Saudi Positioning System Modernization and Expansion

PRESENTED BY:

Presented to:

ILA 36
Orlando FL
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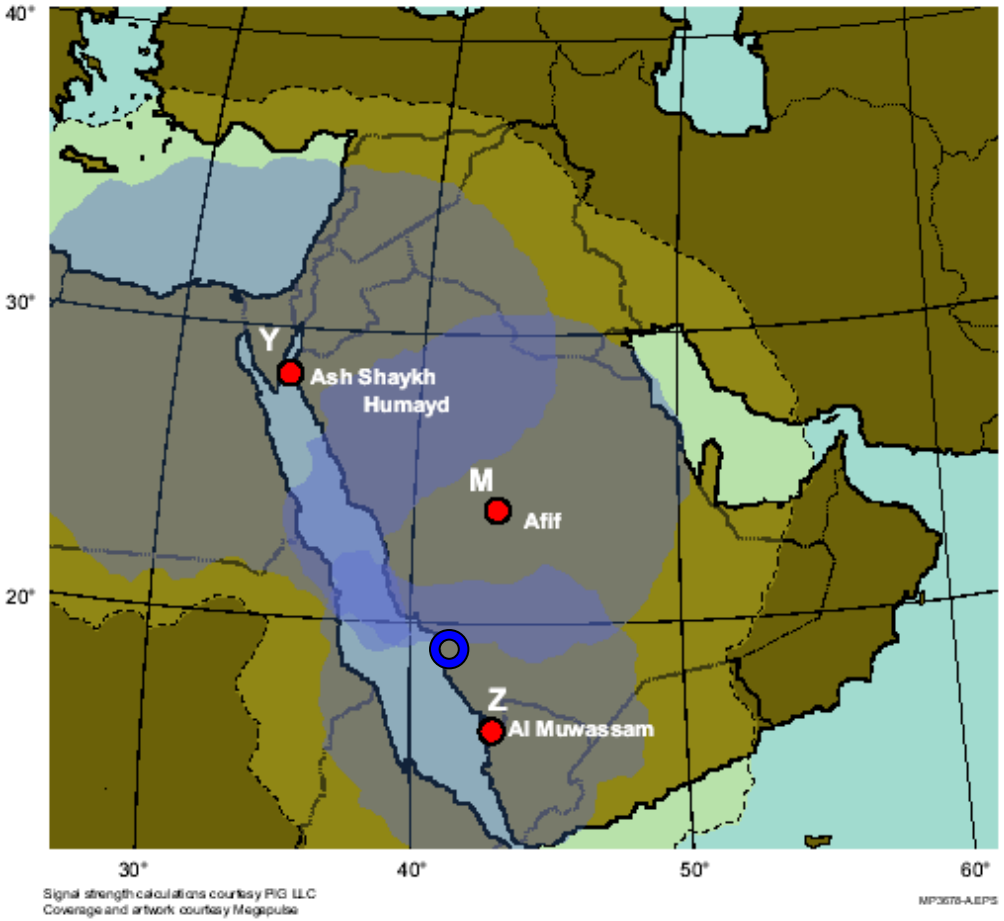
Overview

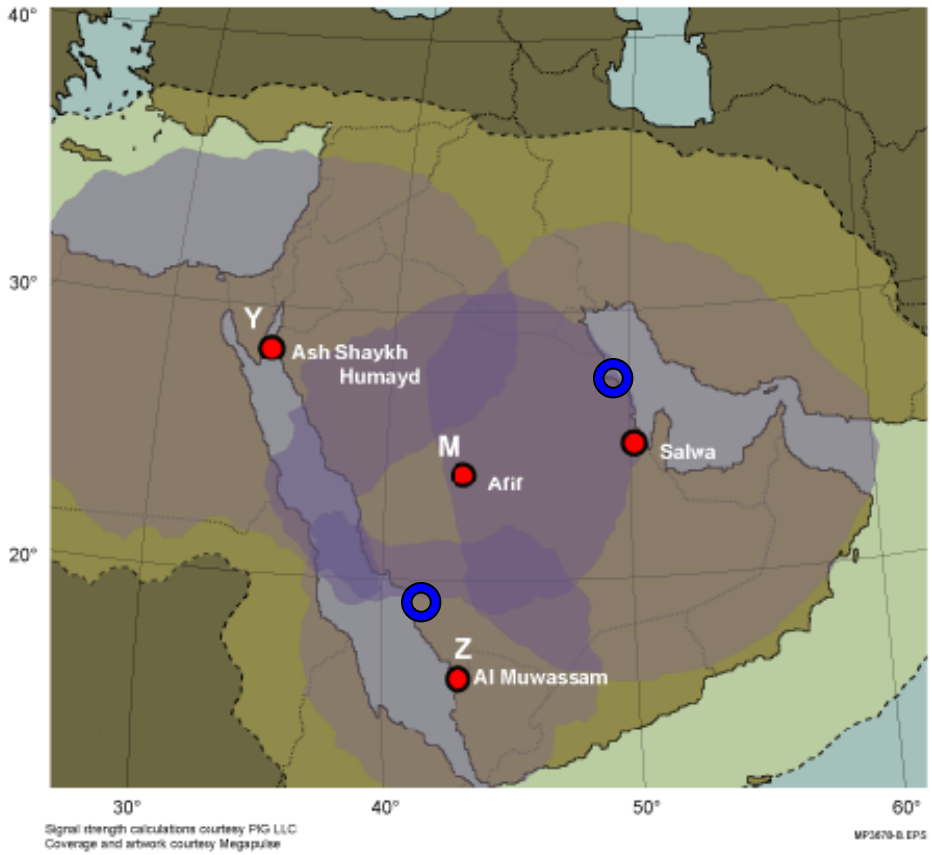
- Saudi Sea Ports Authority (SEAPA) is responsible for the Loran service in Saudi. Contracted O&M is renewed on a three year basis via competitive tender among Saudi firms.
- The latest 3 year contract began in Jan 2007.
- System modernization is part of the scope.
- Included in the current project is:
  - Upgrading system clocks
  - Modernization of Chain Control Equipment
  - Restoring Loran service at Salwa
  - Adding Eurofix to Salwa
- Delivery to be complete by Jan 2008.

Present Saudi Positioning System (SPS) Coverage



- 3 stations, each rated at 1MW
- SAM (LRSII) at Qunfudah, south of Jeddah

Future SPS Coverage



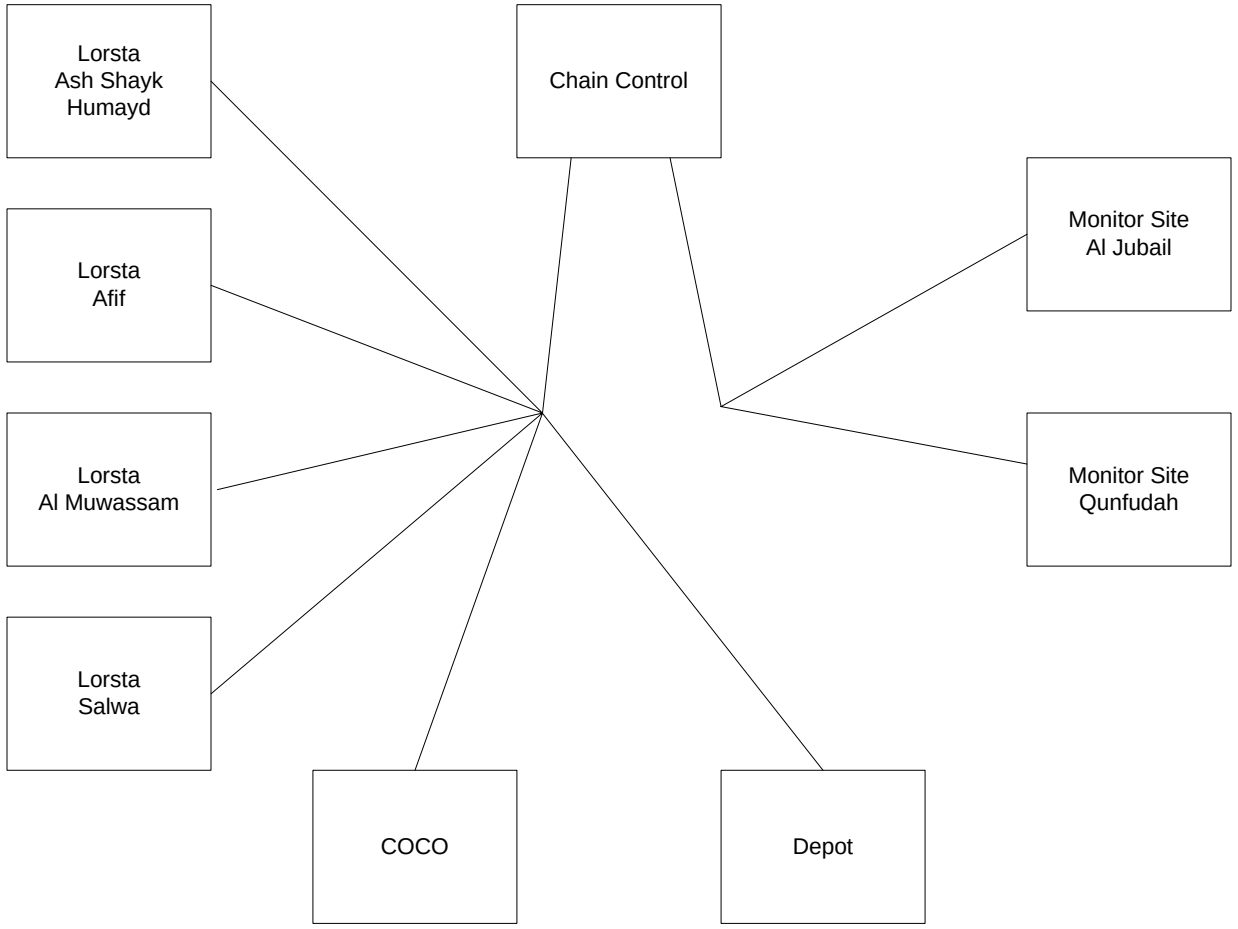
*Outer and inner contours represent 95% and 99% probability of proper message reception and decoding.

- Restoration of 1MW station at Salwa
- Return of Monitor station at Al Jubail

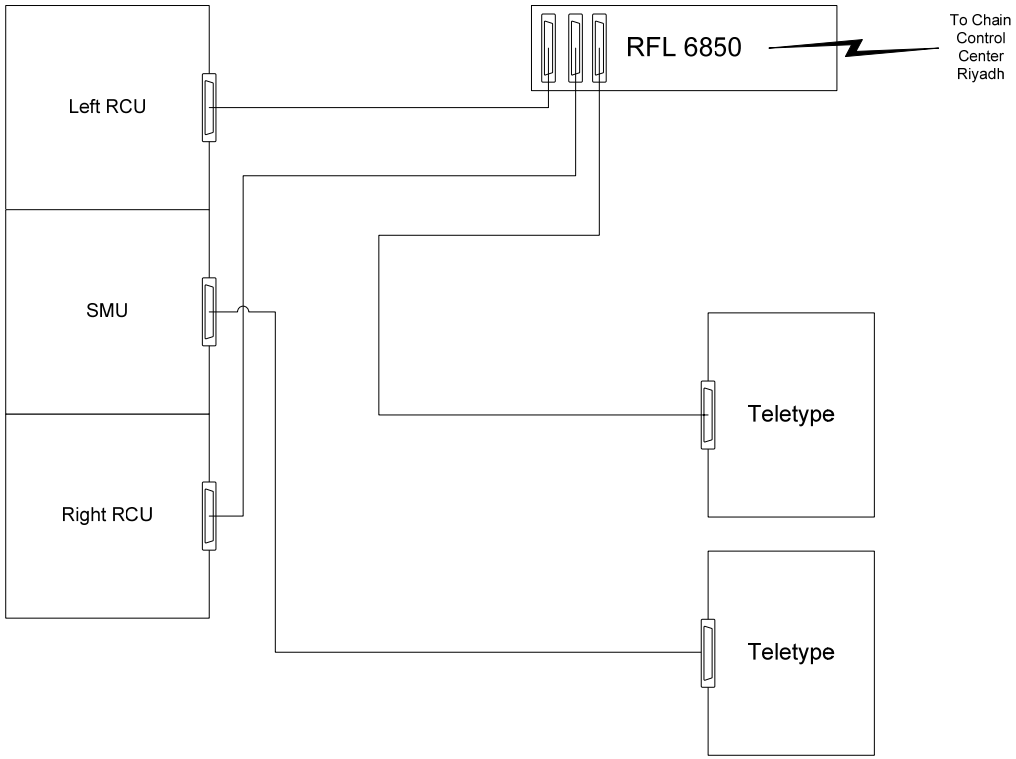
Modernization of Chain Control Equipment

- Replacement hardware and software performs three different functions roughly divided as:
  - Chain Control Station - receives monitor data on a RS-232 data line, processes the data, display the data, display trends determined from the processing of the data, process alarm data, notify the user of such alarms and archive the data in a format which would allow the data to be fully retrieved.
  - Administrative Teletype - currently an ASR43 teletype (with definable addressing) to be replaced with a combination of hardware and software. Future implementation will include a combination of software and hardware to allow for active monitoring and archiving of the SMU messages.
  - SMU logging - An ASR43 teletype logs the output of the Status Monitor Unit (SMU).
- The present Saudi communications system operates at 110 baud. The networks are setup to allow all stations to be online all the time.
- There are two different networks, one for the administrative station traffic, and the other for the monitor station data.

Present Inter-site Communication Diagram

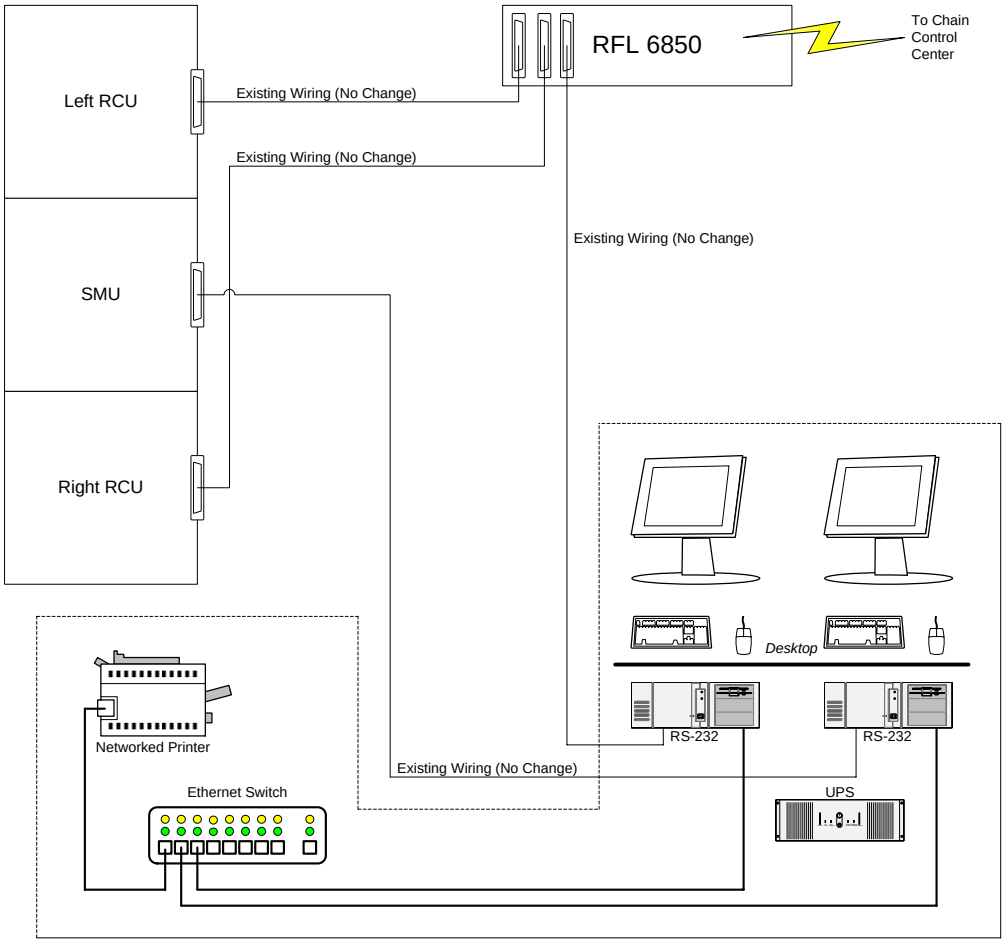


Present Lorsta Communication Interface



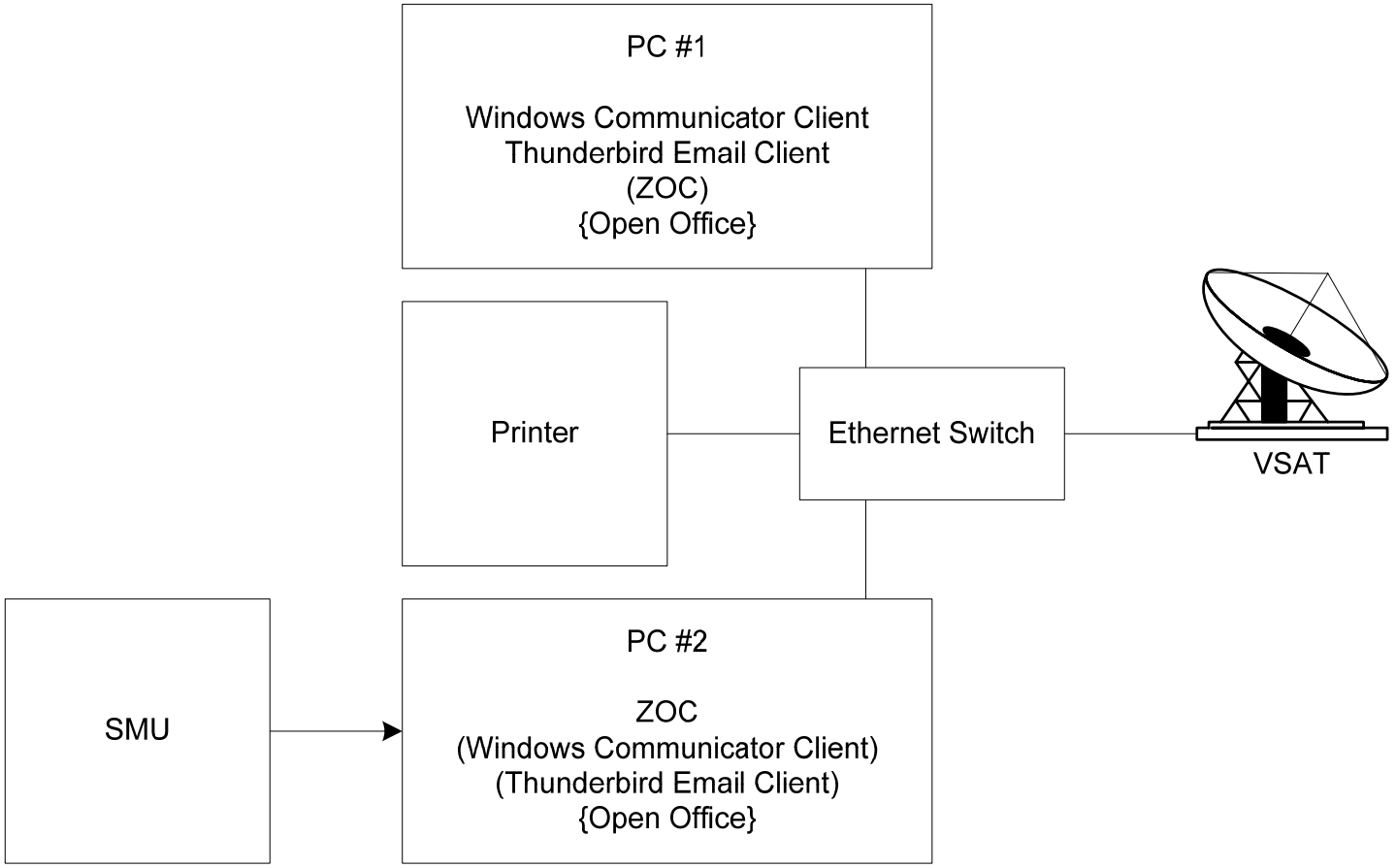
- RFL 6850 converts RS232 to frequency divided channels over a single voice line.

Proposed Lorsta Architecture



- SEAPA decided to eliminate the RFL 6850 and low data rate with VSAT terminals

SMU Logging and Administrative Teletype



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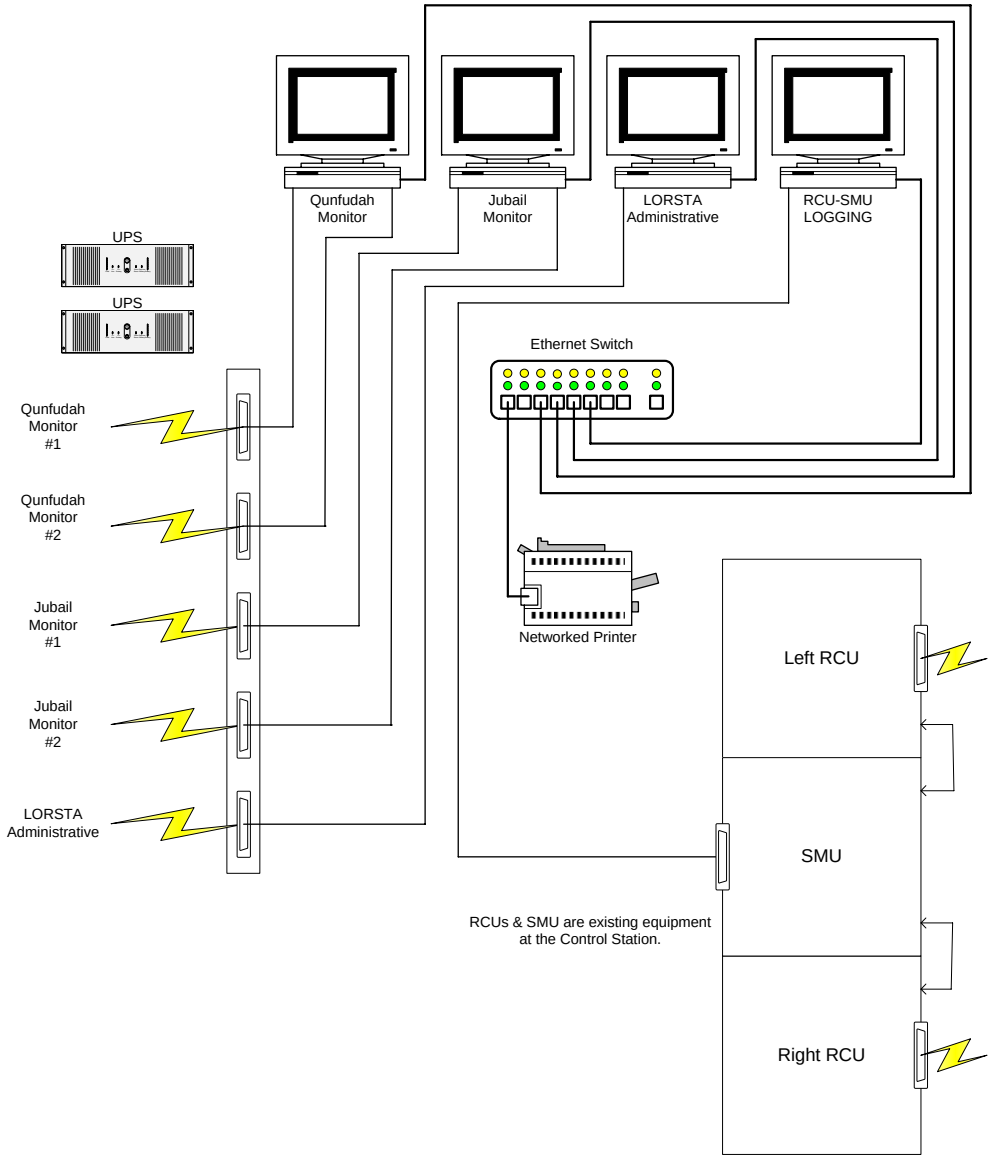
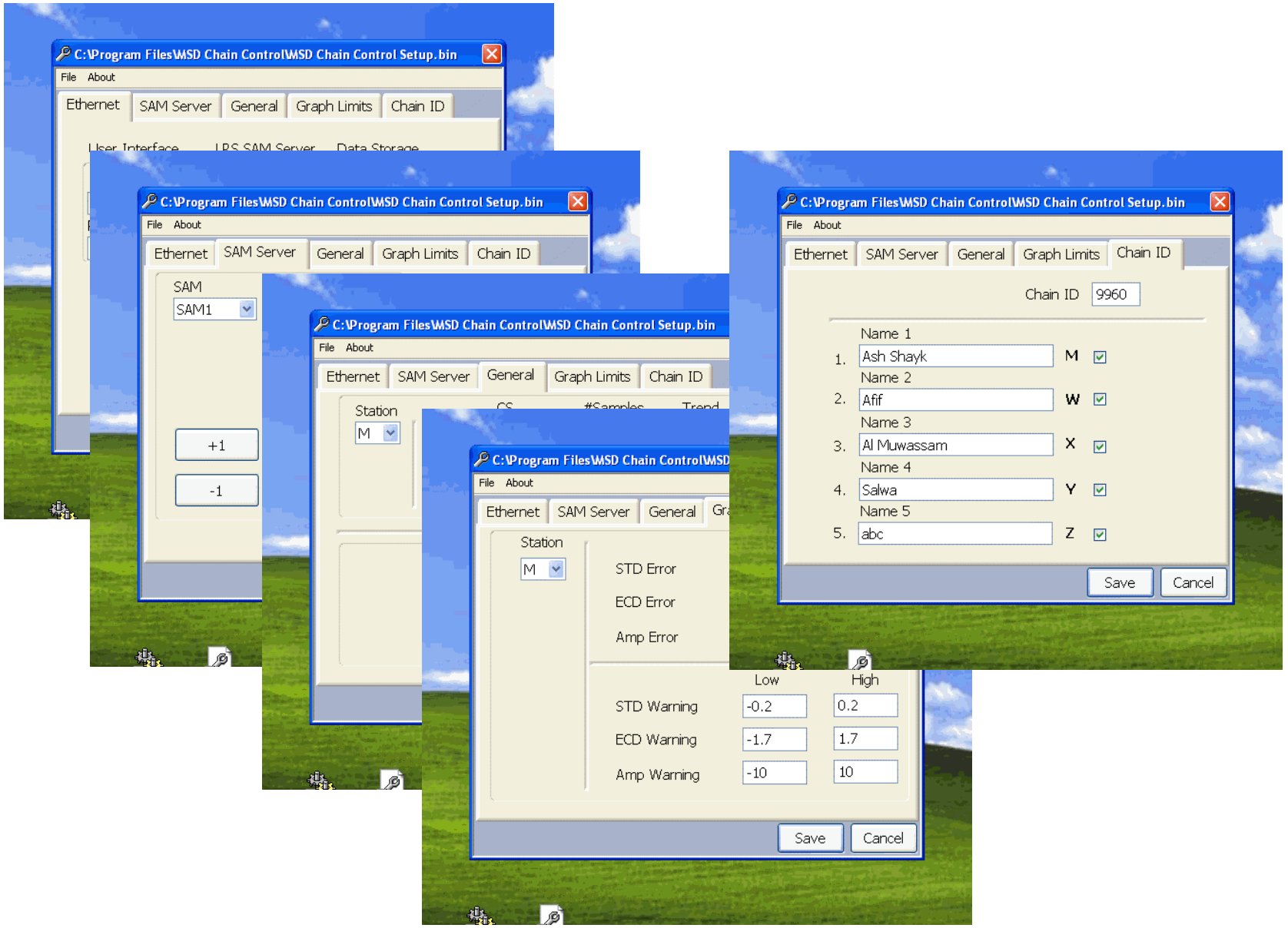
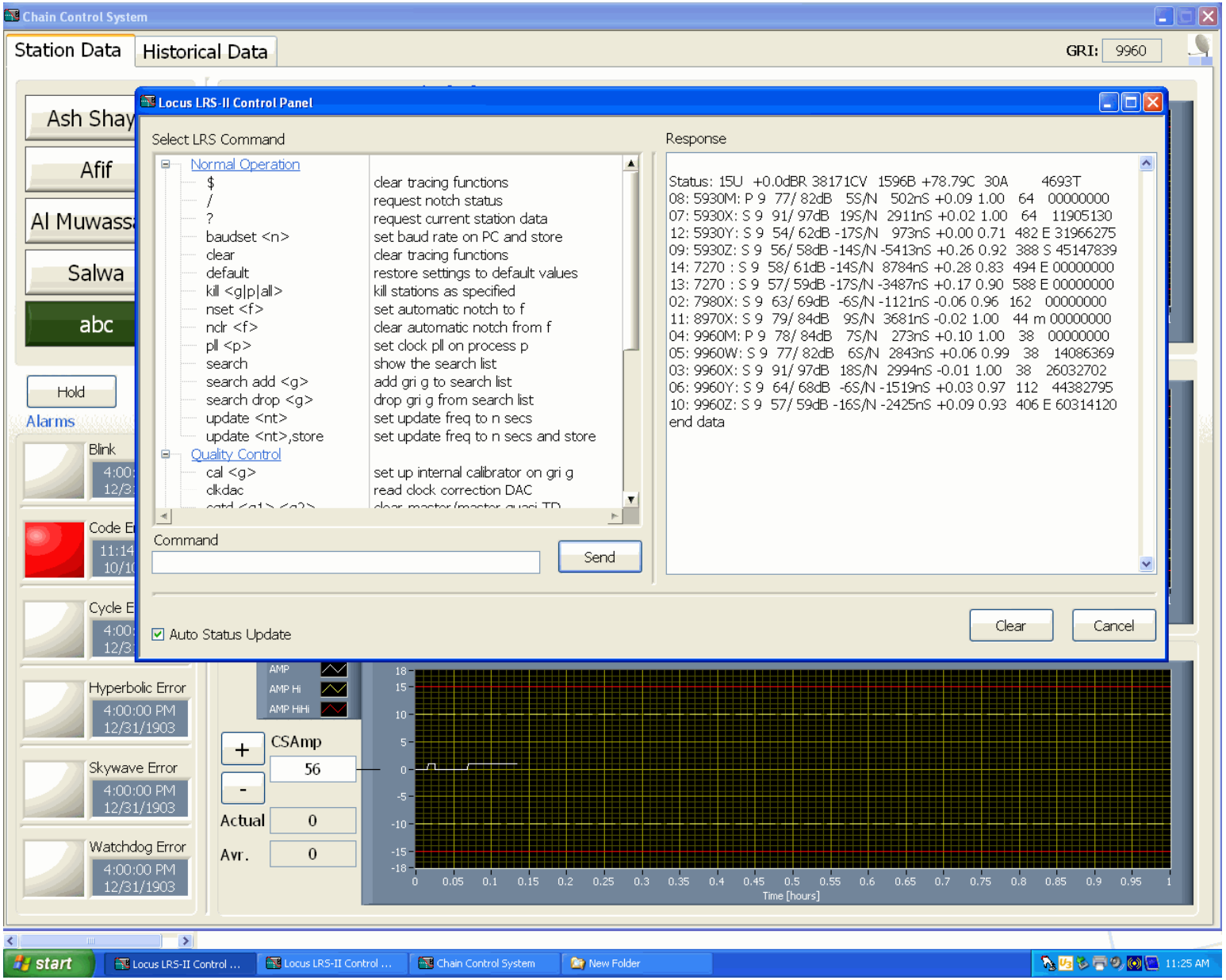
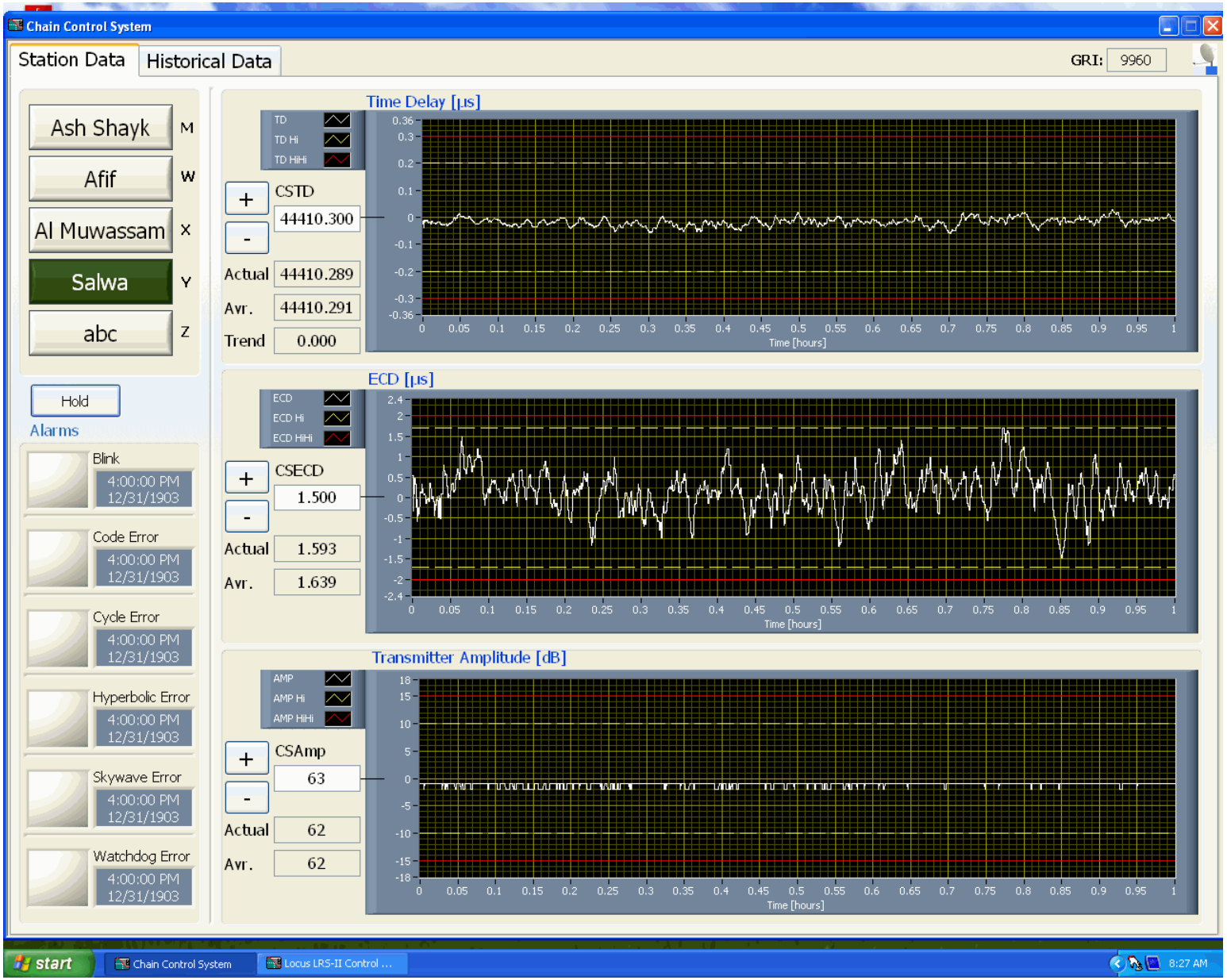
Chain Control

- 4 PCs: 1 each for Monitor sites, 1 administrative, and 1 local RCU SMU logging.
- Config application
- Display Application
- Same admin and logging software apps as at Lorstas




C:\Program Files\MSD Chain Control\MSD Chain Control Setup.bin
File About
Ethernet
SAM Server
General
Graph Limits
Chain ID
SAM
SAM1
+1
-1
Station
M
STD Error
ECD Error
Amp Error
Low
High
STD Warning
-0.2
0.2
ECD Warning
-1.7
1.7
Amp Warning
-10
10
Save
Cancel
Chain ID
9960
Name 1
1. Ash Shayk
M
Name 2
2. Afif
W
Name 3
3. Al Muwassam
X
Name 4
4. Salwa
Y
Name 5
5. abc
Z


Chain Control System
Station Data
Historical Data
GRI: 9960
Ash Shay
Afif
Al Muwass
Salwa
abc
Hold
Alarms
Blink
Code E
Cycle E
Hyperbolic Error
4:00:00 PM
12/31/1903
Skywave Error
4:00:00 PM
12/31/1903
Watchdog Error
4:00:00 PM
12/31/1903
Locus LRS-II Control Panel
Select LRS Command
Normal Operation
$ clear tracing functions
/ request notch status
? request current station data
baudset <n> set baud rate on PC and store
clear clear tracing functions
default restore settings to default values
kill <g|p|all> kill stations as specified
nset <f> set automatic notch to f
ndr <f> clear automatic notch from f
pll <p> set clock pll on process p
search show the search list
search add <g> add gri g to search list
search drop <g> drop gri g from search list
update <nt> set update freq to n secs
update <nt>,store set update freq to n secs and store
Quality Control
cal <g> set up internal calibrator on gri g
clkdac read clock correction DAC
Command
Send
Response
Status: 15U +0.0dBR 38171CV 1596B +78.79C 30A 4693T
08: 5930M: P 9 77/ 82dB 5S/N 502nS +0.09 1.00 64 00000000
07: 5930X: S 9 91/ 97dB 19S/N 2911nS +0.02 1.00 64 11905130
12: 5930Y: S 9 54/ 62dB -17S/N 973nS +0.00 0.71 482 E 31966275
09: 5930Z: S 9 56/ 58dB -14S/N -5413nS +0.26 0.92 388 S 45147839
14: 7270 : S 9 58/ 61dB -14S/N 8784nS +0.28 0.83 494 E 00000000
13: 7270 : S 9 57/ 59dB -17S/N -3487nS +0.17 0.90 588 E 00000000
02: 7980X: S 9 63/ 69dB -6S/N -1121nS -0.06 0.96 162 00000000
11: 8970X: S 9 79/ 84dB 9S/N 3681nS -0.02 1.00 44 m 00000000
04: 9960M: P 9 78/ 84dB 7S/N 273nS +0.10 1.00 38 00000000
05: 9960W: S 9 77/ 82dB 6S/N 2843nS +0.06 0.99 38 14086369
03: 9960X: S 9 91/ 97dB 18S/N 2994nS -0.01 1.00 38 26032702
06: 9960Y: S 9 64/ 68dB -6S/N -1519nS +0.03 0.97 112 44382795
10: 9960Z: S 9 57/ 59dB -16S/N -2425nS +0.09 0.93 406 E 60314120
end data
Auto Status Update
Clear
Cancel
AMP
AMP Hi
AMP HiHi
CSAmp
56
Actual 0
Avr. 0
Time [hours]
start
Locus LRS-II Control ...
Locus LRS-II Control ...
Chain Control System
New Folder
11:25 AM


Chain Control System
Station Data
Historical Data
GRI: 9960
Ash Shayk
Afif
Al Muwassam
Salwa
abc
M
W
X
Y
Z
Hold
Alarms
Blink
4:00:00 PM 12/31/1903
Code Error
4:00:00 PM 12/31/1903
Cycle Error
4:00:00 PM 12/31/1903
Hyperbolic Error
4:00:00 PM 12/31/1903
Skywave Error
4:00:00 PM 12/31/1903
Watchdog Error
4:00:00 PM 12/31/1903
Time Delay [µs]
TD
TD Hi
TD HiHi
CSTD
44410.300
Actual 44410.289
Avr. 44410.291
Trend 0.000
Time [hours]
ECD [µs]
ECD
ECD Hi
ECD HiHi
CSECD
1.500
Actual 1.593
Avr. 1.639
Time [hours]
Transmitter Amplitude [dB]
AMP
AMP Hi
AMP HiHi
CSAmp
63
Actual 62
Avr. 62
Time [hours]
start
Chain Control System
Locus LRS-II Control ...
8:27 AM

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June Trip to Riyadh by John Allen, Megapulse Field Engineer

- Purpose was two fold:
  - Training on replacement Lordac system
  - Site survey of Chain Control Center

- Upon arrival, rerouted to Salwa

ANSUL
Carrier

Summary

- Eurofix hardware shipped in June.
- Chain control hardware shipped in August.
- Due to unavailability of Salwa, delivery of complete 4 station system can not be finalized, requesting contract modification.
- Estimated delay in restoration of Salwa may be as long as 12 months.

Questions?