



Responsive People Build Responsive Ground Systems

The Interim: Until You Achieve an Operationally Responsive Ground System

Presented By Bob Wendlandt

Authors

**Bob Wendlandt, Kelly Clarke, Jordan Lei, Charles Miyamoto,
Kyran Owen-Mankovich**

**The Twelfth Annual Ground System Architectures Workshop
Redondo Beach, California
April 1, 2008**

Copyright 2008 California Institute of Technology



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- Who we are:
 - The Integration Test and Deployment (ITD) Team
- About our GDS
 - Unix based Solaris system
 - Multi-mission system
- How we achieve a responsive ground system
 - The GDS's perspective
 - The project's perspective
 - The user's perspective
 - Our team's perspective



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

Who We Are:

- The Integration Test and Deployment Team
 - Adapt, Integrate & Test the GDS for a project
 - Customize GDS workstation environment
 - Integrate project tools and scripts
 - Provide GDS support to project staff
 - » Engineers, scientists, developers, testers, managers
 - Teaming
 - Team Interaction
 - Team is greater than the sum of all its members



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

About Our GDS

- Development began in 1986
- Adaptation continues in 2008
- Unix based Solaris system
- Flexible Multi-mission ground data system



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

How We Achieve A Responsive GDS

- Perspectives Of The Ground System
 - The GDS perspective
 - The project's perspective
 - The user's perspective
 - The team's perspective



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- The Ground System Perspective:
 - Multi-mission environment
 - Reliable
 - Adaptable
 - Mature
 - Flexible
 - Flexibility means Options
 - Options mean Variability
 - Variability means More to Remember
 - More to Remember means Forgetting Something
 - Forgetting Something can lead to Mistakes



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- The Project's Ground System Perspective:
 - Single-mission environment
 - Reliable for the mission
 - Adaptable to mission's needs
 - Usable by mission engineers
 - Flexible to mission's changing requirements
 - Spacecraft 2 / MER-A / Spirit
 - Spacecraft 1 / MER-B / Opportunity



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- The User's Ground System Perspective:
 - “I just want to see my data”
 - “I do not want to be a GDS expert”
 - “What was that command again?”



MER's Drop-Down Menu



Responsive People Build Responsive Ground Systems

GDS Tools V1.2	
MER-A Tools	
MER-A DMD	▽
mer_evr	▽
evr_view	▽
packet_watch	▽
product_watch	▽
TDS Query Tools	▽
MER-A BC Flow	▽
New Window	▽
MER-B Tools	
MER-B DMD	▽
mer_evr	▽
evr_view	▽
packet_watch	▽
product_watch	▽
TDS Query Tools	▽
MER-B BC Flow	▽
New Window	▽
Generic Tools	
New Window	▽
Window Dump	▽
Screen Dump	▽
<input checked="" type="checkbox"/> Snapshot Dump	
Mission Info	▽
DOM GUIs	▽
OSS Tree	
MER Seq Arch Lib	
Plot Tools	▽
Utilities	▽
All MER BCs	
MER Clock	
MER LST Times	
Time Conversions	▽
CIP	
MCT Tools	▽

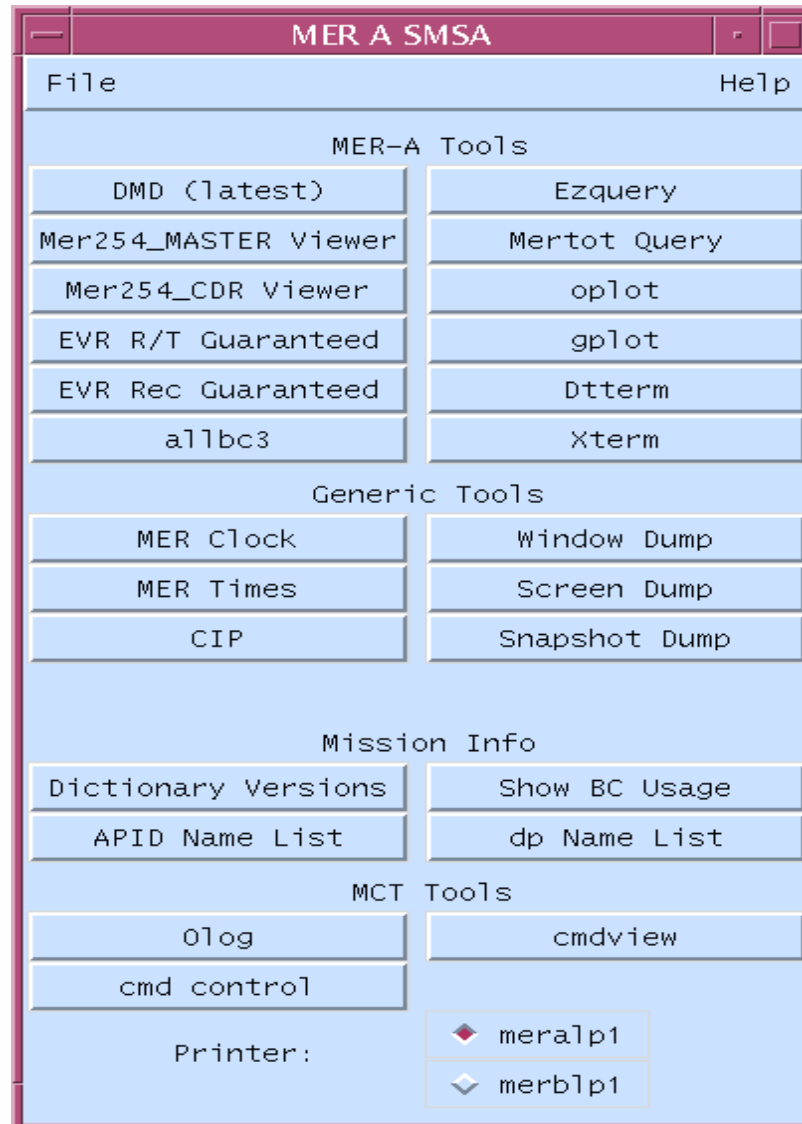
Mer254_MASTER_QueryServer
ezquery mer2
Plot Tools
Mertot Query
TDS Viewer mer2 MASTER
TDS Viewer mer2 CDR
TDS Viewer ODY MASTER
Optional ezquery Printers
ezquery mer2 meralp1
ezquery mer2 merblp1



MER's Remote Menu



Responsive People Build Responsive Ground Systems





Victor's Magic Button



Responsive People Build Responsive Ground Systems

File Help

Source: UCONX, SIM PORT (no uconx) | String Mode: Single, Dual | Uconx Name: msapfsw_gsaw2008 | Radio/SDST: 1, 2, 3, 4, TZ, LV | Test ID: id

Cmd DB: Delivered: 4.0.0EM_20080130_E | User Built: Browse... | Path: /GSAW2008/cmd_db/4.0.0EM_20080130_E

Tlm DB: Delivered: msap_4.0.0_20080204_E | User Built: Browse... | Path: /GSAW2008/tlm_db/msap_4.0.0_20080204_E

Evr DB: Delivered: evr_4.0.0_20080130_C.EvrDefTable | User Built: Browse... | Path: /GSAW2008/evr_db/evr_4.0.0_20080130_C.EvrDefTable

Downlink Uplink

NTTI TIS MPCS

Frame Size: Large Small

Frame Type: ReedSolomon Checksum Turbo: 1/2 1/3 1/6

TIS Decoding: reed_solomon on checksum on turbo on

TIS Derandomize: Off On

DMD DQM

```
start_msap_gds downlink -tti -input_type uconx -input_host localhost -input_name
msapfsw_gsaw2008 -uconx_port 4 -frame_size large -frame_type ReedSolomon -tis
-tlm_db /GSAW2008/tlm_db/msap_4.0.0_20080204_E -tis_ccitt -tis_reed_solomon -tis_turbo
-logdir /GSAW2008/archive/2008/02/06/ -datadir /GSAW2008/archive/2008/02/06/ -bc
MSAPGSAWB0 -decode_tbl /GSAW2008/evr_db/evr_4.0.0_20080130_C.EvrDefTable -stoptag
9527 -testid id
```

Start DOWNLINK ←

Online Tlm DB Packet Watch MSAP EVR MSAP DP Stop

File Locations Info Tools Build User cmd DB Build User tlm DB Build User evr DB

Tool Info: SFOC Tool Info, DMD Info, Build User cmd db Info, Build User tlm db Info

Mission Info: Workstation Info, FSW VC Info

Running on msap_fsw_GSAW2008 Powered by ITD

Victor's Magic Button



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- Our Team's Ground System Perspective
 - Our team is responsive to:
 - The system - We defend it
 - The project - We pursue project success
 - Provide GDS support
 - Work in a constantly changing environment
 - » Office (both ours & user's), labs, testbeds, meeting rooms
 - The user - We support them
 - Tasks: Queue vs. Stack Driven
 - The team - We support each other



Map Of JPL



Responsive People Build Responsive Ground Systems

Offices
(Various)

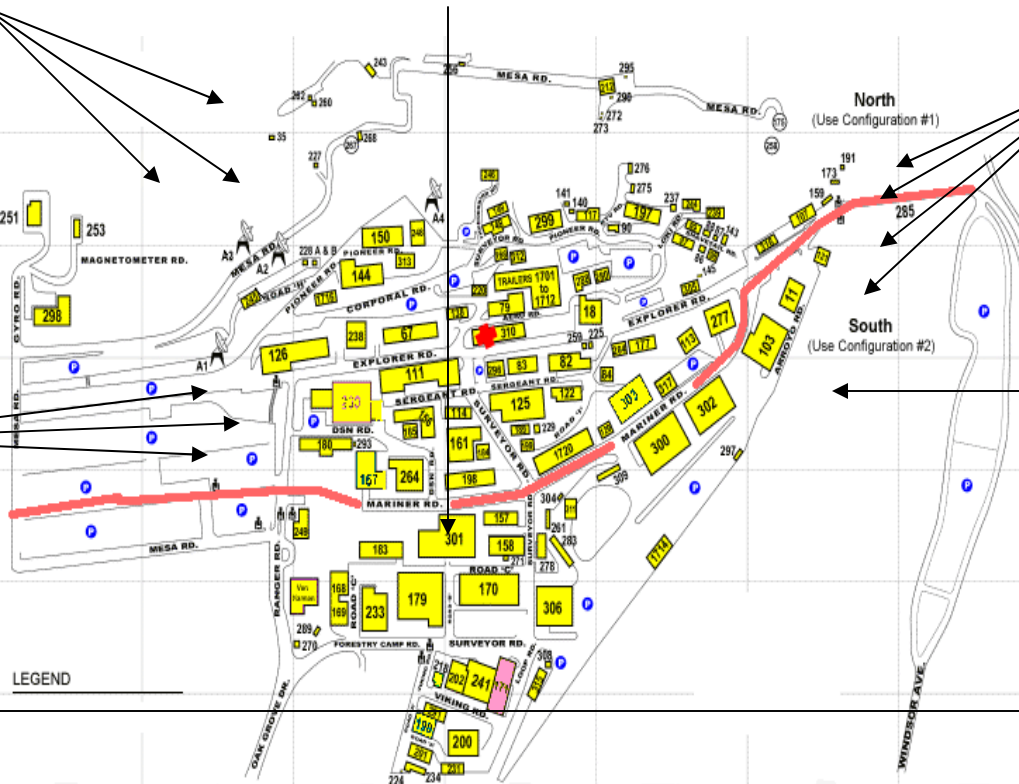
OEL Lab

Meeting
Rooms

Testbeds

ATLO

KSC





Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

- Our Team's Ground System Perspective
 - Our team is responsive to:
 - The system - We defend it
 - The project - We pursue project success
 - Provide GDS support
 - Work in a constantly changing environment
 - » Office (both ours & user's), labs, testbeds, meeting rooms
 - The user - We support them
 - Tasks: Queue vs. Stack Driven
 - The team - We support each other



Achieving an Operationally Responsive GDS



Responsive People Build Responsive Ground Systems

To Achieve A Responsive GDS

- A key component for a responsive ground data system is responsive people that are able to hear the heartbeat of a project's needs and respond to it's ever changing requirements.