

Transport and Transformation of Ammonia (TRANS²Am) 2021 UWKA measurements summary

Category	Instrument	Description, units	Variable name
Atmospheric State			
<i>Air Temperature</i>	Reverse-flow temperature sensor	Reference static air temperature, °C	trf
	Rosemount 102 temperature sensor	Secondary static air temperature, °C	trose
	<i>Derived parameter</i>	Potential temperature, K	thetad
<i>Atmospheric Moisture (Water Vapor)</i>	EdgeTech Vigilant model 137 chilled mirror hygrometer	Dewpoint temperature, °C	tdp
	<i>Derived parameters</i>	EdgeTech relative humidity, %	rh
		EdgeTech equivalent potential temperature, K	thetae
		EdgeTech water vapor mixing ratio, g/kg	mr
<i>Atmospheric Pressure</i>	Rosemount 1501 HADS static pressure sensor	Primary static air pressure (module A), hPa	ps_hads_a
		Static air pressure (module B), hPa	ps_hads_b
	Weston static pressure sensor	Static air pressure, hPa	ps_weston
	CPT 6140 static pressure sensor	Static air pressure, hPa	ps_CPT6140
	CPT 9000 static pressure sensor	Static air pressure, hPa	ps_CPT9000
	<i>Diagnostic parameter</i>	CPT 9000 sensor temperature, °C	temp_CPT9000
	Noseboom pitot	Static pressure correction calculation	dpa, dpb, dpr
<i>Wind Components</i>	Applanix AV 410 GPS/Inertial Measurement Unit (<i>see additional notes for Applanix parameters below under Aircraft State</i>)	u/v/w wind components (using AIAS), m/s	avuwind, avvwind, avwwind
		Wind direction/magnitude (using AIAS), deg; m/s	avwinddir, avwindmag

		Longitudinal/lateral horizontal wind components, m/s	avux, avvy
<i>Photographic Imagery</i>	Forward and downward cameras	Photo imagery at 1-Hz, imagery may be stitched to flight track in .kml files upon request	
Aircraft state			
<i>Aircraft Position and Orientation</i>	Applanix AV 410 GPS/Inertial Measurement Unit	Ground velocity in E-W/N-S/up components, m/s	avewvel, avnsvel, avzvel
		Ground speed, m/s	avgs
		Roll/pitch/heading, deg	avroll, avpitch, avthead
		Latitude/longitude, deg	avlat, avlon
		Orthometric/ellipsoid altitude, m	avzmsl, avzell
		Track angle, deg	avtrack
		Roll/pitch/yaw angle rate, rad/s	avrollr, avpitchr, avyawr
	Body-axis longitudinal/lateral/vertical acceleration component, m/s ²	avlonga, avlata, avnorma	
	<i>Initial diagnostic parameters (realtime Applanix output)</i>	North/east/down position RMS, m	avnposrms/aveposrms/avdposrms
		North/east/down velocity RMS, m/s	avnvelrms/avevelrms/avdvelrms
Roll/pitch/heading angle RMS, deg		avrollrms/avpitchrms/avtheadrms	
<i>Post-processed measurements and diagnostic parameters</i>	Flight data are typically post-processed to incorporate high-precision satellite data available several days subsequent to each flight. With the exception of removing the real-time dilution of precision, the parameters above are replaced with a		

		higher-accuracy with the parameter names beginning with capitalized 'AV', for example <i>AVlat</i> rather than the original <i>avlat</i> .	
		Attack angle (corrected), deg	alpha
		Sideslip angle (corrected), deg	beta
<i>Airspeed</i>		Reference indicated airspeed, m/s	aias
	Co-pilot pitot	Secondary indicated airspeed, m/s	bias
		True airspeed, m/s	tas
		Reference true airspeed, m/s	TASX
<i>Cabin Air Pressure</i>	Cabin air pressure sensor	Ambient cabin air pressure, hPa	cabinp
<i>Timekeeping Parameters</i>		Seconds since start of project year	time
		UTC time in HHMMSS	TIME
		Date in YYYYMMDD	DATE
		Hours from midnight (UTC)	HOUR
		Minutes from beginning of HOUR	MINUTE
		Seconds from beginning of MINUTE	SECONDS
<i>Radiation</i>			
	Heitronics KT 15.85 surface temperature probe	Surface temperature, °C	rstb2
<i>Aerosols</i>			
	DMT Passive Cavity Aerosol Spectrometer Probe (PCASP-100X; two available)	<i>Aerosol Hydrometeor size distribution (0.1 – 3.0 µm diameter), total concentration; parameter names are appended with <u>_IBR</u> if the instrument was installed in the inboard right wing-tip canister and <u>_OBR</u> if in the outboard canister</i>	

		Particle count per size bin	AS200
		Particle concentration per size bin, $\#/cm^3$	CS200
		Total particle count	TCNTP
		Total particle number concentration, $\#/cm^3$	CONCP
	<i>Derived parameters</i>	Mean particle diameter, μm	DBARP
		Particle surface area concentration, $\mu m^2/cm^3$	PSFCP
		Particle volume concentration, $\mu m^3/cm^3$	PVOLP
		Particle size dispersion, unitless	DISPP
	<i>Diagnostic parameters</i>	Sample flow rate, cm^3/s	PFLW
		Sample volume, cm^3/s	PFLWC
		Sheath flow rate, cm^3/s PFLWS	