THE NAVY COMMON DATA LINK

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The NCDL In Operation ...

**Ground Control System**

- Target Controllers
- COTS Ethernet Switch
- Ethernet Cable
- Omni-Directional Antenna
  - NCDL Ground RF Unit
- Coaxial Cable

**Navy Common Data Link (NCDL)**

- NCDL Relay
  - Up to 150 Miles
- NCDL Transponder
  - Up to 230 Miles
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The NCDL is an upgrade to a previously fielded design for the System for Naval Control (SNTC)

- The NCDL is at Technology Readiness Level 6
- Equipment qualification tests will begin in October 2013
  - Environmental Tests per MIL-STD-810F (temp, altitude, etc.)
  - EMI Tests per MIL-STD-461G
- All NCDL engineering drawings and manufacturing data are controlled by the Navy
• These 5 Design Specifications define the NCDL
• Over 200 pages of detailed performance requirements
NCDL Transponder

- 25 watts of transmit power, -96 dBm receive sensitivity
- 28 VDC or 12 VDC operation (MIL-STD-704F)
- Frequency, Address, and LOC Timeout set by users
NCDL Ground RF Unit

- 25 watts of transmit power, -96 dBm receive sensitivity
- Internal GPS provides precision datalink timing
- Power: 100 - 240 VAC, 50/60 Hz
NCDL Relay

- 50 watts of transmit power, -99 dBm receive sensitivity
- Uses 28 VDC MIL-STD-704F aircraft power
- Frequency & Address set by users prior to mission
- Internal GPS provides Relay position to Ground Control System
NCDL Test Set

- Tests NCDL Relays and Transponders
- Supports factory level ATP testing and Go/No Go testing
- Laptop software runs on Windows 7® operating system
- Complies with Navy’s Information Assurance (IA) requirements
Low Cost Omnidirectional Antennas

Tower Mounted
GRFU Antenna

Target Antenna

Relay Antenna
Features & Benefits ...

• Enhanced system performance
  • Transfers 16 times more data than the legacy SNTC datalink

• Fewer equipment requirements
  • Controls up to 8 aerial targets per GRFU or Relay
  • Cuts equipment requirements by a factor of 4

• Primary User Status in UHF Band
  • Users of this band are military only
  • Simplifies frequency coordination at each test range
  • DD Form 1494 Stage 1 approved by NTIA

• Transponders can operate with or without GPS
  • TSPI provided by MEMS INS on Navy’s new SSAT target
  • Other targets fitted with low cost OEM GPS receivers
Features & Benefits ...

• Eight frequency channels are available
  • Support for very complex mission profiles
  • Example: 4 GRFUs can control up to 32 aerial targets or up to 64 land targets simultaneously
  • Separate operations can be performed in the same local area

• Extensive Recording Capabilities
  • Removable SD cards
  • Transponders, GRFUs, and Relays record every RF message that is transmitted or received
  • Transponders record all Serial Bus messages that are transmitted or received from the target autopilot
  • All recorded messages are time stamped with 1 millisecond accuracy
Features & Benefits ...

• Reduced susceptibility to interference and multipathing
  • Operating frequencies can be changed during a mission to counteract the effects of interference and multipathing

• Improved datalink reliability
  • Forward Error Correction (FEC) detects data errors and corrects them in real time
  • 24-Bit Cyclic Redundancy Check (CRC) ensures no remaining data errors will get to the target

• Increased Flexibility
  • Uplink and downlink message content is defined by the target requirements, not the datalink (i.e., open architecture)
  • User-defined message data and user-defined message lengths
    • Uplink and downlink messages can be up to 255 bytes long
Features & Benefits ...

• Transponders provide multiple serial buses to interface with current and future targets
  • CAN, RS-232, RS-485 and ITCS
• Transponders have built-in capability to operate in dual-transponder systems
  • “CTS Enable” signal input provided
• Transponders can become Relays at any time during a mission (Target Relay Mode)
• Transponders, Relays and GRFUs all report the RF Signal Strength of each message they receive
The Navy Common Data Link

“Any Target, Anywhere”