Survey of Attendants at the LEAD Workshop Held in the 88TH American Meteorological Society meeting in New Orleans

Workshop Report
March 2008

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Executive Summary

The LEAD project, now in its fifth year of implementation, is facing new challenges. User adoption is one key factor in considering the success of LEAD at this stage. On January 20, 2008, LEAD organized a workshop at the 88th American Meteorological Society (AMS) annual meeting held in New Orleans. The goal of this workshop was to introduce LEAD tools and resources to attendees who were not familiar with its applications and wanted to receive a thorough introduction.

This report is based on a survey taken from the attendees that came to the LEAD workshop in New Orleans. Two surveys were administered, one entry questionnaire and another upon completion of the workshop. In addition to some basic background and demographic data, the purpose of the survey was to capture the *impressions and attitudes* the attendees had after using LEAD tools for the first time.

The "AMS Workshop on *Linked Environments for Atmospheric Discovery* (LEAD): An Emergent Information Technology Environment for On-Demand, Dynamically Adaptive Interaction with Weather for Research and Education" was divided in three parts:

1. Introduction to LEAD
2. Launch a WRF and create a workflow
3. LEAD as a new paradigm for research and education in the atmospheric sciences (Data Search)

Summary Results

Overall, there were no major problems during the workshop and participants seemed relatively comfortable following the instruction given by the presenters. Notably, there were some system failures (particularly in workflow output); these events almost certainly shaped impressions of LEAD. This said, there was a generally positive feeling of how powerful LEAD is and the possibilities that it brings to the meteorological community. The organizers and presenters did an excellent job helping attendees go through the tasks. However, there was a perception that demonstrations were conducted very quickly and that not everyone could easily follow. Several attendees suggested that printed instructions accompanying the demos would have helped them to better follow the tasks.

According to attendee's comments, LEAD does a good job simplifying the intricacies using of the Weather Research and Forecasting (WRF) model configuration, stability, and criteria. It was mentioned repeatedly that forecasting becomes easier, more dynamic, and self-explanatory. However, some attendees showed doubts towards the integrity and ease of use of the LEAD tools.

With respect to bringing LEAD to the workplace, attendees identified barriers such as stability and confidence in whether runs would be successful. In addition, robustness of the system was cited as an issue, as well as a lack of flexibility when customizing particular jobs. One user noted that a "closer connection is needed between archived data for model initializations and observations, in addition to enhanced reliability of workflows." The majority of attendees did not think LEAD was ready for the classroom. The reasons of these are that they believed: 1- it could not handle multiple users (like 30 or 40) at one time; 2- model customization is limited; 3- and illustration and potentially real-time analysis (like Gempak does) is missing.

Results

In this section, we begin with a review of the attendees' educational background, workshop expectations, general work-type and interests. The remaining results are grouped according three main topic areas: technical backgrounds, and LEAD at work & education.

Sample Population

The sample data is taken from twelve attendees of the workshop. The sample population is far too small to support generalization; however, it provides qualitative data with detailed explanatory information that will serve to inform further studies. This survey is part of a pilot study providing information for a full study, intended to identify usability issues within LEAD applications.

Background and Work Practices & Interests

To better understand respondents' work activities, we asked what is their highest degree accomplished, how many hours they spend on different tasks—research, administrative teaching, consulting and other activities, and their interests (Figure 1).

	# of Attendees	Interests
PH. D	4 **Time Spent Mostly:** Teaching & Some Research	WRF Modelling, Synoptic Meteorology, Operational Wx Research, Mesoscale features, teach meteorology for non-science majors
Master's	5 **Time Spent Mostly:** Research & Consulting	Air quality, operational weather for military, grad student with focus on Arctic climate modeling
Bachelor's	2 **Time Spent Mostly:** Research	Aerosol impacts on weather

Figure 1

Four participants were Ph. D, five Masters, and two Bachelors. Research is the main activity among the different groups. The average (mean) time spent on research per week was 20.4 hours (range = 0-45), and the mean time spent on teaching activities per week was 11.9 (range = 0-40). There is a clear inclination for participants to conduct research. The mean time spent on consulting and 'other' per week was 4.5 and 5.0 consecutively.

None of the users had ever used LEAD before the workshop. Eight users said having high expectations about creating new knowledge on their field with LEAD. Three were neutral.

Attendees Technical Background

Computing Environment

All users either work from a personal laptop or desktop at work, and a third do use PC clusters at work. Also, three participants currently use or have used TeraGrid resources (NCSA: Cobalt, Tungster, Mercury), and six see LEAD as a good candidate to replace these resources. In contrast, four do not see LEAD as a good candidate to replace any of these resources (no further information was provided).

User Radar Data Background and Tools Used

To understand respondent's technology use and adoption, we asked them what is their radar data background and what tools do they use in that. The majority, seven, usually view radar data online, three have experience doing research, three use data for operations, five use for teaching. Most of them use online images and tools. Ten said to use tools such as IDV, vis5D, or Novice. Five users mentioned to use in-house software tools or prepackaged software tools such as Gempak, Cats-HPAC, IDL, MatLab, NCL, or Arcbis.

Most of the attendees saw LEAD as a good candidate to replace or use in addition to their current tools. However, a user points out that for LEAD to replace these tools "it would mandate a much closer connection between archived data for model initializations and observations, in addition to enhanced reliability of workflows". In addition, regarding education, one user mentioned that "once fully implemented I can see map bundles helping me to incorporate LEAD real time runs to update my teaching repertoire for the benefit of my students".

Use of Supercomputers

Nine of thirteen users had used supercomputers before. From those nine, 6 users said LEAD was easier to use, had an easier time monitoring the job, and found it more rewarding than other supercomputers. LEAD does a good job simplifying intricacies of WRF model configuration, stability, and criteria. However robustness of the system was cited as issue, as well as a lack of flexibility when customizing particular jobs. Three users did not respond to this question and one said this was too a simple exercise to draw any comparisons with previous supercomputer experience.

Forecasting Background and How This Experience Compares to That One

We asked participants about their background and how LEAD compares to that experience. Eleven of thirteen respondents had forecasting background. These forecasting experiences vary from Geostationary Satellite Server images and surface maps to upper air maps displays on IDV. Some of the following tools seem to be used often: WRF, MOS, MMS, and operational models.

Some attendees pointed out how they feel about how the LEAD experience varies from that done before*: "This is more straightforward and extremely helpful", "I attended a 1 week workshop for WRF and you in 4 hours replace all the work", "It is fairy easy for me", "before was more complicated", "Dynamic, explanatory", "excellent, it was easier, this makes such use accessible and meaningful for students", "A little more difficult, but much more customizable" and " It is comprehensive in setting. It makes it more practical and easier to get to the answer/solution".*

However, some respondents showed doubts towards the integrity and ease of use of LEAD tools. One user felt "a bit better, but I was lost in several places", other users said of LEAD that is "static and conforming to pre-made configurations", and there is "missing or incomplete data, [and] unreliable access".

LEAD at Work & Education

Using LEAD at Work

Most of the users (nine out of twelve) find LEAD useful for their work/research purposes. Some of the points why LEAD is helpful at work repeating through the participants responses are:

- simulating unique weather events
- efficient analysis of the effects of varying model configuration on results & output
- WRF
- data analysis & access
- tracking and delivering products to specific groups of decision makers

Overall, the greatest benefits participants see LEAD bringing:

- Effectiveness
- Faster Results
- Real-time collaborative NWP with tools researches are using now
- Easy Interface
- Greater customizability
- Ability to quickly execute a model and view results

Aspects that If Implemented Would Lead to use LEAD

When participants were asked about those aspects that if in place would lead them to use LEAD it, four participants answered the question and coincided in the following:

• Modification of model configuration
• Incorporating polar activities
• Ability to search through archived Wx data such as NCDC (National climatic data center)

Bringing LEAD to the Classroom

To better understand what the perception users have when asking them about bringing LEAD to the classroom, we asked them about the benefits and difficulties they see. Eight out of twelve participants responded LEAD is not ready for classroom use. The common difficulties users see in bringing LEAD to the classroom are:

• robustness
• getting everyone to understand all of the settings and how to view the results
• help resources
• stability and confidence in successful runs
• fewer limitations, must permit more modification in name-list parameters to permit students an advanced understanding of internal model parameters.
• Cannot handle multiple user (30-40) at one time

Regarding the benefits users see LEAD bringing to the classroom, some common relevant comments were found:

• attractive
• user-friendly
• teach modeling principles, configuration, and visualization at early educational levels
• students would have a better understanding on how specific meteorological phenomena work

Appendix A – Entry Survey Questions

1. What is your highest degree?

   ____ Bachelor's ____ Master's ____ Ph. D.

2. In what year did you receive your highest degree?

   _____

3. Please characterize the kind of work that you do? (e.g., mesoscale, surface weather analysis, etc.)

   _____
   _____
   _____
   _____

4. In a typical week, how many **hours** do you spend doing each of the following;

   Hours doing research-related work: _____
   Hours doing teaching (including grading, meeting with students, and class prep): _____
   Hours doing consulting: _____

5. Have you ever used LEAD?

   _____ Yes _____ No

   If Yes, what is your level of expertise?

   _____ Proficient _____ Intermediate _____ Beginner

6. What are your expectations about LEAD. Will it help you create new knowledge in your field?

   ____ Strongly Agree ____ Agree ____ Neutral ___ Disagree ____ Strongly Disagree

7. What is the reason you came to this workshop?

   _____ I need LEAD for my research
   _____ I may need LEAD for my research
   _____ I need to learn LEAD for a class I am taking
   _____ other (Please specify _____)

Appendix B – Exit Survey Questions

A) In an average work week, describe your research/teaching/operational computing environment: (fill all that apply)

a. ____personal laptop,
b. ____desktop at work,
c. ____PC cluster at work,
d. ____use Teragrid computing resources
e. ____use non-Teragrid supercomputer facilities

B) Could you see using LEAD in addition to or replacing any of these resources?
_____
_____
_____
_____

How would you describe your radar data background? (fill all that apply)
•

a. _____ view online only,
b. _____ use for research,
c. _____ are a radar specialist,
d. _____ use data for operations,
e. _____ use data for teaching,
f. _____ have done data mining of radar data (please specify _____
_____)

3. A) Describe your most common (non-LEAD) data access/interrogation tools: (fill all that apply)
   a. ____ online images and tools,
   b. ____ downloadable tools e.g. vis5D, IDV (please specify_____),
   c. ____ custom software in-house,
   d. ____ other commercial software (please specify _____),
   B) Could you see using LEAD in addition to or replacing any of these resources?
   _____
   _____
   _____
   _____

4. Have you ever made use of Supercomputers? (e.g., grid/distributed computing, etc.)

   ____ Yes ____ No

how does the experience compares to this one?

_____
_____
_____
_____

5. How would you describe your forecasting background - have you used forecast models for research (or departmental) purposes before?

_____
_____
_____
_____

If yes, how difficult would you describe your experience *before* the workshop of getting up to speed on the full process from accessing data to making forecasts and analyzing/plotting them?

_____
_____
_____
_____

How does your LEAD introduction compare?

_____
_____
_____
_____

6. Where in your activities do you see a use for LEAD?

_____
_____
_____
_____

7. A. How could you use LEAD in your work?

_____
_____
_____
_____

B. Are there aspects of LEAD that are missing that, if present, would lead you to use LEAD?

____ Yes ____ No

Which ones?

_____
_____
_____
_____

8. Do you find LEAD to be user friendly?

____ Strongly Agree ____ Agree ____ Neutral ___ Disagree ____ Strongly Disagree

9. Do you feel LEAD is easy to learn?

____ Strongly Agree ____ Agree ____ Neutral ___ Disagree ____ Strongly Disagree

10. What is the greatest benefit you can see LEAD bringing to your work (or that with your students or co-workers)?

_____
_____
_____
_____

11. What is the greatest difficulty you see in bringing LEAD to your work or school environment, and what would you like to see done to help address it?

_____
_____
_____
_____

12. Do you see LEAD as ready for classroom use?

Yes _____ No_____
Why?

_____
_____
_____

13. If you work with or supervise students or co-workers, would the LEAD capability you have seen today help you or them in your work or teaching?

_____
_____
_____

_____

14. What kind of information or materials would you like to have available to help train them in use of LEAD?

_____
_____
_____
_____

15. Overall was this workshop helpful to you?

____ Strongly Agree ____ Agree ____ Neutral ___ Disagree ____ Strongly Disagree

16. What part of the workshop was *least* intuitive to you - how do you believe that LEAD developers can most improve the facilities that you tried today?

_____
_____
_____
_____

17. Please share with us any additional comments, questions or concerns you may have regarding this questionnaire, and everything we discussed today.

_____
_____
_____

Availability

18. Would you be willing to provide additional feedback on your experience of using LEAD through a phone interview or web survey? If so, you may provide your name and email information here, or please give that information to Sergio.

Name: E-Mail:

Appendix C - Summary of Results for the Entry Survey

This table shows the answeres to those questions (columns) asked to the survey participants (rows)

User	Highest Degree	Degree's Year	Type of work	Average Weekly hours				Ever used LEAD?	LEAD Expectations					Reason for the workshop			
Q.1	Q. 2	Q. 3	Q.4	Q. 5				Q. 6	Q.7					Q. 8			
				Research-related work	Teaching	Consulting	Other		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Need for Research	May Need for Research	Required for a class	Other (Please specify)
1	PH. D	1982	Synoptic Meteorology	6	10	10	10	10			✔						✔
2	PH. D	1992	WRF Modeling, air quality: CMAQ/WRF-Chn	20	20	-	-	No		✔				✔			
3	Bachelors	2002	Aerosol impacts on weather	45	-	-	-	No	✔					✔			
4	Master's	1962	Air quality and emergency responds	15	10	30	-	No	✔					✔			
5	Master's	1986	Atmospheric Science data center user & data services lead. Work with data users & data providers (scientists)	-	-	-	45	No		✔							✔
6	PH. D	-	Teach meteorology for non-science majors. Precipitation climatology. Cloud Climatology.	4	36	-	4	No		✔					✔		✔
7	PH. D	1991	Operational Wx Research, mesoscale features, applied met/clime and student teaching/mentoring.	10	40	5	5	No		✔							✔
8	Bachelor's	2008	-	19	-	-	-	No	✔						✔		
9	Master's	2001	Operational weather for military and other government purposes	5	-	15	-	No			✔						✔
10	Master's	2007	I am a graduate student and my thesis focuses on Arctic climate modeling.	40	15	-	-	No			✔				✔		
11	Master's	2002	Research of various metr. aspects mainly w/ the Oklahoma Mesonet. I also run the wxchallenge forecasting competition.	40	-	-	-	No		✔							✔

Appendix D - Summary of Results for the Exit Survey

This table shows the answeres to those questions (columns) asked to the survey participants (rows)

User	Your Computing environment					Do you see LEAD in addition to or replacing any of these resources	Any Radar data background?						Describe your most common (non-LEAD) data access/interrogation tools				Could you see using LEAD in addition to or replacing any of these resources	Ever made use of Supercomputers?		How does the experience compares to this one?	Your forecasting background - have you used forecast models for research (or departmental) purposes before?	If yes, how difficult would you describe your experience *before* the workshop of getting up to speed on the full process from accessing data to making forecasts and analyzing/plotting them?	How does your LEAD introduction compare?	Where in your activities do you see a use for LEAD?
	Q 1.A					Q 1.B	Q 2.A.						Q 3.A				Q 3.B	Q 4.A		Q 4.B	Q 5.A	Q 5.B	Q 5.C	Q 6
	Personal Laptop	Desktop At Work	PC Cluster at Work	Like Teragrid Comp. Resources	Non-Teragrid Supercomp. Res.		View Online Only	Use For Research	Use as a radar specialist	Use data for operations	User use no learning	Have done data mining of radar data (please specify)	online images and tools	downloadable tools e.g. wdssII, IDV	custom software in-house	other commercial software (Specify)		YES	NO					
1	✔	✔		✔ NCSA: Cobalt, Tungster, Mercury tg		Yes, specifically for running WRF simulations at varying resolutions, domain configurations and with various parameterizations efficiently, linked with unique visualization (i.e., IDV) in a single, user-friendly, organized platform.	✔						✔	✔			Yes, but would mandate a much closer connect between archived data for model initializations and observations, in addition to enhanced reliability of workflows.	✔		Simplified, efficient LEAD capabilities masking intricacies of WRF model configuration, stability criteria, etc.	Yes, various online (operational) models, MOS guidance, satellite, etc. tools.	Static, conforming to pre-made configurations	Dynamic, explanatory	Research purposes, simulating unique weather events, efficient analysis of the effects of varying model configuration on results, output.
2		✔				Absolutely		✔					✔	✔			Yes	✔		This is more friendly user	Average	This is more straightforward and extremely helpful	Excellent	WRF
3	✔	✔				Yes	✔						✔	✔	✔ vis5D		Yes		✔	-	WRF, WRF - Chen	I attended a 1 week workshop for WRF and you in 4 hours replaced all the work	It was easier	WRF Forecast
4	✔	✔				Not at this time				✔	✔		✔	✔		✔ CATS-HPAC	Not at this time	✔		Similar, but robustness is an issue	From hand drawn and analyzed maps to numerical model	A bit better, but I was lost in several places	Not compared to COMET but interesting	Tracking, delivering products to specific groups of decision makers
5	✔	✔	✔	✔	✔	Yes, very powerful conceptually					✔		✔	✔ IDV Nivic e		✔ gempak	Once fully gempak ready - I can see map bundles helping me to incorporate LEAD real time runs to update my teaching repertoire for the benefit of my students.	✔		This is very user-friendly compared to using NCAR or my own institution' s super computing capabilities.	Extensive - run MM5 & WRF	Modest experience in background research, but I've not used in teaching	This makes such use accessible and meaningful for students	Teaching, primarily but also as prototype research. Also very useful for WX challenge
6		✔	✔		✔	It would be extremely useful to the climate community if we had a similar instantiation geared toward this community	✔						✔	✔	✔	✔ IDL, MatLAb FORJRAN	In addition	✔		-	Yes as a student	-	-	Data analysis, data access, data viz
7	✔	✔	✔			In addition to		✔			✔		✔	✔ IDV	✔		In addition	✔		More complicated - this was an easy exercise	Yes, I worked in developing models	More complicated	It was an easy exercise	in my teaching and research
8	✔	✔				Not at this time	✔						✔		✔		Not at this time		✔	N/A	I forecast daily for non-work purposes and look output	It is fairy easy for me	A little more difficult, but much more customizable	To improve forecasts as part of the WxChallenge
9	✔	✔		✔		No	✔								✔	✔ IDL, NCL, RIP	Unsure	✔		This was much, much easier	No - Just for fun, but not research	-	-	I teach on introductory meteorology course and would consider incorporating LEAD into the class.
10	✔	✔				In addition to				✔			✔	✔		✔ Arcbis	In addition	✔		Easier to monitor the job but less flexibility in customizing the job	Extensive forecast background with heavy use on models	-	-	Forecasting, research
11	✔		✔			Absolutely Yes	✔	✔		✔	✔		✔	✔ IDV, vis5D			Companion	✔		Much easier & more rewarding	Yes, extensively	t-censuring, missing or incomplete data, unreliable access	Comprehensive in setting makes if more practical & easier to get to the answer/solution	Research, teaching, demo, partnering in cooperative & collaborative
12	✔	✔	✔			Yes, in education	✔				✔ IDV		✔	✔ IDV			Yes		✔	-	Yes, departmental and weather interpretations. Weather forecasts for non-science majors in the classroom using GOES images, surface maps, upper air maps displays on IDV	I did not developed models	Forecasting with LEAD it would be my first experience using forecast models to develop new knowledgeable	Teaching and research

How could you use LEAD in your work?	Are there aspects of LEAD that are missing that, if present, would lead you to use LEAD?		Which ones?	Do you find LEAD to be user friendly?					Do you feel LEAD is easy to learn?					What is the greatest benefit you can see LEAD bringing to your work (or that with your students or co-workers)?	What is the greatest difficulty you see in bringing LEAD to your work or school environment, and what would you like to see done to help address it?	Do you see LEAD as ready for classroom use?		Why?	If you work with or supervise students or co-workers, would the LEAD capability you have seen today help you or them in your work or teaching?	What kind of information or materials would you like to have available to help train them in use of LEAD?	Overall was this workshop helpful to you?				
Q 7.A	Q 7.B		Q 7.C	Q 8					Q. 9					Q. 10	Q.11	Q. 12 A		Q. 12 B.	Q. 13	Q. 14	Q. 15				
	YES	NO		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	---		YES	NO				Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Given advanced capability for modification of WRF configuration (namelist), I see LEAD becoming a unique tool for WRF modeling and research.	✔		Modification of model configuration (via name-list), nesting domains of various resolutions, constraints on DT and XY for stability criteria, archived data for model initialization of past weather events.			✔				✔				Learning of numerical modeling principles, configuration, visualization, ownership of research at early educational levels (undergraduate, that is)	Stability, confidence in successful runs		✔	Limited, must permit more modification if name-list parameters to permit students an advanced understanding of internal model parameters (e.g. microphysics, resolution, etc.)	Only given suggested improvements	More simplistic format of My Workspace, such as simplifying output for each run into namelist .at wrfont, etc., a natter folder for unnecessary (for introduction at least) files.	✔				
-			-	✔					✔					Effectiveness	Is there a help resource?	✔		Attractive	Extremely.	The simulations perhaps to recruit students	✔				
-			-	✔					✔					Faster results	-	✔		User-friendly	Yes.	-	✔				
Same as above			Don't know enough				✔					✔		Not at this moment	Robustness		✔	Cannot handle multiple users (like 30 or 40) at one time	Not Yet	Too early to say	✔				
Again, teaching primarily - Will facilitate the teaching of synoptic meteorology & NWP providing real time access to models in a neat collaborative environment.		✔	unsure		✔					✔				Have already mentioned - realt-time collaborative NWP with tools researches are using now (if you , port to WRF 3 when ready!)	It is more ready than it was in Spring 2007 when I first saw it. It is close to being ready for me now; I ll keep playing.		✔	It is close - but I teach synoptic to 50 students- there are too many faults still	Yes, - helpful conceptually	15 minutes demo videos w/move clicks, etc, revealed?	✔				
-		✔	-			✔				✔				-	-		✔	Need added robustness if the entire class is using it	-	-		✔			
Try to teach students about the models used in NWP	✔		To be able to modify some of the models features		✔					✔				Easy interface	-		✔	Not yet. I would like some of the educations first experimenting with it.	-	-	✔				
Not at this time		✔	-		✔						✔			Greater customizability	Getting everyone to understand all of the settings and how to view the results.		✔	-	N/A	N/A		✔			
Unsure - my work is more climate based	✔		Right now, WRF does not work well for polar applications. One Polar WRF is finished, it would be nice for LEAD to incorporate that ability.		✔					✔				Ease of exploring modeling at the freshman and sophomore level.	-		✔	Sounds like it is close, but just needs a bit more work	-	-		✔			
Operational Wx forecasts - Wx studies for a region of interest	✔		Ability to customize the model. Ability to search through archived Wx data such as NCDC (National climatic data center)		✔					✔				Ability to quickly execute a model and view results	-		✔	Easy to use but need to be able to customize the model run	N/A	N/A		✔			
Real time situations, particularly if hazardous potential. Research. Case Studies. Training.		Not at this time, it will take more time to find out	-		✔					✔				Understanding of the science by renaming the clutter of the protocol/similar	Support. Age of hardware/sofware in-house	✔		Illustration & potentially realt-time analysis (as per Gempak idea much better)	Yes, but requires some ramp-up.	The tutorials are good/adequate, workshops would help	✔				
Teaching and Research		✔	-		✔					✔				Would motivate students to have a better understanding on how specific meteorological phenomena work. It would give me the opportunity to teach meteorology under the earth system viewport.	I have to train myself better. Practice	✔		As a complement	-	-	✔				

What part of the workshop was "least" intuitive to you - how do you believe that LEAD developers can most improve the facilities that you tried today?	Please share with us any additional comments, questions or concerns you may have regarding this questionnaire, and everything we discussed today.
Q. 16	Q. 17
-	-
-	How long can we keep account?
-	-
Do not know yet	Not at this moment
I forgot my 3 button mouse - could not follow the IDV things well - my fault! I did not advance my own use of IDV	This is great & potentially transformative. I'll demo it at leas this year Wx forecast challenge. But probably will wait to teach W/I until next spring ('09)
Demos were very fast, not everyone could follow it would be helpful to have printed demo instructions.	-
Visualization - I am not too familiar with the IDV	-
Understanding all of the settings	-
You all did excellent job presenting	-
-	-
Not know at this time	On the right track, to network & apply to different uses & simulations
-	-