Secure Access To Telemetry Data

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Overview

- Introductions
- Background & Objectives
- SRAS Overall Architecture
- SRAS Demonstration

Overview of Issues

- Distributed processing requirements are making closed networks more difficult
- NOAA Satellite Operations has found need to export three different types of data
  - Processed H&S telemetry for anomaly analysis
  - Exporting large files for various on-site external analysis using other tools
  - Exporting streams of raw data to other processing systems

Background

- Anomaly investigations need to have key people gaining quick access to the data
- The SOCC is a closed system and requires the people to come to the SOCC to receive the data
- NOAA/NESDIS has the responsibilities to correctly operate the nations weather satellite fleet
- SRAS is primarily a means of providing telemetry data to remote analysts so that spacecraft health and safety can be remotely monitored

Background (Continued)

- The External Analysis Transfer System uses the same one-way fiber technology as SRAS to allow automated transfer of files from the operations network to the administrative network.
- The streaming of data from the operations network to external processing networks is performed using UDP packets through a one-way fiber link.

SRAS Objectives

- Increase effectiveness of communication between off-site engineers and on-line operations crews during after hours anomaly identification
- Improve response time to identify spacecraft anomalies and begin corrective action
- Reduce number of instances where engineers must travel to SOCC during non-work hours

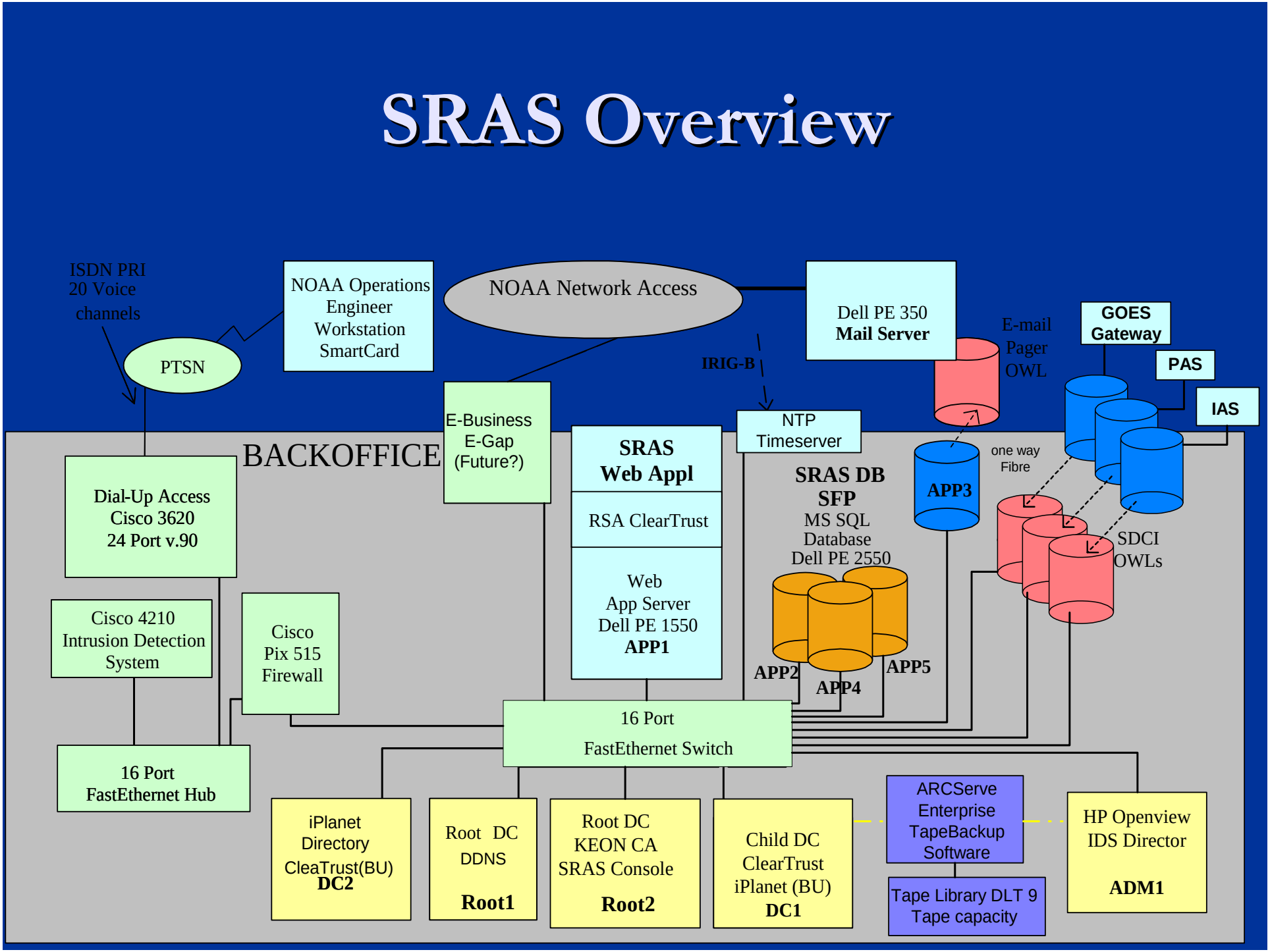
SRAS Objectives

- Increase the pool of experts who have rapid access to health and safety data
- Evaluate the utility of remote access to health and safety data to determine if this function should be included in future ground system architectures
- Evaluate the utility of PKI based security as an authentication mechanism for remote access systems

SRAS Overview

- Telemetry archive files are flowed through a one-way fiber link appliance to the SRAS network.
- Files are processed and stored in a database.
- User's are paged when user specified conditions exist in the inbound data.
- Remote user access using laptop or home pc:
  - Smart card authentication,
  - Dialup or internet,
  - Web access ,
  - Control of which data sets a specific user can see.

SRAS Overview



External Analysis Transfer System Objectives and Overview

- Transfer data to administrative LAN
- One-way fiber optic link allowing:
  - Users to push a file to a directory on the OPS LAN machine
  - Automatic transfer to the Admin LAN machine
  - Users can retrieve the file
  - File clean up automatically handled
  - Operator notification if files not being transferred.

Data Streaming Overview

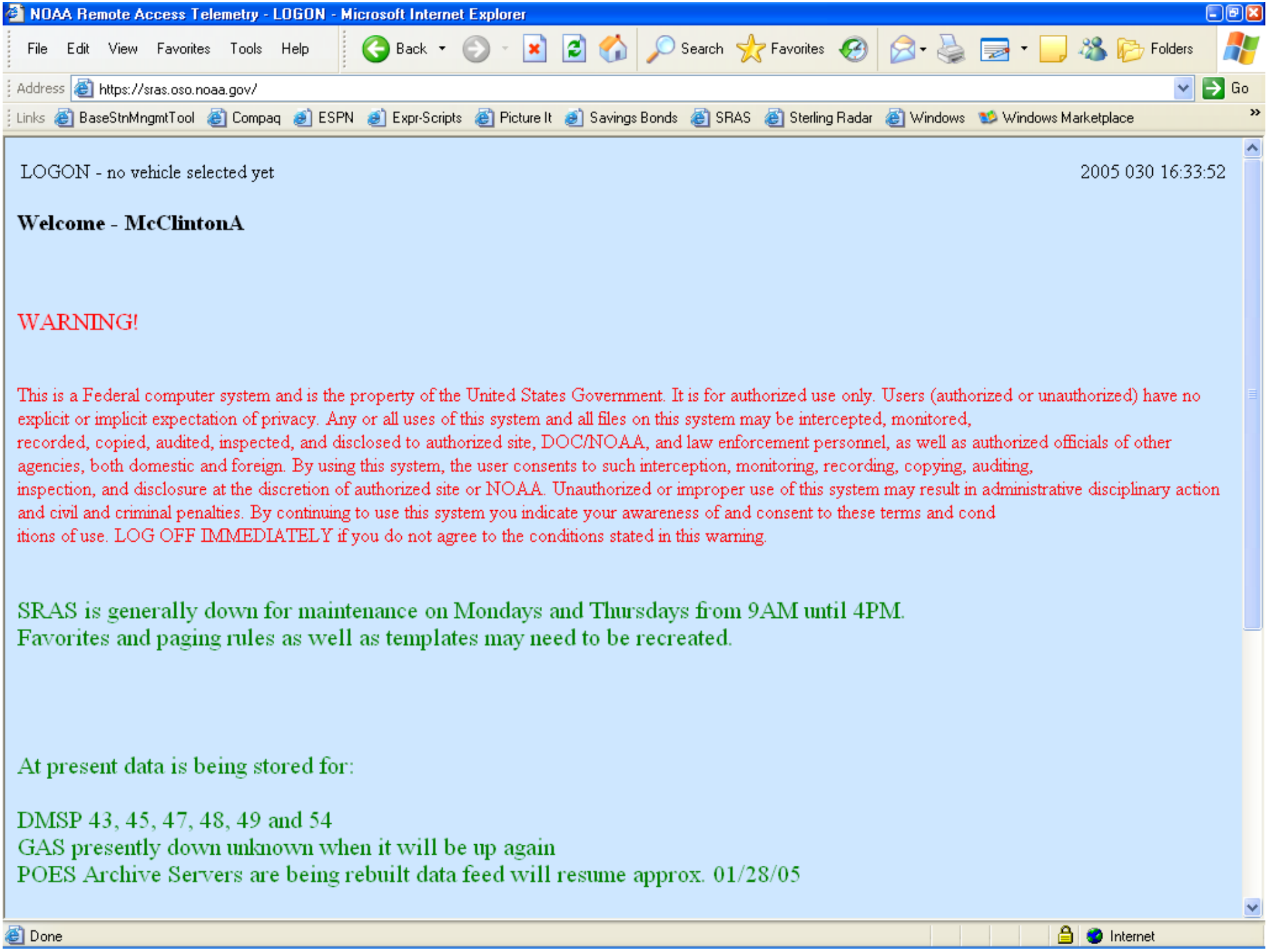
- Need to get real time telemetry streams to several external processing systems.
- Implemented using two different systems but they have very similar capabilities
  - TCP/IP socket set up to machine on OPS LAN
  - UDP or proprietary packet pushed through one-way fiber link to machine on foreign network
  - TCP/IP socket(s) set up from machine on foreign network to other machine(s) on that network.
- One solution was a certified commercial system the other was a home brew using a media converter and two Linux systems.

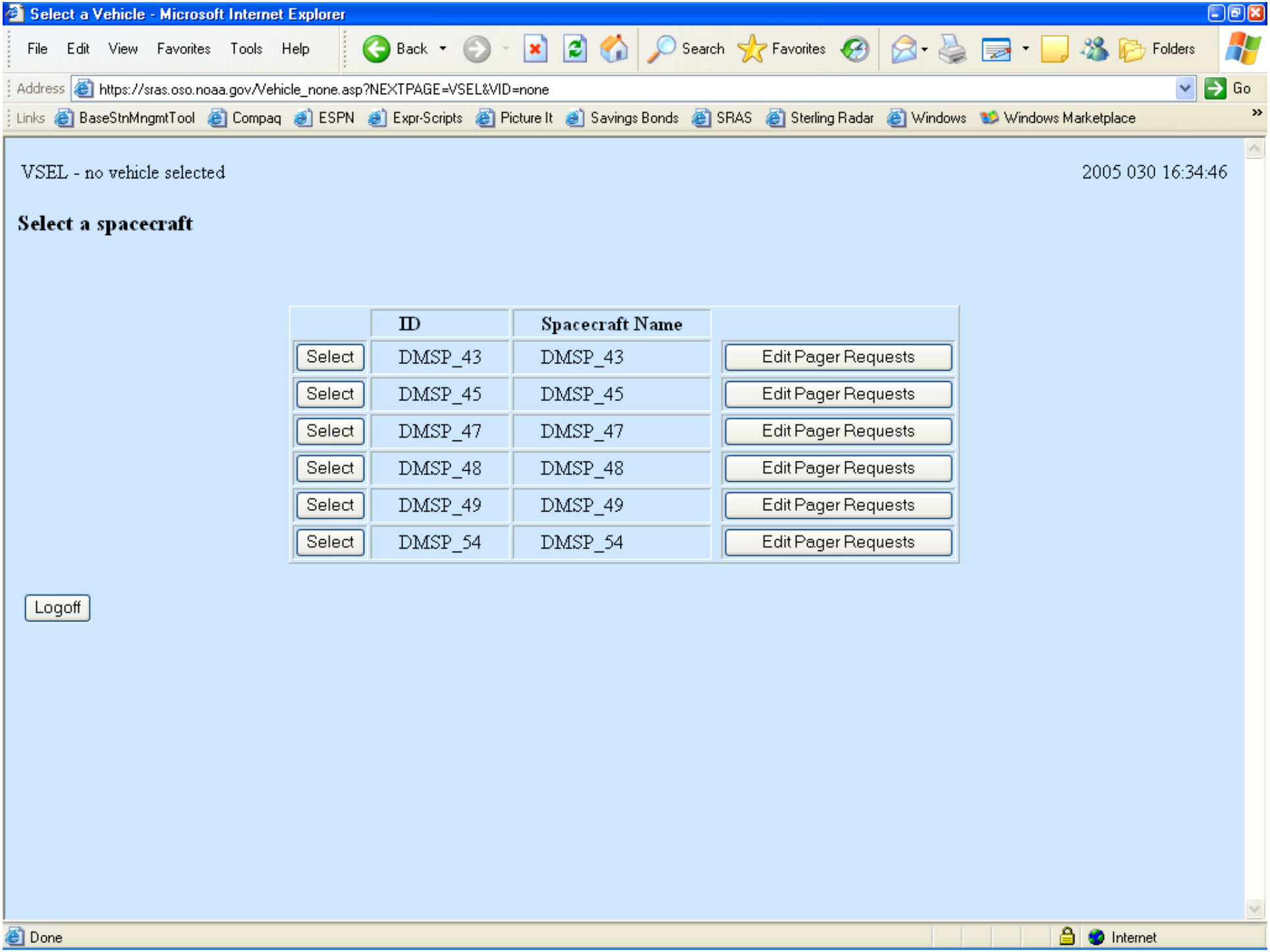
Conclusions

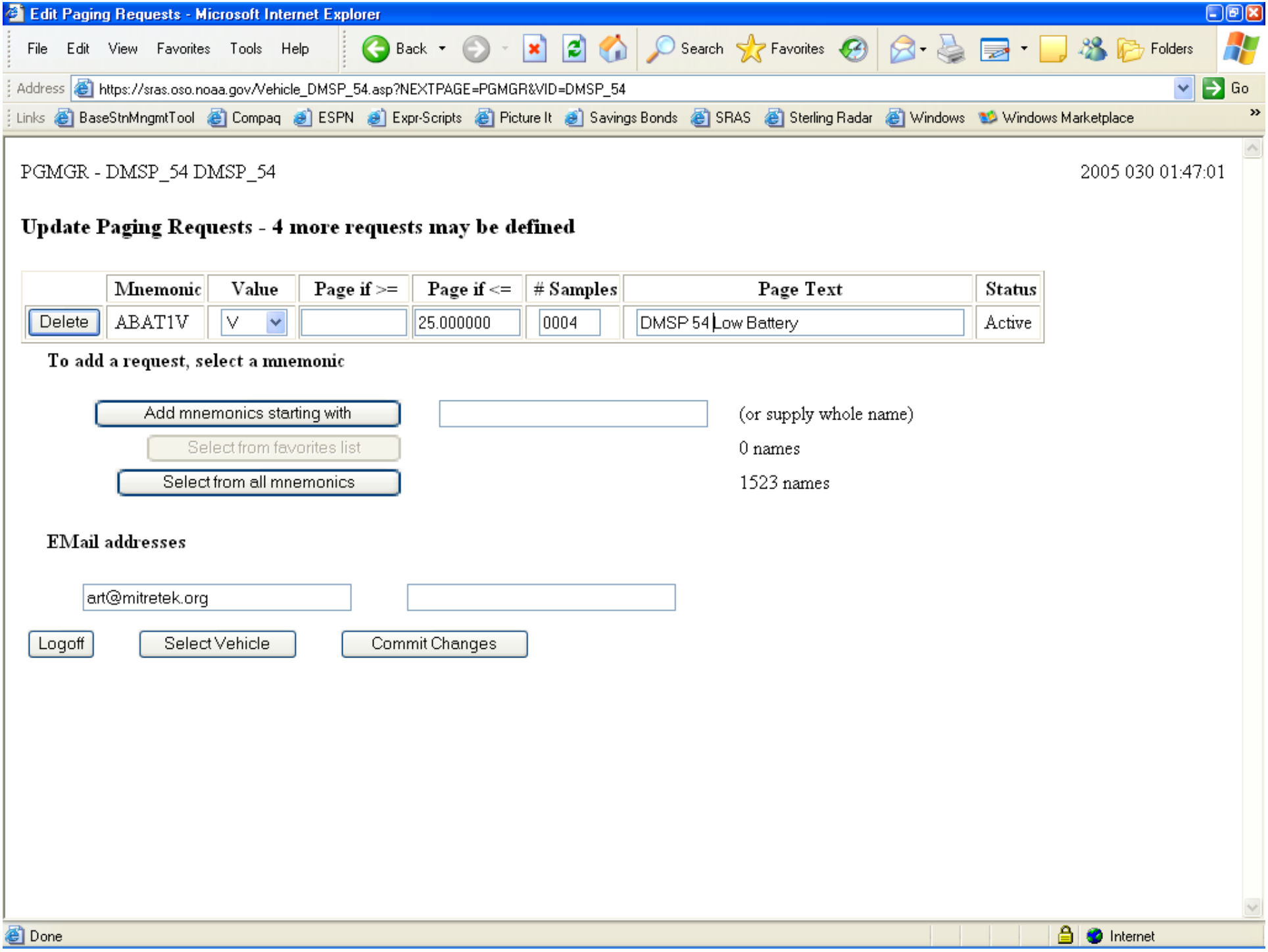
- The use of one-way fiber links provides an attractive way to export data without running the risks associated with Firewalls.

SRAS Demonstration

- Log in using smart card over Verizon EVDO link
- Extract data from current operational SC
- Following slides show capabilities for those not present to see live demo


NOAA Remote Access Telemetry - LOGON - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
LOGON - no vehicle selected yet
2005 030 16:33:52
Welcome - McClintonA
WARNING!
This is a Federal computer system and is the property of the United States Government. It is for authorized use only. Users (authorized or unauthorized) have no explicit or implicit expectation of privacy. Any or all uses of this system and all files on this system may be intercepted, monitored, recorded, copied, audited, inspected, and disclosed to authorized site, DOC/NOAA, and law enforcement personnel, as well as authorized officials of other agencies, both domestic and foreign. By using this system, the user consents to such interception, monitoring, recording, copying, auditing, inspection, and disclosure at the discretion of authorized site or NOAA. Unauthorized or improper use of this system may result in administrative disciplinary action and civil and criminal penalties. By continuing to use this system you indicate your awareness of and consent to these terms and cond itions of use. LOG OFF IMMEDIATELY if you do not agree to the conditions stated in this warning.
SRAS is generally down for maintenance on Mondays and Thursdays from 9AM until 4PM.
Favorites and paging rules as well as templates may need to be recreated.
At present data is being stored for:
DMSP 43, 45, 47, 48, 49 and 54
GAS presently down unknown when it will be up again
POES Archive Servers are being rebuilt data feed will resume approx. 01/28/05
Done
Internet


Select a Vehicle - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/Vehicle_none.asp?NEXTPAGE=VSEL&VID=none
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
VSEL - no vehicle selected
2005 030 16:34:46
Select a spacecraft
ID
Spacecraft Name
Select DMSP_43 DMSP_43 Edit Pager Requests
Select DMSP_45 DMSP_45 Edit Pager Requests
Select DMSP_47 DMSP_47 Edit Pager Requests
Select DMSP_48 DMSP_48 Edit Pager Requests
Select DMSP_49 DMSP_49 Edit Pager Requests
Select DMSP_54 DMSP_54 Edit Pager Requests
Logoff
Done
Internet


Edit Paging Requests - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
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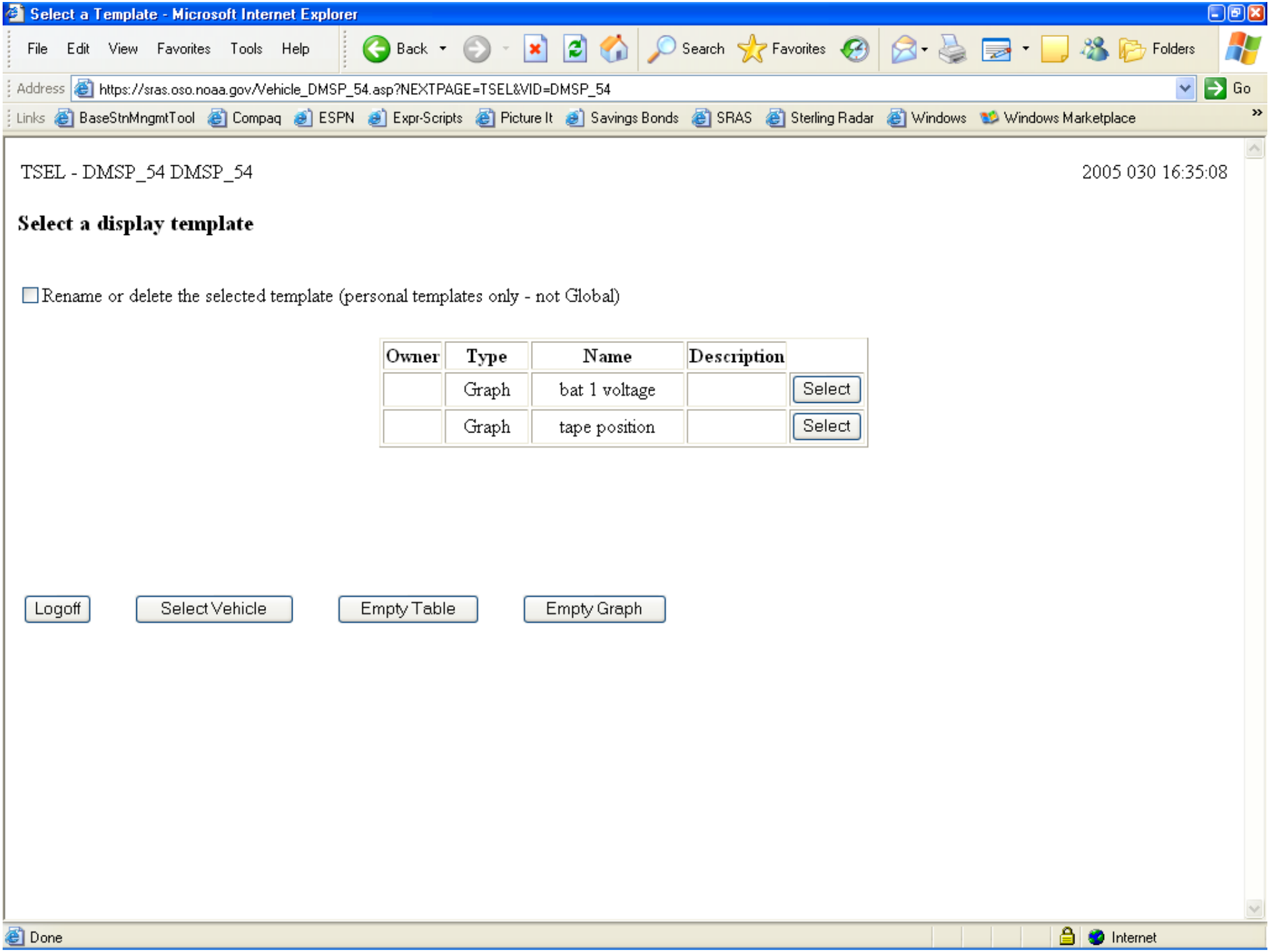
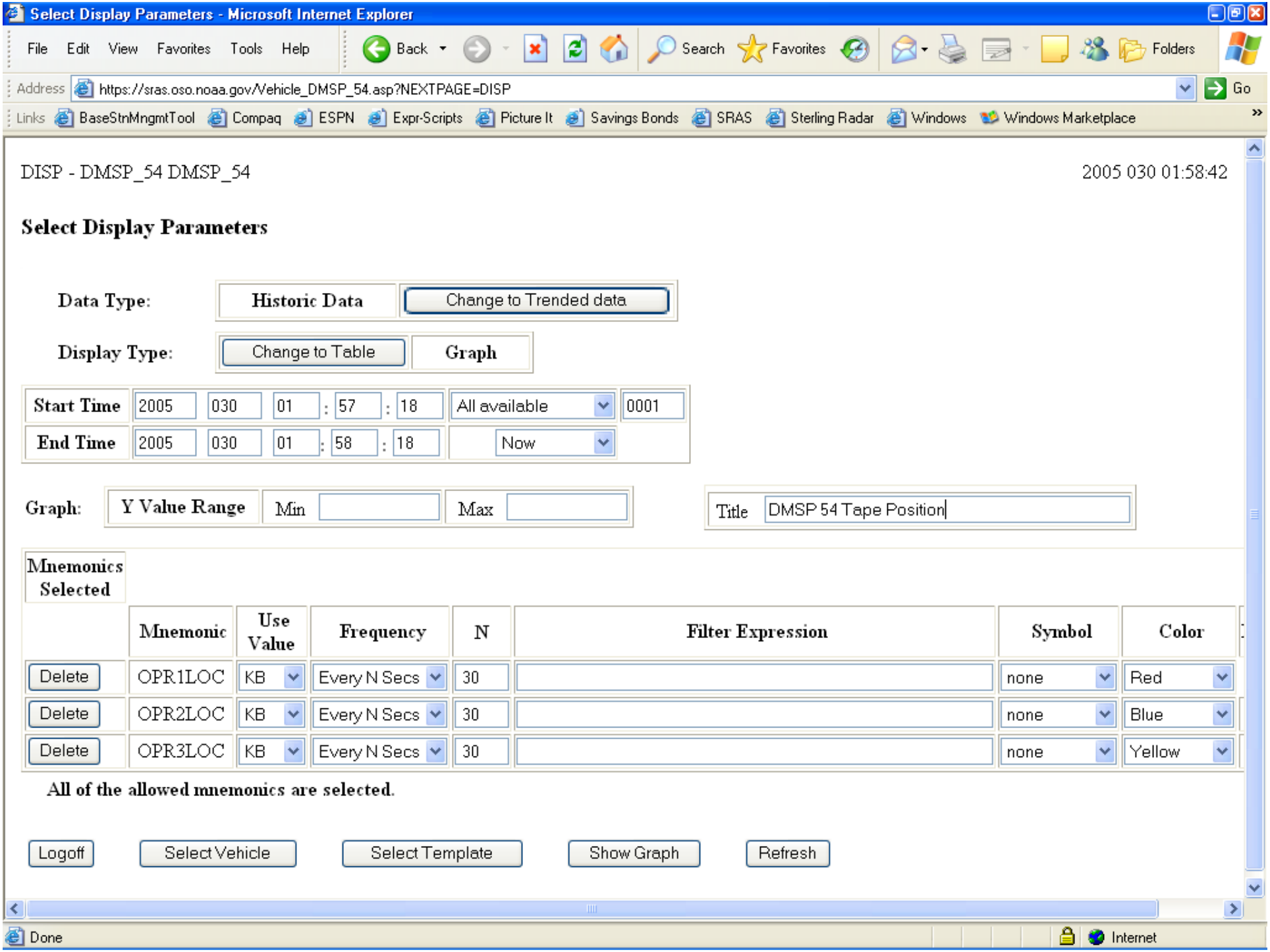
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
PGMGR - DMSP_54 DMSP_54
2005 030 01:47:01
Update Paging Requests - 4 more requests may be defined
Mnemonic
Value
Page if >=
Page if <=
Samples
Page Text
Status
Delete
ABAT1V
V
25.000000
0004
DMSP 54 Low Battery
Active
To add a request, select a mnemonic
Add mnemonics starting with
(or supply whole name)
Select from favorites list
0 names
Select from all mnemonics
1523 names
EMail addresses
art@mitretek.org
Logoff
Select Vehicle
Commit Changes
Done
Internet


Select a Template - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/Vehicle_DMSP_54.asp?NEXTPAGE=TSEL&VID=DMSP_54
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
TSEL - DMSP_54 DMSP_54
2005 030 16:35:08
Select a display template
Rename or delete the selected template (personal templates only - not Global)
Owner
Type
Name
Description
Graph
bat 1 voltage
Select
Graph
tape position
Select
Logoff
Select Vehicle
Empty Table
Empty Graph
Done
Internet


Select Display Parameters - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/Vehicle_DMSP_54.asp?NEXTPAGE=DISP
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
DISP - DMSP_54 DMSP_54
2005 030 01:58:42
Select Display Parameters
Data Type:
Historic Data
Change to Trended data
Display Type:
Change to Table
Graph
Start Time 2005 030 01 : 57 : 18 All available 0001
End Time 2005 030 01 : 58 : 18 Now
Graph:
Y Value Range
Min
Max
Title DMSP 54 Tape Position
Mnemonics Selected
Mnemonic
Use Value
Frequency
N
Filter Expression
Symbol
Color
Delete OPR1LOC KB Every N Secs 30 none Red
Delete OPR2LOC KB Every N Secs 30 none Blue
Delete OPR3LOC KB Every N Secs 30 none Yellow
All of the allowed mnemonics are selected.
Logoff
Select Vehicle
Select Template
Show Graph
Refresh
Done
Internet

Display Data Graph - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Folders

Address https://sras.oso.noaa.gov/Vehicle_DMSP_54.asp?NEXTPAGE=DISP Go

Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace

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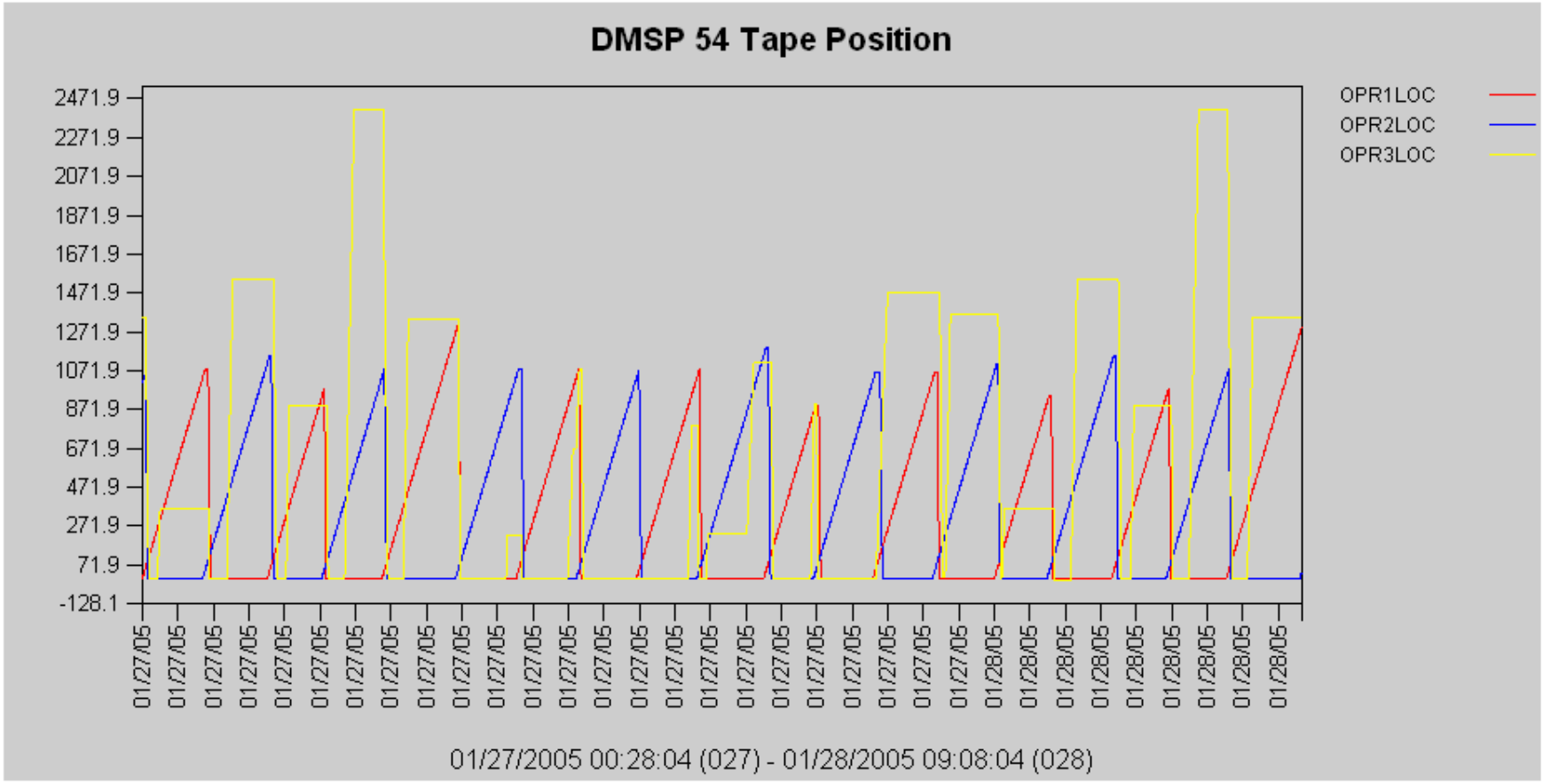
Display Graph - (no template)



Logoff Select Vehicle Select Template Change Parms Save Template

Refresh Data

Done Internet

Display Data Graph - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Folders

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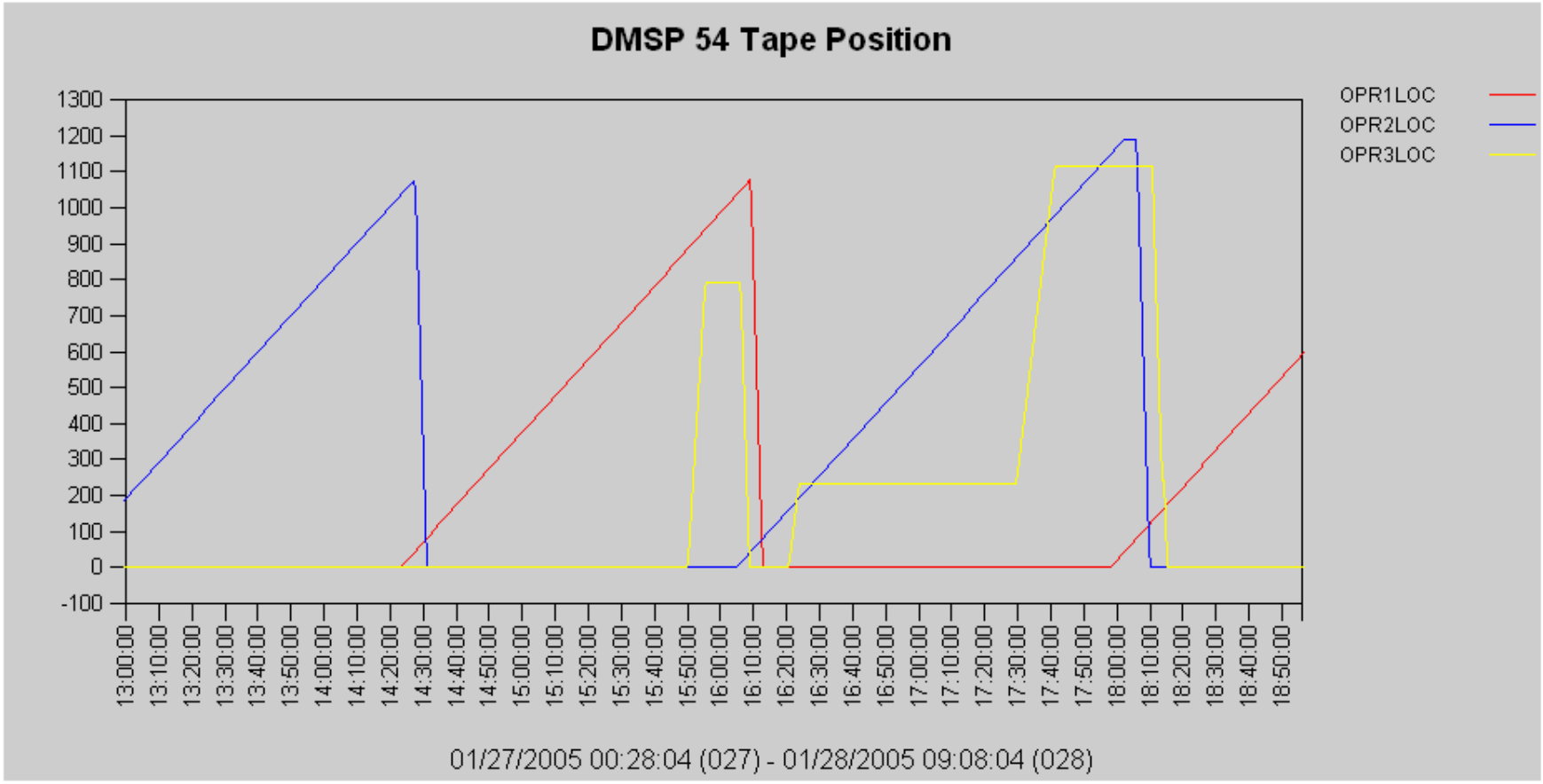

Logoff Select Vehicle Select Template Change Parms Save Template

Refresh Data

Done Internet

Display Data Graph - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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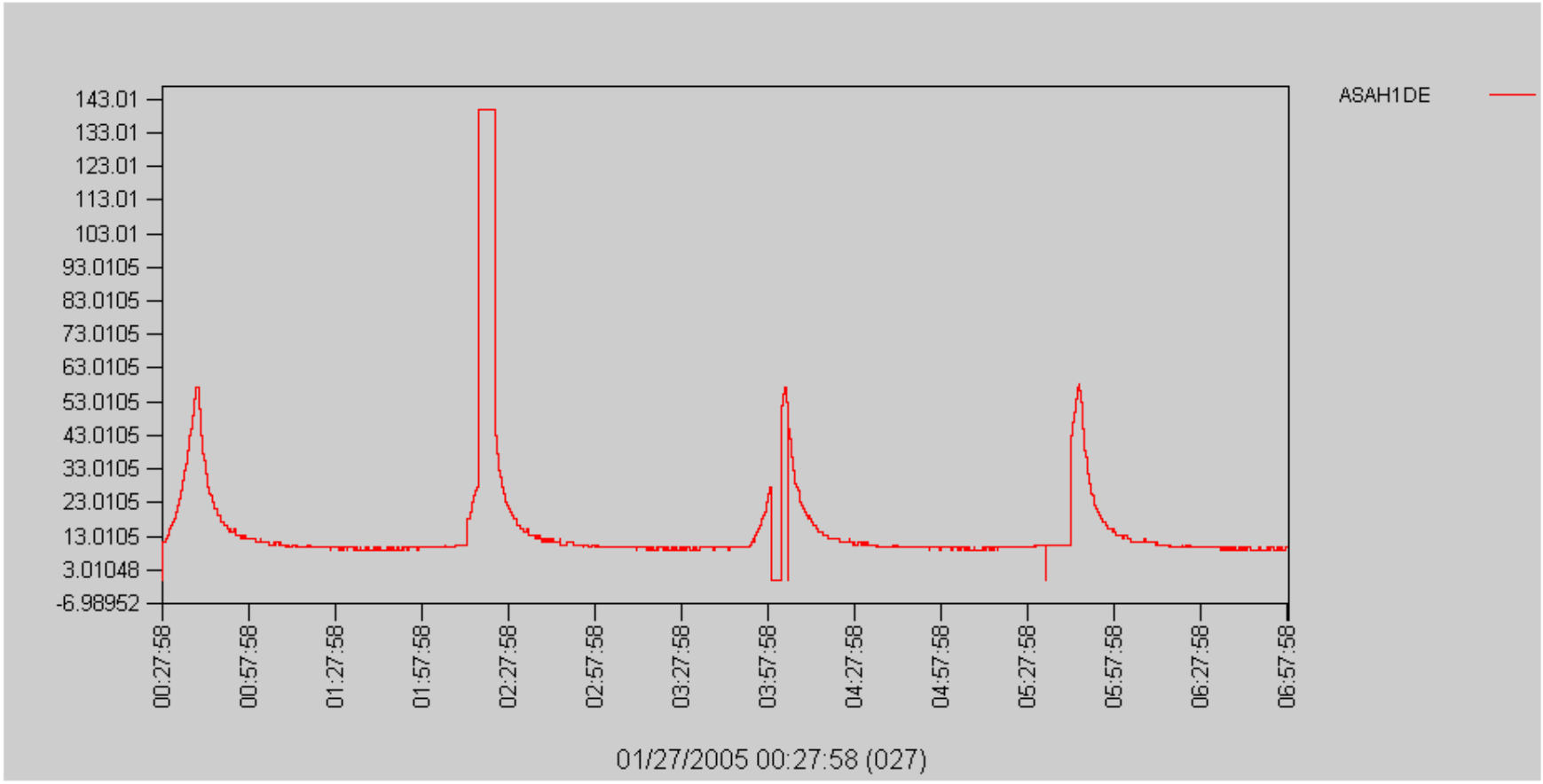
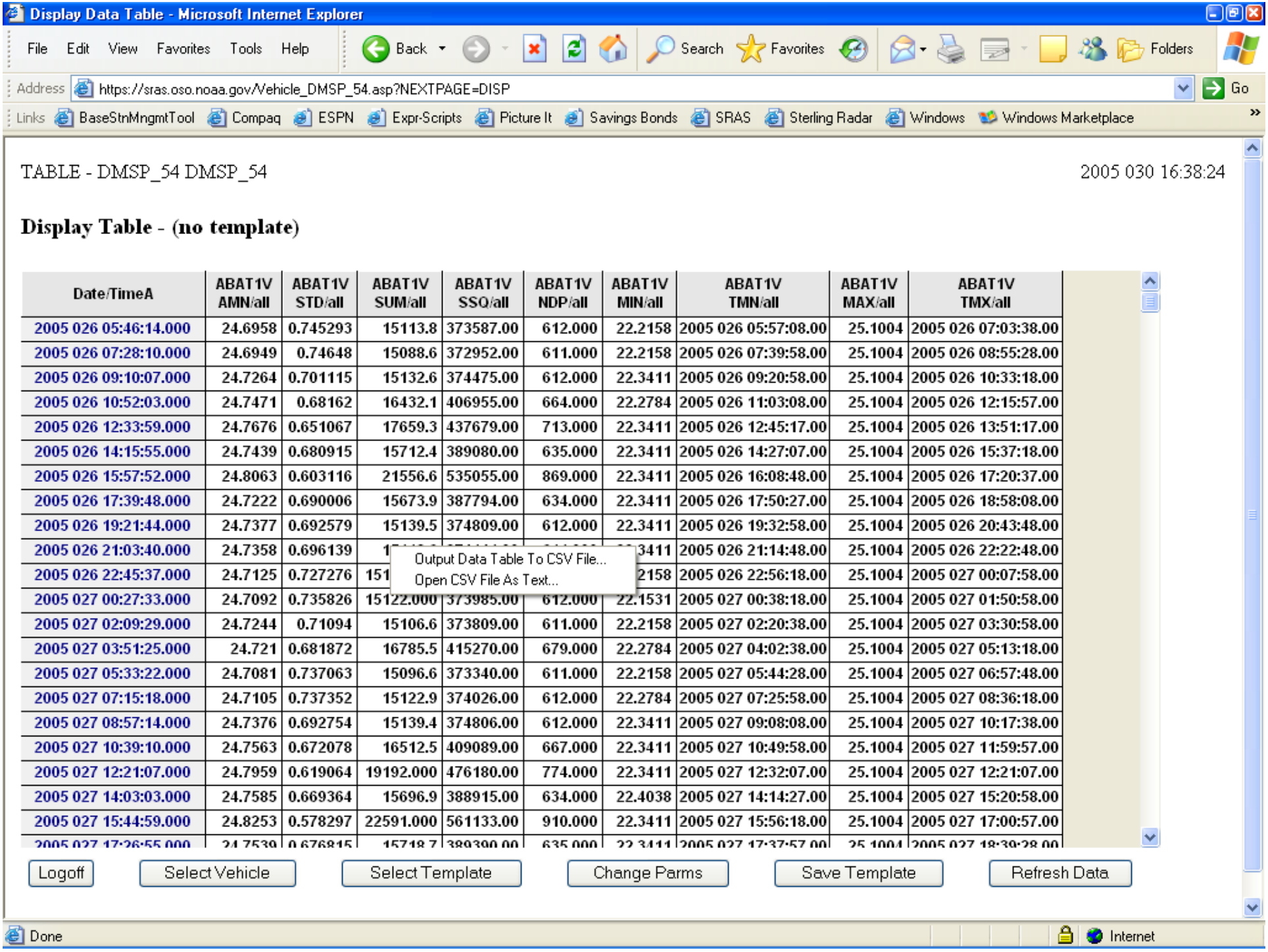


Logoff Select Vehicle Select Template Change Parms Save Template

Refresh Data

Done Internet



Date/TimeA	ABAT1V AMN/all	ABAT1V STD/all	ABAT1V SUM/all	ABAT1V SSQ/all	ABAT1V NDP/all	ABAT1V MIN/all	ABAT1V TMN/all	ABAT1V MAX/all	ABAT1V TMX/all
2005 026 05:46:14.000	24.6958	0.745293	15113.8	373587.00	612.000	22.2158	2005 026 05:57:08.00	25.1004	2005 026 07:03:38.00
2005 026 07:28:10.000	24.6949	0.74648	15088.6	372952.00	611.000	22.2158	2005 026 07:39:58.00	25.1004	2005 026 08:55:28.00
2005 026 09:10:07.000	24.7264	0.701115	15132.6	374475.00	612.000	22.3411	2005 026 09:20:58.00	25.1004	2005 026 10:33:18.00
2005 026 10:52:03.000	24.7471	0.68162	16432.1	406955.00	664.000	22.2784	2005 026 11:03:08.00	25.1004	2005 026 12:15:57.00
2005 026 12:33:59.000	24.7676	0.651067	17659.3	437679.00	713.000	22.3411	2005 026 12:45:17.00	25.1004	2005 026 13:51:17.00
2005 026 14:15:55.000	24.7439	0.680915	15712.4	389080.00	635.000	22.3411	2005 026 14:27:07.00	25.1004	2005 026 15:37:18.00
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2005 026 21:03:40.000	24.7358	0.696139	1			3411	2005 026 21:14:48.00	25.1004	2005 026 22:22:48.00
2005 026 22:45:37.000	24.7125	0.727276	151			2158	2005 026 22:56:18.00	25.1004	2005 027 00:07:58.00
2005 027 00:27:33.000	24.7092	0.735826	15122.000	373985.00	612.000	22.1531	2005 027 00:38:18.00	25.1004	2005 027 01:50:58.00
2005 027 02:09:29.000	24.7244	0.71094	15106.6	373809.00	611.000	22.2158	2005 027 02:20:38.00	25.1004	2005 027 03:30:58.00
2005 027 03:51:25.000	24.721	0.681872	16785.5	415270.00	679.000	22.2784	2005 027 04:02:38.00	25.1004	2005 027 05:13:18.00
2005 027 05:33:22.000	24.7081	0.737063	15096.6	373340.00	611.000	22.2158	2005 027 05:44:28.00	25.1004	2005 027 06:57:48.00
2005 027 07:15:18.000	24.7105	0.737352	15122.9	374026.00	612.000	22.2784	2005 027 07:25:58.00	25.1004	2005 027 08:36:18.00
2005 027 08:57:14.000	24.7376	0.692754	15139.4	374806.00	612.000	22.3411	2005 027 09:08:08.00	25.1004	2005 027 10:17:38.00
2005 027 10:39:10.000	24.7563	0.672078	16512.5	409089.00	667.000	22.3411	2005 027 10:49:58.00	25.1004	2005 027 11:59:57.00
2005 027 12:21:07.000	24.7959	0.619064	19192.000	476180.00	774.000	22.3411	2005 027 12:32:07.00	25.1004	2005 027 12:21:07.00
2005 027 14:03:03.000	24.7585	0.669364	15696.9	388915.00	634.000	22.4038	2005 027 14:14:27.00	25.1004	2005 027 15:20:58.00
2005 027 15:44:59.000	24.8253	0.578297	22591.000	561133.00	910.000	22.3411	2005 027 15:56:18.00	25.1004	2005 027 17:00:57.00
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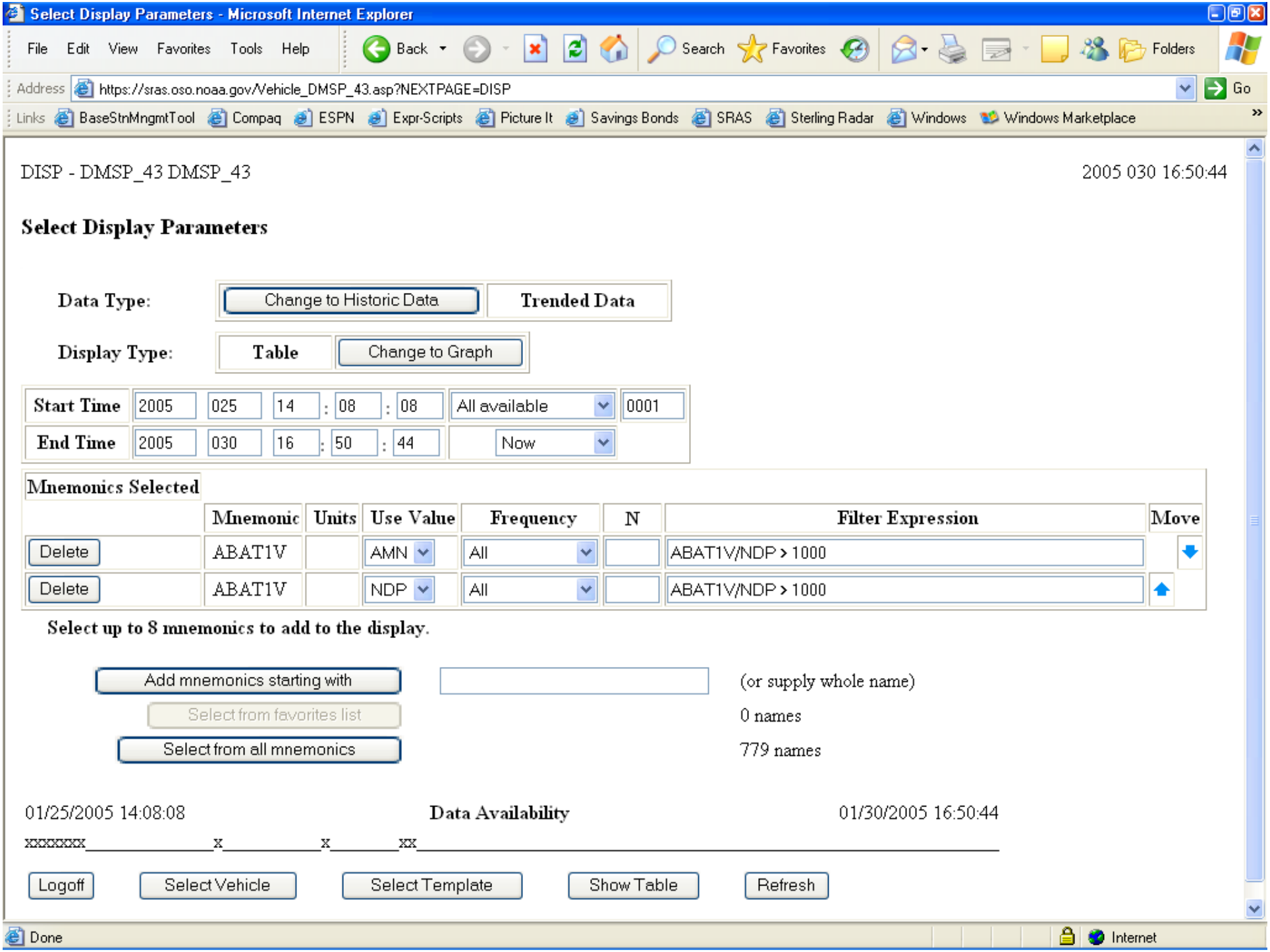
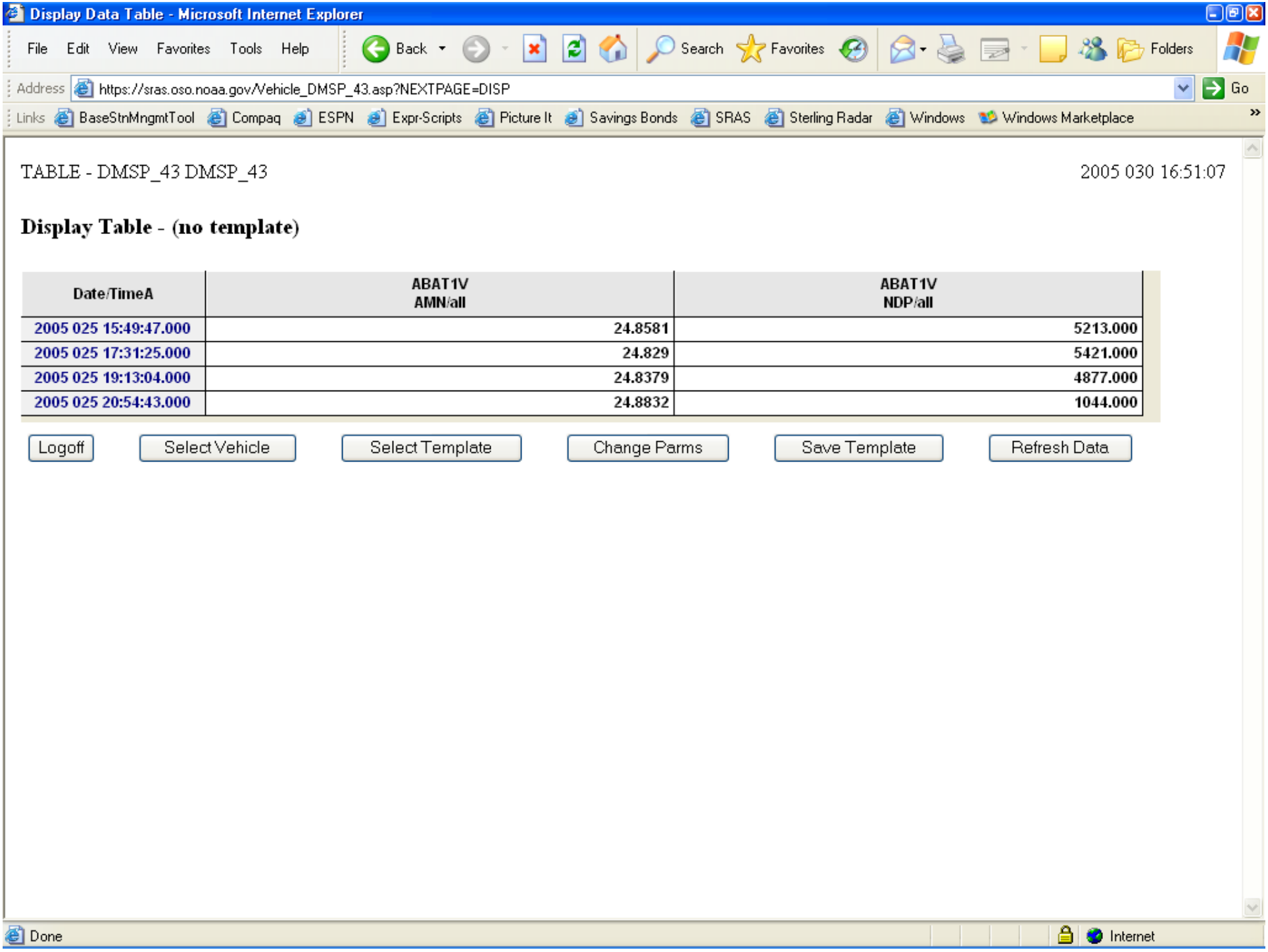

Select Display Parameters - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/Vehicle_DMSP_43.asp?NEXTPAGE=DISP
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
DISP - DMSP_43 DMSP_43
2005 030 16:50:44
Select Display Parameters
Data Type:
Change to Historic Data
Trended Data
Display Type:
Table
Change to Graph
Start Time 2005 025 14 : 08 : 08 All available 0001
End Time 2005 030 16 : 50 : 44 Now
Mnemonics Selected
Mnemonic Units Use Value Frequency N Filter Expression Move
Delete ABAT1V AMN All ABAT1V/NDP > 1000
Delete ABAT1V NDP All ABAT1V/NDP > 1000
Select up to 8 mnemonics to add to the display.
Add mnemonics starting with
(or supply whole name)
Select from favorites list
0 names
Select from all mnemonics
779 names
01/25/2005 14:08:08
Data Availability
01/30/2005 16:50:44
Logoff
Select Vehicle
Select Template
Show Table
Refresh
Done
Internet


Display Data Table - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Folders
Address https://sras.oso.noaa.gov/Vehicle_DMSP_43.asp?NEXTPAGE=DISP
Go
Links BaseStnMngmtTool Compaq ESPN Expr-Scripts Picture It Savings Bonds SRAS Sterling Radar Windows Windows Marketplace
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Display Table - (no template)
Date/TimeA
ABAT1V AMN/all
ABAT1V NDP/all
2005 025 15:49:47.000 24.8581 5213.000
2005 025 17:31:25.000 24.829 5421.000
2005 025 19:13:04.000 24.8379 4877.000
2005 025 20:54:43.000 24.8832 1044.000
Logoff
Select Vehicle
Select Template
Change Parms
Save Template
Refresh Data
Done
Internet