

## **MATERHORN-X-FALL: Dry Run Tests, 27-30 August 2012**

The first experimental campaign scheduled for September 25 - October 25 is approaching fast. This is part of the MATERHORN-X component coordinated by Prof. Pardyjak from University of Utah (UoU) with participation from the University of Notre Dame (UND) group.

At this stage, all teams involved are engaged in making final instrumentation and technological development checks. The technological (MATERHORN-T) aspects involve, *inter alia*, instrumental development for UAV, high-resolution turbulence measurements (i.e. “combo’s probes”) and RF systems for soil moisture measurements by UND.

The team coordinators from the universities and the Dugway Proving Grounds (DPG) group coordinated by Mr. John Pace and Dr. D. Zajc have put a great deal of effort into ensuring that all instruments and technical aspects of the experiment have been fully evaluated and logistic arrangements are in place.

The familiarization experimental campaign (or the Dry Run) is scheduled for August 27-30 as a precursor to the MATERHORN-X fall campaign. It is designed to test and evaluate key components of the Operational Plan, which has been developed over the past several months. During these three-days, the full campaign will be simulated, starting with *Daily Briefing* at the Operations Center located at the DPG’s Meteorology Division’s conference room at Ditto. Here, DPG forecasters will present meteorological forecasts to make “Go/No-Go” decisions for Intensive Observational Periods (IOPs). A simulation of this process is also planned (see attached Daily Operations Timeline). A detailed log of the time required to deploy personnel to key instrumentation sites will be maintained, including identification of possible problems and difficulties. This will be followed by an end-of-day report and an assessment by the participating teams. The primary on-site participating teams are: DPG, UoU and UND. Additional participation via Skype will include: Stephan DeWekker (UVA), Chad Higgins (Oregon State University), Marcus Hultmark (Princeton University) and Yansen Wang (Army Research Laboratory).

The Dry Run will evaluate equipment operations, team coordination and communications. It will be necessary to develop a strategic plan

- a) To coordinate several sites located in an area of about 25 km x 50 km with all instruments working simultaneously in a synchronized mode;
- b) To coordinate ground-based and aerial operations;
- c) To test communication between the different parties involved.

To this end, the Dry Run will simulate MATERHORN-X operations with a reduced set of ground-based instruments that can mimic the critical components of the actual experiment. During the Dry Run, the participants will conduct following chores

- a) Check the functionality of data-recording systems of ground-based instruments been deployed by UoU, UND and DPG as specified in the Operational Plan;
- b) Test the synchronization of system components and transmittal of data;
- c) Evaluate overall set-up and key time commitments during IOPs;
- d) Verify personnel coordination and communication strategy during IOPs;
- e) Test data collection strategy, daily data verification and reporting;

- f) Identify other potential problems and devise possible solutions

**Ground-based Operations:**

The key-sites for Ground-based operations during the Dry Run include: standard DPG instruments (SAMs, PWIDS, FM/CW, Profilers, and Ceilometers) sites, the extended flux sites (EFS), lidar, ceilometer and sodar measurement sites. Although most of the instrumentation for IOPs is not included in the Dry-Run, with the limited set of instrumentation to be deployed, it is possible to evaluate time commitments for various tasks within an IOP and fine tune the man-power deployments in the prototype. These instruments will be deployed according to the Operational Plan. The Dry Run will also include radiosonde releases from the Playa site.

**Aerial Operations:**

No flights will be conducted as part of the Dry Run, however the operation and planning aspect will be tested (with coordination conducted by Stephan DeWekker). Unmanned Flamingo UAV, manned CIRPAS Twin Otter and DATAHAWK UAV operations are planned for MATERHORN, subject to the availability of funding. During the Dry Run, potential flight plans for each of these aircrafts will be proposed and discussed with the respective PIs and DGP personnel. Prospective flight plans will be drafted prior to the Dry Run, and selection of a particular flight plan will be made depending on meteorological conditions and science objectives of the IOP. The aircraft operations are to be closely coordinated with DPG flight operators, and the Dry Run will be a venue to start coordinating with DPG flight operators.

## MATERHORN-X Daily Operations Timeline

We will test the efficacy of the following proposed Daily Operations Timeline. Times are given relative to Local Time (i.e., Mountain Daylight Time).

### *Every Day:*

- 0700–0800 Forecasters supporting MATERHORN operations will evaluate various current weather models
- 0800–0900 Forecast preparation and submission to MATERHORN Field Catalogue.
- 0800–0900 Status update of all MATERHORN facilities to MATERHORN Field Catalogue.  
Initialize remote communications links (e.g. Skype)
- 0900–1000 MATERHORN Daily Planning Meeting (see Operational Plan).
- 1000–1100 Mission and IOP-type selection (Daytime Start / Nighttime Start IOP) and preparation of Mission Plan (flight plans, scanning strategies, TB operations).
- 1100–1600 Notifications - facilities, Air Traffic Control Centers, Field Catalogue Operations Report.

### *Operational (IOP) Day:* (Approximate times for day light operations)

- 0900 Operational update—weather and facility status
- 0930 Go/No decision
- 1000 Notify all field personnel and DPG personnel of decision and mission plan

### **a) Daytime Start IOP**

- 1200–1200+24h IOP operations for soundings and other enhanced ground-based operations.
- 1000–1100 Pre-flight briefings (1.5 hr before takeoff).
- 0700–2000 Flight operations (pre-planned and coordinated)
- 1600–2100 Debriefings (1 hr after landing).

### **b) Nighttime Start IOP**

- 2400–2400+24h IOP operations for soundings and other enhanced ground-based operations.
- 2000–2200 Pre-flight briefings (1.5 hr before take-off).
- 0700–2000 Flight operations (pre-planned and coordinated)
- 0200–0400 Debriefings (1 hr after landing).

***IOP Operations Timeline***

Two types of 24-hour IOP operations will be conducted to ensure that full nighttime and daytime cycles are fully captured. Daytime Start IOPs begin at 2:15pm MDT, while Night time Start IOPs begin at 2:15am. Tables below summarise the overall IOPs where: RS – indicates the start time of a Radiosounding launch (soundings are every 3 hours); TS – indicates the start time of a Tethered Balloon Sounding (soundings are every 30 minutes); DPM – Daily Planning Meeting; 0Z and 12Z indicate standard UTC soundings.

**Daytime Start IOP**

Time MDT	RS	TS	Other
1400-1500	1415	X	
		X	
1500-1600		X	
		X	
1600-1700		X	
		X	
1700-1800	1715 (0Z)	X	
		X	
1800-1900		X	
		X	
1900-2000		X	
		X	
2000-2100	2015	X	
		X	
2100-2200		X	
		X	
2200-2300		X	
		X	
2300-2400	2315	X	
		X	
0000-0100		X	
		X	
0100-0200		X	
		X	
0200-0300	0215	X	
		X	
0300-0400		X	
		X	
0400-0500		X	
		X	
0500-0600	0515 (12Z)	X	
		X	
0600-0700		X	
		X	
0700-0800		X	
		X	
0800-0900	0815	X	DPM
		X	
0900-1000		X	
		X	
1000-1100		X	
		X	
1100-1200	1115	X	
		X	
1200-1300		X	
		X	
1300-1400		X	

**Nighttime Start IOP**

Time MDT	RS	TS	Other
0200-0300	0215	X	
		X	
0300-0400		X	
		X	
0400-0500		X	
		X	
0500-0600	0515 (12Z)	X	
		X	
0600-0700		X	
		X	
0700-0800		X	
		X	
0800-0900	2015	X	
		X	
0900-1000		X	DPM
		X	
1000-1100		X	
		X	
2300-2400	2315	X	
		X	
0000-0100		X	
		X	
0100-0200		X	
		X	
0200-0300	0215	X	
		X	
0300-0400		X	
		X	
0400-0500		X	
		X	
0500-0600	0515 (12Z)	X	
		X	
0600-0700		X	
		X	
0700-0800		X	
		X	
0800-0900	0815	X	
		X	
0900-1000		X	
		X	
1000-1100		X	
		X	
1100-1200	1115	X	
		X	
1200-1300		X	
		X	
1300-1400		X	