

5. Overview of DTC Status and Annual Operating Plan

WRF Executive Oversight Board Meeting 2
30 July 2004

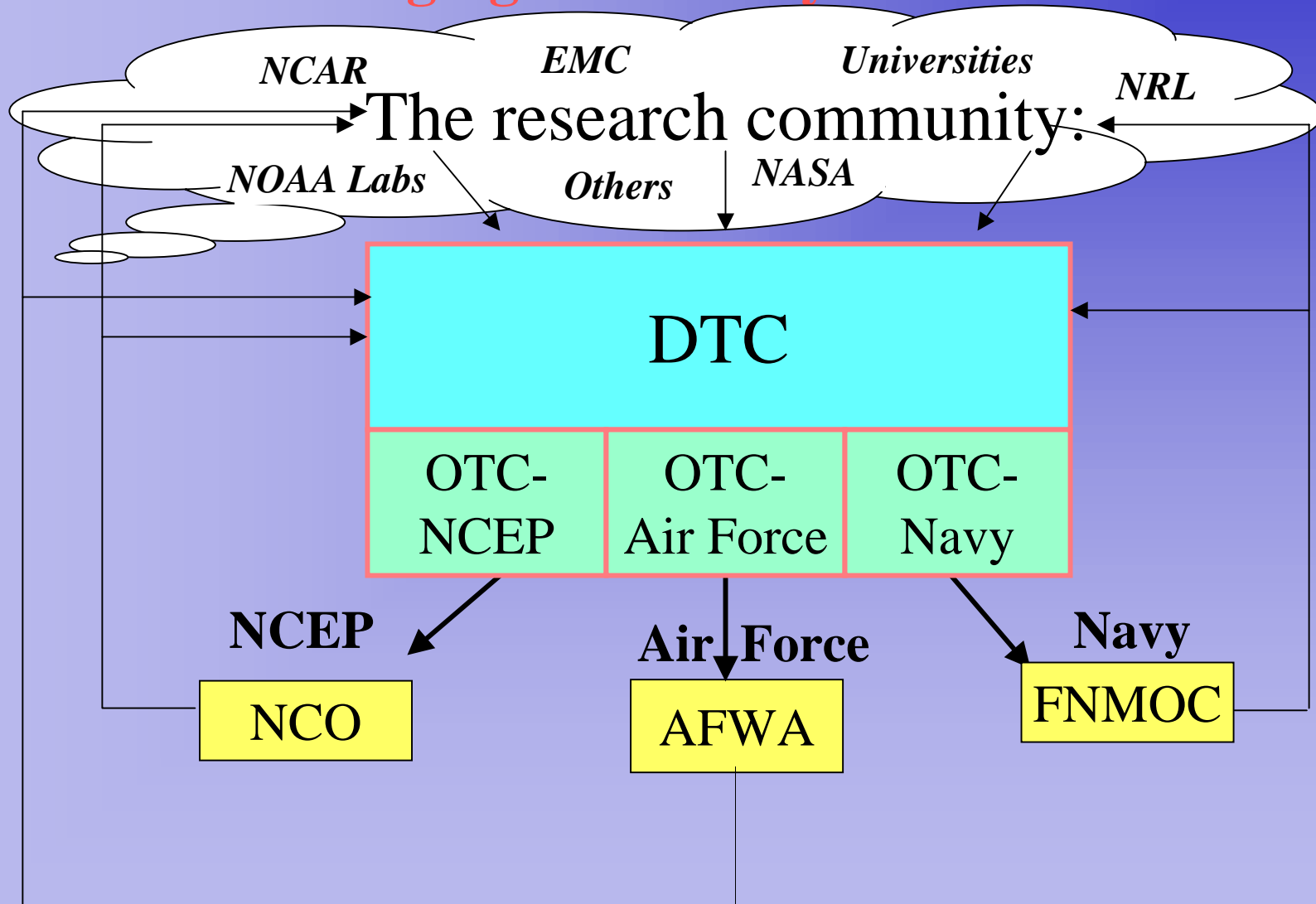
Vision

The DTC will be a facility where the NWP communities interact to **accelerate testing and evaluation of new models and techniques for research applications and operational implementation**, in a way that doesn't interfere with current operations

Why Do We Need a DTC?

- Currently in the US the transfer of new NWP science and technology from research into operations is inefficient.
 - Primarily conducted at the operational centers and/or their associated research organizations
 - It does not take advantage of the considerable talent elsewhere in the research community
- Presently the research and operations NWP communities have insufficient opportunities to collaborate in an operations-like environment.
- There is nowhere that these communities can join to perform extensive rigorous model testing using a common model and operational data stream without disrupting operations.

The Flow of Science from Research to Operations in the WRF Era: Bridging the “Valley of Death”



Goals

- Link Research and Operational Communities
- Speed transition of research results into operations
- Accelerate improvement in weather forecasts
- Develop and test promising new NWP techniques
- Provide an opportunity for NWP community to perform cycled or real-time tests of model and data assimilation systems

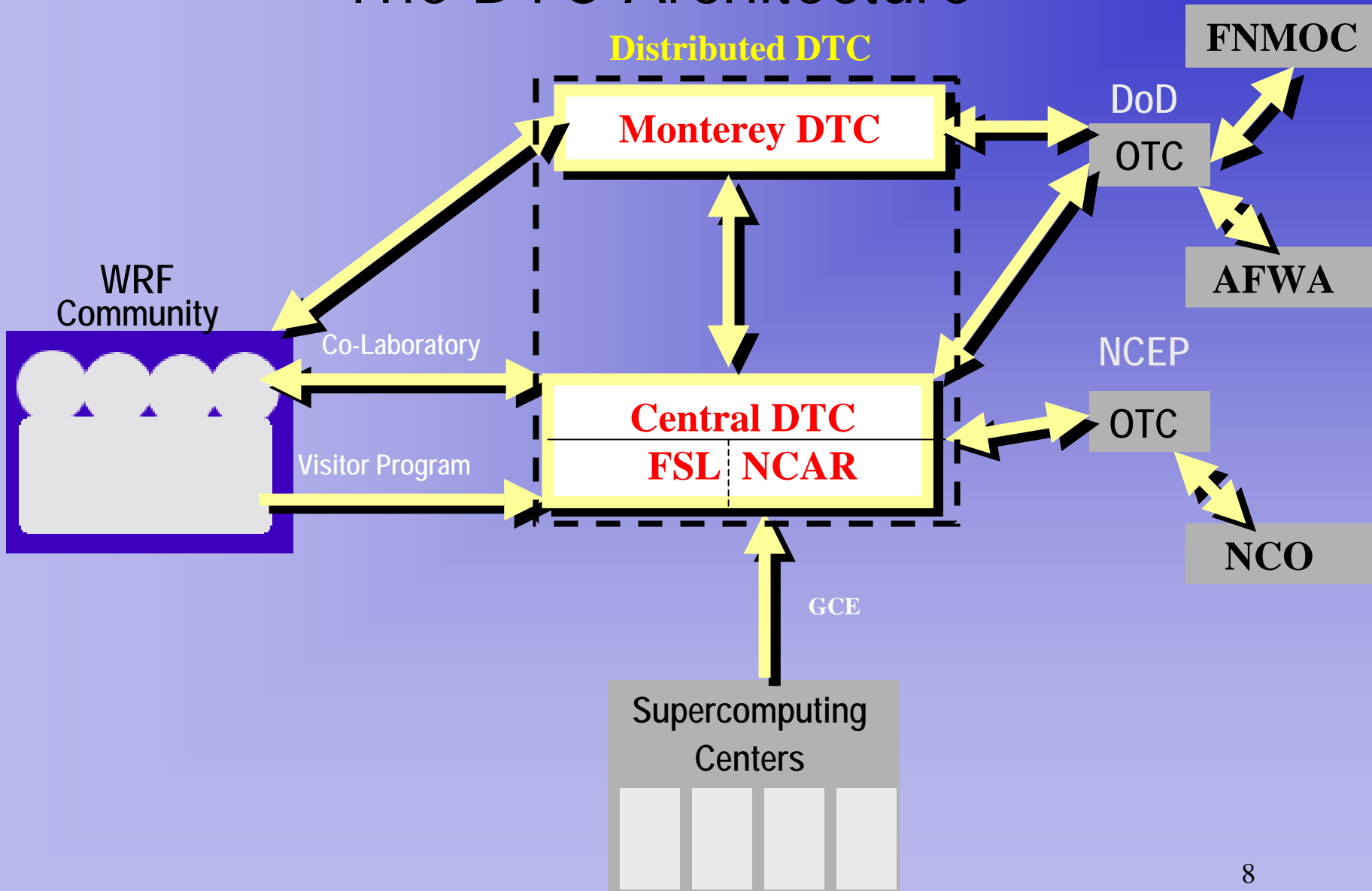
Basic Structure of the DTC

- The physical center will be located in Boulder. Components at NCAR and FSL. This will be referred to as the Central DTC
- Components will be distributed at other locations
 - NRL (NRL DTC)
 - Other??

Structure of a Distributed Component

- Similar to the Central DTC
 - A director of the distributed component
 - A clearly defined staff who reports to that director (with a significant fraction of their time dedicated to the DTC)
 - A budget
- The directors of the distributed components would form an executive committee that would guide DTC activities and coordinate among the various components
- Members of a component would make extended visits to other components
- These ideas will be part of a Terms of Reference that is under development

The DTC Architecture

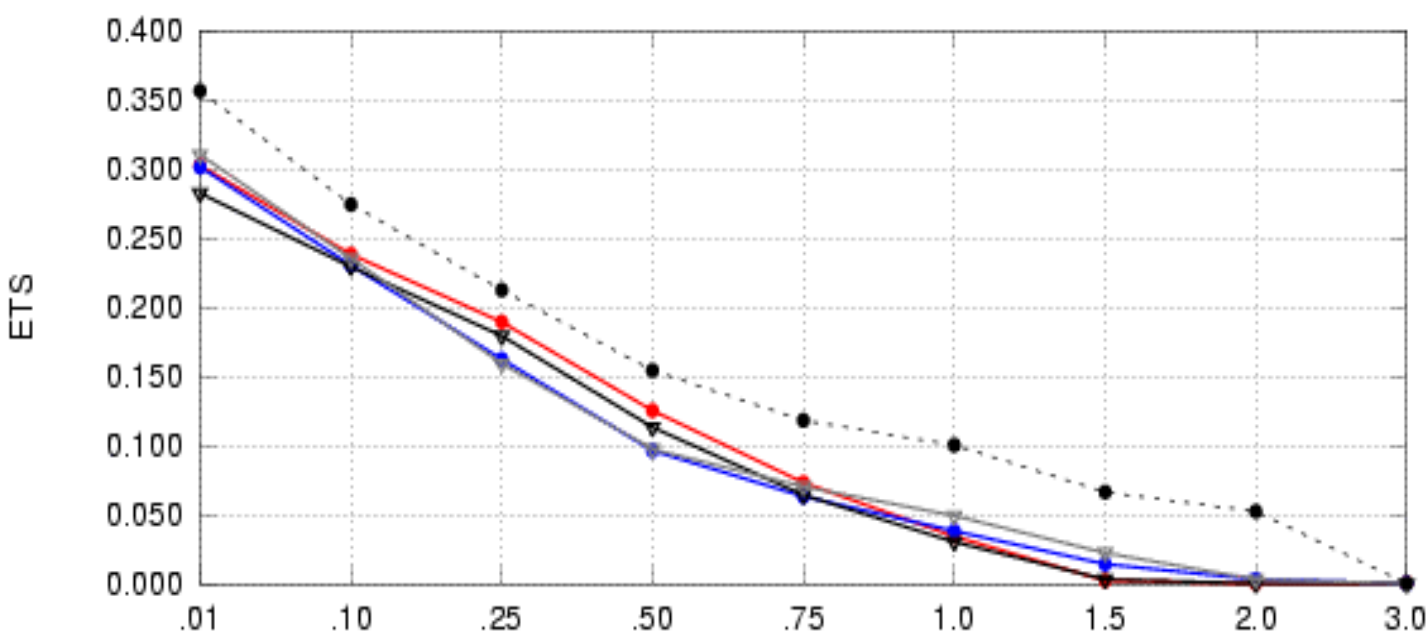
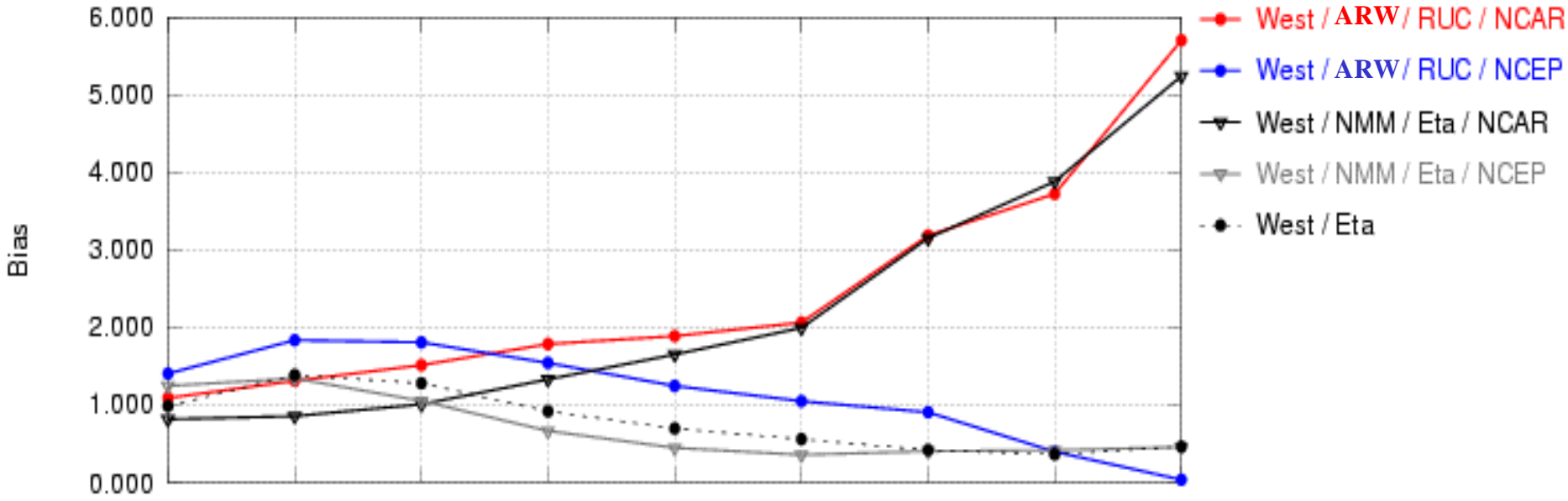


Accomplishments FY03-04

- Strengthened working relationship between DTC partners (NCEP, AFWA, FSL, NCAR)
 - A good working relationship within the Central DTC (FSL and NCAR) established
- Completed the basic WRF Reference Code, including NMM, and EM cores, NCEP Post and Verification codes, ported all codes to FSL and transferred them to NCAR, NCEP, AFWA and NAVO computers
- WRF EM core implemented at NCEP for real-time predictions
- Completed WRF Test Plan
 - Critical for NCEP IOC of WRF in FY04
 - Began evaluating results—presented at the WRF workshop in June

Precipitation (Daily) Forecast Hour=24 August 1 - 31, 2002

Nobs = 223146 83921 36074 13310 6415 3219 744 241 33



Accomplishments FY03-04

- Began providing WRF code to the community (EM core, NMM will be available in version 2.x, Fall?)
- Real-time cloud resolving experiment over Midwest (May-July)
- First ensemble WRF application developed (in support of predicting winter road conditions for NHWA)
- First use of WRF in an operational forecast environment with displays on AWIPS (at the Jacksonville WFO)

Accomplishments FY03-04

- Began visitor program
- Obtained considerable computing resources from NCAR, FSL and NAVO
- Completed the Implementation Plan
 - Input from WRF partners
 - Plan will likely evolve over time

FY04 Goals

- Establish the DTC as a functioning entity
- Examine questions raised in FY03 testing
 - Optimal configuration of mesoscale ensembles
 - Optimal physics packages for WRF
 - Develop verification infrastructure
 - Impact of number and distribution of vertical levels in the two cores
- Begin a visitor program

FY04 Visitor program

- Bill Gallus and Isidora Jankov (Iowa State University)
 - Sensitivity of WRF warm season forecasts to changes in physics, dynamic core and grid resolution
 - Verification techniques
 - Fastest version of WRF that still allows convection resolving resolution (grid spacing, physics time-step, fastest physics)
- Dave Dempsey (San Francisco State University)
 - Investigate optimal model physics for WRF (cloud microphysics, precipitation, and boundary layer)
 - Develop and test additions to the WRF physics
- Ying Lin (NCEP)
 - Develop a “Relaxed Threat Score” and other verification techniques.

FY05 Annual Plan

- Conduct a Hi-Res real-time forecast experiment over the Conus, focus on East
 - Extensive involvement of Eastern Region Forecasters
 - Nov-March
- Determine configuration of WRF to that can be run at cloud resolving resolutions in the High Resolution Domains
 - Fall and Winter
- Optimal configuration of Ensemble for the High Resolution windows
 - Fall and Winter

FY05 Annual Plan

- Continue visitor program
 - An additional visitor this calendar year?
 - Announcement of opportunity for next year (Fall)
- Begin making NMM core available to the community
 - Offer has been made to add an associate scientist to the DTC. This will be his/her primary responsibility
- Convene the first Advisory Panel meeting (Fall or Winter)
- Complete a DTC Terms of Reference (Fall)

The Long Term Plan

Phased Implementation Strategy

- Phase 1

(FY03-FY05) Implement a minimal Central DTC

- Limited Staff at NCAR and FSL
- Emphasis on a visitor program
- Conduct tests similar to those currently underway
 - Will include a series of real-time experiments with forecaster participation (Hi Res large domain, corresponding ensemble)
- Develop the distributed computing resource
 - Portal development?
- Develop and implement the distributed DTC concept

The Long Term Plan

Phased Implementation Strategy

- Phase 2

FY06-FY07 Fully Functional DTC

- Gradual ramp-up to full staff
- Entire WRF model maintained for and made available to the community
- Transparent use of the distributed computing resources
- Full and competitive visitor program
- DTC fully responsive to the the WRF Research Applications and Operational Requirements Boards

- Phase 3

FY08-FY09 Unified Modeling in the DTC

- Ocean Modeling, Global modeling...

Current staffing in the Central DTC

- NCAR
 - Director (Gall .75 FTE)
 - Project Scientist (Nance, 1.0 FTE)
 - Associate Scientist (Offer made 7/21/04, 1.0 FTE)
 - Total (2.75 FTE)
- FSL
 - Deputy Director (Koch, .2 FTE)
 - Project Scientist Contractor (Bernadette, .5 FTE)
 - Software porting/development (Harrop, Hart, Tierney, 1.1 FTE)
 - Scientific Programmers (Loughe+Middlecoff, .7 FTE)
 - Total (2.5 FTE—1.75 contributed from FSL)

FY 04 Funding (Central DTC)

- NCAR
 - \$250K (current actual \$160K)*
 - Computer Resources (\$480K, \$200K special request)*
 - Space Allocation (\$90K)*
- NOAA OAR
 - \$350K*
 - 1.75 FTE reassigned NOAA positions (\$400K)*
 - Computer Resources (IJET \$500K)*
- NOAA NWS
 - \$300K (current actual \$100k)*
- Total from all sources not including computer resources
 - \$1.4M (current actual \$1.1M)*

Eventual Annual Budget for the Central DTC

- Visitor Program \$1.0 M
- 13 FTE technical staff \$2.9 M
(Including staff at FSL)
- Other personnel 3 FTE (Admin, Director) \$0.7 M
- Enhancement to computing,
networking and storage \$0.6 M
- Space \$0.2 M
- Travel and other \$0.1 M

- Total \$5.5 M₂₁

END