



'Cable-to-the-Sky'

Two-Way Telemetry Adaptive Control and Communications

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Grand Canyon Telemetry Initial Research Focus

- Sand Bars
- Mass Balance
- Sediment Surrogate
Monitoring Technologies



Instruments



ISCO 6712 Pump Sampler



Sequoia LISST devices



YSI 6920
Sonde

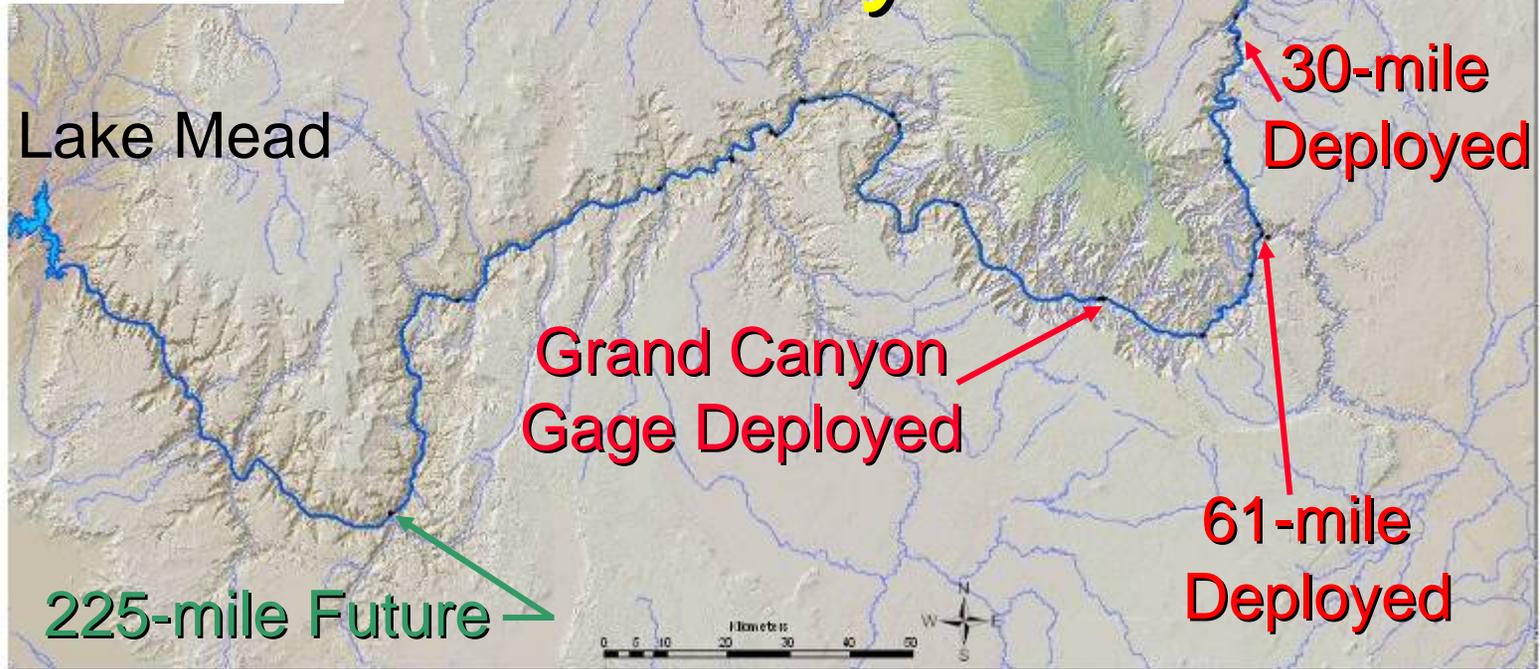


Nortek EZQ





Two-Way Telemetry Sites



Concept

- Virtual presence at remote sites
- Automated download of scientific monitoring instruments
- Relay data back to Agency for analysis



Design

Cost

Power

Adaptive



Current Deployments

- Desktop Control And Data Retrieval
- Temperature and Voltage Logging
- Automated FTP of RTU logs



Future Deployments and Remote Upgrades



- Daily simultaneous instrument downloads
- FTP to USGS servers - Ingest into Oracle
- Web access to data / analyses / models

Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP

Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:08:17
 Send: 62 KB
 Receive: 391 KB

Remote Control

SatControl

AddTime 10:00 22:17 Rug Cmds waiting in Que displaycurrents Turn Off PC/Modem Exit

05/12/2005 10:17:34 12.6 89.7 102.9 100.9 311.7

SatControl 2004-NOV-09 21:57 ver 1.08 Battery Voltage RTU PC Box Modem Box Ambient

RUG3 2004-NOV-09-Satellite01

atomic.bat

TOOLS.EXE X-CTU

My Documents Shortcut to gcmrc satcontrol.exe System r3setupD VNC Viewer My Computer My Network Places Internet Explorer Recycle Bin

Start SatControl 10:17 AM



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- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP
 Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:05:50
 Send: 50 KB
 Receive: 231 KB

Remote Control

SatControl

AddTime 10:00 24:57 Rug Cmds waiting in Que

05/12/2005 10:14:54

SatControl 2004-NOV-09 21:57 ver 1.08

RUG3 2004-NOV-09-Satellite01

TTTOOLS.EXE X-CTU

lisstCom3 - HyperTerminal

```

Next Sample in 630 seconds
Next Sample in 625 seconds
Next Sample in 620 seconds
Next Sample in 615 seconds
Next Sample in 610 seconds
Next Sample in 605 seconds
Next Sample in 600 seconds
Next Sample in 595 seconds
Next Sample in 590 seconds
Next Sample in 585 seconds
Next Sample in 580 seconds
Next Sample in 575 seconds
Next Sample in 570 seconds
Next Sample in 565 seconds
Next Sample in 560 seconds
Next Sample in 555 seconds
Next Sample in 550 seconds
Next Sample in 545 seconds
Next Sample in 540 seconds
Next Sample in 535 seconds
Next Sample in 530 seconds
Next Sample in 525 seconds
Next Sample in 520 seconds

```

Connected 0:04:06 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture

lisstCom4 - HyperTerminal

```

Time to next sample = 80 seconds. Next sample is #1533
Time to next sample = 70 seconds. Next sample is #1533
Time to next sample = 60 seconds. Next sample is #1533
Time to next sample = 50 seconds. Next sample is #1533
Time to next sample = 40 seconds. Next sample is #1533
Time to next sample = 30 seconds. Next sample is #1533
Time to next sample = 20 seconds. Next sample is #1533
Time to next sample = 10 seconds. Next sample is #1533
Acquiring Average 100 of 1000
Acquiring Average 200 of 1000
Acquiring Average 300 of 1000
Acquiring Average 400 of 1000
Acquiring Average 500 of 1000
Acquiring Average 600 of 1000
Acquiring Average 700 of 1000
Acquiring Average 800 of 1000
Acquiring Average 900 of 1000
Acquiring Average 1000 of 1000
Sample #1534 of 250000      179.221      2.990      0.010      14.503      8.034
000
Time to next sample = 790 seconds. Next sample is #1534
Time to next sample = 780 seconds. Next sample is #1534
Time to next sample = 770 seconds. Next sample is #1534

```

Connected 0:04:07 Auto detect 19200 8-N-1 SCROLL CAPS NUM Cap



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP
 Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:09:56
 Send: 76 KB
 Receive: 478 KB

Remote Control

COM PORTS 61-mile.txt lisstCom3.ht lisstCom4.ht EasyQ EcoWatch isco07.ht isco08.ht atomic.bat

SatControl

AddTime 10:00 **20:36** **Rug Cmds waiting in Que** **displaycurrents** Turn Off PC/Modem Exit

05/12/2005 10:19:23 **12.6** **90.9** **103.2** **101.9** **311.7**

SatControl 2004-NOV-09 21:57 ver 1.08 Battery Voltage RTU PC-Box Modem Box Ambient

RUG3 2004-NOV-09-Satellite01

isco07 - HyperTerminal

File Edit View Call Transfer Help

```

?
*** Model 6712 HW Rev: A0 SW Rev: 2.21.0000 ID 3687507004
> ?
> menu
<S>STATUS - Get current status information
<S>SCREEN <D>UMP - View 6712's display
<S>PAUSE - Enter the MANUAL PAUSE menu if running a program
<5> DISABLE - Disables a currently running program
<6> ENABLE - Enables a program previously DISABLEd
CONTROL - Get control of 6712's keypad
<Q>uit - Exit MENU
    
```

Connected 0:00:36 Auto detect 19200 8-N-1 SCROLL CAPS NUM Capture Print echo

My Documents Shortcuts to Second drive System Taskbar View viewer My Computer My Network Internet Recycle Bin

gcmrc Places Explorer

Start SatControl isco07 - HyperTerminal 10:19 AM



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP
 Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:10:39
 Send: 84 KB
 Receive: 500 KB

Remote Control

COM PORTS 61-mile.txt lisstCom3.ht lisstCom4.ht EasyQ EcoWatch isco07.ht isco08.ht atomic.bat

SatControl

AddTime 10:00 **19:59** Rug Cnds waiting in Que displaycurrents Turn Off PC/ Modem Exit

05/12/2005 10:19:53 **12.6** **90.7** **103.4** **102.2** **311.7**

SatControl 2004-NOV-09 21:57 ver 1.08 Battery Voltage RTU PC Box Modem Box Ambient

RUG3 2004-NOV-09-Satellite01

isco07 - HyperTerminal

File Edit View Call Transfer Help

```

<6>, ENABLE - Enables a program previously DISABLED
CONTROL - Get control of 6712's keypad
<Q>uit - Exit MENU

> st
Sampler Status: Program Running (PUMP TUBE WARNING)
Program Status: 0 samples in bottle ? (Disabled: pin F)

RAIN: 0.00 in

<ST>ATUS - Get current status information
<S>CREEN<D>UMP - View 6712's display
<P>AUSE - Enter the MANUAL PAUSE menu if running a program
<5>,DISABLE - Disables a currently running program
<6>, ENABLE - Enables a program previously DISABLED
CONTROL - Get control of 6712's keypad
<Q>uit - Exit MENU
  
```

Connected 0:01:13 Auto detect 19200 8-N-1 SCROLL CAPS NUM Capture Print echo



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP
 Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:15:56
 Send: 130 KB
 Receive: 679 KB

Remote Control

COM PORTS
61-mile.txt

lisstCom3.ht lisstCom4.ht EasyQ EcoWatch isco07.ht isco08.ht atomic.bat

SatControl

AddTime 10:00 **14:38** *Rug Cms waiting in Que* **displaycurrents** Turn Off PC/ Modem Exit

05/12/2005 10:25:13 **12.7** **93.5** **104.3** **103.0** **311.7**

SatControl 2004-NOV-09 21:57 ver 1.08 Battery Voltage RTU PC Box Modem Box Ambient

RUG3 2004-NOV-09-Satellite01

isco08 - HyperTerminal

File Edit View Call Transfer Help

```

<1>. RUN1 - Runs extended program 1 if currently at standby
<2>. RUN2 - Runs extended program 2 if currently at standby
<3>. RUN3 - Runs extended program 3 if currently at standby
<4>. RUN4 - Runs extended program 4 if currently at standby
CONTROL - Get control of 6712's keypad
<Q>uit - Exit MENU

> control
< STOP_PROGRAM
RESUME PROGRAM
GRAB SAMPLE >
Exiting CONTROL mode.

<ST>ATUS - Get current status information
<S>CREEN,<D>UMP - View 6712's display
<5>.DISABLE - Disables a currently running program
<6>.ENABLE - Enables a program previously DISABLED
CONTROL - Get control of 6712's keypad
<Q>uit - Exit MENU

> _
    
```

Connected 0:03:22 Auto detect 19200 8-N-1 SCROLL CAPS NUM Capture

My Documents Network Places Internet Explorer Recycle Bin

Start SatControl isco08 - HyperTerminal 10:25 AM

Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

- 60MILE_SAT02**
- 148.65.72.30
- TCP/IP
- Encryption Level: None
- Windows XP
- Connected
- Time of Session: 00:22:25
- Send: 202 KB
- Receive: 935 KB

Remote Control

EcoWatch - [Sonde - COM6]

File View Comm Real-time Appl Window Help

Date m/d/y	Time hh:mm:ss	Temp C	SpCond uS/cm	Battery volts
05/12/2005	06:00:07	10.83	909	11.3
05/12/2005	06:15:07	10.82	909	11.3
05/12/2005	06:30:07	10.81	909	11.4
05/12/2005	06:45:07	10.80	909	11.3
05/12/2005	07:00:07	10.79	910	11.3
05/12/2005	07:15:07	10.78	910	11.4
05/12/2005	07:30:07	10.76	911	11.3
05/12/2005	07:45:07	10.75	911	11.4
05/12/2005	08:00:07	10.74	911	11.4
05/12/2005	08:15:08	10.73	912	11.3
05/12/2005	08:00:07	10.74	911	11.4
05/12/2005	08:15:08	10.73	912	11.3
05/12/2005	08:45:07	10.72	913	11.3
05/12/2005	09:00:07	10.74	914	11.4
05/12/2005	09:15:08	10.76	914	11.3
05/12/2005	10:15:08	10.81	915	11.3

For Help, press F1

Start SatControl EcoWatch - [Sonde - ...] 10:31 AM



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP

Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:26:16
 Send: 232 KB
 Receive: 1135 KB

Remote Control

```

C:\>w32tm /resync /rediscover
Sending resync command to local computer...
  
```

My Documents Shortcut to gcmrc satcontrol.exe System r3setupD VNC Viewer My Computer My Network Places Internet Explorer Recycle Bin

Start SatControl atomic.bat 10:35 AM



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

- 60MILE_SAT02**
- 148.65.72.30
- TCP/IP
- Encryption Level: None
- Windows XP
- Connected
- Time of Session: 00:18:38
- Send: 165 KB
- Receive: 795 KB

Remote Control

COM PORTS 61-mile.txt lisstCom3.ht lisstCom4.ht EasyQ EcoWatch isco07.ht isco08.ht atomic.bat

SatControl

AddTime 10:00 **12:04** Turn Off PC/Modem Exit

05/12/2005 10:27:53 **12.7** **94.3** **104.8** **103.9** **311.7**

SatControl 2004-NOV-09 21:57 ver 1.08 Battery Voltage RTI PC Box Modem Box Ambient

RUG3 2004-N

Automatic Updates

Choose updates to download

Update Title

- Windows Malicious Software Removal Tool - May 2005 (KB890830)

Details

Size: 473 KB

After the download, this tool runs once to check your computer for infection by specific, prevalent malicious software (including Blaster, Sasser, and Mydoom) and helps to remove any infection found. If an infection is found, the tool will display a status report the next time you start your computer. A new version of the tool will be offered every month. If you want to manually run the tool on your computer, you can download a copy from the Microsoft Download Center or run an online version from microsoft.com. This tool is not a replacement for an anti-virus product. To help protect your computer, you should use an anti-virus product.

[Change automatic updates settings](#) Download Cancel

Start SatControl EcoWatch Automatic Updates 10:27 AM



Session Manager

- Remote Control
- Remote Management
- File Transfer
- Command Queue
- Show Chat
- End Session

Remote Control

- Full Screen
- Screen Scaling
- View/Edit Online Options
- Transfer Clipboard
- Start/Stop Session Recording
- Save Current Screen
- Send Ctrl+Alt+Del
- Restart Host Computer

Details

60MILE_SAT02
 148.65.72.30
 TCP/IP

Encryption Level: None
 Windows XP
 Connected
 Time of Session: 00:27:14
 Send: 242 KB
 Receive: 1172 KB

Remote Control

COM PORTS 61-mile.txt lisstCom3.ht lisstCom4.ht EasyQ EcoWatch isco07.ht isco08.ht atomic.bat

SatControl

AddTime 10:00 **02:41**

05/12/2005 10:36:32

SatControl 2004-NOV-09 21:57 ver 1
 RUG3 2004-NOV-09-Satellite01

System Shutdown

This system is shutting down. Please save all work in progress and log off. Any unsaved changes will be lost. This shutdown was initiated by NT AUTHORITY\SYSTEM

Time before shutdown : 00:00:20

Message
 Sat Control shut down.

Exiting SatControl Exit

106.8 **311.7**

odem Box Ambient

My Documents Shortcut to gcmrc satcontrol.exe System r3setupD VNC Viewer My Computer My Network Places Internet Explorer Recycle Bin

Start SatControl System Shutdown 10:36 AM