MUST Trial Data and Results
Release 1.0 March 2002

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Introduction

The objective of the MUST (Mock Urban Setting Test) trials, conducted at Dugway Proving Ground on September 6-27 2001, was to acquire near full-scale dispersion and meteorological data for the purpose of urban dispersion model development and validation.

This report describes the processing and preliminary analysis of the two main sets of data acquired during the trials, namely: the dispersion data, which was obtained using 74 high-speed photoionization detectors (48 DPIDs and 26 UVICs) within the obstacle array; and the meteorological data (i.e., the wind velocity and sonic temperature), which was obtained using 22 sonic aenomometers (14 DPG and 8 DSTL) within or surrounding the obstacle array.

In the preprocessing stage, the digital data collected during the trials was assembled and plotted. The DPID/UVIC data was then baseline corrected, and converted to standard units (ppm) using calibration data acquired during the trials. The DPG/DSTL sonic data, which generally consisted of ascii files containing an hour of data, was corrected for bad or missing samples, and assembled to create data files which spanned the periods DPID/UVIC data was collected.

[The scripts, programs, and keystrokes (!) used to preprocess (i.e., assemble, clean, and organize) the MUST trial data are not described in this report or included on the accompanying set of CDs. However, information regarding the preprocessing stage, and the programs/scripts used in this stage, are available upon request.]

The (six) CDs which accompany this report contain:

 a) documents describing the MUST trials, instrumentation, and analysis;
 b) the preprocessed (clean) PID and sonic data, in binary and ascii formats;
 c) PDF and Postscript plots of the preprocessed data;
 d) tables containing various statistics for selected trials and periods;
 e) the scripts used to manipulate, plot, and analyse the data.

1.0 CD Contents

The preprocessed MUST trial data and preliminary results are recorded on six CDs in the following manner:

CD#	Directory	Contents
1	must1/doc	Documentation
1	must1/scripts	Scripts used to process the data

1	must1/dpid	DPID data and results (part 1)
2	must1/dpid	DPID data and results (part 2)
3	must1/uvic	UVIC data and results (part 1)
4	must1/uvic	UVIC data and results (part 2)
5	must1/dpgsonic	DPG sonic data and results
6	must1/dstlsonic	DSTL sonic data and results

The doc directory contains four documents (in various formats): this README file; the MUST report, which describes the test grid, instrumentation, and trial parameters; the trial notes for the UVICS and UK (DSTL) sonics; and an outline of the statistical quantities extracted from the data.

The scripts directory contains the scripts used to manipulate, plot, and analyse the preprocessed trial data.

The data directories (i.e., dpid, uvic, dpgsonic, and dstlsonic) each contain:

- the preprocessed data from the corresponding instruments, in binary and ascii formats;
- plots of the trial data, i.e., gas concentration vs time for the DPID and UVIC sensors, or wind speed and direction vs time for the DPG and DSTL sonic aenemometers, in both Postscript and PDF formats;
- tables of various statistics, such as the mean concentration and wind speed, at points within and around the array for selected trials and periods.

2.0 Documentation

The doc directory contains the following files:

README.TXT	This document (DOS/Windows format text file)
readme.unix	Unix text version of the above file
readme.pdf	PDF version of the above file
readme.ps	Postscript version of the above file
MUSTrpt1211.doc	Detailed outline of the MUST trials (Word format)
MUSTrpt1211.pdf	PDF version of the above file
MUSTrpt1211.ps	Postscript version of the above file
Uvicnotes.doc	Notes regarding the UVICs and UK sonics (Word format)
Uvicnotes.pdf	PDF version of the above file
Uvicnotes.ps	Postscript version of the above file
Muststats.pdf	Description of the derived statistics (PDF format)
Muststats.ps	Postscript version of the above file

The MUST report, written by C. Biltoft at DPG, describes (in fine detail) the layout of the MUST test grid, the instrumention used in the tests, etc. In order to interpret the MUST data sets and results, the MUST report is required reading.

The Uvicnotes document, written by I. Griffiths et al at DSTL, describes the configuration of and the data acquired by the UVICs and DSTL sonics. It is included here as it contains relevant information not found in the MUST report.

The Muststats document, written by E. Yee at DRES, defines and describes the the statistical quantities of most interest in dispersion theory/models. Most, but not all, of the quantities defined in this paper have been computed for selected portions of the MUST data sets.

2.1 Filenames and Compression

In most cases, files are named according to the date and time the trial began. For example, if a trial started on September 25, 2001 (Julian day number 268) at 21:50 MDT, files associated with the trial are named 'X2682150Y.Z', where X, Y, and Z are the prefix, postfix, and extension to the base filename.

Most of the data, plots, and tables are stored on CD in either tgz (compressed tar) and/or zip format. This compression reduces the CD space required from approximately 15 Gbytes (25+ CDs) to 3 Gbytes (6 CDs). The ascii-format files containing the PID and DPG/DSTL sonic data are extremely large, and are stored in compressed forms only (i.e., these files have to be copied to a hard drive and uncompressed in order to use them). However, all documentation, plots, and tables are stored in uncompressed form, so with the appropriate software, can be viewed directly from CD.

The *.tgz files can be unpacked by moving them to an appropriate directory on the hard drive, and issuing the command 'tar zxvf xxx', where xxx is the name of the tgz file.

The *.zip files can be unpacked in a similar fashion by using the 'unzip' program under Unix, or the pkunzip (or equivalent) program under DOS or Windows.

2.2 Scripts

The scripts directory contains the FAN scripts used to manipulate, plot, and analyse the MUST data. FAN (a Fluctuation ANalysis program) is a C-like interpreter, similar to Matlab, written by the author for processing time series such as those obtained in these dispersion trials.

The FAN program itself is not included on these CDs, but the scripts are provided in the event researchers wish to inspect and/or check the code used to process/analyse the data.

3.0 DPID Data and Results

The dpid directory is split into five subdirectories, namely:

dpid/ppb	DPID data in binary format (1 file per trial)
dpid/ascii	DPID data in ascii format (1 file per trial and detector)
dpid/cplots	colour contour plots of the DPID data (1 plot per trial)
dpid/lplots	line plots of the DPID data (5 plots per trial)

dpid/stats tables of the derived statistics (1-4 files per trial)

3.1 Binary Files

The dpid/ppb directory contains a single compressed tar file -- dpid_ppb.tgz. As noted earlier, this file can be uncompressed by moving it to some directory on the hard drive and issuing the command 'tar zxvf dpid_ppb.tgz'.

The files in dpid_ppb.tgz are named JJJhhmmM.ppb, where JJJhhmm indicates the date and time the trial was started (see above). Each file contains the pre-processed (i.e., baseline corrected and calibrated) DPID data for all 48 sensors. As these binary files are only readable by the FAN program, (or by a custom-coded program), and their contents are duplicated in ascii form (see below), their format will not be described here.

3.2 Ascii Files

The dpid/ascii directory contains a series of zip files named JJJhhmm.zip. Each zip file contains 48 ascii text files named JJJhhmm_Dxx.dat, where JJJhhmm is the start date/time of the trial, and xx is the DPID sensor number (01-48).

For example, file 2562235_D34.dat (in zip file 2562235.zip) contains the data for DPID number 34, starting at 22:34:00 MDT, September 14. The first column in the file is the time, in seconds, since the start of trial, while the second column is the measured tracer concentration in ppm. A portion of this file is shown here:

```
 0.000 0.057
 0.020 0.063
 0.040 0.066
 ....
 240.000 5.618
 240.020 5.591
 240.040 5.378
 ...
 1260.940 0.000
 1260.960 0.000
 1260.980 0.000
```

As can be see in this example, the trial lasted 1261 seconds, with near-zero concentrations (at detector #34) at the beginning and end of the trial, and concentrations of ~5 ppm 240 seconds into the trial.

3.3 Colour Contour Plots

The dpid/cplots directory contains a series of PDF plot files (one per trial) which show the tracer concentration vs time over the entire DPID array. It is strongly recommended that researchers making use of the MUST data first look at these plots (then the corresponding line plots described in the next section), as they show at a glance which detectors were hit by gas during a particular trial, and give an indication of the overall stationarity (i.e., speed and direction) of the wind during the trial period.

As noted in the Appendix C of the MUST report, DPIDs were positioned along five sampling lines -- four horizontal and one vertical. To interpret the contour

plots of the DPID data, consider the following:

The contour plots are divided into five panels, with detector numbers (DN) 1-12 in the first, 13-21 in the second, 22-30 in the third, 31-40 in the fourth,and 41-48 in the fifth panel. The first four panels show the gas concentration along the horizontal sampling lines, from south (line 1) to north (line 4), with DN 1, 13, 22, and 31 on the east end of the lines, and DN 12, 21, 30, and 40 on the west ends. The last panel shows the concentration along the vertical sampling line from top (DN 41) to bottom (DN 48).

Note that the detectors on the main tower were moved several times during the trials. The following table shows the detector positions (in meters AGL) during the trial period.

Julian Days	DN 41	DN 42	DN 43	DN 44	DN 45	DN 46	DN 47	DN 48
254 - 258	12m	10m	8m	6m	4m	3m	2m	1m
261 - 262	20m	16m	12m	8m	6m	4m	2m	1m
263 - 269	16m	12m	10m	8m	6m	4m	2m	1m

The plot files (JJJhhmmM_contour.pdf) are also stored in a single zip file named dpid_cplots_pdf.zip, and the Postscript versions of these plots are stored in file dpid_cplots_ps.tgz.

3.4 Line Plots

The dpid/lplots directory contains a number of PDF plot files which show the tracer concentration (in ppm) vs time along each of the five DPID sampling lines. These plot files are named JJJhhmmM_linex.pdf, where x is the line number (1-5).

These plots are also stored in a single zip file named dpid_lplots_pdf.zip, while the Postscript versions are stored in file dpid_lplots_ps.tgz.

3.5 Statistics

Based on the colour contour plots of the DPID data, several statistical quantities were derived from selected portions of the concentration time series. The trials and periods chosen for analysis were primarily based on the stationarity (i.e., speed and direction) of the wind over the period.

Files containing the derived statistics (in directory dpid/stats) are named JJJhhmmM_0N.txt, where N is the period number (1-4). For example, two periods from trial 2682150M were chosen for analysis: 150-950 seconds (N=1), and 300-500 seconds (N=2).

The format of these files in shown in the following example (2682150M_01.txt):

```
    Trial 2682150M
    Period 150:950s

    Detector  Mean  Fluctuation     Skewness     Kurtosis
    Number    Conc  Amplitude

    DN01      0.017        1.957        5.200       43.302
```

DN02	0.029	1.516	4.718	40.859
DN03	0.188	1.166	3.418	21.120
DN04	0.185	1.432	3.699	21.972
DN05	0.676	0.802	2.138	9.290
DN06	0.783	0.899	1.863	7.116
DN07	2.099	0.625	1.048	4.066
DN08	3.000	0.634	1.150	4.576
DN09	5.089	0.551	0.479	3.081
DN10	3.129	1.643	4.769	44.684
DN11	0.107	5.442	13.076	219.229
DN12	0.000	0.000	0.000	0.000
DN13	0.674	0.643	1.484	5.548
...				
DN47	2.959	0.338	0.319	3.801
DN48	2.377	0.352	0.139	3.038
A1	0.000	0.000	0.000	0.000
A2	0.000	0.000	0.000	0.000
A3	0.000	0.000	0.000	0.000
A4	0.000	0.000	0.000	0.000
A5	0.000	0.000	0.000	0.000
A6	0.000	0.000	0.000	0.000
B1	7.380	0.559	1.082	5.977
B2	8.940	0.488	0.722	4.720
B3	6.629	0.403	0.621	3.973
B4	4.557	0.454	1.413	11.019
B5	3.015	0.656	4.040	61.213
B6	0.253	0.614	0.561	3.450
Wake	2.420	0.322	0.328	2.883
C1	0.955	0.361	-0.195	2.631
C2	0.787	0.352	-0.130	2.726
C3	0.895	0.307	-0.088	2.892
C4	1.037	0.284	-0.114	2.911
C5	0.000	0.000	0.000	0.000
C6	1.003	0.245	0.125	3.130
D1	0.041	1.594	4.244	34.280
D2	0.027	2.375	5.668	50.174
D3	0.019	1.958	4.537	31.161
D4	0.000	0.000	0.000	0.000
D5	0.000	0.000	0.000	0.000
D6	0.009	1.582	2.856	19.231
Tip	2.955	0.372	0.413	3.862

Data from both the DPID and UVIC sensors were used in the analysis, as seen in the above example. The names (A1 A2 ...) and locations of the UVIC sensors are described in Appendix C of the MUST report.

4.0 UVIC Data and Results

The uvic directory is split into four subdirectories, namely:

uvic/ppb	UVIC data in binary format (2 files per trial)
uvic/ascii	UVIC data in ascii format (1 file per trial and detector)
uvic/lplots	line plots of the UVIC data (2 plots per trial)
uvic/stats	tables of the derived statistics (1-4 files per trial)

4.1 Binary Files

The uvic/ppb directory contains a single compressed tar file -- uvic_ppb.tgz. The files in uvic_ppb.tgz are named JJJhhmmX.ppb, where JJJhhmm indicates the date and time the trial was started, and X is the code for the acquisition system (A or B).

Each file contains the processed (i.e., baseline corrected and calibrated) UVIC data for 13 sensors. As with the DPID binary files, their format will not be described here.

4.2 Ascii Files

The uvic/ascii directory contains a number of zip files named JJJhhmm.zip. Each zip file contains 24 ascii text files named JJJhhmm_XN.dat, where X is the tower name (A,B,C,D) and N is the position of the sensor on the tower (1-6), and 2 files named JJJhhmm_Tip.dat and JJJhhmm_Wake.dat.

The format of the UVIC ascii data files is identical to the DPID files.

4.3 Line Plots

The uvic/lplots directory contains a number of PDF plot files (two per trial) which show the tracer concentration (in ppm) vs time at each UVIC. These plot files are named JJJhhmmX.pdf, where X is the code for the acquisition system (A or B).

The first plot (X=A) shows the concentration measured by UVICS mounted on the west towers (A and B), and by the wake detector, while the second plot (X=B) shows the concentration at the east towers (C and D), and by the UVIC located on the main tower at 2-m AGL (Tip).

The plots are also stored in a single zip file (uvic_lplots_pdf.zip), while Postscript versions of these plots are stored in the file uvic_lplots_ps.tgz.

4.4 Statistics

Files containing the statistics derived from the DPID and UVIC measurements are stored in the uvic/stats directory. These files are identical to those in directory dpid/stats (Section 3.5).

5.0 DPG Sonic Data and Results

The dpgsonic directory is split into four subdirectories, namely:

```
dpgsonic/bin   DPG sonic data in binary format (1 file per trial day)
dpgsonic/ascii DPG sonic data in ascii format (14 files per trial day)
dpgsonic/plots line plots of the DPG sonic data (4 plots per trial day)
dpgsonic/stats tables of the derived statistics (1-4 files per trial)
```

5.1 Binary Files

The dpgsonic/bin directory contains a single compressed tar file named

dpgsonic_cor.tgz. The files in this archive are named mJJJhhmm.cor, where JJJhhmm indicates the date and time the sonic data collection was started.

Each file contains the processed (i.e., rotated) wind data collected by the 14 2- or 3-component sonic aenemometers operated by DPG. As with other binary files, their format will not be described here.

5.2 Ascii Files

The dpgsonic/ascii directory contains a number of zip files named mJJJhhmm.zip. Each zip file contains 14 ascii text files named mJJJhhmm_DN.dat, where JJJhhmm indicates the start date/time, and DN is the code for the location of the sonic aenemometer, as shown in the following table:

Code	Location	Height (AGL)
N1	North Tower	4m
N2	North Tower	8m
N3	North Tower	16m
S1	South Tower	4m
S2	South Tower	8m
S3	South Tower	16m
T1	Main Tower	4m
T2	Main Tower	8m
T3	Main Tower	16m
T4	Main Tower	32m
V1	2.5m NW of conex H6	1.15m
V2	in front of conex G5	1.15m
V3	between conex G6 and H6	1.15m
V4	between conex G6 and G7	1.15m

Each ascii text file contains the data collected by a single 2-component or 3-component sonic aenemometer over the course of a trial day. For example, file m2681815_T2.dat contains the data from the sonic mounted at the 8m level on the main tower, beginning at 18:15:00 on September 25.

As noted in the MUST report, the sonic aenemometers were oriented (pointed) in various directions. To simplify matters, the sonic data was rotated into a common coordinate system, in which the x-axis points 30 degrees W of N, the y-axis points 120 degrees W of N, and the z-axis points up. In other words, (x,y,z) form a right-handed coordinate system in which the x-axis is normal to the wide face of the obstacles. The components of the wind velocity along (x,y,z) are denoted by (U,V,W).

The ascii data files consists of five columns of numbers, where:

- column 1 is the time (s) since the start of file;
- column 2 is the x-component (m/s) of the wind velocity (U);
- column 3 is the y-component (m/s) of the wind velocity (V);
- column 4 is the z-component (m/s) of the wind velocity (W);
- column 5 is the temperature (degrees K) derived from the speed of sound.

For example, file m2681815_T2.dat begins with:

```
 0.000 3.250 -6.180 1.060 305.999
 0.100 5.060 -5.530 0.340 306.034
 0.200 4.420 -5.450 0.250 305.999
 0.300 4.030 -6.810 -0.590 305.981
 0.400 3.450 -7.380 0.090 305.999
 0.500 4.690 -8.020 -0.990 305.842
 ...
```

The file format for 2-component instruments (in which only the horizontal wind components are measured) is the same as that for 3-component instruments -- the z-component (W) is simply set to 0.0.

Note that in the preprocessing stage, gaps in the original sonic data (caused by missing or corrupt measurements) were filled in by replacing the missing samples with the last valid measurement. This is apparent in some of the sonic data plots (next section) -- gaps in the data appear as straight lines (i.e., constant wind speed and direction).

5.3 Line Plots

The dpgsonic/plots directory contains a number of PDF plot files (four per trial day) which show the wind speed and direction measured by each DPG sonic. These plot files are named mJJJhhmm_X.pdf, where X is the location code (i.e., N = North Tower, S = South Tower, T = Main Tower, and V = Vx probes).

In these plots, the (U,V) wind components (as defined in the previous section) were used to calculate the wind speed and direction. Note that the displayed wind bearing is reversed from the conventional sense, i.e., a positive bearing indicates the wind is blowing from east to west across the array. As well, the (U,V) components were smoothed using 30-second block averaging before plotting in order to show the low- to mid-frequency fluctuations more clearly.

The plots are also stored in a single zip file (dpgsonic_plots_pdf.zip), while Postscript versions of these plots are stored in file dpgsonics_plots_ps.tgz.

5.4 Statistics

In a manner similar to that used for the concentration data, statistical quantities were derived from selected portions of the wind velocity and temperature time series. The trials and periods chosen for analysis are identical to those used for the concentration data.

Because of the wide range of numeric values in the derived wind statistics, two sets of tables (files) were generated -- one set in floating point format (xx.xxxxx) and a second set in exponential format (x.xxxxxeyy). The first set of files is stored in directory dpgsonic/stats/float, and the second set in directory dpgsonic/stats/expon. Apart from the difference in numeric formats, the two sets of tables are identical.

Files containing the derived statistics are named mJJJhhmm_N.txt, where N is the period number (1-4). For example, two periods from trial 2682150M were chosen for analysis: 150-950 seconds (N=1), and 300-500 seconds (N=2).

The format of these files in shown in the following example (m2682150_1.txt):

Trial 2682150M
Period 150:950s

Sonic	N1	N2	N3	...	V3	V4
mean(U)	0.00000	3.21974	4.62495	...	1.69253	2.38778
mean{V)	0.00000	-3.59283	-4.73667	...	-0.54315	-0.54667
mean(W)	0.00000	0.00000	0.00000	...	0.10356	0.09617
mean(T)	287.75893	297.99417	298.46471	...	298.69630	298.38605
mean(A)	0.00000	-48.13464	-45.68374	...	-17.79194	-12.89530
Speed	0.00000	4.82444	6.62014	...	1.77754	2.44956
<U>	0.00000	0.75685	0.53388	...	0.80766	0.67790
<V>	0.00000	0.78560	0.54609	...	0.53578	0.75863
<W>	0.00000	0.00000	0.00000	...	0.41686	0.47671
<T>	0.00000	0.29141	0.30640	...	0.25429	0.20287
<A>	0.00000	8.49541	4.42968	...	22.40240	18.79467
<U^2>	0.00000	0.57282	0.28503	...	0.65231	0.45955
<V^2>	0.00000	0.61716	0.29821	...	0.28707	0.57552
<W^2>	0.00000	0.00000	0.00000	...	0.17377	0.22725
<T^2>	0.00000	0.08492	0.09388	...	0.06466	0.04116
<A^2>	0.00000	72.17206	19.62206	...	501.86747	353.23956
TKE	0.00000	0.54543	0.38185	...	0.52753	0.56177
<UV>	0.00000	-0.12522	-0.03582	...	0.11477	0.04698
<UW>	0.00000	0.00000	0.00000	...	-0.08781	-0.04741
<VW>	0.00000	0.00000	0.00000	...	0.00164	0.03066
<WU^2>	0.00000	0.00000	0.00000	...	-0.03483	-0.03711
<WV^2>	0.00000	0.00000	0.00000	...	-0.00964	-0.06597
<U^3>	0.00000	-0.07059	-0.02044	...	0.23663	-0.02178
<V^3>	0.00000	0.11463	0.01918	...	0.00803	0.10823
<W^3>	0.00000	0.00000	0.00000	...	-0.01969	-0.03257
<U^4>	0.00000	0.95645	0.24395	...	1.16650	0.89529
<V^4>	0.00000	1.11135	0.25909	...	0.29111	0.95282
<W^4>	0.00000	0.00000	0.00000	...	0.11948	0.17026
SkU	0.00000	-0.16283	-0.13431	...	0.44915	-0.06992
SkV	0.00000	0.23642	0.11775	...	0.05219	0.24789
SkW	0.00000	0.00000	0.00000	...	-0.27181	-0.30069
KrU	0.00000	2.91491	3.00281	...	2.74139	4.23933
KrV	0.00000	2.91775	2.91342	...	3.53261	2.87665
KrW	0.00000	0.00000	0.00000	...	3.95673	3.29685
<UT>	0.00000	0.09284	0.06560	...	0.10243	0.03911
<VT>	0.00000	-0.10929	-0.07943	...	0.02900	0.03577
<WT>	0.00000	0.00000	0.00000	...	-0.03926	-0.02480
g<UT>/T	0.00000	0.00306	0.00216	...	0.00336	0.00129
g<VT>/T	0.00000	-0.00360	-0.00261	...	0.00095	0.00118
g<WT>/T	0.00000	0.00000	0.00000	...	-0.00129	-0.00082
u*	0.00000	0.00000	0.00000	...	0.08783	0.05646
w*	0.00000	0.00000	0.00000	...	0.00000	0.00000
L	0.00000	0.00000	0.00000	...	1.31354	0.55181
H	0.00000	0.00000	0.00000	...	-43.40489	-27.41878

The sonic names (N1 N2 ...) are described in Section 5.2. Only 5 out of 14 sonics are shown in the above example due to page width restrictions.

As noted in Section 2.0, the statistical quantities derived from the wind velocity and temperature measurements are described in file Muststats.pdf. Abbreviated names for these quantities have been used in the generated tables, as the proper mathematical symbols are difficult/impossible to express in a

portable format.

The primary quantities in the tables are: (U,V,W) -- the wind components (in m/s); T -- the sonic temperature (in degrees K); and A -- the wind bearing (in degrees CCW from grid-north).

The standard deviation of a variable X is denoted by <X>, the variance by <X^2>, the third order moment by <X^3>, the cross moment between X and Y by <XY>, etc.

The auxilliary quantities in the tables are:

- TKE turbulence kinetic energy
- SkX skewness
- KrX kurtosis
- g<XT>/T buoyant production terms (m^2/s^3)
- u* friction velocity (m/s)
- w* local free convection velocity scale (m/s)
- L Monin-Obukhov length (m)
- H sensible heat flux (W/m^2)

Note that W (the vertical wind velocity) was not recorded by the 2-component sonics mounted on the north and south towers, so terms involving W at these locations are set to 0.0. If a sonic was not functioning during a trial (such as the one at N1 in the above example), the measured/derived quantities are set to 0.0 (or some constant) as well.

6.0 DSTL Sonic Data and Results

The dstlsonic directory is split into four subdirectories, namely:

dstlsonic/bin DSTL sonic data in binary format (1 file per trial day)
dstlsonic/ascii DSTL sonic data in ascii format (8 files per trial day)
dstlsonic/plots line plots of the DSTL sonic data (2 plots per trial day)
dstlsonic/stats tables of the derived statistics (1-4 files per trial)

6.1 Binary Files

The dstlsonic/bin directory contains a single compressed tar file named dstlsonic_cor.tgz. The files in this archive are named mJJJhhmm.cor, where JJJhhmm indicates the date and time the sonic data collection was started.

Each file contains the processed (i.e., rotated) wind data collected by the 8 3-component sonic aenemometers operated by DSTL. As with other binary files, their format will not be described here.

6.2 Ascii Files

The dstlsonic/ascii directory contains a number of zip files named mJJJhhmm.zip. Each zip file contains 8 ascii text files named mJJJhhmm_DN.dat, where JJJhhmm indicates the start date/time, and DN is the code for the location of the sonic aenemometer, as shown in the following table:

Code	Location	Height (AGL)

A1	Northwest Tower	2m
A2	Northwest Tower	6m
B1	Southwest Tower	2m
B2	Southwest Tower	6m
C1	Northeast Tower	2m
C2	Northeast Tower	6m
D1	Southeast Tower	2m
D2	Southeast Tower	6m

Each ascii text file contains the data collected by a single 3-component sonic aenemometer over the course of a trial day. For example, file m2681821_A1.dat contains the data from the sonic mounted at the 2m level on the northwest tower, beginning at 18:21:00 on September 25.

Section 5.2 describes the coordinate transform (rotation) applied to the DPG sonic data, and the format of the ascii files in dpgsonic/ascii. The same transformation was applied to the DSTL sonic data, and the DSTL data is stored using the same format.

6.3 Line Plots

The dstlsonic/plots directory contains a number of PDF plot files (two per trial day) which show the wind speed and direction measured by each DSTL sonic. These plot files are named mJJJhhmm_X.pdf, where X is the location code (i.e., E = Northeast and Southeast towers, W = Northwest and Southwest towers).

The notes in Section 5.3 regarding plots of the DPG sonic data apply to the DSTL sonic data plots as well.

6.4 Statistics

The description of the DPG sonic statistics (Section 5.4) apply to the DSTL sonic data, apart from the names of the sonics (A1 B1 ... instead of N1 N2 ...), and the location of the files (dstlsonic/stats instead of dpgsonic/stats).