A Web-based Emergency Response System for Lights Out Operations

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Sponsor

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Advanced Architectures and Automation (Code 588)

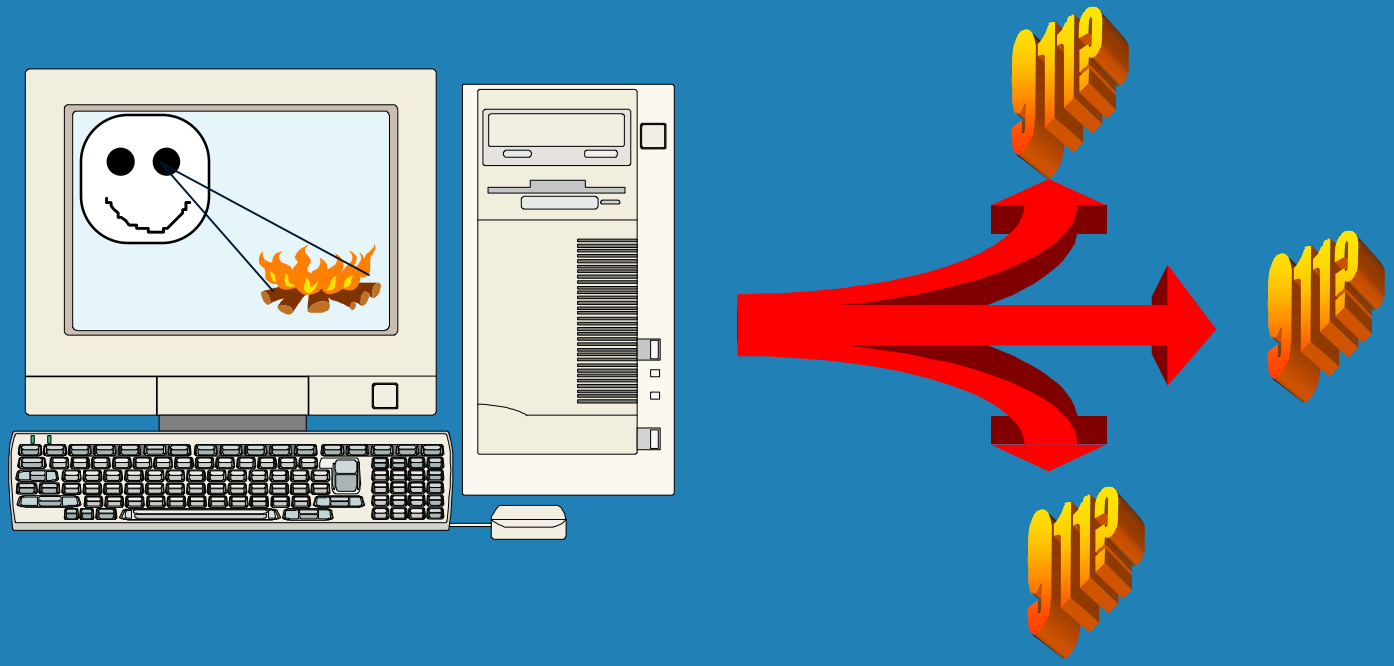
NASA Goddard Space Flight Center

Changing Environment

- "Traditional" Operations
  - 7x24 Support
  - Unique and Dedicated Resources
- "Lights Out" Environment
  - No Operator or (5x8) or 1 Shift/Day
  - On-Call FOT
  - Multi-Mission Support

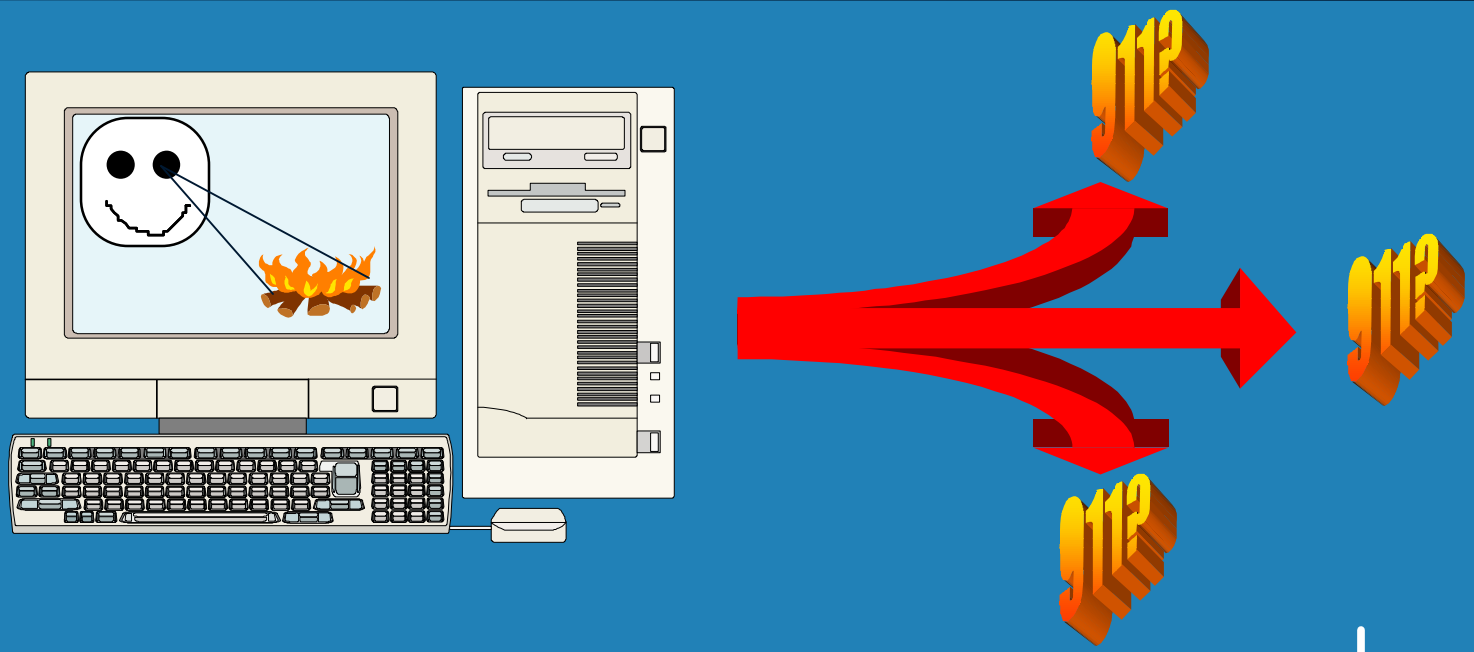
PNNL

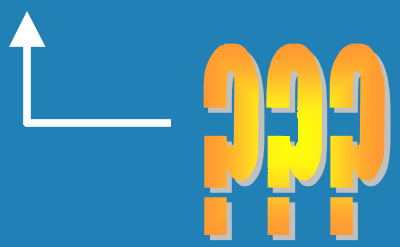
1st Generation Response -- Automate & Broadcast



PNNL

1st Generation Response -- Automate & Broadcast





Did the message get sent?
Did anyone get the message?
Did the right person get the message?
What's wrong?

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2nd Generation Response -- SERS

Spacecraft Emergency Response System

Goal: To work with mission operations staff to develop the future technology and workgroup computing concepts that will be needed to better meet the new ground rules for mission operations.

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SERS - Prime Capabilities

- Flexible Communications Interface
- Easy Access
- Intelligent Notifications
- 2-Way Communications
- Secure & Reliable
- Cost Effective

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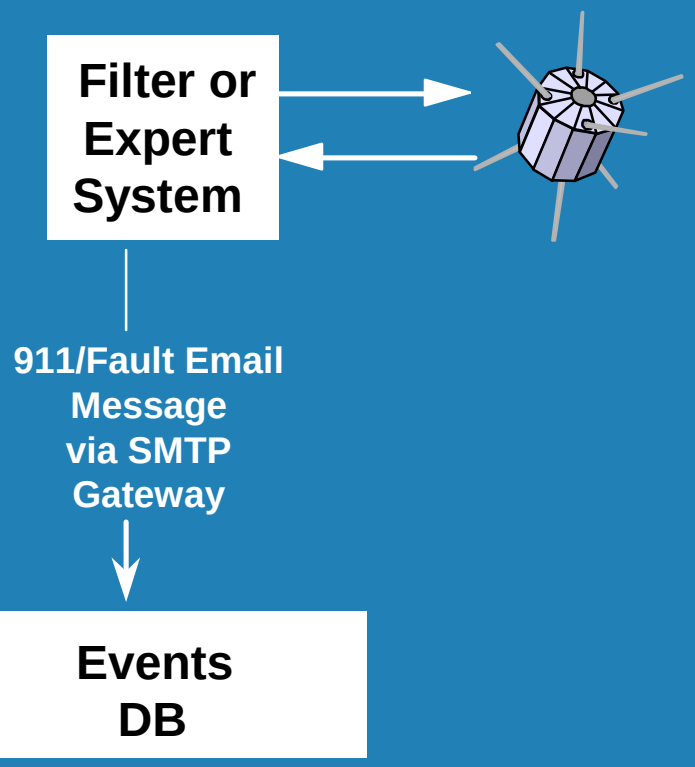
Flexible Interface



E-Mail Interface

```
Date: Fri, 1 Aug 1997 11:35:48 -0400
From: chu@trace5
Message-Id: <199708011535.LAA20664@vintage.>
To: vmoc@vmoc1.gsfc.nasa.gov
Subject: VMOC Incident
Status: R

Spacecraft%%TRACE&& Originator%%ITOS&&
EpisodeID%%PASS_INCIDENT&&
EpisodeStart%%4/22/97 09:12:59&&
EpisodeEnd%%4/22/97 15:39:10&&
IncidentStart%%4/22/97 09:14:01&&
IncidentEnd%%4/22/97 15:36:01&&
EventFile%%trace5:/usr/tcw.trace/logs/EVT_97-112-13:12.LOG&&

<ATTACHMENT>
<LIMIT_VIOL>
Time%%97-112-09:35:39&&
Type%%Red&&
Status%%high&&
Title%%AACET&&
Value%%180.8116056&&
<SC_EVENT>
Time%%97-112-09:14:01&&
Title%%UNDEFIN Subsys-OS Code#0000 Data - ( 0000, 0000,
0000, 0000 ) 68-145-00:00:00.00000 0&&
```

E-Mail Interface

<ATTACHMENT>
<SC_EVENT>
Time%%97-112-09:14:01&&
Title%%UNDEFIN Subsys-OS Code#0000 Data - (0000, 0000, 0000, 0000) 68-145-00:00:00.00000 0&&
<DSP_ERROR>
Time%%97-112-09:15:55&&
Title%%/home/trace/ops/pages/leo_safe.page (parser): unrecognized statement, line 185[n??]&&
<STOL_ERROR>
Time%%97-112-09:21:35&&
Title%%totlmcnfig is an unknown command mnemonic.&&
<LIMIT_VIOL>
Time%%97-112-09:35:39&&
Type%%Red&&
Status%%high&&
Title%%AACET&&
Value%%180.8116056&&
<SC_EVENT>
Time%%97-112-09:36:35&&
Title%%INFO Subsys-LC Code#1011 Data - (000B, 0008, 04B1, DDDD) 97-350-13:49:09.02598 Transmitter on for 20 Minutes Sensed (AP, RTS, failcnt)&&

SERS Configuration for TRACE

Real-time
Operational
Computers

FTP
(Log Files)

Firewall

Firewall

- SERS Domino Server
- REP

SERS
Prime

Easy Access - Web User Interface

SERS Home Page - Netscape

File Edit View Go Communicator Help

Bookmarks Location: http://smexvmoc2.nascom.nasa.gov/

Internet Lookup New&Cool

Spacecraft Emergency Response System

Operations

- Events
- Pass Summaries
- Anomalies
- Mnemonics

Configuration

- Alert Criteria
- On-Call Schedule
- Team Members
- Software Versions

Tools

- Reports
- Password
- Users Guide
- SERS Problem Report

Pre-Launch

- Spacecraft Anaomalies
- Ground Anomalies

Missions

SERS Configuration for TRACE

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SERS
Prime

Alert E-Mail &
Web Access

Internet

Alert E-Mail &
Web Access

E-mail Notification
Browser Access to
Databases

Intelligent Notifications

- Type of Problem
- Who is best suited to respond
- Who is available

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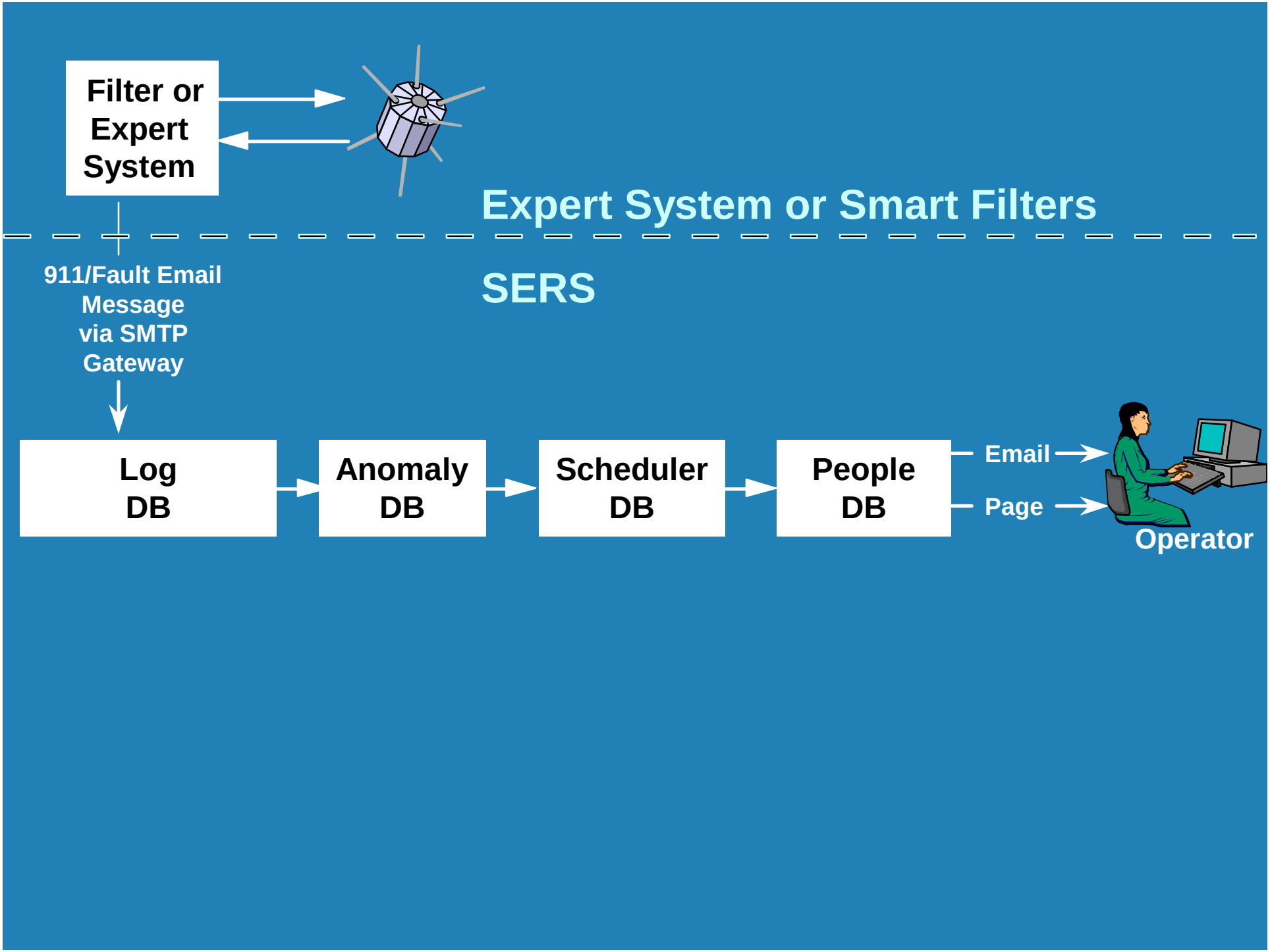
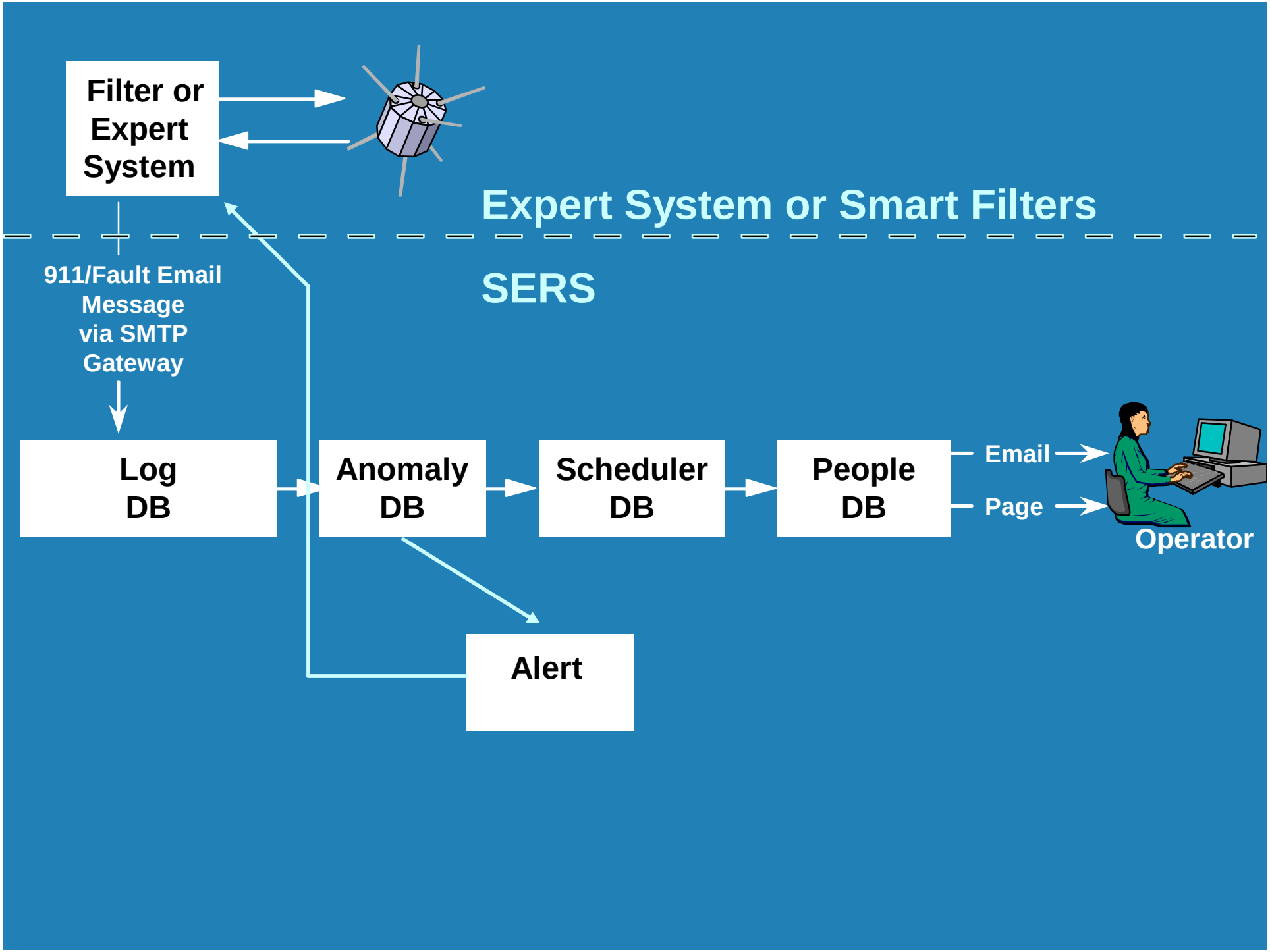

Filter or Expert System
Expert System or Smart Filters
SERS
911/Fault Email Message via SMTP Gateway
Log DB
Anomaly DB
Scheduler DB
People DB
Email
Page
Operator


Filter or Expert System
Expert System or Smart Filters
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911/Fault Email Message via SMTP Gateway
Log DB
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People DB
Email
Page
Operator
Alert

2-Way Communications

- Web
- Paging
  - SkyTel 2-Way Network
  - Pelorus Pager Gateway

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SERS Configuration for TRACE

Real-time Operational Computers

FTP (Log Files)

Firewall

Firewall

- SERS Domino Server
- REP
- Internet (IP) Pager Gateway

SERS Prime

Alert E-Mail & Web Access

Alert Paging

Internet

Alert E-Mail & Web Access

Alert Paging

E-mail Notification Browser Access to Databases

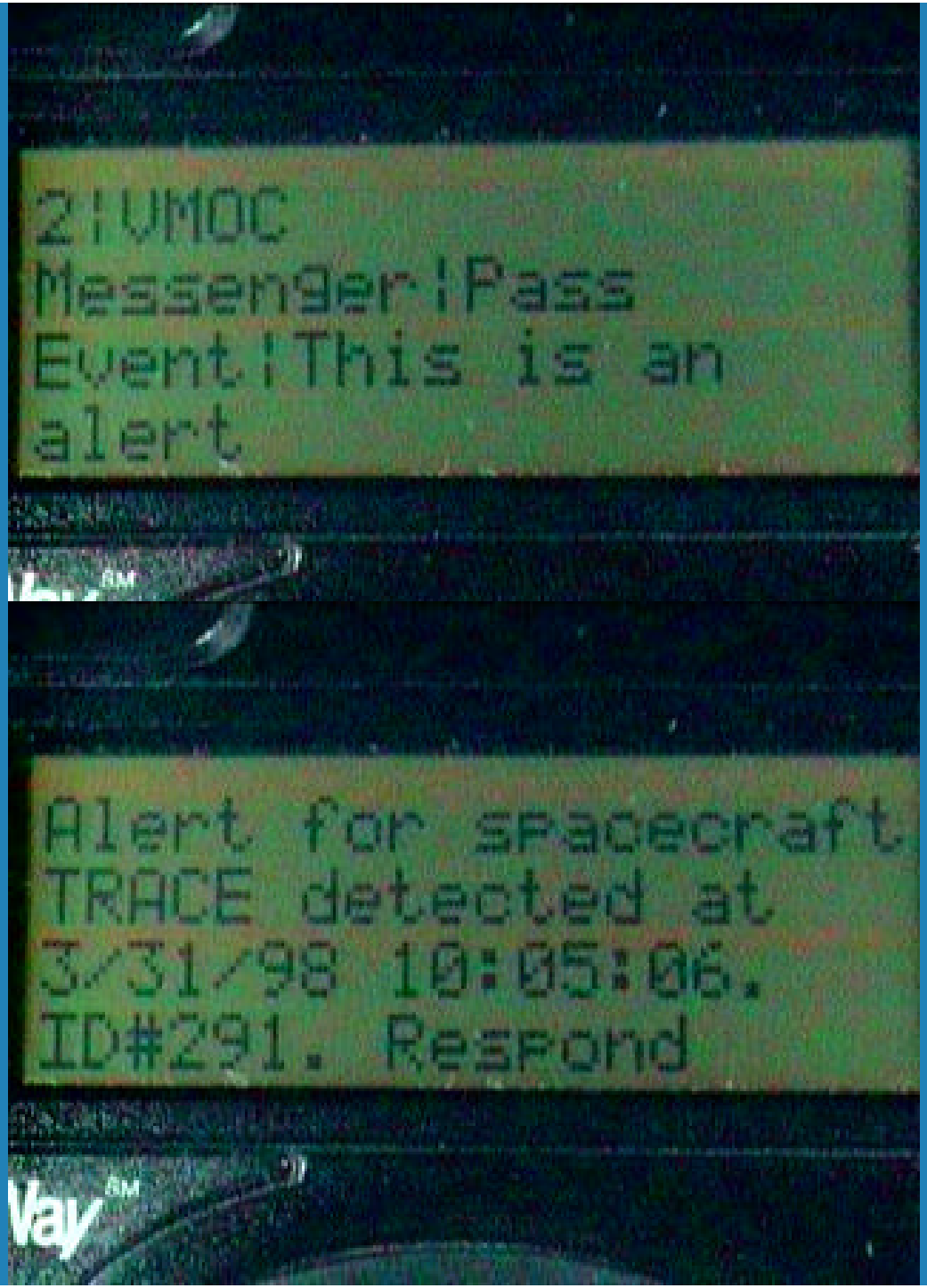
SkyTel

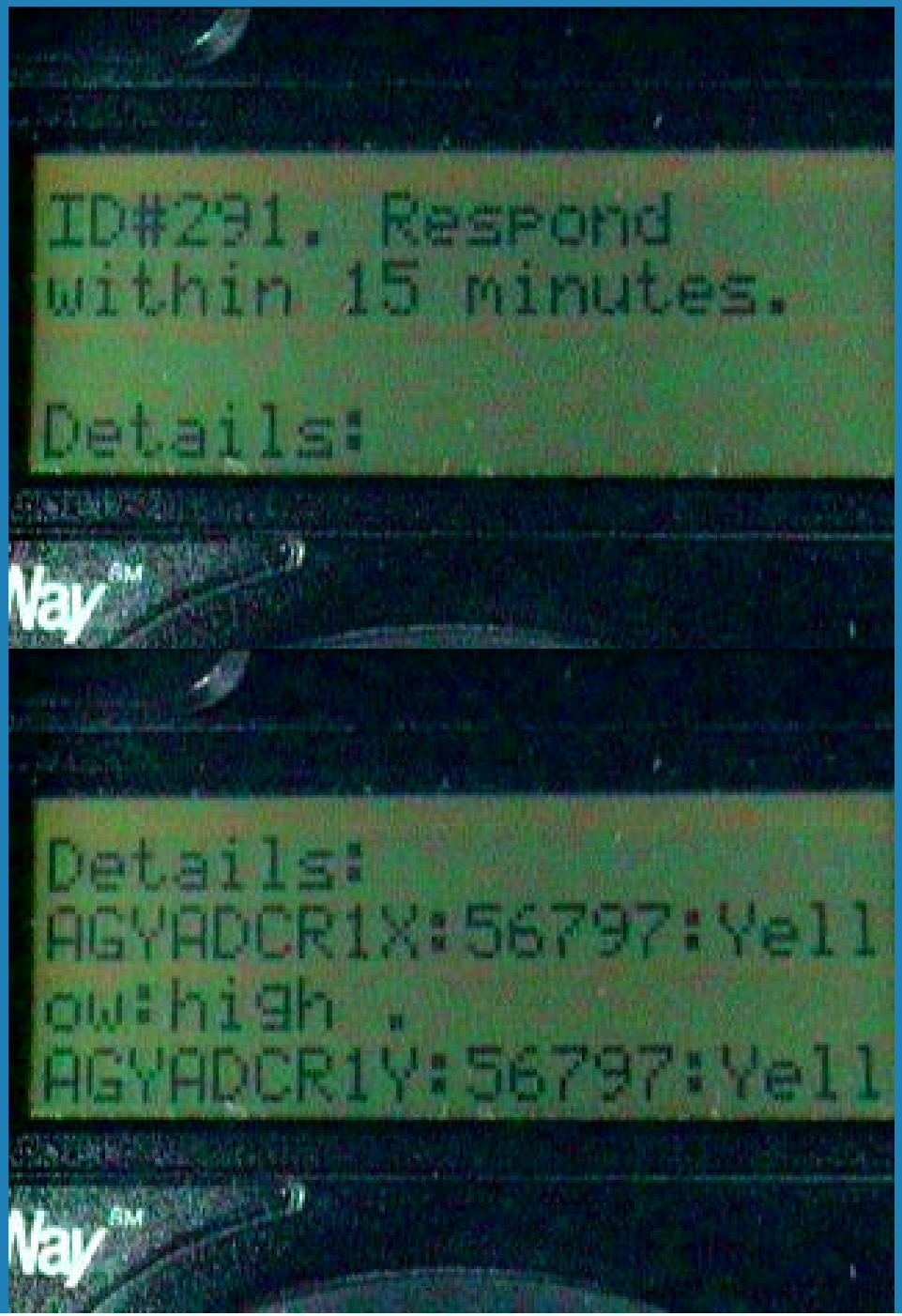
2-Way Paging Service

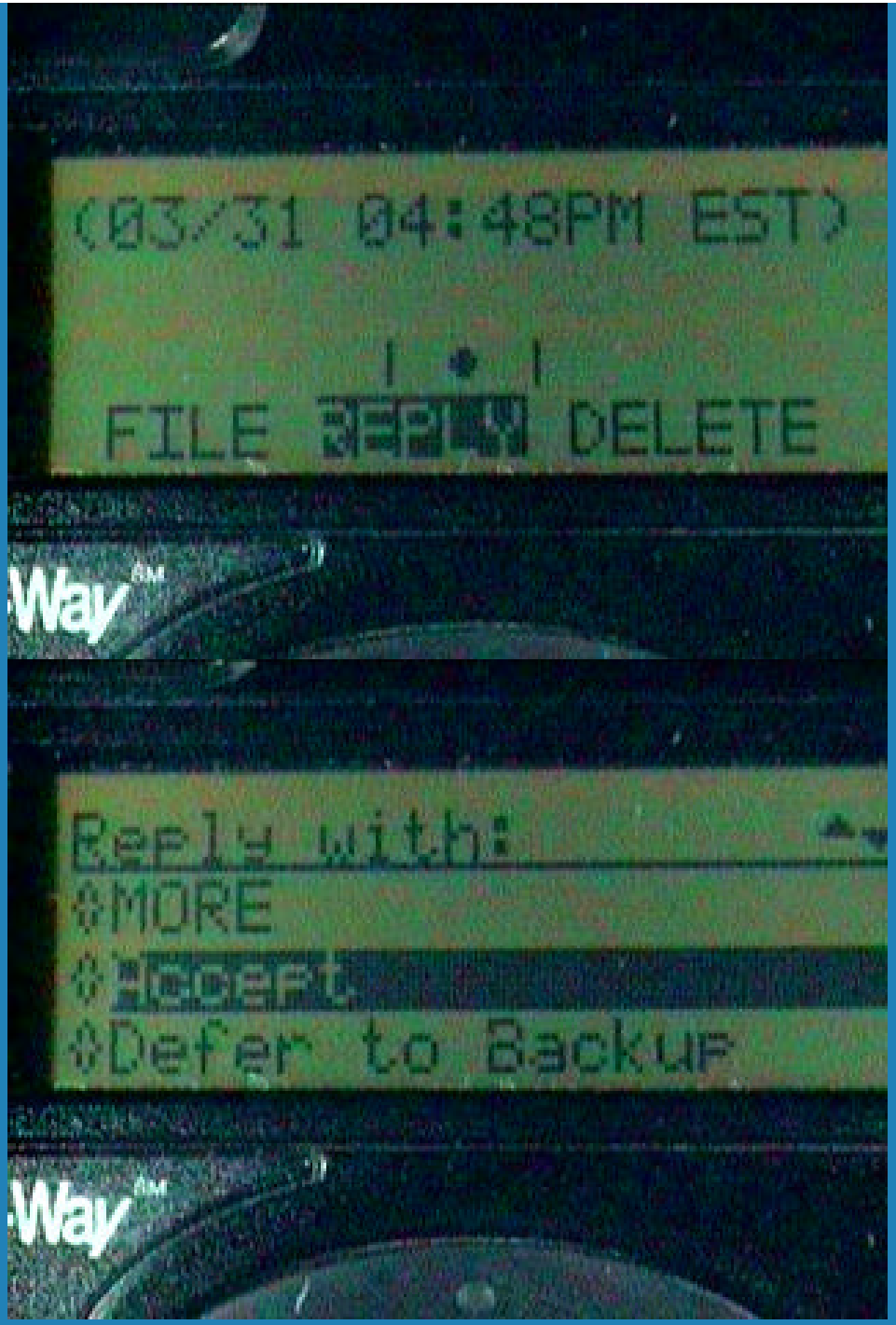
Alert Paging

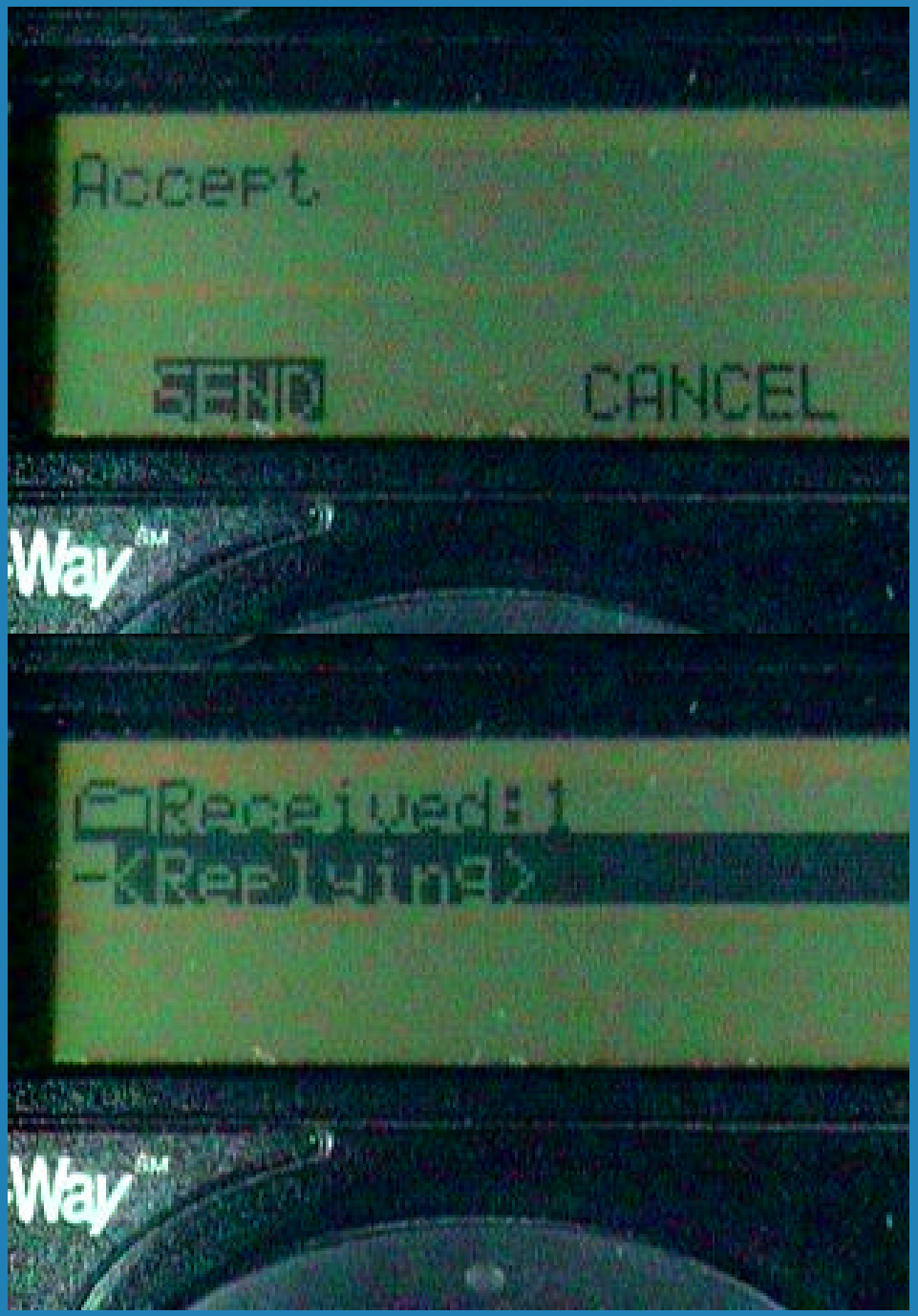
Paging Notification and Response

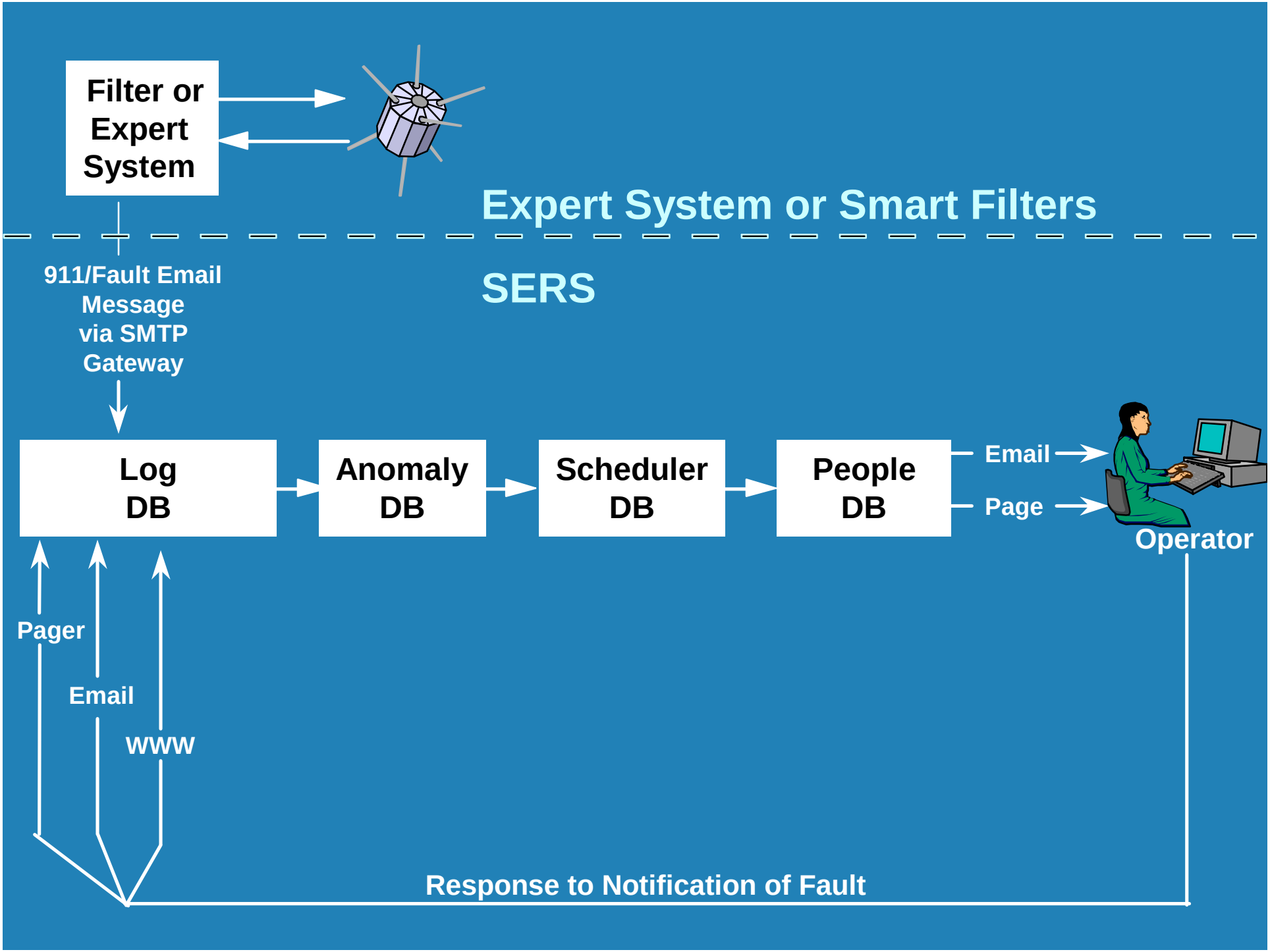
SkyTel 2Way™


2!VMOC
Messenger!Pass
Event!This is an
alert
Alert for spacecraft
TRACE detected at
3/31/98 10:05:06.
ID#291. Respond


ID#231. Respond
within 15 minutes.
Details:
Details:
AGYADCR1X:56797:Yell
ow:high
AGYADCR1Y:56797:Yell


(03/31 04:48PM EST)
FILE REPLY DELETE
Reply with:
MORE
ACCEPT
Defer to Backup


Accept
SEND
CANCEL
Way
Received:1
Way


Filter or Expert System
Expert System or Smart Filters
SERS
911/Fault Email Message via SMTP Gateway
Log DB
Anomaly DB
Scheduler DB
People DB
Email
Page
Operator
Pager
Email
WWW
Response to Notification of Fault

Secure & Reliable

- Passwords & SSL
- Prime & Backup Domino Servers
- TCP/IP & Analog Paging

SERS Configuration for TRACE

Real-time Operational Computers

FTP (Log Files)

Firewall

Firewall

- SERS Domino Server
- REP
- Internet (IP) Pager Gateway

SERS Prime

Continuous Replication

SERS Backup

- SERS Domino Server
- Analog Pager Gateway

Modem

Alert E-Mail & Web Access

Alert E-Mail & Web Access

Internet

Alert Paging

Alert Paging (Analog)

Alert E-Mail & Web Access

E-mail Notification Browser Access to Databases

SkyTel

2-Way Paging Service

Alert Paging

Paging Notification and Response

Secure & Reliable

- System Monitor
- Process Monitor
- Ground System Monitor

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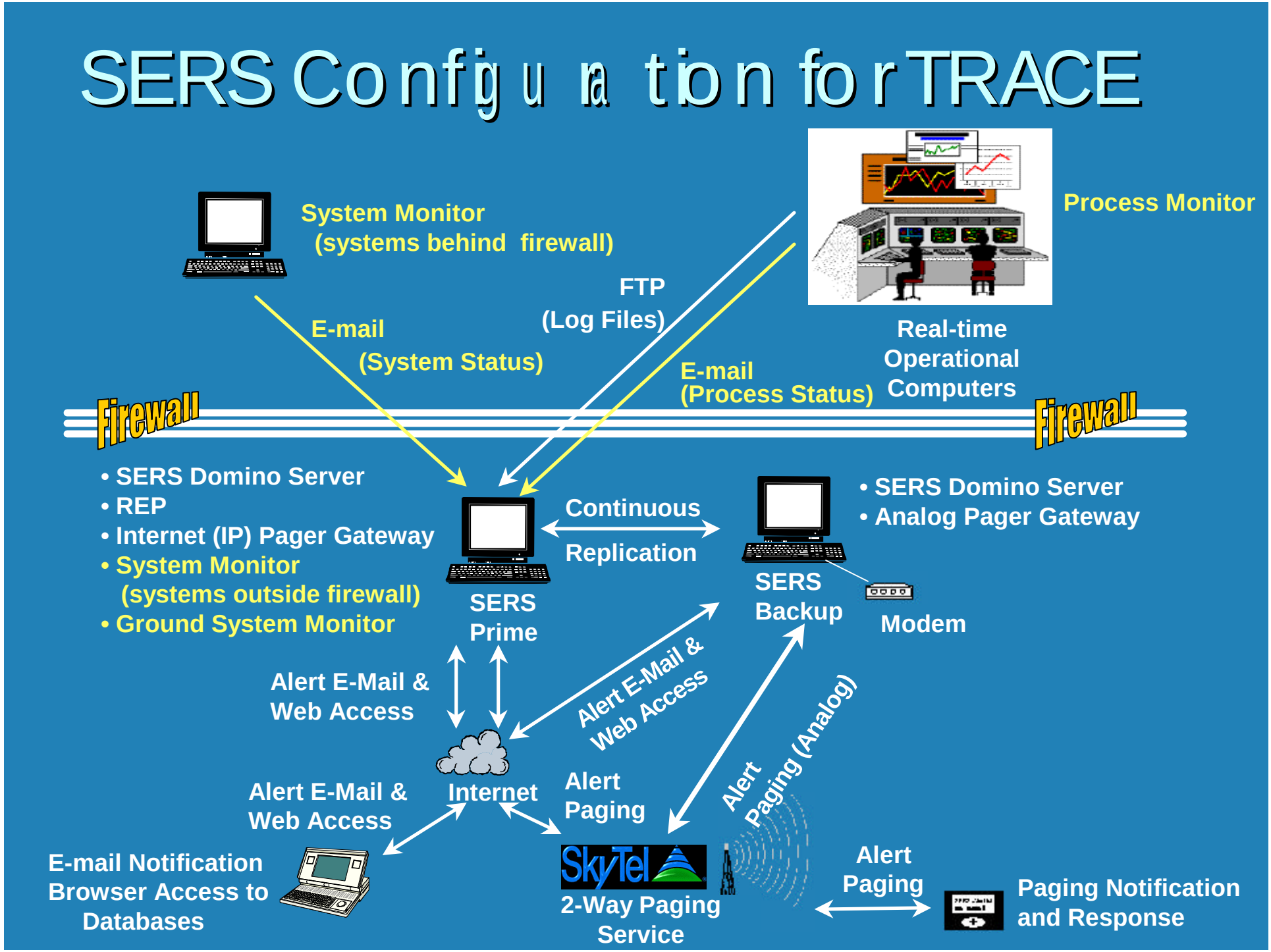
SERS Configuration for TRACE



Cost Effective - COTS

- PC - NT (Server or Workstation)
- Lotus Domino / Notes server(s)
- Grand Central Pager Gateway
- Microsoft Excel
- Shareware Utilities
- Unix scripts and C++ code
- Web User Interface
- PC ($2000) + Software ($2500)

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SERS 2.0 (6/98)

- Telephony
  - Text-to-Speech
  - Menu Response
  - Voice Recording
- Multi-mission capabilities
- Expert System Interface

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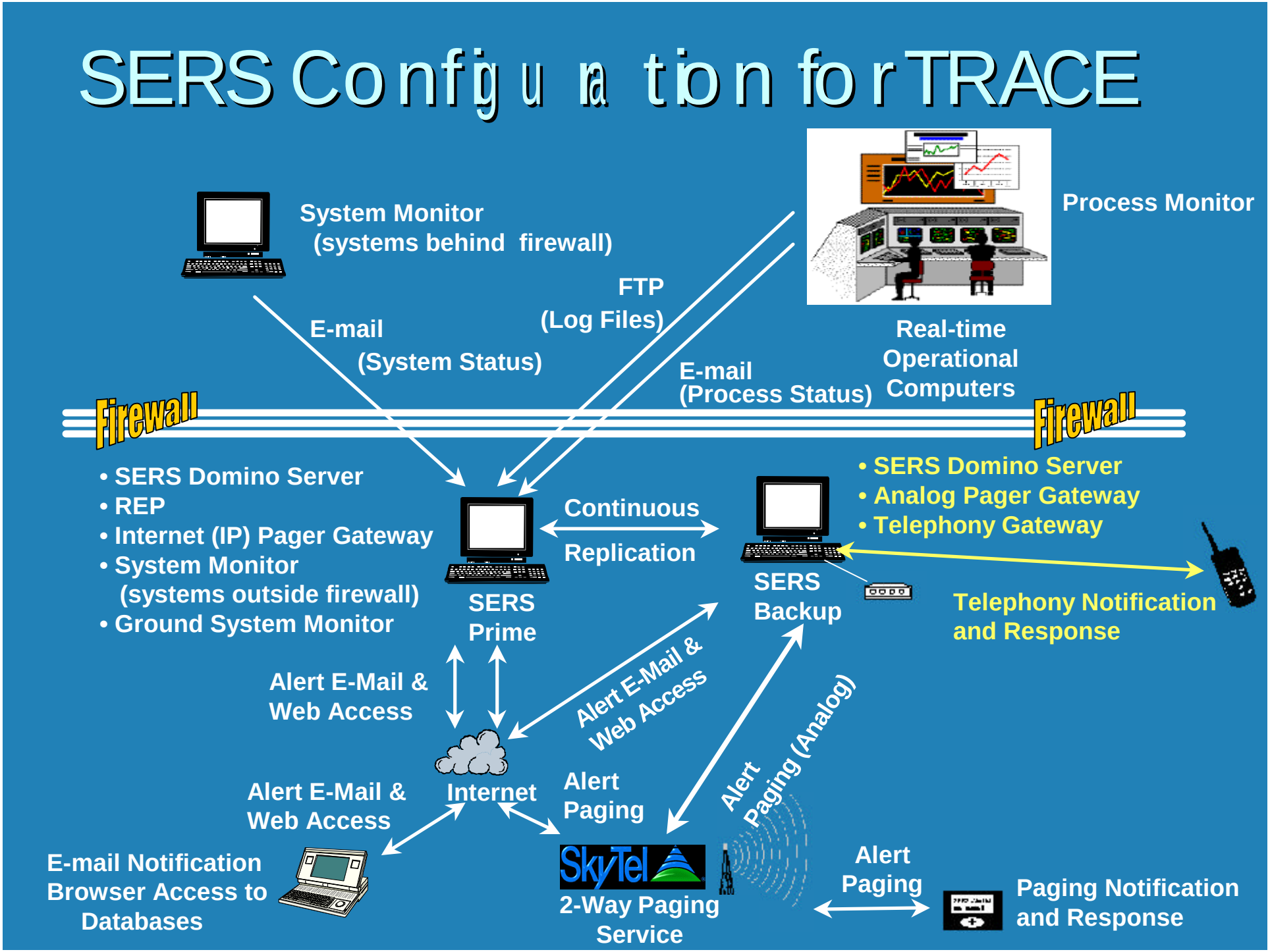
SERS Configuration for TRACE



SERS & VMOC

- Virtual Mission Operations Center
  - Research new technologies
- Planned Initiatives
  - Personal Digital Assistants
  - Advanced Groupware
    - videoconferencing
    - screen & application sharing
- Increased Automation

For More Information

- VMOC Web Site
  - http://www.grouch o.gsfc.nasa.gov
- TRACE Web Site
  - http://smexvmoc1.nascom.nasa.gov
- Contacts
  - Jeff Fox, PNNL (jeff.fox@pnl.gov)
  - Julie Breed, NASA (julie.breed@gsfc.nasa.gov)