

The Network Designs Census 2000 Communicator



NDI Awarded Census 2000 Decennial Network Project

ADNOC Grand Opening

Come to the Grand Opening of the Auxiliary Decennial Network Operations Center in support of Census 2000 Project.

We are proud of our accomplishment and wish to thank the Bureau of the Census for its support of small, women-owned business.

**November 15, 1999
10 AM to 3 PM
Refreshments Served**

In 1999, the Bureau of the Census (BOC) Decennial Systems Contract Management Office (DSCMO) awarded Network Designs, Inc. (NDI) the Decennial Network Operations Center (DNOC) project through GSA Schedule GS-35F-4707H.

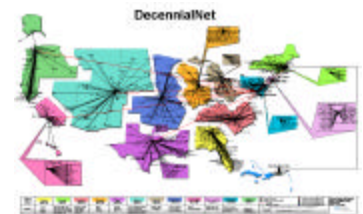
Early in the project, DSCMO Project Manager, Mr. Ed Cormier, determined that the only way to manage the diverse Decennial Net was to build and operate the DNOC in-house. Toward that end, Network Designs, Inc., a *women-owned, small business*, has worked with the DSCMO to plan, develop, implement, staff, and maintain the DNOC for Census 2000.

The DNOC project, designed by NDI in collaboration with the DSCMO, is envisioned to ensure

- (1) network reliability;
- (2) uniform accessibility; and
- (3) efficient network monitoring and maintenance of the decennial network.

The BOC Decennial Net is a frame-relay based network using AT&T FTS2000 circuits. These 128 Kbps circuits—running from Local Census Offices (LCOs) to Regional Census Centers (RCCs)—comprise additional burst capacities to 256 Kbps. T1 lines provisioned at 1024K link the RCCs to the core routers in the Bowie Census Center (BCC), Bowie, MD.

The BCC, in turn, is connected to the BOC campus in Suitland, MD, and the Census Data Center (CDC) in Jeffersonville, IN, via asynchronous transfer mode (ATM) links. The entire



Census 2000 Decennial Network Diagram

network is monitored from the DNOC in the Beta Center in Suitland, MD.

Presently, Network Designs is monitoring the Decennial Net infrastructure, which includes—(1) over 1200 Cisco Systems routers and switches; (2) 900 servers; (3) and approximately 10,000 desktop computers in the Beta Center, RCC, LCO, DCC and ACERO offices.

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Baselining the Network, Upgrading the Routed Infrastructure

To effectively respond to the DSCMO goals for the Decennial Net, Network Designs and the DSCMO changed the routing protocol from NLSP to EIGRP. NDI implemented this change and configured all routers throughout the BOC and Decennial Net at a standard IOS version.

After performing network modeling and simulation testing, NDI and DSCMO determined that higher speed circuits were needed to support the overall bandwidth and data requirements of the Decennial Net (LCO to RCC). The Configuration Control Board approved upgrading

the Decennial Net infrastructure from a 128 Kbps to a 256 Kbps network, with additional burst capacities to 512 Kbps.

Currently, Network Designs is working with AT&T to upgrade the network for all 520 LCOs as well as Puerto Rico.

Reducing Router Adjacency for Network Reliability

Network Designs completed the upgrade of the RCC routed infrastructure in mid-July, 1999. The reduction of router adjacency was implemented so that no single router would support (route) more than 15 to 20 adjacent neighbors over serial (frame relay) links.

The project was effectively completed by a project "team" comprising DSCMO, TCO, and NDI technical personnel who traveled to the RCCs to perform the installations. "This project demonstrated how the entire Decennial team worked together to accomplish a major

planned objective," said Mr. Cormier, BOC DSCMO Project Manager.

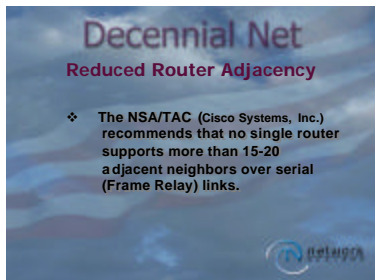
NDI coordinated all dates and times for the RCC router upgrades through the Decennial Operations Technical Support office (DOTS).

Upgrading the RCC routed infrastructure involved the following steps:

- Adding one to three new routers
- Adding or changing existing LAN switch technology

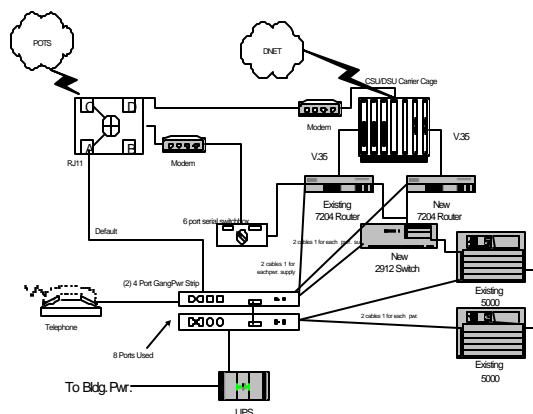
- Providing remote management of Telco equipment
- Ensuring out-of-band management of routers, switches, and CSU/DSUs
- Installing and testing on-site parameter upgrades

Once all hardware moves were completed and site-specific configurations were verified, the on-site team tested out-of-band management and remote management capability.



Network Designs Provides Out-of-Band Management for RCCs and LCOs to Meet Decennial Net Project Goals

A dial-up modem and ancillary switching and cabling components are being installed in each RCC and LCO to allow the DNOC to dial in and monitor Decennial Net components in case of loss of normal network connectivity. Out-of-band management functions allow DNOC personnel to dial in to RCC Decennial Net components and perform all DNOC procedures, such as troubleshooting network outages.



Collaboration Critical to Advance Router Installs

Network Designs developed an Advance Router Deployment Plan (ARDP) to ensure that a working, reliable telecommunications infrastructure is in place before the deployment of LCO routers region-wide.

The ARDP considers the operations and procedures of the following project players: the Bureau of Census, Census

2000 Project Management Office (DCSMO); the Decennial Network Operations Center (DNOC) – Network Designs, Inc. (NDI); the AT&T FTS installation contractor – NetcommSolutions International (NSI), subcontractor to NDI; and the LCO integration contractors – Unisys and Compucomm.

NDI's Advance Router Deployment Plan covers logistical

issues; points of receipt; installation procedures; problem resolution procedures; return-of-materials procedures; and a clarification of responsibilities among the key players.

NDI has been collaborating and will continue to work closely with NSI to complete the successful implementation of this plan.



Cisco 7204 Router (PLRCCRTR01)

Census CustomerNet: Featuring Online Network Diagrams

Network Designs has established the *Census CustomerNet* intranet site to provide project management information that is essential to the aggressive rollout of the Census 2000 IT plan in each of its phases:

- Phase 1:* Test and implementation of DNOC
- Phase 2:* Evaluation, validation, and verification of DNOC operations procedures
- Phase 3:* Ongoing DNOC operations support during Census
- Phase 4:* System turn-down: post-Census network analysis

Apart from providing key contacts, technical, and scheduling information, this site features

online network diagrams—using netViz network documentation software—and pictorial training aids for the Census 2000 Auto-techs. netViz provides a variety of tools for examining and manipulating data embedded in graphic object. Designed to support visualization and depiction of large or complex systems, our online network diagramming approach permits systems to be decomposed into subsystems that are much easier to create, view, understand, modify, and manage.

The *Census CustomerNet* currently maintains diagram-



Visit www.netdes.com/census for up-to-date information.

ming information on RCC upgrades, the Decennial Net, and ACERO. Visit www.netdes.com/census to view project status.



Introducing NDI's *Census 2000 Communicator*

This newsletter has been developed especially for you, our valued client. Our goals are to communicate our accomplishments, elaborate on technology developments, and identify the topics that are of concern to you. We hope that you, in turn, can use this newsletter to showcase your successes to internal and external audiences.

Network Designs, a small, women-owned business, is committed to providing superior IT services to you in person, online, and through written media. We strive to be your interface with technology. To view this newsletter online, visit www.netdes.com/census/newsletter. Enter or request your user name and password to gain access to this secure site.

Newsletter Contents

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February 2000

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13 <i>Bowie Redundancy and Reconfiguration completion.</i>	14	15	16	17	18	19 <i>Out-of-Band Management Completion</i>
20	21	22	23 <i>Data Capture Center Full Load test</i>	24	25	26
27	28	29				

ADNOC Project Schedule—This Month in Review

- **February 13:** Bowie Redundancy and Reconfiguration completion
- **February 19:** Out-Of-Band Management completion
- **February 23-25:** Data Capture Center Full Load test

ADNOC First-Level Monitoring: All Day, Every Day

To ensure the maximum reliability and efficiency of the Decennial Net, Network Designs has established an Auxiliary Decennial Network Operations Center (ADNOC). "The ADNOC is one more element in our plan to provide complete network reliability and integrity," said Mr. Cormier,

DSCMO Project Manager.

The ADNOC, located at the corporate office of Network Designs—501 Church Street, Vienna, Virginia—is staffed by trained network monitoring personnel to support the DNOC outside of its regular hours of operation. Since the ADNOC mirrors all current DNOC Decennial Net operations, the auxiliary facility will perform disaster recovery in the event of loss of DNOC Decennial Net monitoring capability from the Beta Center, Building 2, Suitland, MD. Should the DNOC facility go down, the ADNOC will provide all DNOC functionality and be brought online within two hours of the failure.

The ADNOC will minimize the effects of network outages occurring outside of the hours of operation of the DNOC. In addition, the Decennial Net monitoring functions of the ADNOC will be transparent to all Decennial Net users.

The existence of the ADNOC ensures that all Decennial Net operational organizations have a call center available 7 days a week, 24 hours a day. As a first-level monitoring facility, the ADNOC will field calls from DOTs, RCCs, DCCs, BCC, and LCOs. All reported problems will be prioritized then resolved or escalated for prompt consideration and response.



ADNOC Functionality and Capability

The ADNOC has full, frame-relay access to the Decennial Net via AT&T's FTS wide area network (WAN) and appears to the network as a pier Decennial Net node. Network Designs also has installed and integrated a SUN Ultra10 workstation to ensure DNOCS1 system integrity and to provide full DNOCS1 server-to-ADNOC server redundancy.

At the conclusion of Phase II system implementation, all DNOCS1-ADNOC procedures were documented and added to the DNOCS1 Standard Operating

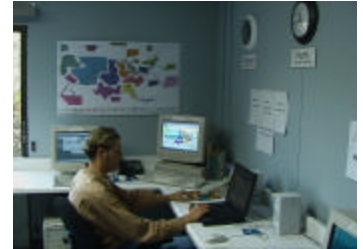
Procedures (SOP) manual.

The ADNOC will ensure complete DNOCS1 capability and functionality, including connectivity and access to all managed Decennial Net components using—

- Telnet and Cisco Command Line Interface (CLI)
- HPOV Interactive Session (X-Window) with DNOCS1 Access to/from DOTS
- Remedy Trouble Reporting System.

The ADNOC will provide—

- Independent Decennial Net monitoring and management functions, in case of loss of DNOCS1
- Efficient telephone communication procedures to ensure the orderly transition of incoming DNOCS1 telephone calls to incoming ADNOC telephone calls
- BOC cc:Mail for report generation and distribution
- Out-of-band management of Decennial Net components



Census Decennial 2000 ADNOC Facility

Design Change for Puerto Rico Connections to Decennial Net

The original design of the Puerto Rico Area Office (PRAO) Decennial Net infrastructure detailed connecting 9 LCOs directly to the Boston RCC via frame relay. Since AT&T does not offer frame relay services in Puerto Rico, the only telecommunications option available to the BOC was installing dedicated digital service (DDS) direct T1 lines in each of the Puerto Rico LCOs to the PRAO.

A Cisco Model 7206 router was installed to support the total

number of DDS circuits. Moreover, to support the total number of T1 lines allotted for the PRAO, an additional T1 was supplied from the PRAO to the Boston RCC.

The change to the PRAO telecommunications infrastructure required 11 DDS circuits terminated at the PRAO router. The circuits consist of 1 full T1 (ACERO) and 10 fractional T1 (256K), for a total bandwidth of 3MB.

Under the design of the initial network infrastructure, the data would have been throttled through a single T1 (1024MB) to the Boston RCC, causing a data throughput mismatch and a potential over subscription of the T1 link to the Boston RCC.

The PRAO-to-Boston links are now operational and the Puerto Rico LCOs are slated for completion by mid-October, 1999.

Planning the Puerto Rico Area Office (PRAO) Network Infrastructure Change With DDS Direct T1s

Mitigating Risks to RCCs—Designs Prepared

In its continued effort to provide a mission critical network, DSCMO has developed a RCC Disaster Recovery and Contingency Planning Initiative.

The RCC Disaster Recovery and Contingency Planning Initiative calls for a method of rerouting all LCO connections from any RCC to the Beta Center in the

event of catastrophic loss of an RCC facility.

All LCO frame-relay circuits will have dormant circuits—provisioned within the AT&T frame relay network—which can be activated in the event of a catastrophic loss of the RCC. Five T1 circuits will be installed in the Beta Center to replicate the frame-relay circuit

requirements of LCOs to RCCs.

NDI is configuring and testing the routers in the Beta Center, which will be activated should a disaster occur.

Currently, the NDI DNOCS1 engineering staff is developing 12 discrete configuration scenarios to help mitigate the risks to RCCs.





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