	Calibrated at 0 and 2. Value is product of amplitude and dominant frequency at sensor location. Transport delay 357.4ms @ MADRAS. Working range 0 -->3.
Engine vibration Engine 4	inches / second		Engine vibration signal conditioner Endevco 6610M44	0.1	(1) ±0.2, (2) ±3.37%	Design specification	1	Turbine stage.	Calibrated at 0 and 2. Value is product of amplitude and dominant frequency at sensor location. Transport delay 357.4ms @ MADRAS. Working range 0 -->3.
FDR Event	binary		FDR control panel					Cockpit	1=no event

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Flap position	degrees		Dowty / Ultra flap computer.	1	(1) ±3, (2) ±2.256	(1) Calibration specification, (2) Design specification.	2		Range 0 --> 33. Transport delay 236.5ms @ MADRAS. Note if examining raw data that scale from volts to counts to degrees is non-linear (graph in Bae document ADE-46V-D-463-313026 page A38).
FMS Navigation mode	binary		GNS-XLS No.1				1	Cockpit	Complex, see manuals. Transport delay 40ms @ LRU, 119.5ms @ MADRAS.
Frame Counter	12 bit count								Rane 0-->4095 frames , so resets at 4.55 hrs
Fuel flow Engine 1	kg / hr	MdotF(1)	Eldec 9-328-19/-20 fuel flow meter [probably, may be a Smiths Primary engine display panel 321EDP3-2]	1	(1) ±50, (2) ±1.87%	(1) Maximum error permitted between cockpit indication and ROSE recorder, (2) Design specification RMS	1		3 point calibration against nominal 0, 1000, 2500 lb/hr inputs. There does not seem to be calibration.against any absolute base value. Transport delay 357.4ms at MADRAS.
Fuel flow Engine 2	kg / hr	MdotF(1)	Eldec 9-328-19/-20 fuel flow meter [probably, may be a Smiths Primary engine display panel 321EDP3-2]	1	(1) ±50, (2) ±1.87%	(1) Maximum error permitted between cockpit indication and ROSE recorder, (2) Design specification RMS	1		3 point calibration against nominal 0, 1000, 2500 lb/hr inputs. There does not seem to be calibration.against any absolute base value. Transport delay 357.4ms at MADRAS.
Fuel flow Engine 3	kg / hr	MdotF(1)	Eldec 9-328-19/-20 fuel flow meter [probably, may be a Smiths Primary engine display panel 321EDP3-2]	1	(1) ±50, (2) ±1.87%	(1) Maximum error permitted between cockpit indication and ROSE recorder, (2) Design specification RMS	1		3 point calibration against nominal 0, 1000, 2500 lb/hr inputs. There does not seem to be calibration.against any absolute base value. Transport delay 357.4ms at MADRAS.
Fuel flow Engine 4	kg / hr	MdotF(1)	Eldec 9-328-19/-20 fuel flow meter [probably, may be a Smiths Primary engine display panel 321EDP3-2]	1	(1) ±50, (2) ±1.87%	(1) Maximum error permitted between cockpit indication and ROSE recorder, (2) Design specification RMS	1		3 point calibration against nominal 0, 1000, 2500 lb/hr inputs. There does not seem to be calibration.against any absolute base value. Transport delay 357.4ms at MADRAS.
Geometric altitude	feet	h	EGPWC	1					Transport delay: 40ms @ LRU, 119.5ms @ MADRAS.
Geometric altitude Vertical Figure of Merit (VFOM)	feet		EGPWC	0.125			1		
Glideslope deviation	mV		Nav receiver Collins 51 RV-4	0.3mV	±10%	RMS, from design specification	2	Cockpit	Transport delay 236.5ms @ MADRAS. 75mVdc = 1 dot. +Ve = upwards deviation = aircraft below beam (fly up)
Ground Prox	binary		EGPWS (modes 1-5)					Cockpit	1=no warning
Groundspeed	knots	GS	GNS-XLS FMS No.1		±0.125	Design specification, RMS.	2	Cockpit	Transport delay: 40ms @ LRU, 119.5ms @ MADRAS. Scale 0 --> 4,096 kts.

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HF1 PTT discrete	binary								0=transmit, 1=inactive
HF2 PTT discrete	binary								0=transmit, 1=inactive
Hydraulic low pressure green	binary								0=warning, 1=no warning
Hydraulic low pressure yellow	binary								0=warning, 1=no warning
IAS hold	binary		Autopilot						0=active, 1=not active
ILS Glideslope	degrees			0.1					
ILS Localiser	degrees			0.1					
Indicated Airspeed	knots	IAS	Penny & Giles D11852 transducer	1 knot	±3 to ±5%	Calibration minima. Design system spec is ±2.06% RMS.	2	External ports P1, P2, P3 and S1, S2, S3 below cockpit windows. Transducer in fwd cargo compartment, LHS frames 22-23	RVSM compliant system. Range 15 - 600 kts. MADRAS delay 236.5ms
Lateral acceleration	g	Ny	Sundstrand tri-axial accelerometer	0.001	(1) ±0.09, (2) 0.9% RMS	(1) At 1g, 0g & -1g, from calibration specs, (2) From design specs.	4	Hydraulics bay, left side, frame 29	Transport delay 176.5ms @ MADRAS. +Ve in aceleration. Trustworthy in range ±0.97g.
Latitude	degrees	Lat	NMU (Nav Mgmt Unit) within GNS-XLS FMS No.1	0.001	0.001	Co-inciding design and calibration specifications.	1		Expressed as 3 place decimal +Ve N (e.g. N52 20 28 is 53.337). Transport delay: 500ms @ LRU, 119.5ms @ MADRAS. Refreshing internally at 2.5Hz.
Lift spoilers green	binary								0=open, 1=closed
Lift spoilers Yellow	binary								0=open, 1=closed
Longitude	degrees	Long	NMU (Nav Mgmt Unit) within GNS-XLS FMS No.1	0.001	0.001	Co-inciding design and calibration specifications.	1		Expressed as 3 place decimal +Ve E (e.g. W002 08 94 is -2.149). Transport delay: 500ms @ LRU, 119.5ms @ MADRAS. Refreshing internally at 2.5Hz.
Longitudinal acceleration	g	Nx	Sundstrand tri-axial accelerometer	0.001	(1) ±0.09, (2) ±0.9% RMS	(1) At 1g, 0g & -1g, from calibration specs, (2) From design specs.	4	Hydraulics bay, left side, frame 29	Transport delay 176.5ms @ MADRAS. +Ve in aceleration. Trustworthy in range ±0.97g.
Low altitude operation switch	binary								1=off, 0=selected
Mach hold	binary		Autopilot						0=active, 1=not active
Magnetic heading	degrees	Hdg	Honeywell compass coupler unit	0.125	(1) ±2, (2) ± 1.35 RMS	(1) Calibration spec, (2) Design spec.	1		Transport delay 185.6ms @ MADRAS.
Main landing gear down and locked	binary								0=locked in position, 1=not
Main landing gear up and locked	binary								0=locked in position, 1=not
Master warning	binary								1=warning, 0=no warning
N1 compensation	binary								1=engaged, 0=not engaged
N1 Engine 1	%	N1(1)		0.1	(1) ±2, (2) ± 1.12 RMS	(1) Calibration spec, (2) Design spec.	2	Engine 1	Tested range 20% to 105%. Declared scale 0-120%. Transport delay at MADRAS 236.5ms.

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Name of Variable	UNITS	Aeronautical term	Source	Precision	Accuracy	Accuracy definition	Min. Refresh rate (Hz)	Physical location	Notes
N1 Engine 2	%	N1(2)		0.1	(1) ±2, (2) ± 1.12 RMS	(1) Calibration spec, (2) Design spec.	2	Engine 2	Tested range 20% to 105%. Declared scale 0-120%. Transport delay at MADRAS 236.5ms.
N1 Engine 3	%	N1(3)		0.1	(1) ±2, (2) ± 1.12 RMS	(1) Calibration spec, (2) Design spec.	2	Engine 3	Tested range 20% to 105%. Declared scale 0-120%. Transport delay at MADRAS 236.5ms.
N1 Engine 4	%	N1(4)		0.1	(1) ±2, (2) ± 1.12 RMS	(1) Calibration spec, (2) Design spec.	2	Engine 4	Tested range 20% to 105%. Declared scale 0-120%. Transport delay at MADRAS 236.5ms.
N2 Engine 1	%	N2(1)	Engine core speed probe	0.1	(1) ±2% of value, (2) ±0.51%	(1) Calibration spec, (2) Design spec.	2	Engine 1	Test range 20% to 102%. Working range 0-100%. Transport delay 119.5ms @ MADRAS
N2 Engine 2	%	N2(2)	Engine core speed probe	0.1	(1) ±2% of value, (2) ±0.51%	(1) Calibration spec, (2) Design spec.	2	Engine 2	Test range 20% to 102%. Working range 0-100%. Transport delay 119.5ms @ MADRAS
N2 Engine 3	%	N2(3)	Engine core speed probe	0.1	(1) ±2% of value, (2) ±0.51%	(1) Calibration spec, (2) Design spec.	2	Engine 3	Test range 20% to 102%. Working range 0-100%. Transport delay 119.5ms @ MADRAS
N2 Engine 4	%	N2(4)	Engine core speed probe	0.1	(1) ±2% of value, (2) ±0.51%	(1) Calibration spec, (2) Design spec.	2	Engine 4	Test range 20% to 102%. Working range 0-100%. Transport delay 119.5ms @ MADRAS
Normal acceleration	g	Nz	Sundstrand tri-axial accelerometer	0.0023	±0.9%	RMS	8	Hydraulics bay, left side, frame 29	Reliable working range -3.0 --> +5.1 (a/c envelope 0 --> 2.5). +ve upwards. Transport delay 146.5ms @ MADRAS.
Oil low pessure warning Engine 1	binary							Engine 1	0=low pressure, 1=acceptable
Oil low pessure warning Engine 2	binary							Engine 2	0=low pressure, 1=acceptable
Oil low pessure warning Engine 3	binary							Engine 3	0=low pressure, 1=acceptable
Oil low pessure warning Engine 4	binary							Engine 4	0=low pressure, 1=acceptable
P1 barometric setting	mb	QNH	RVSM Altimeter No.1	0.1	0.1	design specification	1	Cockpit	Transport delay 40ms @ LRU, 119.5ms @ MADRAS. Internal refresh rate 16Hz. (hPa are the same as mb)
P2 barometric setting	mb	QNH	RVSM Altimeter No.1	0.1	0.1	design specification	1	Cockpit	Transport delay 40ms @ LRU, 119.5ms @ MADRAS. Internal refresh rate 16Hz. (hPa are the same as mb)
Pitch attitude	degrees	θ	Vert Gyro 1 (Honeywell VG314)	0.125	(1) ±2, (2) ± 1.35 RMS	(1) Calibration spec, (2) Design spec.	4		Tested range ±60deg. Transport delay 185.6ms @ MADRAS. Positive is nose-up.

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Name of Variable	UNITS	Aeronautical term	Source	Precision	Accuracy	Accuracy definition	Min. Refresh rate (Hz)	Physical location	Notes
Pylon overheat 1									1=overheat, 0=no overheat. Engine pylon (not cloud physics)
Pylon overheat 2									1=overheat, 0=no overheat. Engine pylon (not cloud physics)
Pylon overheat 3									1=overheat, 0=no overheat. Engine pylon (not cloud physics)
Pylon overheat 4									1=overheat, 0=no overheat. Engine pylon (not cloud physics)
Radio altitude 1	feet	h	Collins 850F-4 via ARINC 552A (No.1 radio altimeter.)	1	-20ft to 500ft, greater of ±1.5ft / ±2%; above 500ft ±3%	Design specification	4	Below fuselage - No.1 RadAlt Tx/Rx	Effective from 0 to 4,500ft, calibrated from 0 to 2,500ft. Transport delay 176.5ms at MADRAS. +Ve = above ground!
radio altitude 2	feet	h	No.2 radio altimeter	1	±5%, becoming ±3ft below 200ft and ±2ft below 50ft.	Calibration specification	4	Below fuselage - No.2 RadAlt Tx/Rx	Effective over range ±8,192ft. Transport delays: 40ms at LRU, 119.5ms at MADRAS. +Ve = above ground!
Roll attitude	degrees	ϕ	Vert Gyro 1 (Honeywell VG314)	1	(1) ±2, (2) ± 1.35 RMS	(1) Calibration spec, (2) Design spec.			Reliable range ±60deg. Transport delay 185.6ms @ MADRAS. Positive is right wing down.
Roll spoiler port side	degrees		Penny & Giles D40014 rotary potentiometer.	0.1	(1) ±2, (2) 0.707 ± RMS	(1) Calibration specification, (2) Design specification.	4		0deg=closed, 10deg=open. +Ve is spoiler trailing edge up. Transport delay 176.5ms @ MADRAS
Roll spoiler starboard side	degrees		Penny & Giles D40014 rotary potentiometer.	0.1	(1) ±2, (2) 0.707 ± RMS	(1) Calibration specification, (2) Design specification.	4		0deg=closed, 10deg=open. +Ve is spoiler trailing edge up. Transport delay 176.5ms @ MADRAS
Rudder position	degrees		Penny & Giles rotary potentiometer (D15953 or D44059)	1	(1) ±2, (2) ±1.12 RMS	(1) Calibration specification, (2) Design specification.		Base of vertical stabiliser, rib 4	+Ve right. Transport delay 176.5ms @ MADRAS. Nominal travel ± 30deg.
Stick push activation	binary								1=no push, 0=activation
Stick shaker activation	binary								1=no warning, 0=activation
T/O Configuration warning	binary		Elevator trim					Cockpit	0=no warning
TCAS Resolution advisory	binary								Complex refer to manuals. Bsaed upon bits 1-12 of a 12 bit word
Terrain clearance (computed)	feet		EGPWC	1	±1	Design specification	1		Transport delay: 40ms @ LRU, 119.5ms @ MADRAS. +Ve is above terrain threshold. Working range ±131,072ft.
Time (GMT)	hrs, minutes	t		0.1 mins	0.141	RMS	1		Transport delay: 200ms @ LRU, 119.5ms @ MADRAS

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Total Air Temperature	degC	TAT	Rosemount 102 EL 2BH (TAT probe 1)	1	(1) ±2, (2) ± 1.36 RMS	(1) Calibration spec, (2) Design spec.	4		Working range -65 --> +90. Transport delay 185.6ms at MADRAS.
VOR or Localiser deviation	mV		Nav receiver Collins 51 RV-4	0.3mV	±10%	RMS, from design specification	2	Cockpit	Transport delay 236.5ms @ MADRAS. 75mVdc = 1 dot. +Ve = right deviation = aircraft left of beam (fly right)
Weight on wheels Left	binary								0=weight on wheels, 1=weight off wheels
Weight on wheels Right	binary								0=weight on wheels, 1=weight off wheels
Wind Direction (True)	deg		GNS-XLS FMS No.1		±0.703	Design specification, RMS.	1	Cockpit	Transport delay: 500ms @ LRU, 119.5ms @ MADRAS. Refreshing internally at 2.5Hz.
Windshear warning	binary		RDR4b radar					Nose radome	1=no warning
Windspeed	knots	Vw	GNS-XLS FMS No.1	1	±1	Design specification, RMS.	1	Cockpit	Transport delay: 40ms @ LRU, 119.5ms @ MADRAS. Scale 0 --> 255 kts. Refreshing internally at 2.5Hz.
Yaw damper 1	binary								0=engaged, 1=not engaged
Yaw damper 2	binary								0=engaged, 1=not engaged

Data available from radiometers

Frequency, Wavelength, Wave number	UNITS	Full description	Source	Resolution	Refresh rate (Hz)	Physical location	Notes
23.8	GHz	Dual-frequency Extension to In-flight Microwave Observing System	Deimos Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Water Vapour Absorption Line
50.1	GHz	Dual-frequency Extension to In-flight Microwave Observing System	Deimos Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Oxygen Vapour Absorption Line
88.992	GHz	Microwave Airborne Radiometer Scanning System	MARSS Radiometer		Depends on Scan Sequence	Aft fuselage port side pylon	Window frequency
118.65	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Oxygen Vapour Absorption Line
157.05	GHz	Microwave Airborne Radiometer Scanning System	MARSS Radiometer		Depends on Scan Sequence	Aft fuselage port side pylon	Window frequency
183.31	GHz	Microwave Airborne Radiometer Scanning System	MARSS Radiometer		Depends on Scan Sequence	Aft fuselage port side pylon	Water Vapour Absorption Line
243.2	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Window frequency
325.15	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Water Vapour Absorption Line
448	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Water Vapour Absorption Line
664	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Window frequency
874.4	GHz	International Submillimetre Airborne Radiometer	ISMAR Radiometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	Window frequency
300 to 1145	nm	Short Wave Spectrometer - Scanning	SWS	3nm	Depends on Integration time	Starboard window blank	
945 to 1705	nm	Short Wave Spectrometer - Scanning	SWS	6nm	Depends on Integration time	Starboard window blank	
300 to 1145	nm	Spectral Hemispheric Irradiance Measurement - Visible	Upper SHIMS	3nm	Depends on Integration time	Upper BBR panel	
945 to 1705	nm	Spectral Hemispheric Irradiance Measurement - Near-Infrared	Upper SHIMS	6nm	Depends on Integration time	Upper BBR panel	
300 to 1145	nm	Spectral Hemispheric Irradiance Measurement - Visible	Lower SHIMS	3nm	Depends on Integration time	Lower BBR panel	
945 to 1705	nm	Spectral Hemispheric Irradiance Measurement - Near-Infrared	Lower SHIMS	6nm	Depends on Integration time	Lower BBR panel	
550 to 3000	cm-1	An upward and downward-pointing infrared interferometer	ARIES Interferometer		Depends on Scan Sequence	Large Radiometer Blister (LRB)	
8 to 9.2	µm	Imaging infrared camera	Phoenix LWIR Camera	320 x 256 pixels	Depends on Integration time	Large Radiometer Blister (LRB)	

Data available from Leosphere ALS450 LIDAR, when fitted.

Wavelength	UNITS	Full description	Source	Resolution	Refresh rate (Hz)	Physical location
354.7	nm	Elastic backscattering lidar with daytime capability, suitable for aerosol and thin cloud observations Daytime capability, suitable for aerosol and thin cloud observations	Leosphere ALS450 LiDAR	Vertical resolution 1.5m	Variable	Aft hold, downward facing.

Data potentially available from chemistry instruments

Compound	Data type	Precision	Accuracy	Averaging time	Instrument source	Notes
CO	Data	1ppb	3%	1s	VIV resonance / flourescence aerolaser 5002	
O3	Data	1ppb	5%	4s	UV absorption TEI49c	
CO2	Data	0.7ppm	0.2ppm	1s	Cavity enhanced absorption spectrometer (Los Gatos)	
CH4	Data	2.5ppb	1.3ppm	1s	Cavity enhanced absorption spectrometer (Los Gatos)	
NO	Data	5pptv	5pptv	10s	Chemiluminescence with photolytic conversion for NO2 (Air quality designs Inc)	
NO2	Data	15pptv	15pptv	10s	Chemiluminescence with photolytic conversion for NO2 (Air quality designs Inc)	
DMS	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CHBr3	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CH2Br2	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CHBr2Cl	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
Ch3I	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
Ch2BrCl	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CHBrCl2	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CH2ICl	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CH2IBr	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CH2I2	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CH2Cl2	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
CHCl3	Data	~0.1 to 1 pptv	~0.1 to 1 pptv	30s fill time	TD-GC-MS (Markes)	Using whole air sampling and ground analysis
NHMC	Data	~5pptv	~5pptv	30s fill time	GC-FID (Flame Ionization Detector) (Perkins Elmer)	Using whole air sampling and ground analysis. Group includes alkanes, alkenes, aromatics, small o-VOCs (acetone, methanol, acetaldehyde, ethanol), DMS
Halocarbons, VOCs	Data	~1-5pptv	~1-5pptv	300s	GC-MS (Gas Chromatography Mass Spectrometry) (Agilent)	
BrO	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
Br2	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
HOBr	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
BrCl	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
HCOOH	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	Formic acid
HCN	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
ClNO2	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
HNO3	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
N205	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	
CH3COOH	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	Acetic acid
CH3CH2COOH	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	Propanoic acid
CH3CH2Ch2COOH	Data	~0.3-5ppt	~0.3-5ppt	30s	CIMS (Chemical Ionization Mass Spectrometer)	Butanoic acid
IO	Data	~0.15 ppt	~0.1-0.2 ppt	100 s	BBCEAS (Broadband Cavity Enhanced Absorption Spectrometer)	
N2O5	Data	~1 ppt	~1-2 ppt	1 s	BBCEAS (Broadband Cavity Enhanced Absorption Spectrometer)	

NO3	Data	~1 ppt	~1-2 ppt		1 s	BBCEAS (Broadband Cavity Enhanced Absorption Spectrometer)
NO2	Data	~30 ppt	~30 ppt		1 s	BBCEAS (Broadband Cavity Enhanced Absorption Spectrometer)
PAN	Data		3%	10%	90s	Dual Column GC-ECD
Black Carbon	Data				10s	Soot particle photometer SP-2

Data available from Airframe strain gauges

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