Fugro
MultiFix 4 Positioning & QC software description
- 22 November 2004, Issue 3 -

1. INTRODUCTION

MultiFix 4 is Fugro's fourth generation real time position computation and QC program. It is an integral part of the SkyFix XP and SkyFix Premier service but can also be used with the standard SkyFix service. MultiFix 4 was released to support Fugro latest generation positioning service, SkyFix XP.

MultiFix 4 is one of a series of programs, which includes other tools and utilities with a similar user interface and layout structure, like static, and dynamic position comparison programs, a correction monitors program, a terminal program and a replay utility.

MultiFix 4 takes in Almanac, Ephemeris and Raw Code and Carrier measurements from a single or dual frequency GPS receiver (or, for replay, from logged files).

It takes in RTCM SC104 Version 2 differential correction messages from one or more RTCM Correction delivery systems. It takes in Fugro Proprietary RTCM Type 11, 48, 49 and 50 orbit and clock corrections for use with SkyFix XP.

It takes in RTCM Type 15 or Fugro Proprietary RTCM Type 55 Ionospheric range corrections generated at selected SkyFix Premier reference stations and broadcast via the Fugro global network of high and low power L-Band beams.

Some of the key features are:

- There is no limit on the number of RTCM correction delivery systems
- There is no limit on the number of RTCM differential reference stations
- There is no limit on the number of computations
- Each computation can employ corrections from any combination of reference stations available (SkyFix XP only requires one correction source as it is not restricted to individual reference stations)
- Uses the EGM96 geoid/spheroid separation model.
- The computations with statistical evaluation based upon the UKOOA recommendations
- Multiple XP Correction sources
- Capable of logging and replaying data
- There is no limit on the number of outputs
- There is no limit on the number of view windows
- The view windows can be customised
- Extra user-specific NMEA output formats can be defined
- TCP/IP communication via sockets for GPS, RTCM and position data transfer between networked computers

MultiFix 4 has been designed in a modular fashion such that data is passed between modules as if over a computer network. The core module MultiFix 4 performs the computation of position. Additional modules are available and more will be made available in the future. While a single computer can be used, the various modules will equally be able to be run on different computers, provided there is a network interconnection.

The RTCM corrections that are generated at reference stations are contaminated by a variety of error components, one of which is Ionospheric delay. The Ionospheric delay is currently more variable because of greater sun spot activity. MultiFix's standard computation uses the Klobuchar Ionospheric delay model. This model is updated periodically but is not responsive to the current short-term variability. MultiFix 4 has an additional calculation option when working with dual frequency receivers and in receipt of Type 15 or 55 RTCM messages. With dual frequency receivers, estimates can be made of the Ionospheric delay by examining the differences between the measurements from the two frequencies. If the same procedure for estimation of Ionospheric delay is performed at the reference stations and on the mobile, both the RTCM corrections and the pseudo-ranges can have the Ionospheric delay removed, effectively providing an Iono-Free DGPS position solution.

As with all Differential positioning systems, they are restricted by range from reference stations, typically 2000km. Fugro has overcome this limitation with the launch of SkyFix XP.

SkyFix XP approaches the differential technique from a totally different perspective. The global network of reference stations is used to track all satellites continuously throughout their orbit. These global observation sets are then combined into a single correction process. This process identifies, isolates and measures each individual source of error and provides a complete set of orbit corrections for each GPS satellite. As such this measurement set can be used at any location, regardless of distance to a reference station, making the system truly global

The remaining tropospheric and ionospheric error sources are estimated or eliminated at the user end. The Tropospheric error is removed utilising a Tropospheric modelling technique as part of the position calculation within MultiFix 4. Whilst the ionospheric delay is eliminated by using a dual frequency GPS receiver at the users location. Multipath and receiver noise at the users location are limited by using the carrier phase observations.

2. MINIMUM HARDWARE REQUIREMENT

MultiFix 4 requires a PC running Windows NT, Windows 2000 or Windows XP. A 600 MHz Pentium III (or Equivalent) with 128MB RAM is recommended. For configurations using 15 (total for all RTCM sources) or more reference stations it is recommended that available memory be increased to 256MB Ram. Further, a graphics resolution of at least 1024 by 768 pixels is recommended in order to achieve maximum clarity of all the graphics displays.

For the installation of the applications, ideally the PC should have a CD-ROM drive. It is possible to create and install from floppies but beware that 8 floppies are required.

MultiFix 4 needs a single frequency GPS receiver, such as the Ashtech DG16, Trimble 4000DS, BD112, DSM or DSM212, to run in standard SkyFix mode and a dual frequency GPS receiver, such as the Ashtech ZX-Sensor or Trimble MS750/BD750, 4000 SSE/I to run in SkyFix XP and Premier mode.

Assuming data is not being input or output over network sockets, as a minimum the PC needs 1 COM port for two-way communications to the GPS receiver and a second COM port for the input of RTCM corrections. Given that the second port is for input only, by using a special breakout cable, the same COM port used for the RTCM input can also be used for the output of position messages.

If there is more than one RTCM delivery system or data is to be output on several ports, then additional COM ports will be required. These can be any proprietary asynchronous serial board (or PCMCIA card) the Windows drivers for which, allow the board’s/card’s ports to be mapped as additional COM ports.

3. HARDWARE INTERCONNECTION

3.1 SkyFix Single Frequency

The following diagrams outlines the hardware requirements and interconnections for a standard single-frequency SkyFix setup using Fugro MK3 or MK5 decoders and an Ashtech DG16 GPS receiver.

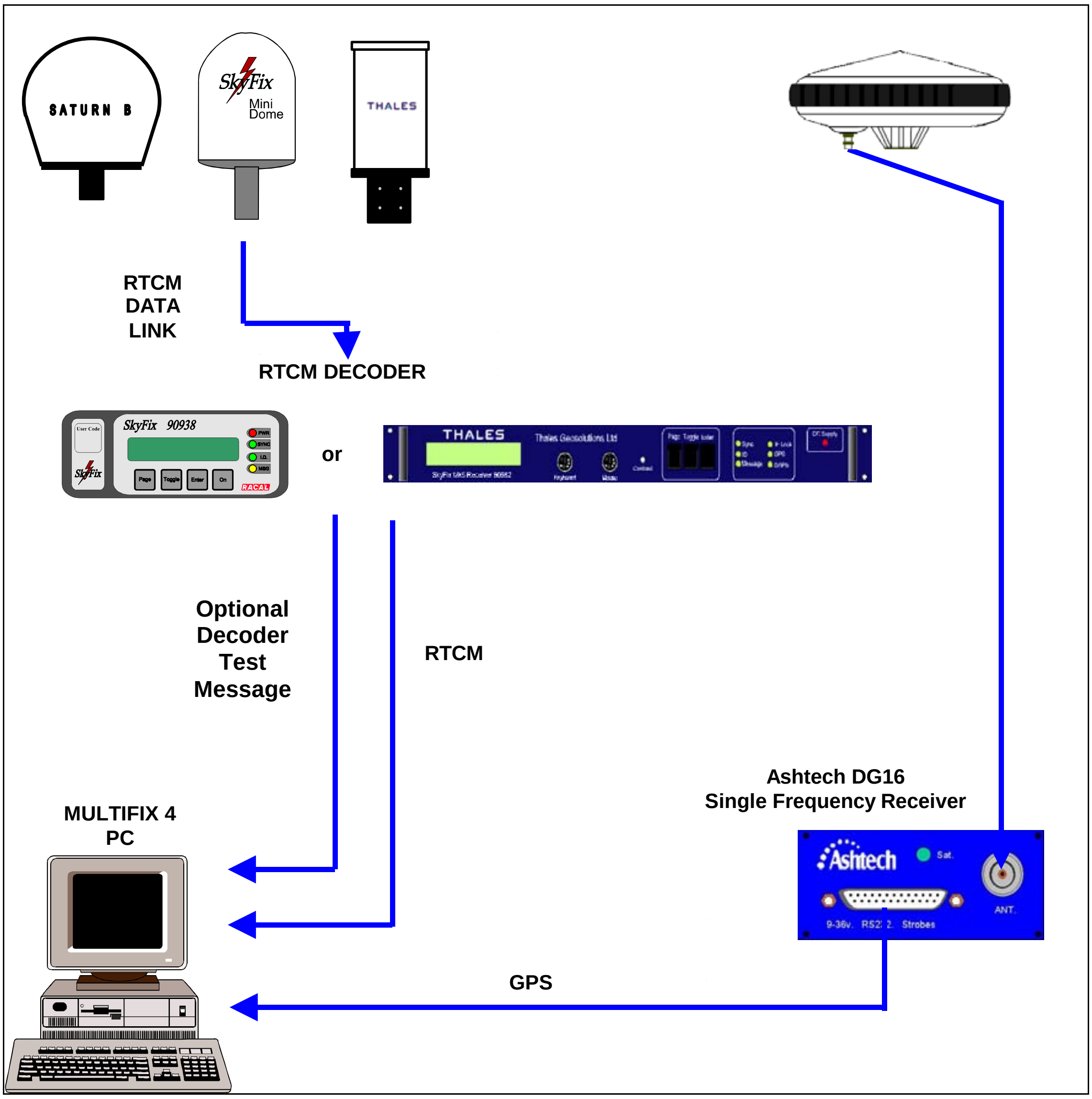

SATURN B
SkyFix
Mini Dome
THALES
RTCM
DATA
LINK
RTCM DECODER
SkyFix 90938
RACAL
or
THALES
Thales GeoSolutions Ltd
Optional
Decoder
Test
Message
RTCM
Ashtech DG16
Single Frequency Receiver
Ashtech
Sat.
ANT.
9-36v.
RS232
Strobes
MULTIFIX 4
PC
GPS

Figure 1 Example Interconnection with an Ashtech DG16 Receiver

3.2 SkyFix XP / Premier Dual - Frequency

The following diagrams outlines the hardware requirements and interconnections for a SkyFix XP or Premier dual-frequency setup using an Ashtech ZX Sensor.

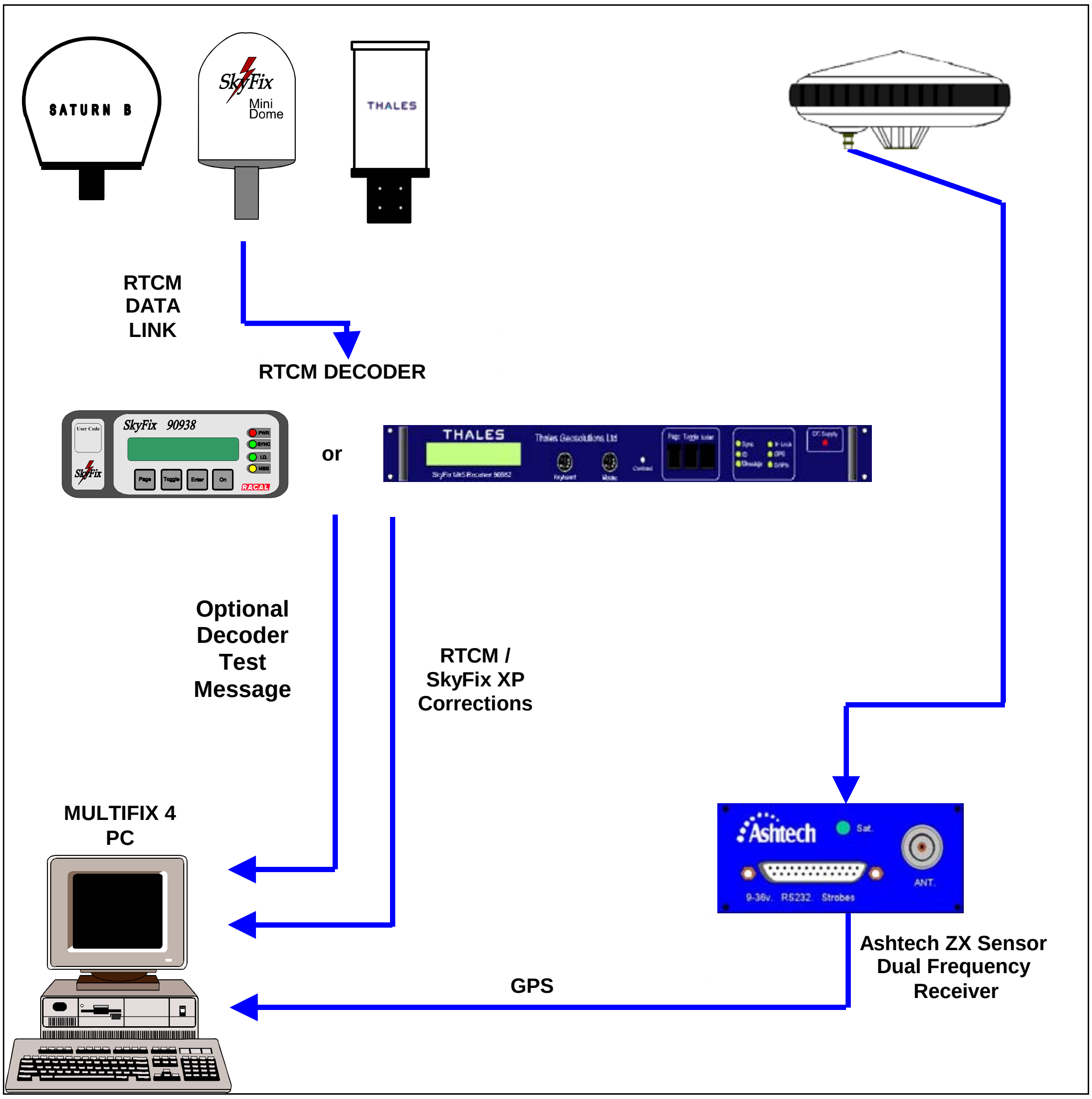

SATURN B
SkyFix Mini Dome
THALES
RTCM DATA LINK
RTCM DECODER
SkyFix 90938
or
THALES
Optional Decoder Test Message
RTCM / SkyFix XP Corrections
MULTIFIX 4 PC
Ashtech
GPS
Ashtech ZX Sensor Dual Frequency Receiver

Figure 2. Example Interconnection with Ashtech ZX Sensor

The following diagrams outlines the hardware requirements and interconnections for a setup using an embedded Ashtech DG14/16 receiver.

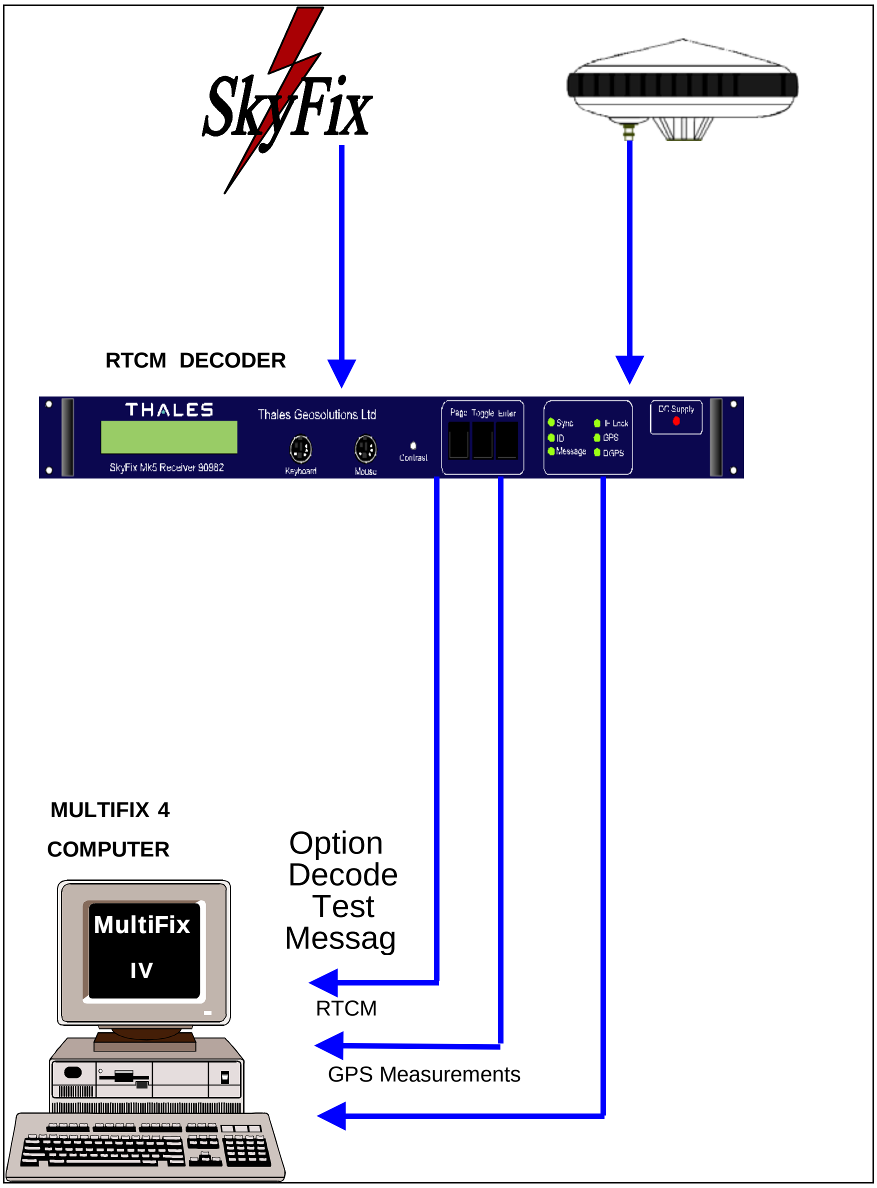

SkyFix
RTCM DECODER
THALES
Thales Geosolutions Ltd
SkyFix Mk5 Receiver 90982
Keyboard
Mouse
Contrast
Page Toggle Enter
Sync
ID
Message
IF Lock
GPS
DGPS
DC Supply
MULTIFIX 4
COMPUTER
MultiFix
IV
Option
Decode
Test
Messag
RTCM
GPS Measurements

Figure 3 Example Interconnection with MK5 and internal GPS Receiver

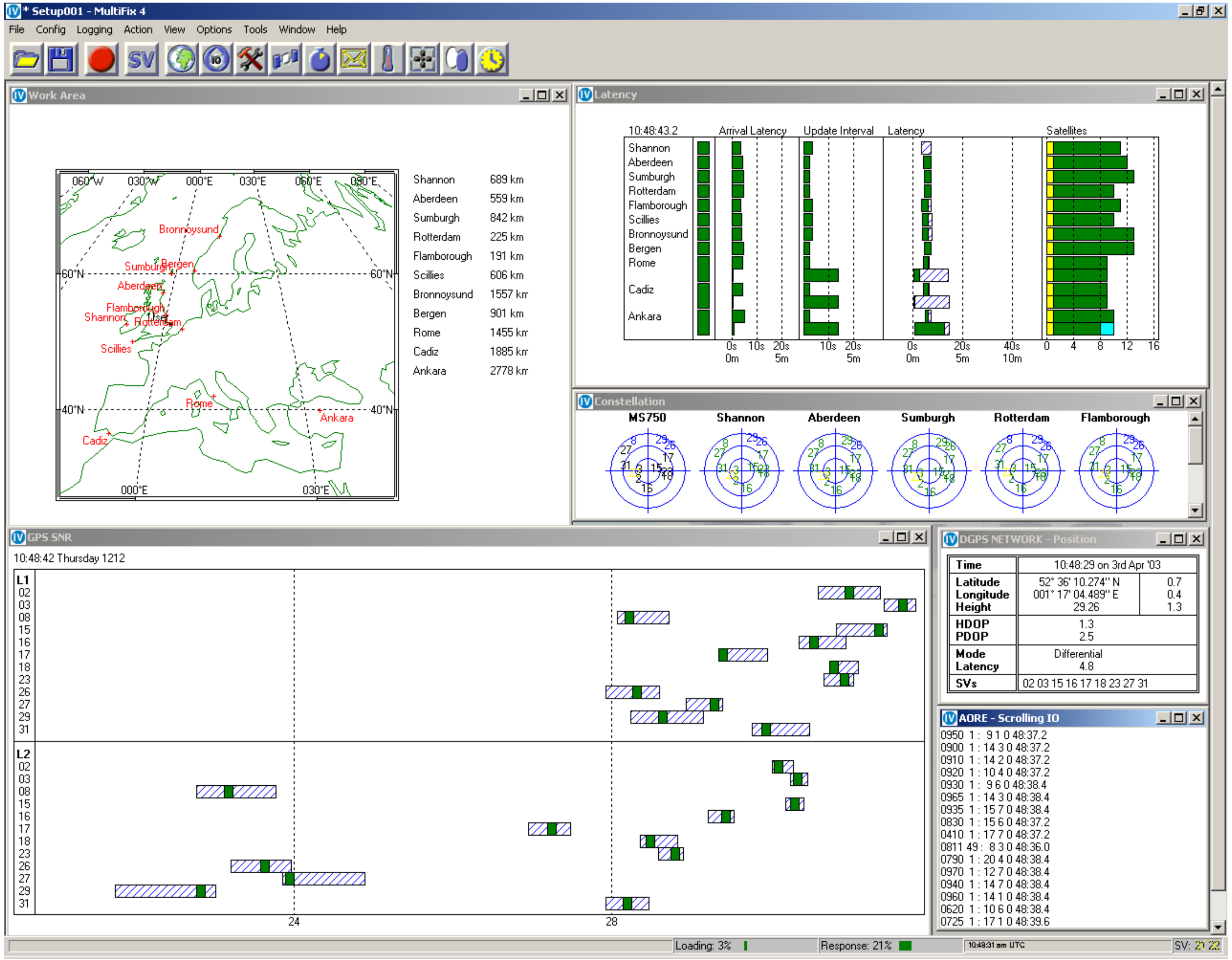
4. MULTIFIX 4 POSITIONING AND QC DISPLAYS

MultiFix 4 has a large number of features to accomodate the user requirements of highly accurate positions with QC information and outputs in different formats. MultiFix 4 runs in a Windows environment, which allows the user to design his preferred screen layout by opening, sizing and placing the numerous displays that are available. Examples of the various displays can be found below. Other features are:

- unlimited number of single frequency and dual frequency DGPS calculations
- unlimited number of RTCM inputs
- unlimited number of position outputs
- user configurable graphical displays
- user defined NMEA outputs
- TCP/IP communication via sockets for GPS, RTCM and position data transfer between networked computers

This MultiFix 4 display shows:

- a map of the work area with the location of the user and the available reference stations
- the SNR values of the GPS satellites
- constellation plots of the corrections of each of the reference stations
- a position display of one of the solutions
- terminal displays of the GPS raw data stream and one of the RTCM input streams
- latency and correction quality for each of the available reference stations


* Setup001 - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
SV
Work Area
060°W
030°W
000°E
030°E
060°E
090°E
60°N
40°N
Bronnoysund
Sumburgh
Bergen
Aberdeen
Flamborough
Shannon
Rotterdam
Scillies
Rome
Cadiz
Ankara
Latency
10:48:43.2
Arrival Latency
Update Interval
Latency
Satellites
0s
10s
20s
0m
5m
40s
10m
0
4
8
12
16
Constellation
MS750
GPS SNR
10:48:42 Thursday 1212
L1
L2
24
28
Loading: 3%
Response: 21%
10:48:31 am UTC
SV: 21 22

Shannon	689 km
Aberdeen	559 km
Sumburgh	842 km
Rotterdam	225 km
Flamborough	191 km
Scillies	606 km
Bronnoysund	1557 km
Bergen	901 km
Rome	1455 km
Cadiz	1885 km
Ankara	2778 km

DGPS NETWORK - Position

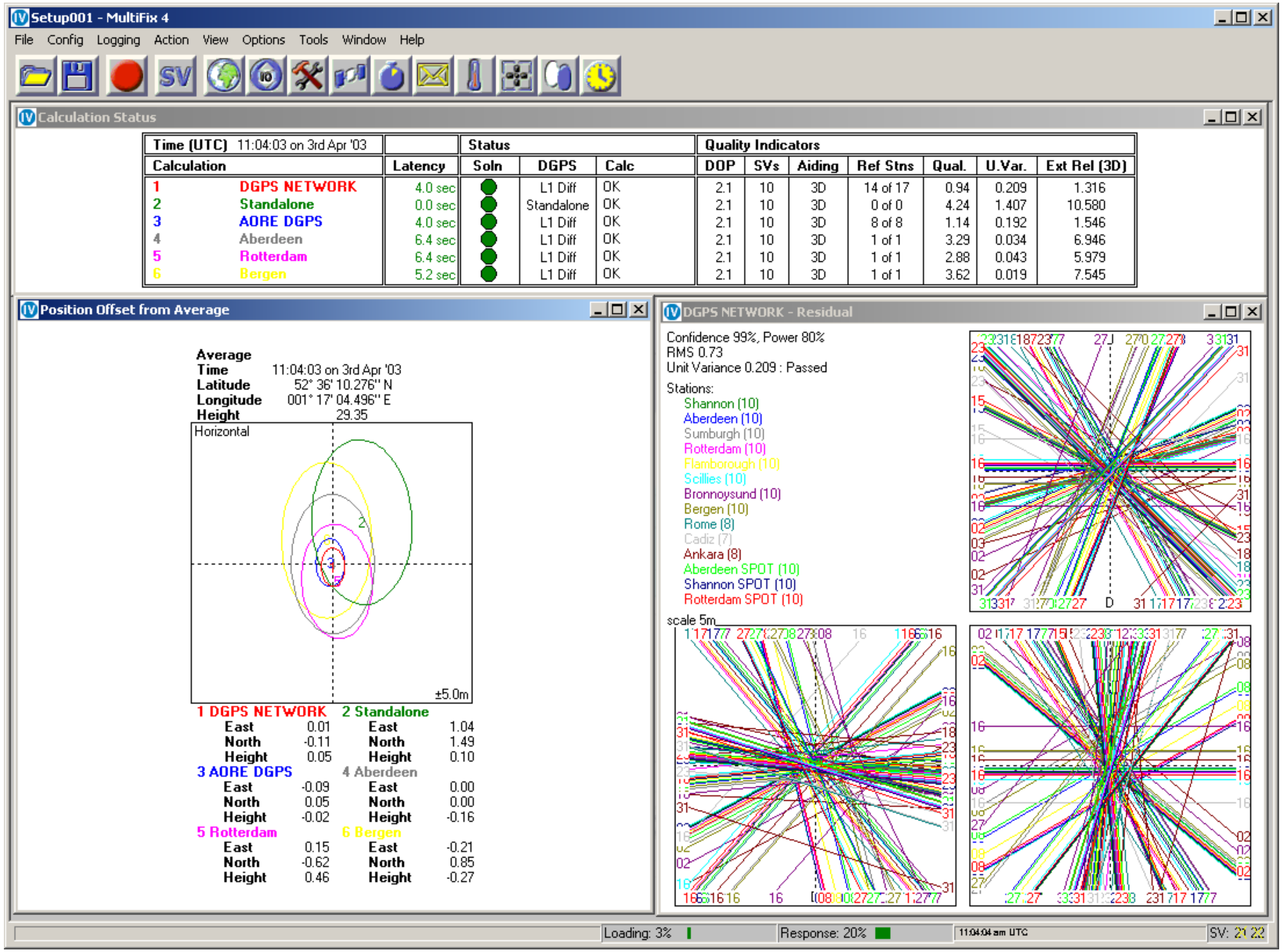
Time	10:48:29 on 3rd Apr '03	
Latitude **Longitude** **Height**	52° 36' 10.274'' N 001° 17' 04.489'' E 29.26	0.7 0.4 1.3
HDOP **PDOP**	1.3 2.5	
Mode **Latency**	Differential 4.8	
SVs	02 03 15 16 17 18 23 27 31	

AORE - Scrolling IO

```
0950  1 :  9 1 0 48:37.2
0900  1 : 14 3 0 48:37.2
0910  1 : 14 2 0 48:37.2
0920  1 : 10 4 0 48:37.2
0930  1 :  9 6 0 48:38.4
0965  1 : 14 3 0 48:38.4
0935  1 : 15 7 0 48:38.4
0830  1 : 15 6 0 48:37.2
0410  1 : 17 7 0 48:37.2
0811 49 :  8 3 0 48:36.0
0790  1 : 20 4 0 48:38.4
0970  1 : 12 7 0 48:38.4
0940  1 : 14 7 0 48:38.4
0960  1 : 14 1 0 48:38.4
0620  1 : 10 6 0 48:38.4
0725  1 : 17 1 0 48:39.6
```

This MultiFix 4 display shows:

- satellite residual plots and solution quality information
- position offsets and error ellipses
- summary of calculation status of all solutions with unit variance and quality indicator


Setup001 - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
SV
Calculation Status
Position Offset from Average
DGPS NETWORK - Residual
Horizontal
±5.0m
1
2
3
5
6
Loading: 3%
Response: 20%
11:04:04 am UTC
SV: 21 22

Time (UTC) 11:04:03 on 3rd Apr '03		Status			Quality Indicators						
Calculation	Latency	Soln	DGPS	Calc	DOP	SVs	Aiding	Ref Stns	Qual.	U.Var.	Ext Rel (3D)
1 DGPS NETWORK	4.0 sec	●	L1 Diff	OK	2.1	10	3D	14 of 17	0.94	0.209	1.316
2 Standalone	0.0 sec	●	Standalone	OK	2.1	10	3D	0 of 0	4.24	1.407	10.580
3 AORE DGPS	4.0 sec	●	L1 Diff	OK	2.1	10	3D	8 of 8	1.14	0.192	1.546
4 Aberdeen	6.4 sec	●	L1 Diff	OK	2.1	10	3D	1 of 1	3.29	0.034	6.946
5 Rotterdam	6.4 sec	●	L1 Diff	OK	2.1	10	3D	1 of 1	2.88	0.043	5.979
6 Bergen	5.2 sec	●	L1 Diff	OK	2.1	10	3D	1 of 1	3.62	0.019	7.545

Average

Time	11:04:03 on 3rd Apr '03
Latitude	52° 36' 10.276'' N
Longitude	001° 17' 04.496'' E
Height	29.35

1 DGPS NETWORK		**2 Standalone**	
East	0.01	**East**	1.04
North	-0.11	**North**	1.49
Height	0.05	**Height**	0.10
3 AORE DGPS		**4 Aberdeen**	
East	-0.09	**East**	0.00
North	0.05	**North**	0.00
Height	-0.02	**Height**	-0.16
5 Rotterdam		**6 Bergen**	
East	0.15	**East**	-0.21
North	-0.62	**North**	0.85
Height	0.46	**Height**	-0.27

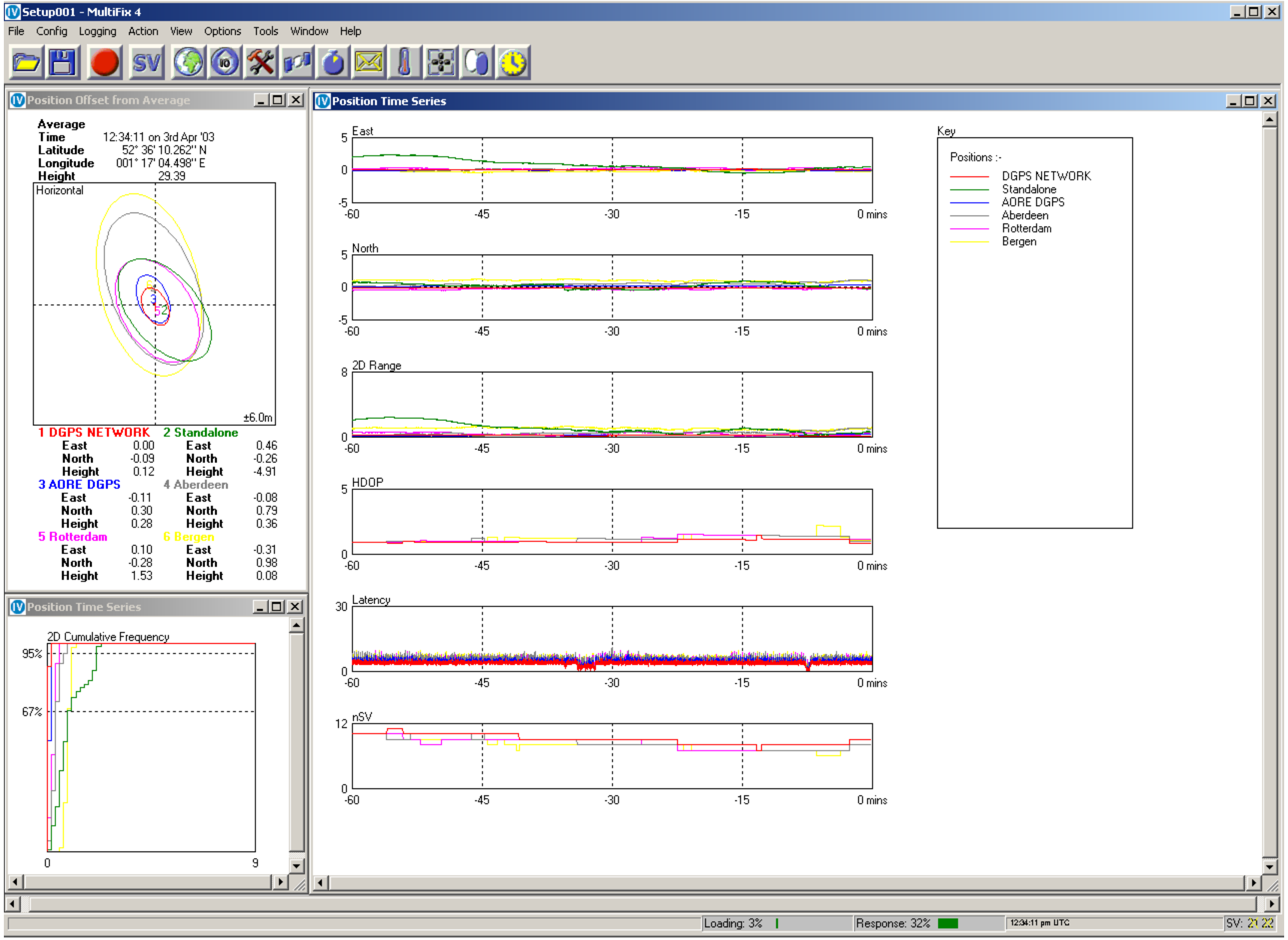
Confidence 99%, Power 80%
RMS 0.73
Unit Variance 0.209 : Passed

Stations:
- Shannon (10)
- Aberdeen (10)
- Sumburgh (10)
- Rotterdam (10)
- Flamborough (10)
- Scillies (10)
- Bronnoysund (10)
- Bergen (10)
- Rome (8)
- Cadiz (7)
- Ankara (8)
- Aberdeen SPOT (10)
- Shannon SPOT (10)
- Rotterdam SPOT (10)

scale 5m

This MultiFix 4 display shows:

- Position, Geometry and Latency Time Series Plots
- 2D Cumulative Frequency histogram
- Solution position offsets and error ellipses


Setup001 - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
SV
Position Offset from Average
Horizontal
±6.0m
Position Time Series
2D Cumulative Frequency
95%
67%
0
9
East
North
2D Range
HDOP
Latency
nSV
5
0
-5
8
30
12
-60
-45
-30
-15
0 mins
Key
Positions :-
DGPS NETWORK
Standalone
AORE DGPS
Aberdeen
Rotterdam
Bergen

Average
Time 12:34:11 on 3rd Apr '03
Latitude 52° 36' 10.262" N
Longitude 001° 17' 04.498" E
Height 29.39

1 DGPS NETWORK
East 0.00
North -0.09
Height 0.12

2 Standalone
East 0.46
North -0.26
Height -4.91

3 AORE DGPS
East -0.11
North 0.30
Height 0.28

4 Aberdeen
East -0.08
North 0.79
Height 0.36

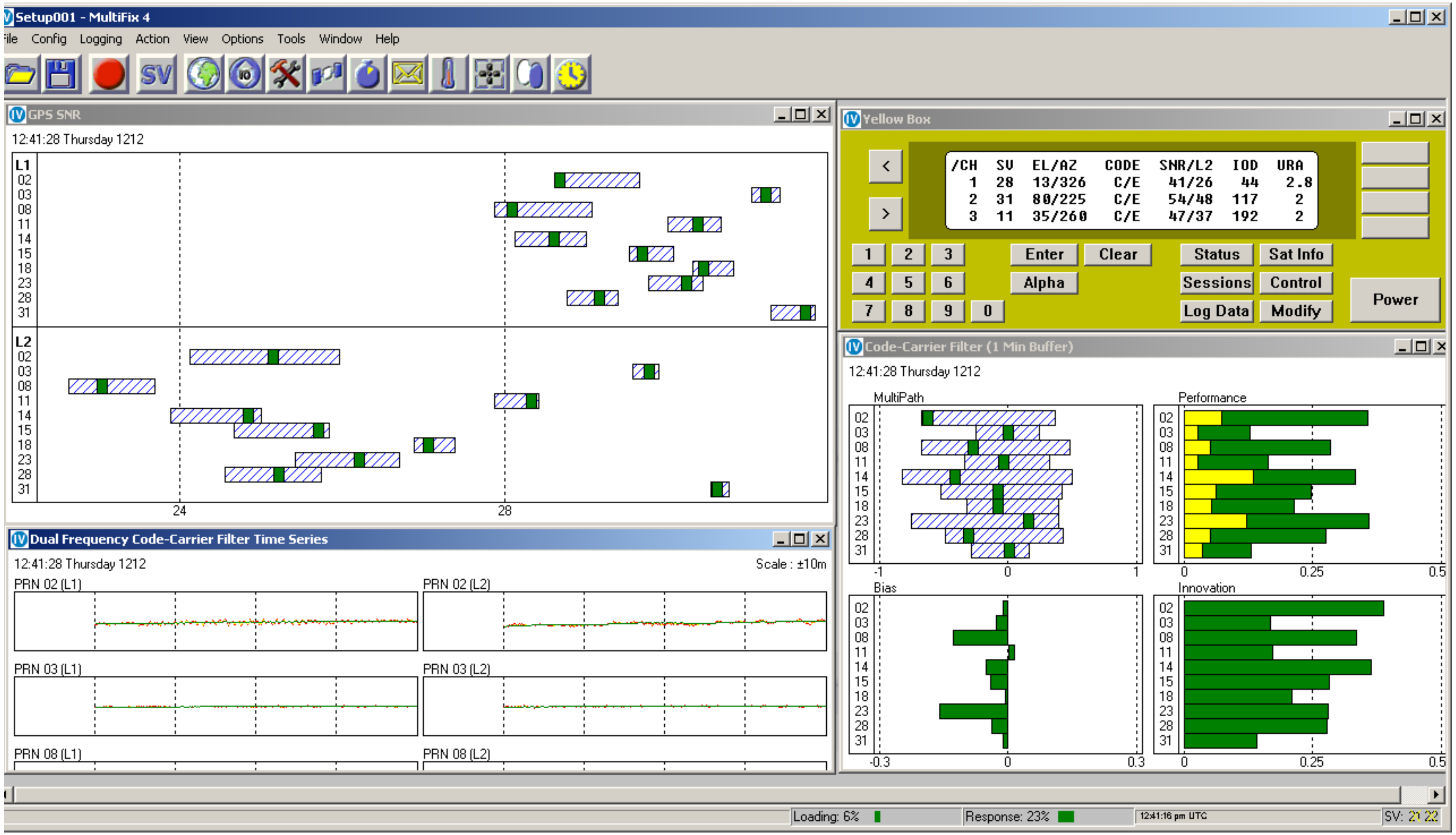
5 Rotterdam
East 0.10
North -0.28
Height 1.53

6 Bergen
East -0.31
North 0.98
Height 0.08

Loading: 3%
Response: 32%
12:34:11 pm UTC
SV: 21 22

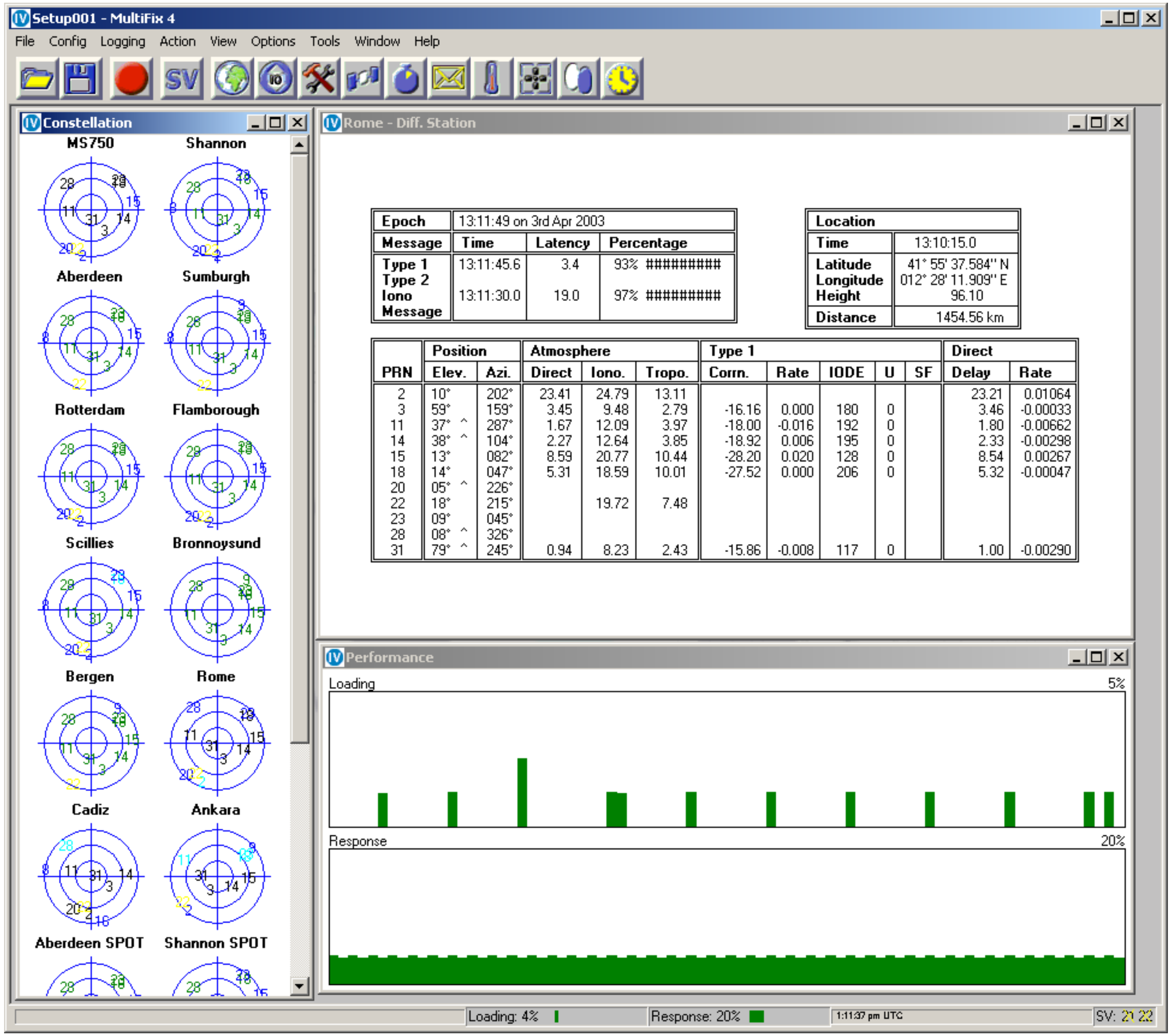
This MultiFix 4 display shows:

- the Code-Carrier filter graphs of the L1 and L2 GPS observations
- the front pannel of the GPS receiver
- the SNR values of the GPS satellites
- the activity of the Code-Carrier filter


```
/CH  SV  EL/AZ   CODE  SNR/L2  IOD  URA
 1   28  13/326  C/E   41/26    44  2.8
 2   31  80/225  C/E   54/48   117   2
 3   11  35/260  C/E   47/37   192   2
```
Setup001 - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
GPS SNR
12:41:28 Thursday 1212
L1
02
03
08
11
14
15
18
23
28
31
L2
02
03
08
11
14
15
18
23
28
31
24
28
Yellow Box
<
>
1
2
3
4
5
6
7
8
9
0
Enter
Clear
Alpha
Status
Sat Info
Sessions
Control
Log Data
Modify
Power
Code-Carrier Filter (1 Min Buffer)
12:41:28 Thursday 1212
MultiPath
-1
0
1
Performance
0
0.25
0.5
Bias
-0.3
0
0.3
Innovation
0
0.25
0.5
Dual Frequency Code-Carrier Filter Time Series
12:41:28 Thursday 1212
Scale : ±10m
PRN 02 (L1)
PRN 02 (L2)
PRN 03 (L1)
PRN 03 (L2)
PRN 08 (L1)
PRN 08 (L2)
Loading: 6%
Response: 23%
12:41:16 pm UTC
SV: 21 22

This MultiFix 4 display shows:

- constellation plots of the corrections of each of the reference stations
- table with differential station correction information
- hardware processor Performance table


Setup001 - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
Constellation
MS750
Shannon
Aberdeen
Sumburgh
Rotterdam
Flamborough
Scillies
Bronnoysund
Bergen
Rome
Cadiz
Ankara
Aberdeen SPOT
Shannon SPOT
Rome - Diff. Station
Performance
Loading
5%
Response
20%
Loading: 4%
Response: 20%
1:11:37 pm UTC
SV: 21 22

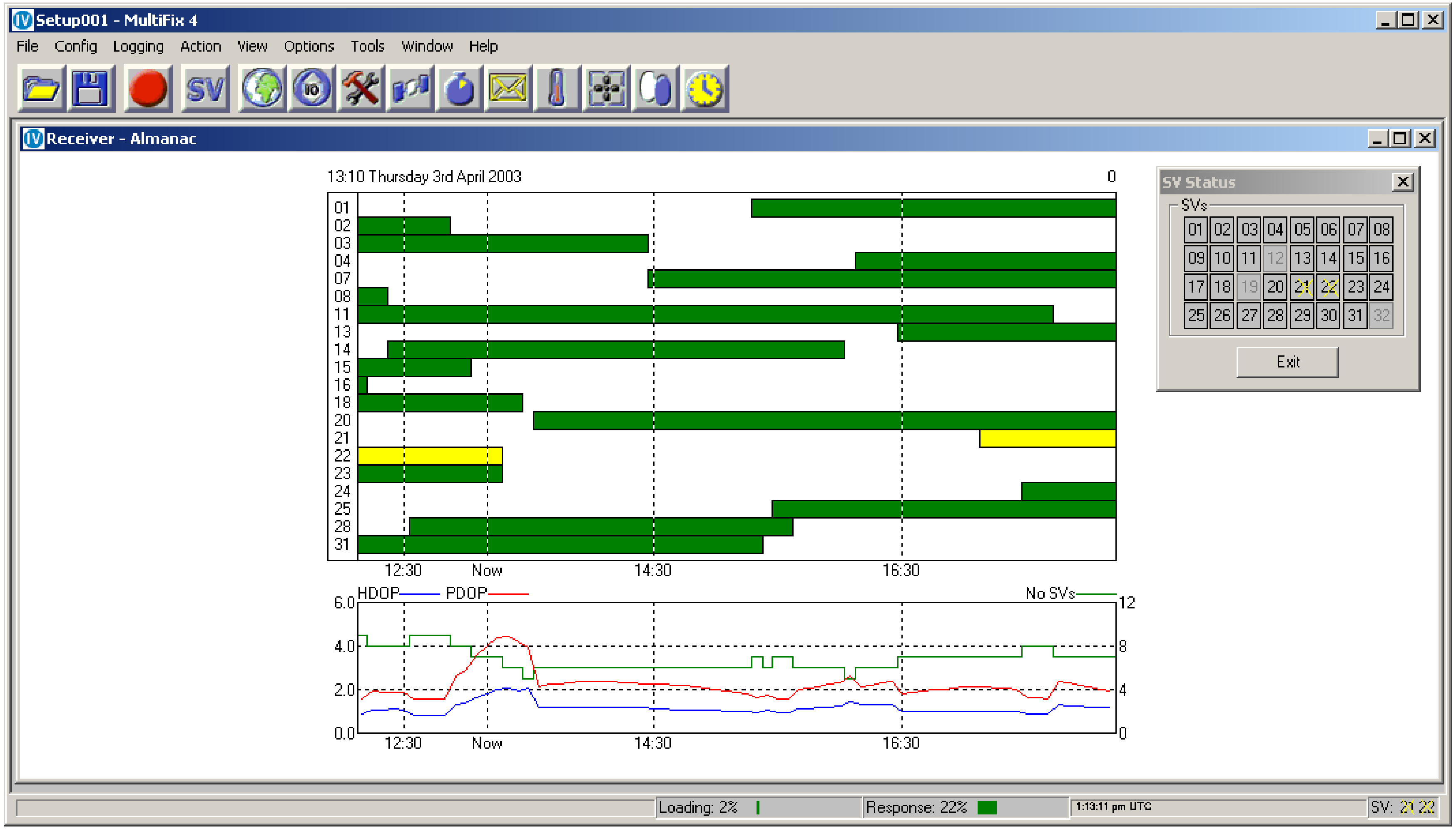
Epoch	13:11:49 on 3rd Apr 2003		
Message	**Time**	**Latency**	**Percentage**
Type 1	13:11:45.6	3.4	93% ##########
Type 2			
Iono Message	13:11:30.0	19.0	97% ##########

Location	
Time	13:10:15.0
Latitude	41° 55' 37.584'' N
Longitude	012° 28' 11.909'' E
Height	96.10
Distance	1454.56 km

	Position			Atmosphere		Type 1					Direct	
PRN	**Elev.**		**Azi.**	**Direct**	**Iono.**	**Tropo.**	**Corrn.**	**Rate**	**IODE**	**U**	**SF**	**Delay**	**Rate**
2	10°		202°	23.41	24.79	13.11						23.21	0.01064
3	59°		159°	3.45	9.48	2.79	-16.16	0.000	180	0		3.46	-0.00033
11	37°	^	287°	1.67	12.09	3.97	-18.00	-0.016	192	0		1.80	-0.00662
14	38°	^	104°	2.27	12.64	3.85	-18.92	0.006	195	0		2.33	-0.00298
15	13°		082°	8.59	20.77	10.44	-28.20	0.020	128	0		8.54	0.00267
18	14°		047°	5.31	18.59	10.01	-27.52	0.000	206	0		5.32	-0.00047
20	05°	^	226°										
22	18°		215°		19.72	7.48							
23	09°		045°										
28	08°	^	326°										
31	79°	^	245°	0.94	8.23	2.43	-15.86	-0.008	117	0		1.00	-0.00290

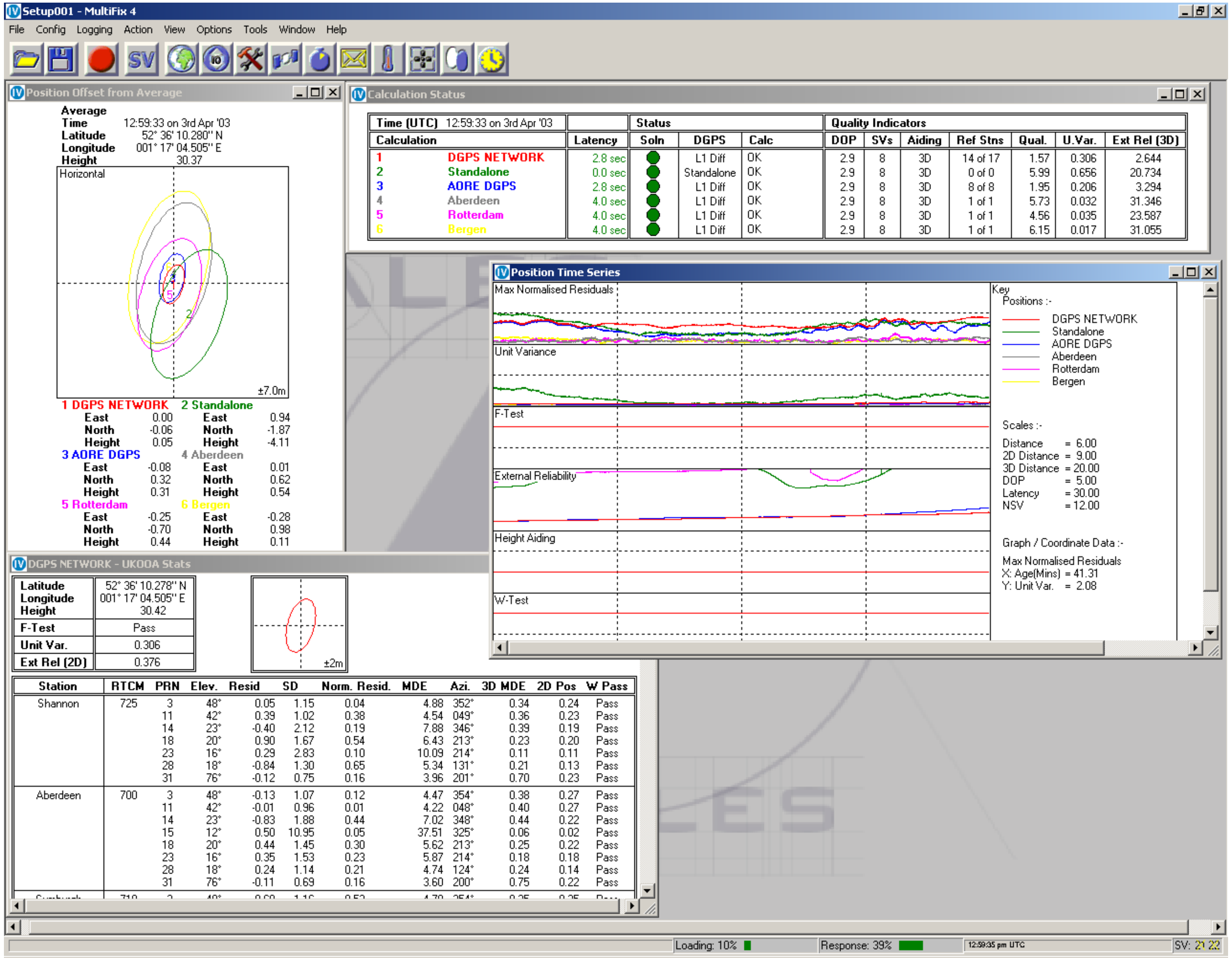
This MultiFix 4 display shows:

- Alamanac View for a single station solution
- SV disable/enable panel


Setup001 - MultiFix 4
File Config Logging Action View Options Tools Window Help
SV
Receiver - Almanac
13:10 Thursday 3rd April 2003
0
01 02 03 04 07 08 11 13 14 15 16 18 20 21 22 23 24 25 28 31
12:30 Now 14:30 16:30
HDOP PDOP No SVs
6.0 4.0 2.0 0.0
12 8 4 0
12:30 Now 14:30 16:30
SV Status
SVs
01 02 03 04 05 06 07 08
09 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
Exit
Loading: 2%
Response: 22%
1:13:11 pm UTC
SV: 21 22

This MultiFix 4 display shows:

- Calculation Status
- Table of UKOOA statistics of Pseudo-Range Correction residuals
- Time series plots of UKOOA statistics of calculations
- Solution position offsets and error ellipses


Setup001 - MultiFix 4
File Config Logging Action View Options Tools Window Help
SV
Position Offset from Average
Horizontal
±7.0m
Calculation Status
Position Time Series
Max Normalised Residuals
Unit Variance
F-Test
External Reliability
Height Aiding
W-Test
DGPS NETWORK - UKOOA Stats
±2m
Loading: 10%
Response: 39%
12:59:35 pm UTC
SV: 21 22

Calculation Status

Time (UTC) 12:59:33 on 3rd Apr '03			Status			Quality Indicators						
Calculation		**Latency**	**Soln**	**DGPS**	**Calc**	**DOP**	**SVs**	**Aiding**	**Ref Stns**	**Qual.**	**U.Var.**	**Ext Rel (3D)**
1	DGPS NETWORK	2.8 sec	●	L1 Diff	OK	2.9	8	3D	14 of 17	1.57	0.306	2.644
2	Standalone	0.0 sec	●	Standalone	OK	2.9	8	3D	0 of 0	5.99	0.656	20.734
3	AORE DGPS	2.8 sec	●	L1 Diff	OK	2.9	8	3D	8 of 8	1.95	0.206	3.294
4	Aberdeen	4.0 sec	●	L1 Diff	OK	2.9	8	3D	1 of 1	5.73	0.032	31.346
5	Rotterdam	4.0 sec	●	L1 Diff	OK	2.9	8	3D	1 of 1	4.56	0.035	23.587
6	Bergen	4.0 sec	●	L1 Diff	OK	2.9	8	3D	1 of 1	6.15	0.017	31.055

Position Offset from Average

Average	
Time	12:59:33 on 3rd Apr '03
Latitude	52° 36' 10.280'' N
Longitude	001° 17' 04.505'' E
Height	30.37

1 DGPS NETWORK			**2 Standalone**	
East	0.00		**East**	0.94
North	-0.06		**North**	-1.87
Height	0.05		**Height**	-4.11
3 AORE DGPS			**4 Aberdeen**	
East	-0.08		**East**	0.01
North	0.32		**North**	0.62
Height	0.31		**Height**	0.54
5 Rotterdam			**6 Bergen**	
East	-0.25		**East**	-0.28
North	-0.70		**North**	0.98
Height	0.44		**Height**	0.11

DGPS NETWORK - UKOOA Stats

Latitude **Longitude** **Height**	52° 36' 10.278'' N 001° 17' 04.505'' E 30.42
F-Test	Pass
Unit Var.	0.306
Ext Rel (2D)	0.376

Station	RTCM	PRN	Elev.	Resid	SD	Norm. Resid.	MDE	Azi.	3D MDE	2D Pos	W Pass
Shannon	725	3	48°	0.05	1.15	0.04	4.88	352°	0.34	0.24	Pass
		11	42°	0.39	1.02	0.38	4.54	049°	0.36	0.23	Pass
		14	23°	-0.40	2.12	0.19	7.88	346°	0.39	0.19	Pass
		18	20°	0.90	1.67	0.54	6.43	213°	0.23	0.20	Pass
		23	16°	0.29	2.83	0.10	10.09	214°	0.11	0.11	Pass
		28	18°	-0.84	1.30	0.65	5.34	131°	0.21	0.13	Pass
		31	76°	-0.12	0.75	0.16	3.96	201°	0.70	0.23	Pass
Aberdeen	700	3	48°	-0.13	1.07	0.12	4.47	354°	0.38	0.27	Pass
		11	42°	-0.01	0.96	0.01	4.22	048°	0.40	0.27	Pass
		14	23°	-0.83	1.88	0.44	7.02	348°	0.44	0.22	Pass
		15	12°	0.50	10.95	0.05	37.51	325°	0.06	0.02	Pass
		18	20°	0.44	1.45	0.30	5.62	213°	0.25	0.22	Pass
		23	16°	0.35	1.53	0.23	5.87	214°	0.18	0.18	Pass
		28	18°	0.24	1.14	0.21	4.74	124°	0.24	0.14	Pass
		31	76°	-0.11	0.69	0.16	3.60	200°	0.75	0.22	Pass

Position Time Series

Key

Positions :-

- DGPS NETWORK
- Standalone
- AORE DGPS
- Aberdeen
- Rotterdam
- Bergen

Scales :-

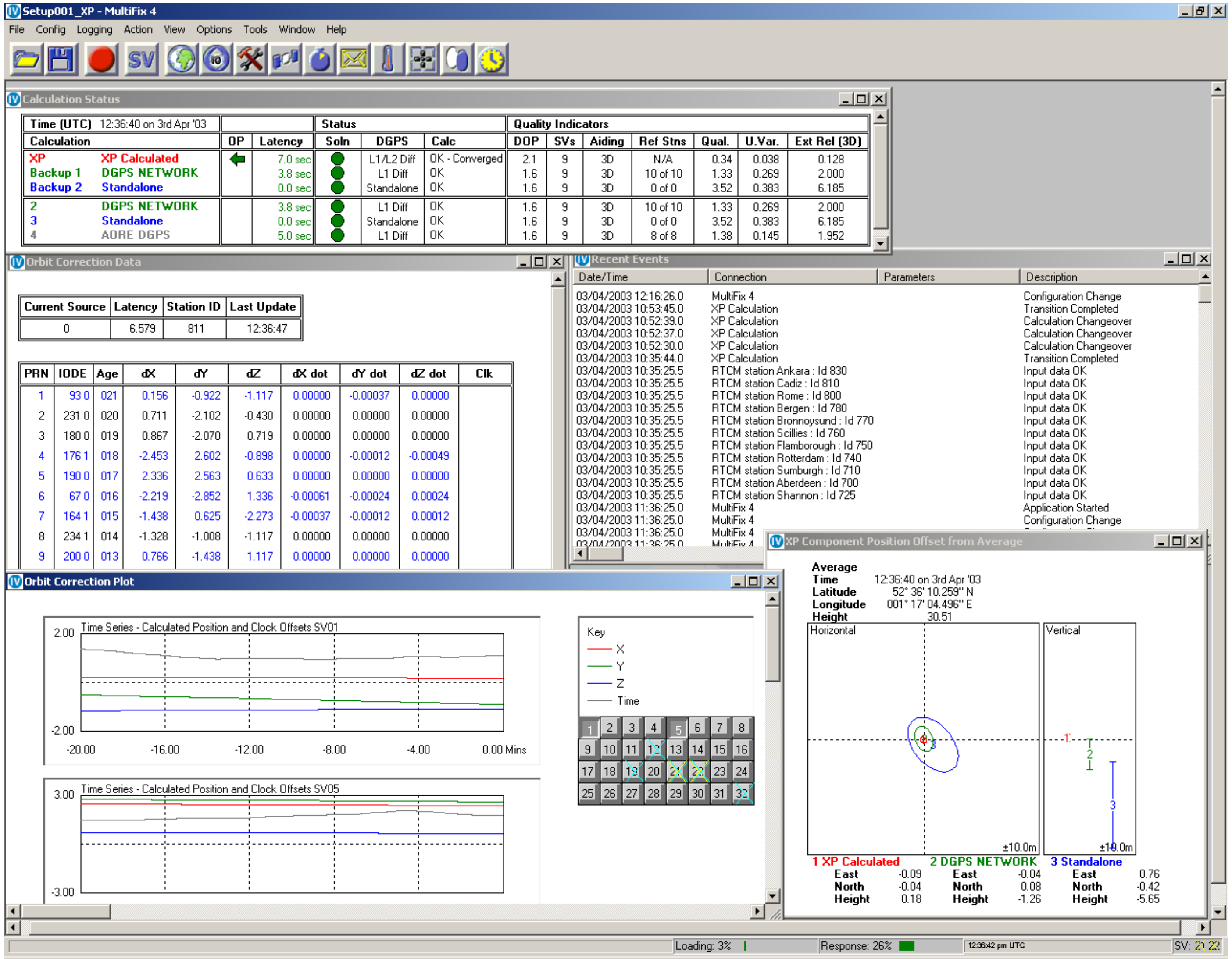
Distance = 6.00
2D Distance = 9.00
3D Distance = 20.00
DOP = 5.00
Latency = 30.00
NSV = 12.00

Graph / Coordinate Data :-

Max Normalised Residuals
X: Age(Mins) = 41.31
Y: Unit Var. = 2.08

This MultiFix 4 display shows:

- Calculation Status
- XP Orbit Correction Data Table
- XP Orbit Correction Time Series Plot
- XP Solution position offsets and error ellipses
- Event Logger


Setup001_XP - MultiFix 4
File
Config
Logging
Action
View
Options
Tools
Window
Help
SV
Calculation Status
Orbit Correction Data
Recent Events
Orbit Correction Plot
Time Series - Calculated Position and Clock Offsets SV01
2.00
-2.00
-20.00
-16.00
-12.00
-8.00
-4.00
0.00 Mins
Time Series - Calculated Position and Clock Offsets SV05
3.00
-3.00
Key
X
Y
Z
Time
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
XP Component Position Offset from Average
Horizontal
Vertical
±10.0m
±10.0m
1
2
3
Loading: 3%
Response: 26%
12:36:42 pm UTC
SV: 21 22

Calculation Status

Time (UTC) 12:36:40 on 3rd Apr '03				Status			Quality Indicators						
Calculation		OP	Latency	Soln	DGPS	Calc	DOP	SVs	Aiding	Ref Stns	Qual.	U.Var.	Ext Rel (3D)
XP	XP Calculated	⬅	7.0 sec	●	L1/L2 Diff	OK - Converged	2.1	9	3D	N/A	0.34	0.038	0.128
Backup 1	DGPS NETWORK		3.8 sec	●	L1 Diff	OK	1.6	9	3D	10 of 10	1.33	0.269	2.000
Backup 2	Standalone		0.0 sec	●	Standalone	OK	1.6	9	3D	0 of 0	3.52	0.383	6.185
2	DGPS NETWORK		3.8 sec	●	L1 Diff	OK	1.6	9	3D	10 of 10	1.33	0.269	2.000
3	Standalone		0.0 sec	●	Standalone	OK	1.6	9	3D	0 of 0	3.52	0.383	6.185
4	AORE DGPS		5.0 sec	●	L1 Diff	OK	1.6	9	3D	8 of 8	1.38	0.145	1.952

Orbit Correction Data

Current Source	Latency	Station ID	Last Update
0	6.579	811	12:36:47

PRN	IODE	Age	dX	dY	dZ	dX dot	dY dot	dZ dot	Clk
1	93 0	021	0.156	-0.922	-1.117	0.00000	-0.00037	0.00000	
2	231 0	020	0.711	-2.102	-0.430	0.00000	0.00000	0.00000	
3	180 0	019	0.867	-2.070	0.719	0.00000	0.00000	0.00000	
4	176 1	018	-2.453	2.602	-0.898	0.00000	-0.00012	-0.00049	
5	190 0	017	2.336	2.563	0.633	0.00000	0.00000	0.00000	
6	67 0	016	-2.219	-2.852	1.336	-0.00061	-0.00024	0.00024	
7	164 1	015	-1.438	0.625	-2.273	-0.00037	-0.00012	0.00012	
8	234 1	014	-1.328	-1.008	-1.117	0.00000	0.00000	0.00000	
9	200 0	013	0.766	-1.438	1.117	0.00000	0.00000	0.00000	

Recent Events

Date/Time	Connection	Parameters	Description
03/04/2003 12:16:26.0	MultiFix 4		Configuration Change
03/04/2003 10:53:45.0	XP Calculation		Transition Completed
03/04/2003 10:52:39.0	XP Calculation		Calculation Changeover
03/04/2003 10:52:37.0	XP Calculation		Calculation Changeover
03/04/2003 10:52:30.0	XP Calculation		Calculation Changeover
03/04/2003 10:35:44.0	XP Calculation		Transition Completed
03/04/2003 10:35:25.5	RTCM station Ankara : Id 830		Input data OK
03/04/2003 10:35:25.5	RTCM station Cadiz : Id 810		Input data OK
03/04/2003 10:35:25.5	RTCM station Rome : Id 800		Input data OK
03/04/2003 10:35:25.5	RTCM station Bergen : Id 780		Input data OK
03/04/2003 10:35:25.5	RTCM station Bronnoysund : Id 770		Input data OK
03/04/2003 10:35:25.5	RTCM station Scillies : Id 760		Input data OK
03/04/2003 10:35:25.5	RTCM station Flamborough : Id 750		Input data OK
03/04/2003 10:35:25.5	RTCM station Rotterdam : Id 740		Input data OK
03/04/2003 10:35:25.5	RTCM station Sumburgh : Id 710		Input data OK
03/04/2003 10:35:25.5	RTCM station Aberdeen : Id 700		Input data OK
03/04/2003 10:35:25.5	RTCM station Shannon : Id 725		Input data OK
03/04/2003 11:36:25.0	MultiFix 4		Application Started
03/04/2003 11:36:25.0	MultiFix 4		Configuration Change
03/04/2003 11:36:25.0	MultiFix 4		

Average

Time	12:36:40 on 3rd Apr '03
Latitude	52° 36' 10.259'' N
Longitude	001° 17' 04.496'' E
Height	30.51

1 XP Calculated		2 DGPS NETWORK		3 Standalone	
East	-0.09	**East**	-0.04	**East**	0.76
North	-0.04	**North**	0.08	**North**	-0.42
Height	0.18	**Height**	-1.26	**Height**	-5.65