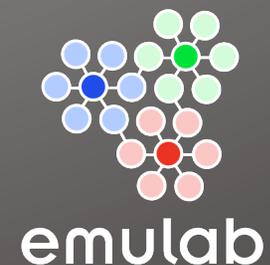


Steve Corbató  
Director, Cyberinfrastructure, University Information Technology  
Adjunct Faculty, School of Computing  
University of Utah

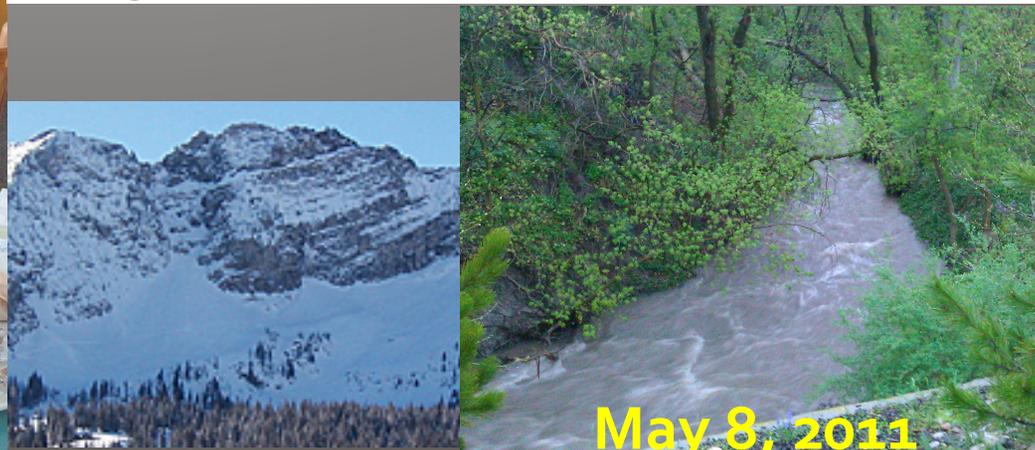
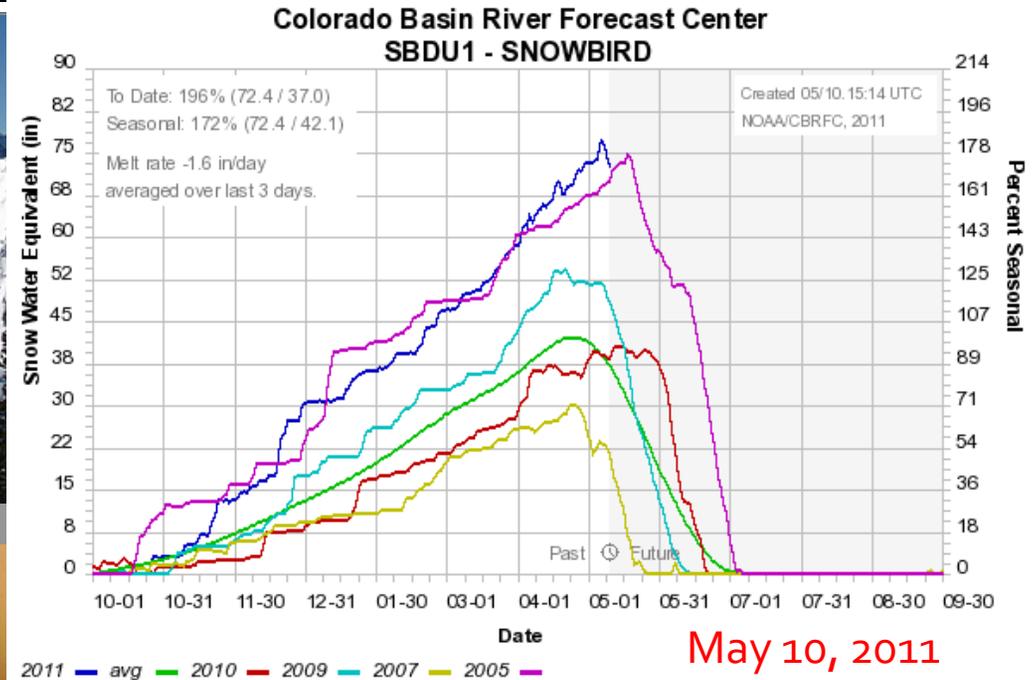
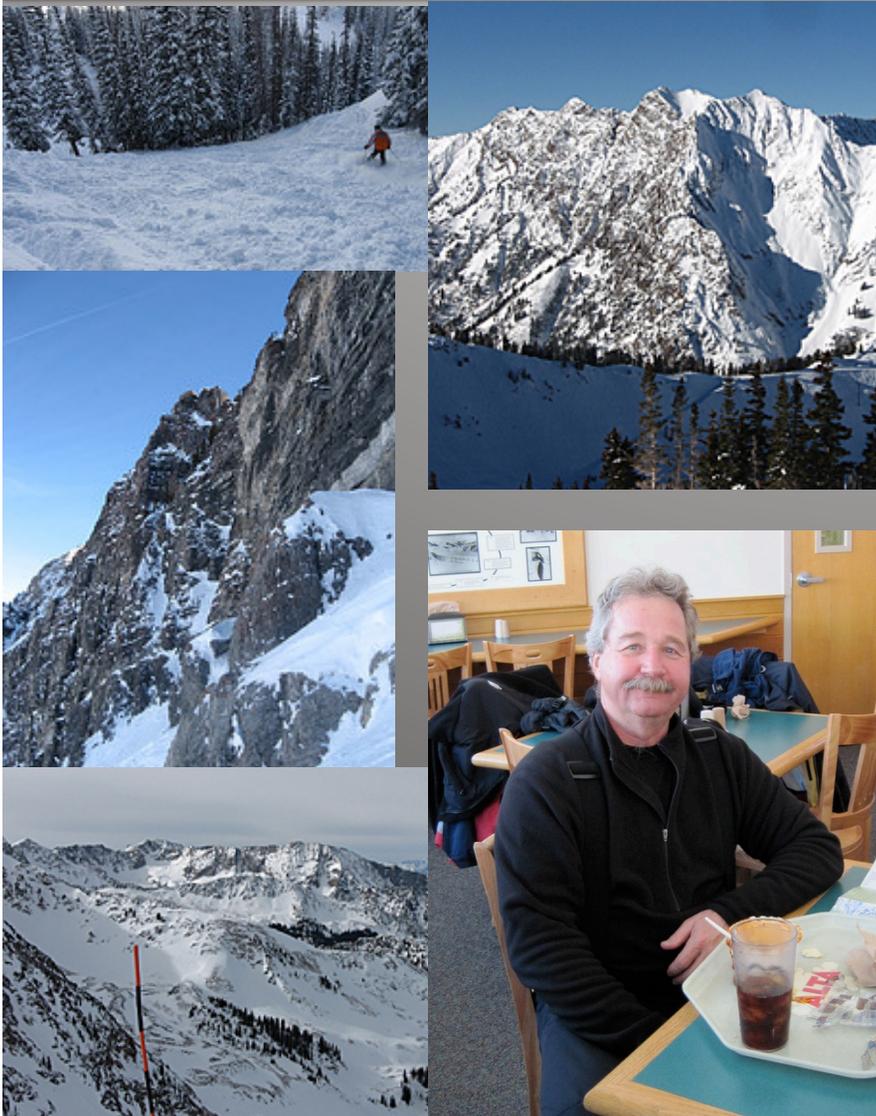
NOAA N-Wave Stakeholder Users Conference  
Boulder, Colorado – May 11, 2011

*Univ. of Utah/UEN collaboration in  
support of NOAA/NWS advanced  
networking in Salt Lake City*



# It's all about the skiing and snowpack!

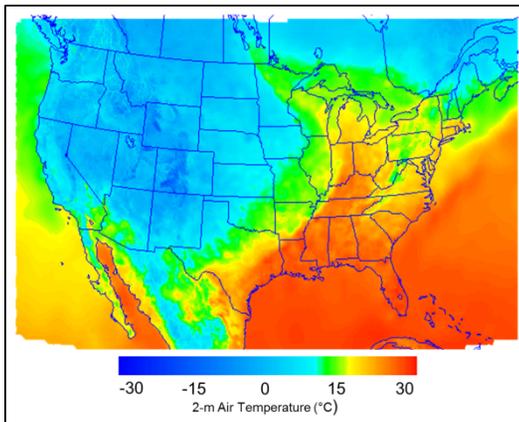
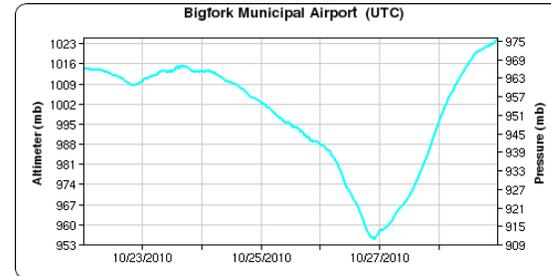
(NWS/SLC WFO hosts USFS/Utah Avalanche Center)



Source: Prof. John Horel



# Collaboration between the NOAA/NWS & Department of Atmospheric Sciences at the University of Utah: Research, Development, and Operations





- Ten academic and six research faculty
- Wide ranging basic and applied research supported (~\$4 million annually) by federal agencies and other sources
- Mountain Meteorology Group
  - foster R&D to improve understanding and prediction of weather and climate processes in regions of complex terrain



Three NWS SCEP Students presently:

- Trevor Alcott
- Jon Rutz
- Kristen Yeager

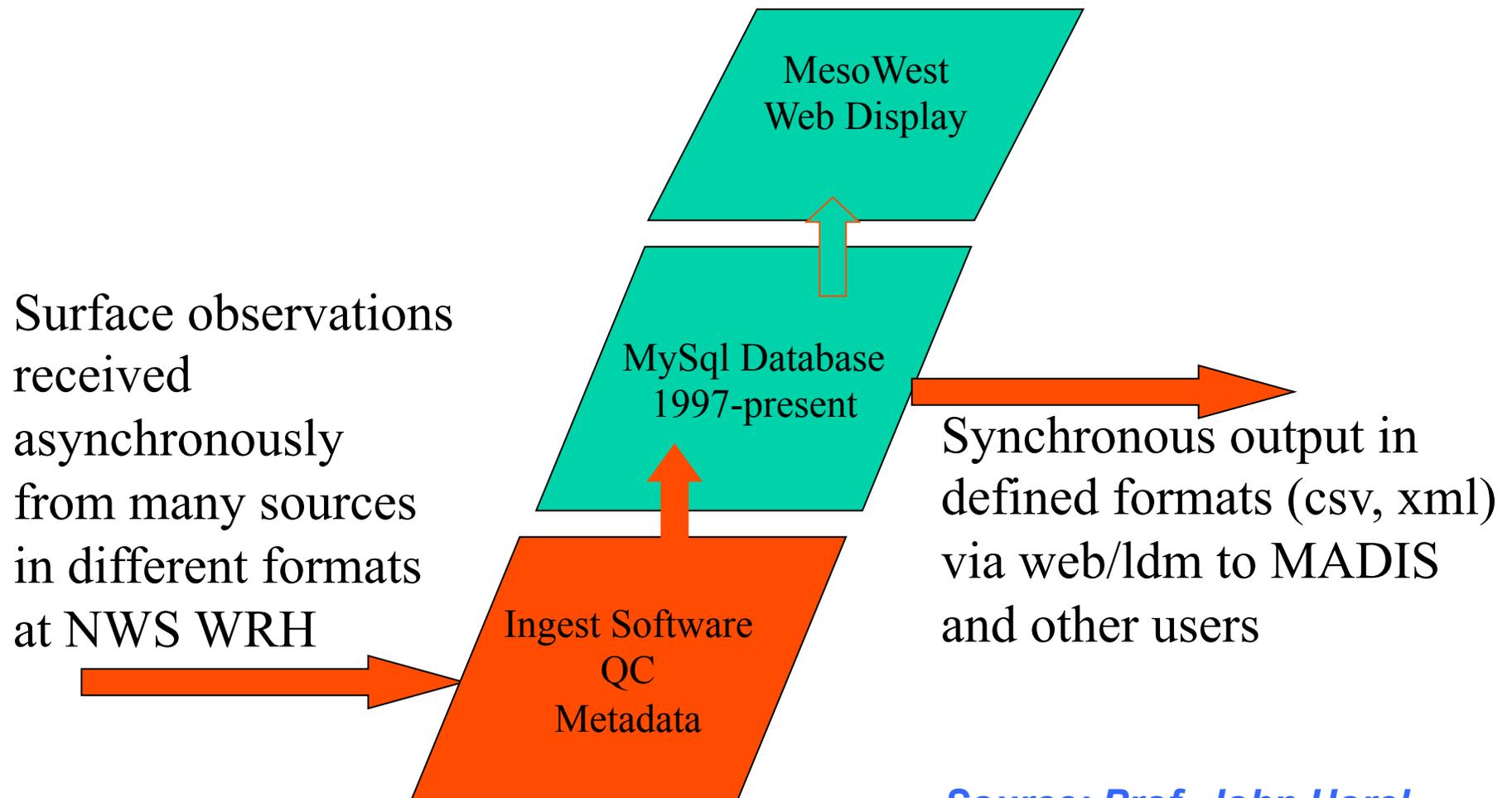
*Source: Prof. John Horel*

## UU has been collaborating extensively with NWS over past two decades

- MesoWest: real-time and retrospective access to weather information began during early 1990's
- Weather support for 2002 Winter Olympics
- Continuous funding as NOAA Cooperative Institute for Regional Prediction and/or NWS CSTAR program since 1996
- Collaboration with Meteorological Assimilation Data Ingest System (MADIS) effort at NOAA Environmental Systems Research Laboratory (ESRL) and national mesonet efforts
  - Support MADIS that runs operationally in real-time with a distributed architecture consisting of ingest and distribution services at the NWS Telecommunications Operations Center (TOC) and processing at National Centers for Environmental Prediction (NCEP) Central Operations

*Source: Prof. John Horel*

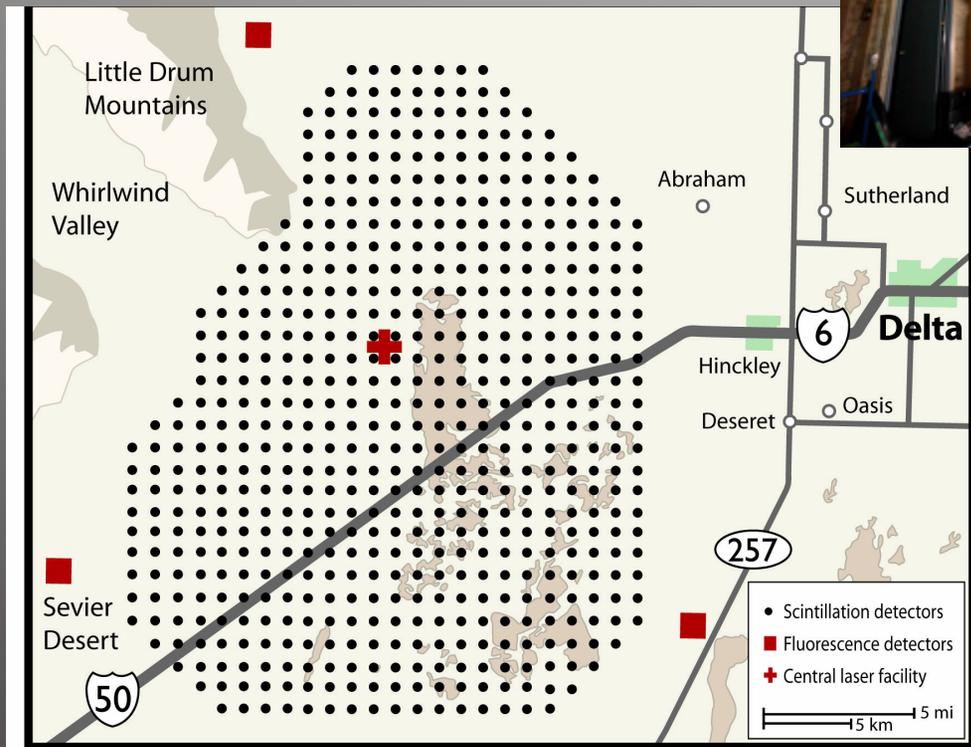
## MesoWest (<http://mesowest.utah.edu>)



*Source: Prof. John Horel*

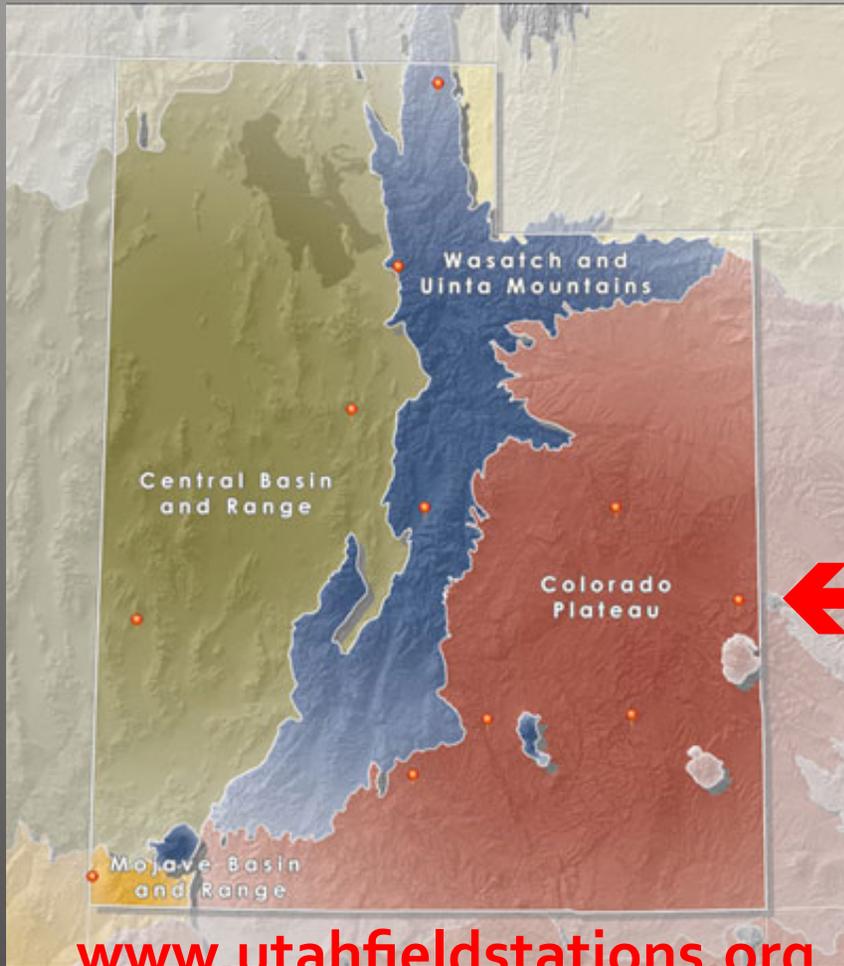
# Utah... a great place for field science

## Frisco Peak Observatory Milford, Utah



## Ultra High Energy Cosmic Ray Observatory Delta, Utah

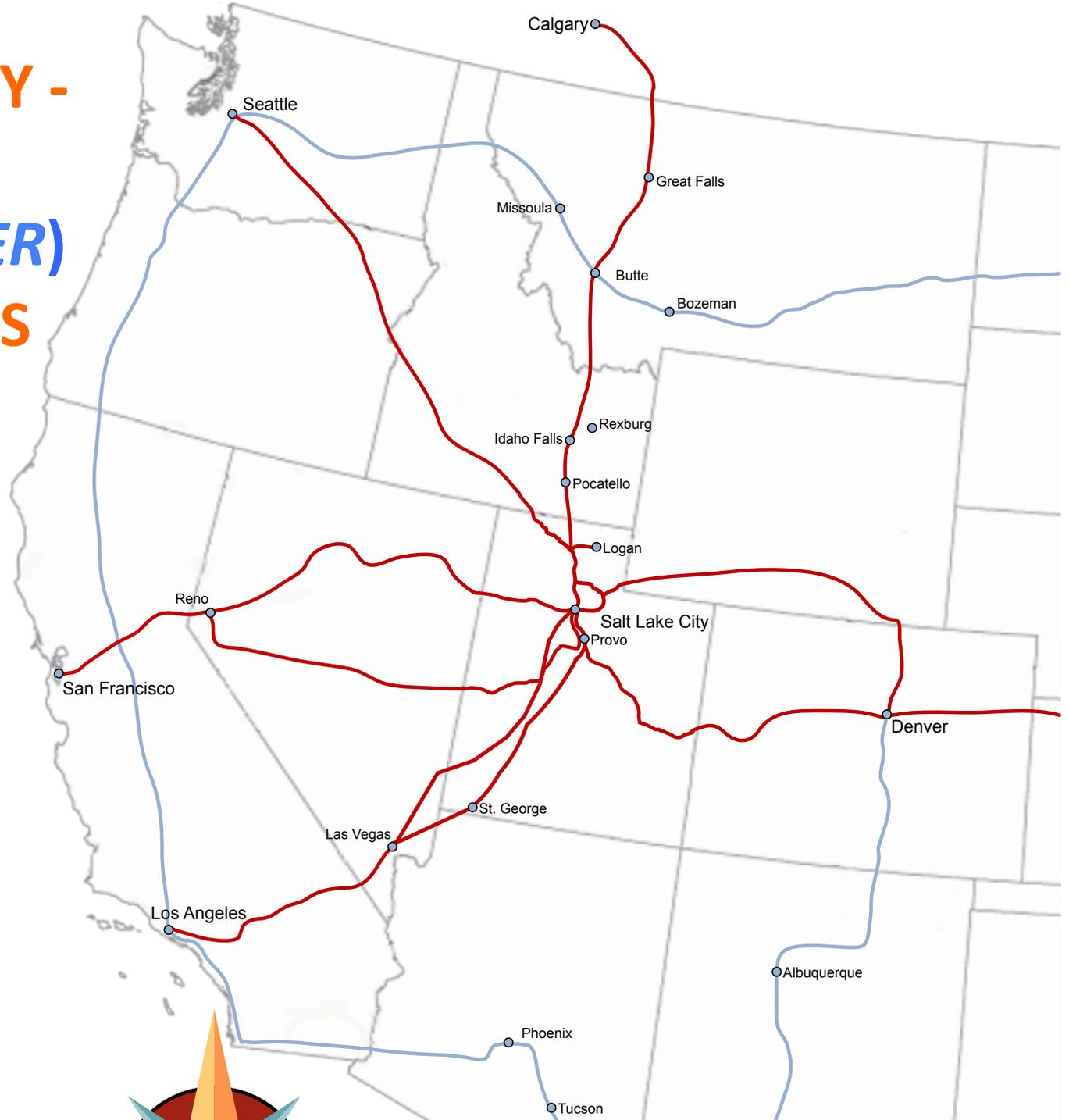
# Utah Field Station Network



Rio Mesa Center, Dolores River (eastern Utah)



**SALT LAKE CITY -  
THE  
(OPTICAL FIBER)  
CROSSROADS  
OF THE  
WEST**



# Regional Optical Network Development in Utah



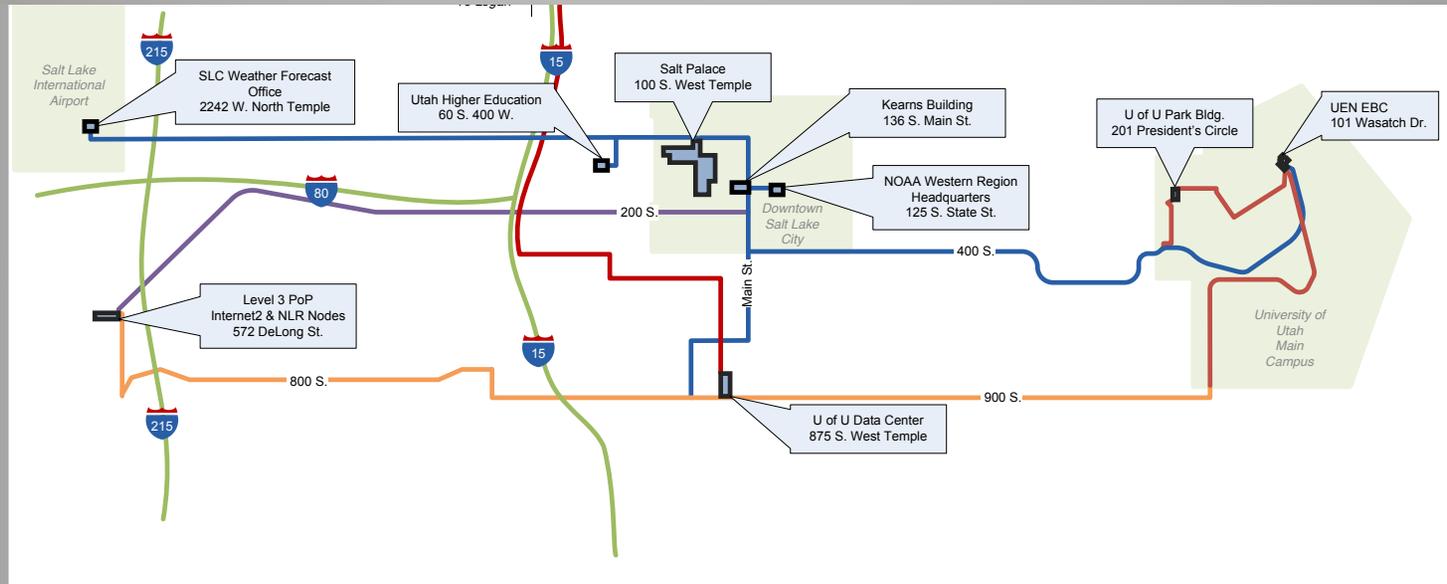
- Collaboration of Utah Education Network (UEN) and University of Utah
  - Leverage UEN operational capability & statewide reach
- Motivations
  - New University off-campus data center in downtown SLC
  - Reach national R&E networks (Internet2, ESnet, N-Wave) at SLC Level 3 PoP at 100 Gbps
  - Enhanced interconnectivity among 3 research universities in Utah – BYU, USU, and UofU
  - Network research leadership at Utah – Emulab/protoGENI
  - Computational science/visualization leadership at Utah - SCI Institute
  - **Connect federal R&D partners: NOAA/NWS, USFS RSAC**

# Regional Optical Network Development in Utah - II



- Leverage public sector partner assets (fiber & conduit) wherever possible
  - UDOT (highway RoW)
  - Utah Transit Authority (UTA/TRAX light rail)
- Work with wholesale oriented carriers (e.g., Zayo, Syringa)
- Leverage federal stimulus funding
  - NSF EPSCoR RII Cyber Connectivity award - \$1.18M (S. Corbató, U of Uah)
  - NTIA BTOP Round 1 award - \$13.4M (M. Petersen/ D. Sampson, UEN)

# Salt Lake City metro optical network



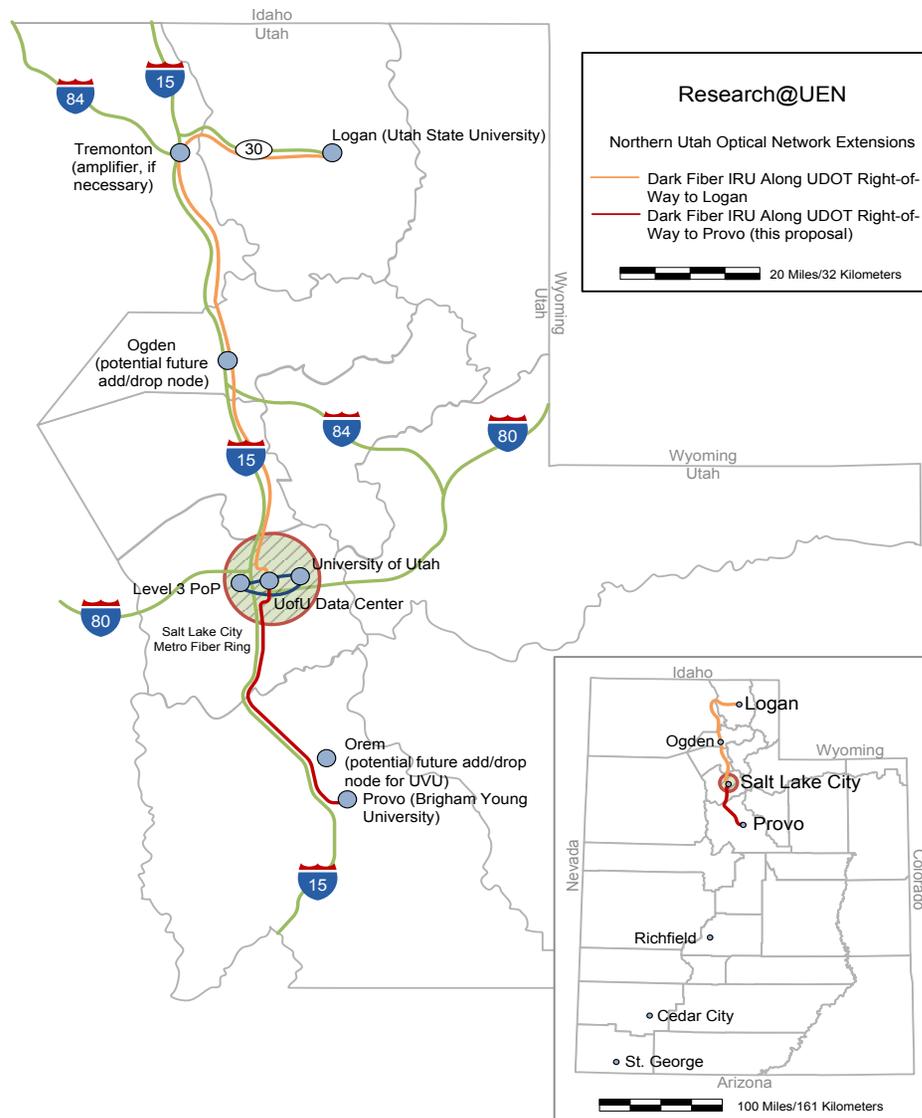
**Research@UEN: Salt Lake City Metro Optical Network**

- U of U Campus Fiber —
- UTA Light Rail Routes (proposed) —
- CENIC/LLC Fiber IRU (through AFS) —
- AFS Fiber IRU (proposed) —
- Northern Utah Extension (proposed) —

1 Mile

Carrier proprietary information included

# Extensions for USU and BYU



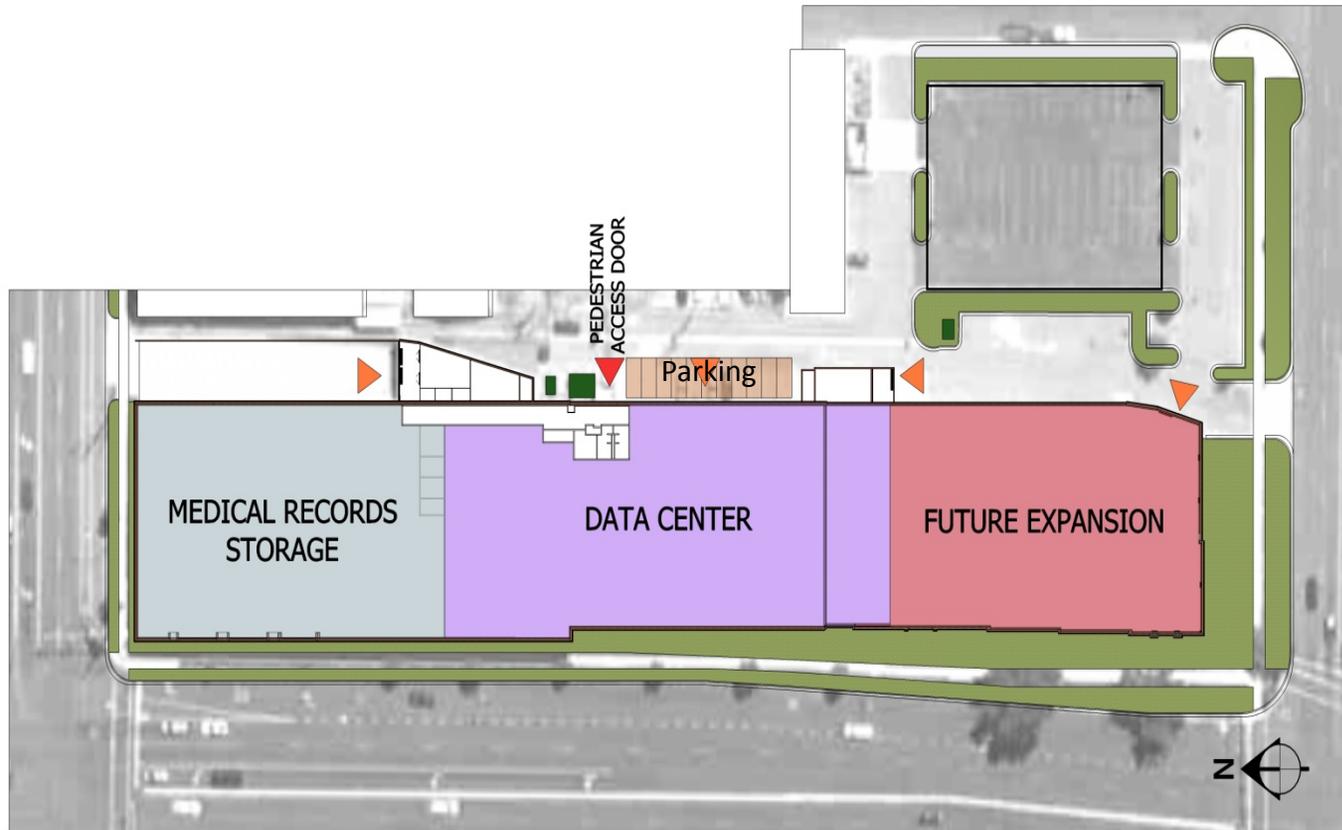
# New off-campus data center



- 74,000+ sq ft<sup>2</sup> former industrial building south of downtown SLC (~4 miles off-campus)
- Designing for enterprise & HPC/CI (1.15 MW)
- Co-location by research groups & partners
- Low industrial electric power rates in Utah
- Energy efficient design (low PUE)
- Readiness: early 1Q 2012







# Utah/Idaho/Montana collaboration for Internet2 connectivity – 2010-2011



- Colorado
  - Northrop Grumman Information Technology (Lafayette)
- Idaho
  - Idaho Regional Optical Network (IRON) [[Internet2 SEGP](#)]
    - [DOE Idaho National Laboratory \(INL – Idaho Falls\)](#)
    - Idaho State University
    - Boise State University
    - University of Idaho
    - Brigham Young University - Idaho
- Montana
  - University of Montana
  - [USDA Forest Service Fire Research Labs \(Missoula\)](#)
- Utah
  - Brigham Young University
  - University of Utah
  - Utah Education Network [[Internet2 SEGP](#)]
  - Utah State University
- Connectivity
  - 2x10G IP to Internet2 (UofU/SLC and UM/Missoula->Seattle)
  - 10G wavelengths: Boise-SLC and Denver-SLC

# Intermountain Crossroads: I-15 North Project



Missoula: U. of Montana, Fire  
Research Labs (USFS)

Hamilton MT: Rocky Mountain Labs  
(NIH)

Helena MT: MT State Gov't,  
Northern Tier Network

Butte MT: NTN, Montana Tech

Dillon MT: U Montana-Western

Rexburg ID: BYU-Idaho, IRON  
Idaho Falls ID: Idaho Nat'l Lab,  
ESnet, IRON

Pocatello ID: Idaho State U.

Tremonton UT: Utah State U.  
(add/drop for Logan)

Ogden UT: Weber State U.,  
Hill AFB

Salt Lake City UT: U of Utah,  
UEN, UT State Gov't

Internet2 & ESnet nodes

# Questions?



- Steve Corbató
  - [steve.corbato@utah.edu](mailto:steve.corbato@utah.edu)
  - 801-585-9464