

# GPS Processing within the Geodatabase

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Seiler Instrument

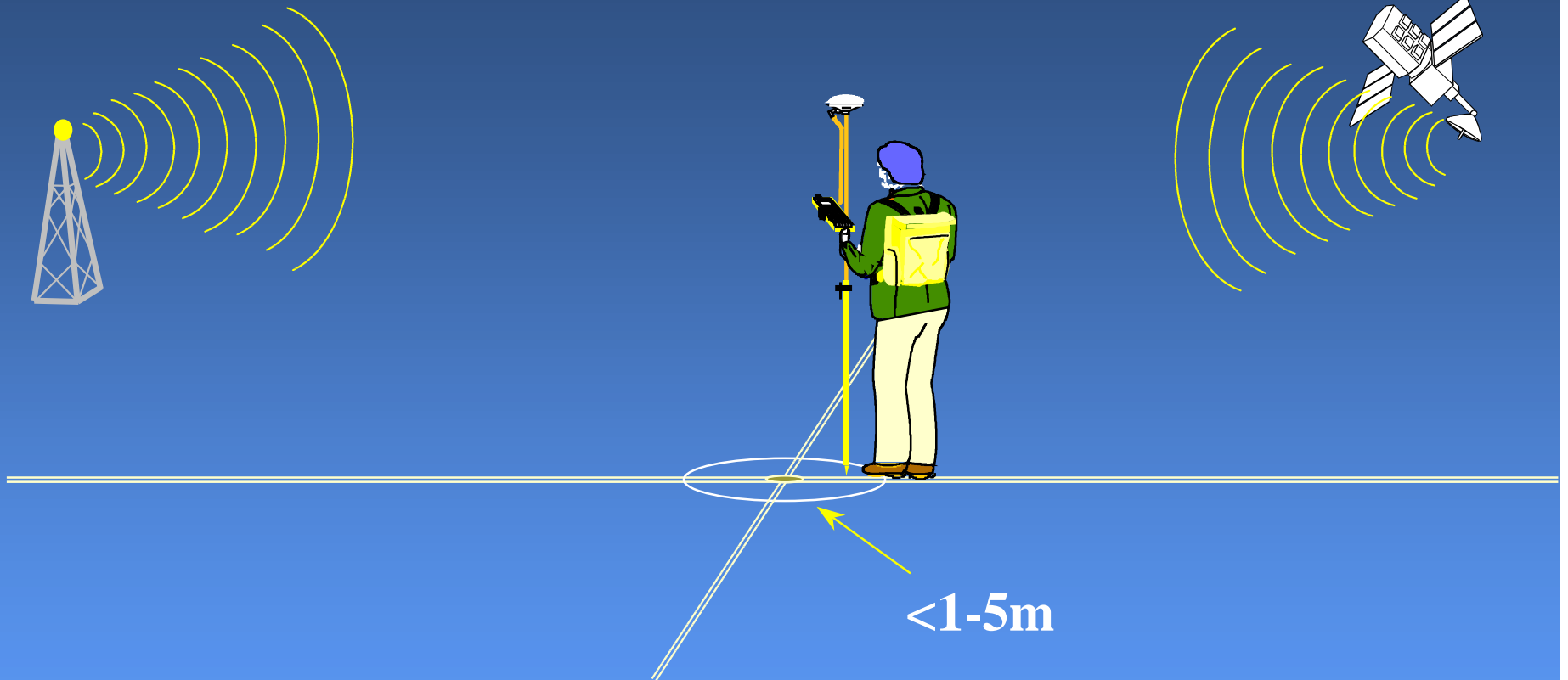
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# Field Hardware Options



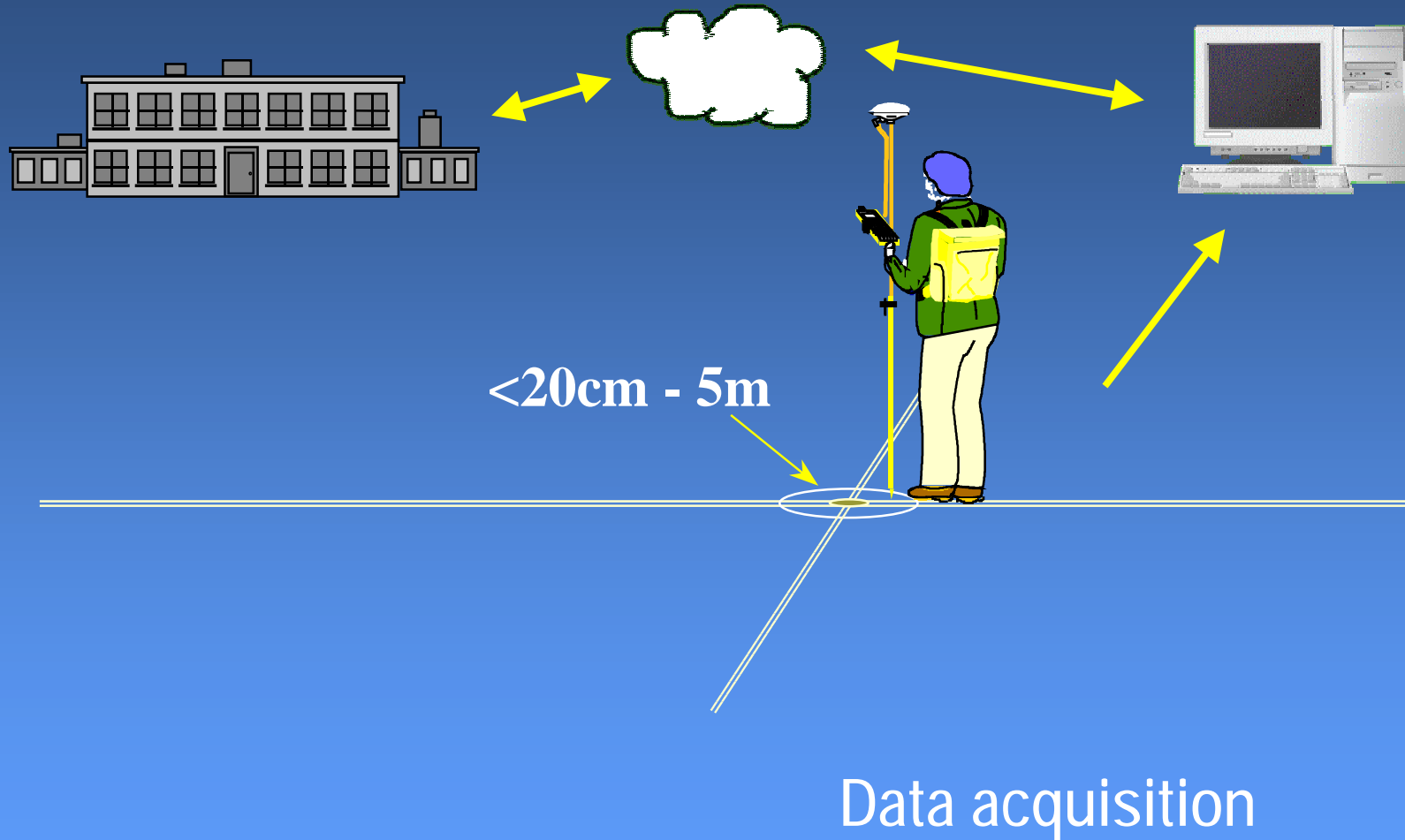
# Real-time DGPS



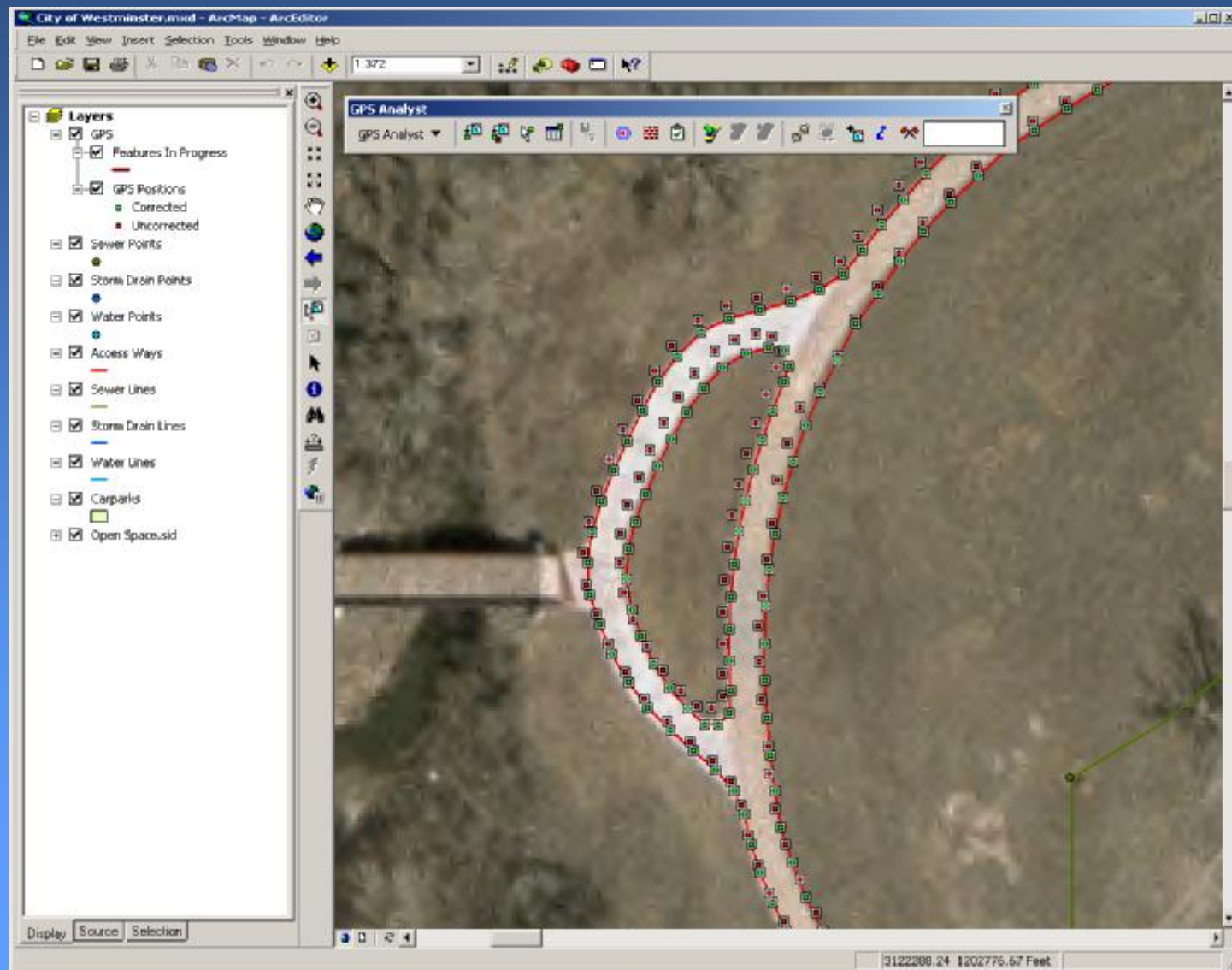
Navigation

Data verification

# Post processed DGPS



# Why postprocess your data?



# Differential Correction Improves positions accuracies in your data

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- Provides better GPS accuracy for your data



Light blue  
GPS collected data prior to  
differential correction

Dark blue  
GPS after differential  
correction

# What is GPS Analyst?

- ↳ ArcGIS Desktop extension that allows you to work directly with GPS data

A screenshot of the ArcGIS Desktop interface showing the GPS Analyst extension. The main map window displays a map of a city with red and blue lines representing roads and a green line representing a GPS track. The GPS Analyst toolbar is visible in the top left corner of the map window. Two dialog boxes are open: "GPS Position Properties" and "Select Base Provider".

**GPS Position Properties**

Field	Value
Position ID	153
Latitude	43°32'38.74362"S
Longitude	172°35'25.51447"E
Altitude (IMU)	31.074 m
Antenna Height	0.000 m
Date	19/02/2004
Time	3:07:24 pm
GPS Session	Imported 22-07-2004 3:20:40 p.m. from Path.sdf
Selected as Location	Yes
Velocity	?
Velocity Up	?
Heading	?
Estimated Accuracy	5.752 m
Signo North	4.071 m
Signo East	4.071 m
Signo Up	9.952 m
Correction Type	Uncorrected
Occupation Type	Kinematic
Solution Type	Collection
Correction Source	Unknown
Frequency Type	L1
Frequency Algorithm Type	N/A
PDOP	2.8
HDOP	1.6
VDOP	2.2
TDOP	1.7
Satellites	4, 5, 7, 9, 10, 17, 24

**Select Base Provider**

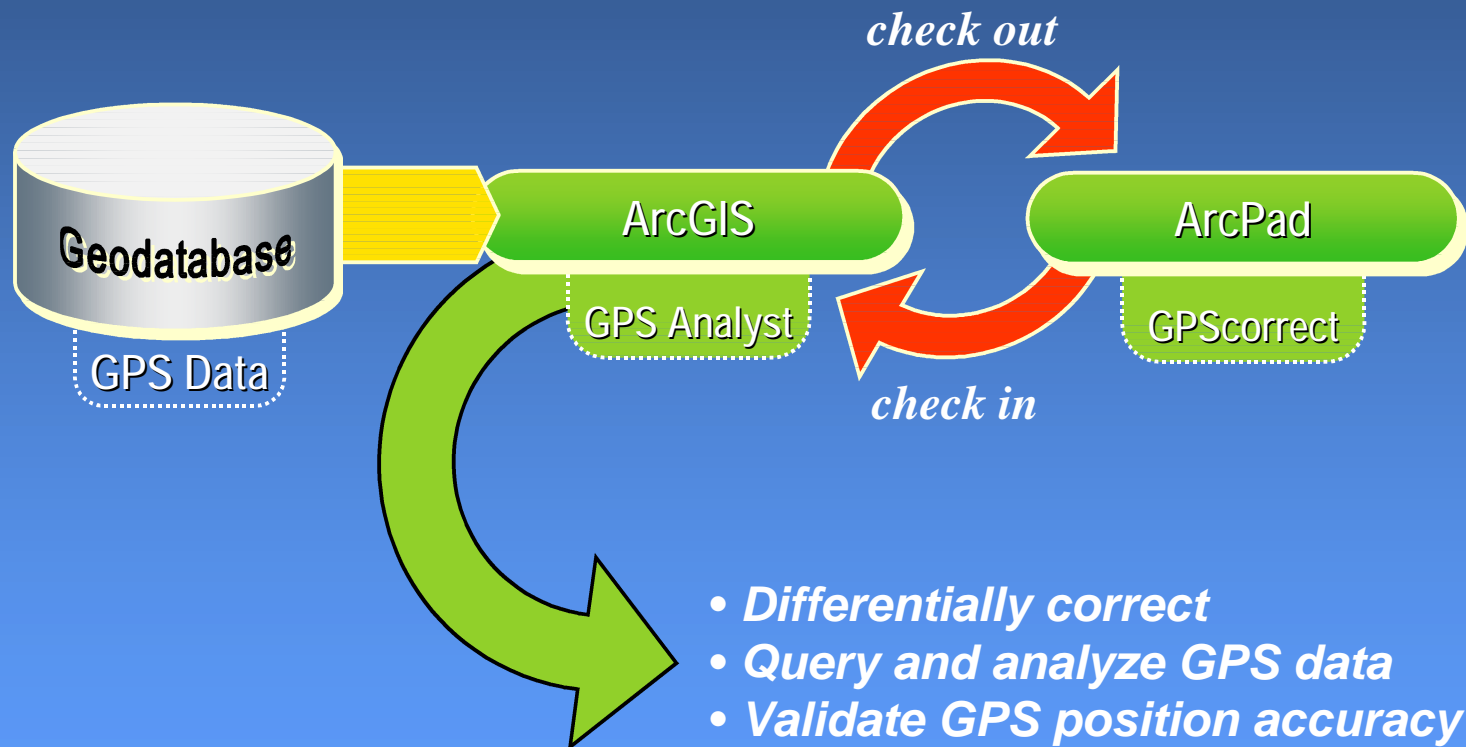
Provider	Distance	Integrity Index
CORS, Mt. Hamilton CA	4 km	95.84
CORS, Chabot CA	33 km	95.26
CORS, Oakland 1 CA	36 km	92.82
CORS, Pigeon Point CA	40 km	88.73
CORS, Berkeley CA	43 km	87.58
SOPAC, Mt. Diablo, daily	43 km	86.62
SOPAC, Briones Reservoir, daily	48 km	85.41

Type: all types [Update List]

[Copy...] [Properties...] [Delete...]

[OK] [Cancel]

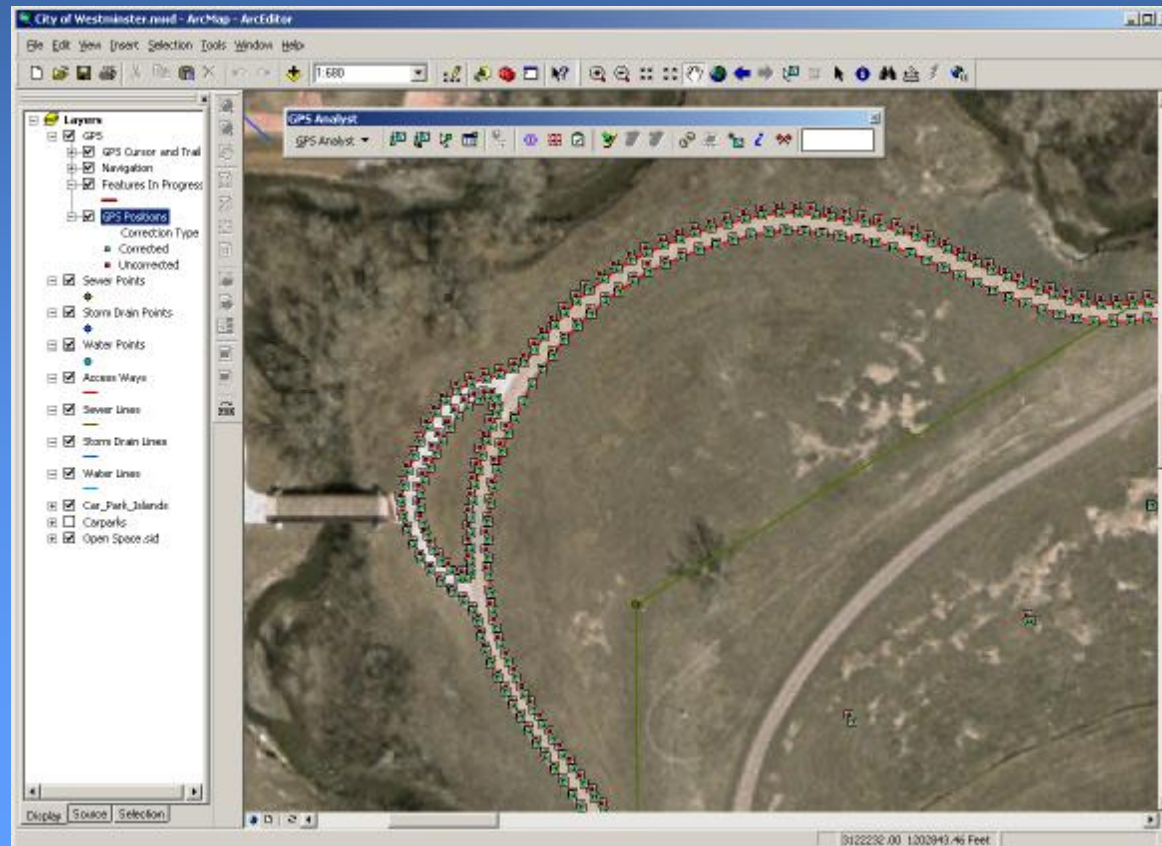
# GPS Analyst Data Flow





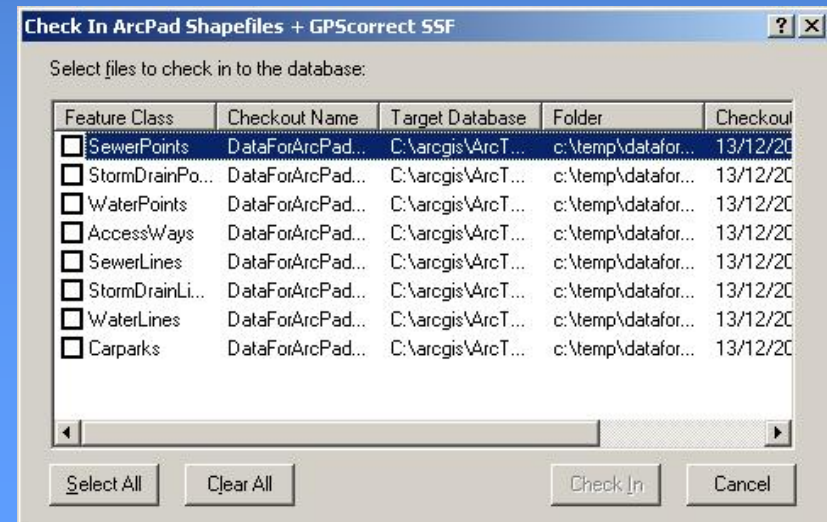
# Key features

- View, edit, and analyze GPS data directly inside ArcMap



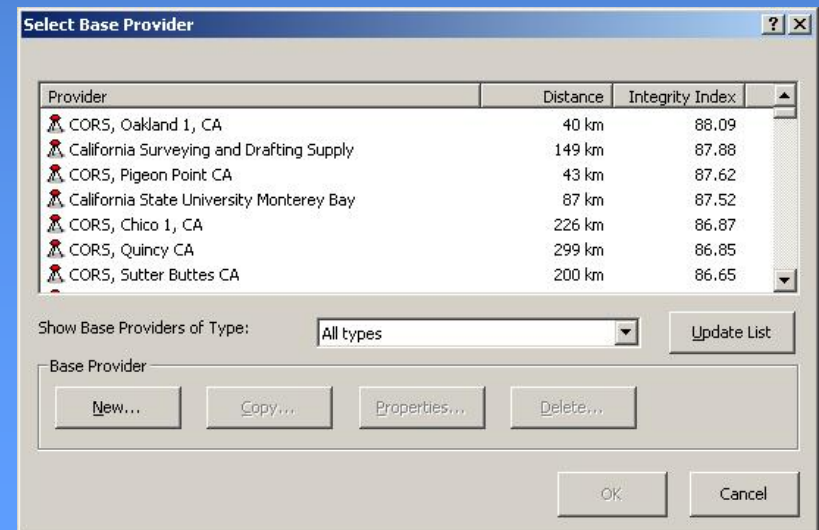
# Key features

- u Improve productivity by eliminating extra file conversions
  - u Direct check-out and check-in of data from ArcPad + Trimble® GPSCorrect™ extension for ESRI ArcPad
- u Import and export files from TerraSync™ in ArcCatalog



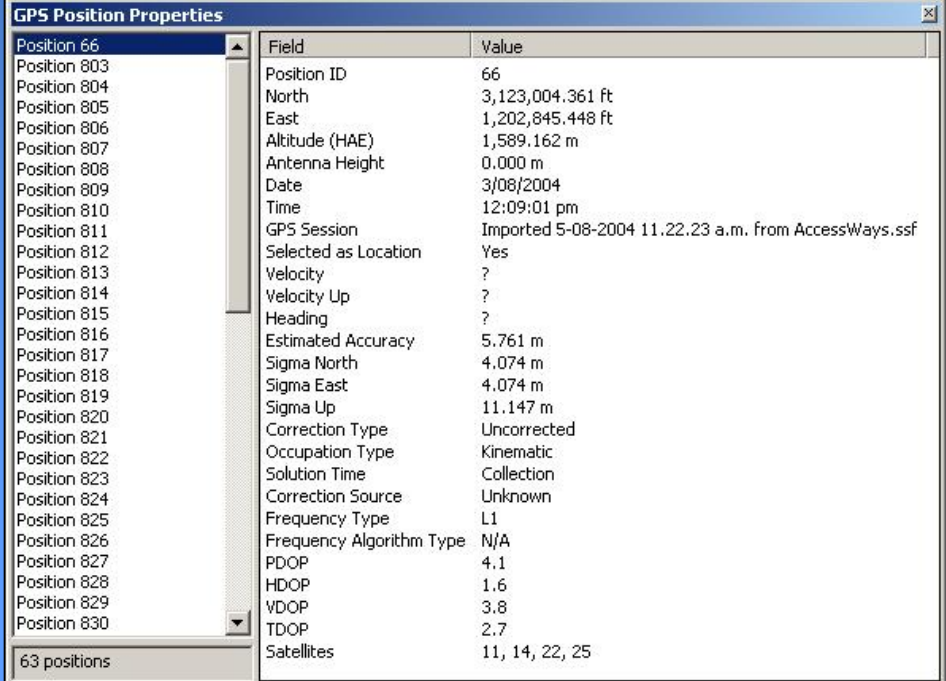
# Key features

- u Improve GPS position accuracy by postprocessing data
  - u Using Trimble's proven differential correction engines
  - u With automatic base file search and download from the Internet



# Key features

- Have confidence in the quality of your data
  - Store detailed information on every GPS position

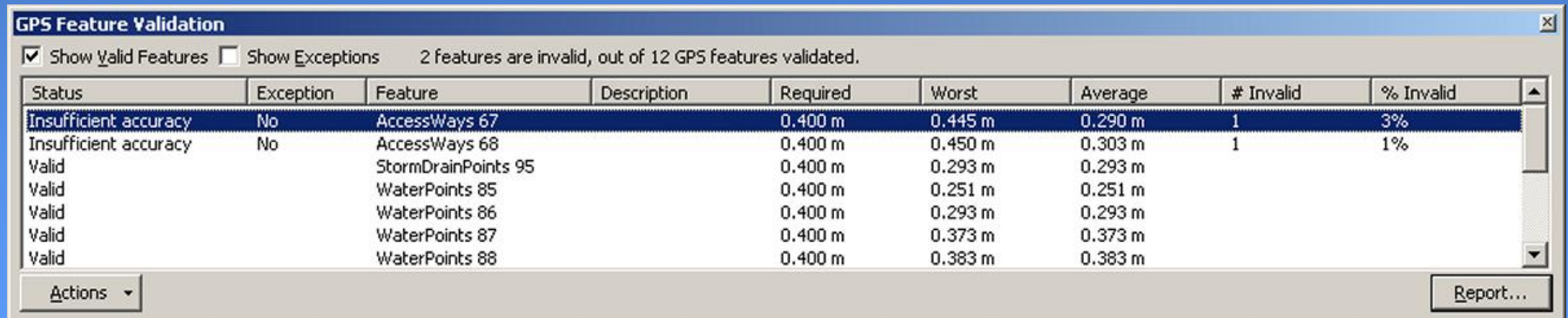


The screenshot shows a software window titled "GPS Position Properties". On the left is a list of positions from Position 803 to Position 830, with "Position 66" selected. On the right is a table with two columns: "Field" and "Value". The table lists various properties for the selected position, including coordinates, altitude, date, time, session information, and accuracy metrics.

Field	Value
Position ID	66
North	3,123,004.361 ft
East	1,202,845.448 ft
Altitude (HAE)	1,589.162 m
Antenna Height	0.000 m
Date	3/08/2004
Time	12:09:01 pm
GPS Session	Imported 5-08-2004 11.22.23 a.m. from AccessWays.ssf
Selected as Location	Yes
Velocity	?
Velocity Up	?
Heading	?
Estimated Accuracy	5.761 m
Sigma North	4.074 m
Sigma East	4.074 m
Sigma Up	11.147 m
Correction Type	Uncorrected
Occupation Type	Kinematic
Solution Time	Collection
Correction Source	Unknown
Frequency Type	L1
Frequency Algorithm Type	N/A
PDOP	4.1
HDOP	1.6
VDOP	3.8
TDOP	2.7
Satellites	11, 14, 22, 25

# Key features

- u Ensure features meet your required accuracy
  - u Run validation on GPS positions
  - u Rebuild features that do not meet the accuracy requirement



The screenshot shows a dialog box titled "GPS Feature Validation". It has two checkboxes: "Show Valid Features" (checked) and "Show Exceptions" (unchecked). Below the checkboxes, it says "2 features are invalid, out of 12 GPS features validated." The main part of the dialog is a table with the following columns: Status, Exception, Feature, Description, Required, Worst, Average, # Invalid, and % Invalid. The table contains 8 rows of data. The first two rows are highlighted in blue, indicating they are the features that failed validation. The first row shows "Insufficient accuracy" for "AccessWays 67" with a required accuracy of 0.400 m, a worst accuracy of 0.445 m, and an average accuracy of 0.290 m. The second row shows "Insufficient accuracy" for "AccessWays 68" with a required accuracy of 0.400 m, a worst accuracy of 0.450 m, and an average accuracy of 0.303 m. The remaining six rows show "Valid" status for various features: "StormDrainPoints 95", "WaterPoints 85", "WaterPoints 86", "WaterPoints 87", and "WaterPoints 88". At the bottom left of the dialog is an "Actions" dropdown menu, and at the bottom right is a "Report..." button.

Status	Exception	Feature	Description	Required	Worst	Average	# Invalid	% Invalid
Insufficient accuracy	No	AccessWays 67		0.400 m	0.445 m	0.290 m	1	3%
Insufficient accuracy	No	AccessWays 68		0.400 m	0.450 m	0.303 m	1	1%
Valid		StormDrainPoints 95		0.400 m	0.293 m	0.293 m		
Valid		WaterPoints 85		0.400 m	0.251 m	0.251 m		
Valid		WaterPoints 86		0.400 m	0.293 m	0.293 m		
Valid		WaterPoints 87		0.400 m	0.373 m	0.373 m		
Valid		WaterPoints 88		0.400 m	0.383 m	0.383 m		

# Summary

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- u **Use the GPS Analyst extension to:**
  - u View, edit, and analyze GPS data directly inside ArcMap
    - u Create custom data processing applications and workflows
  - u Store detailed information on every GPS position
  - u Validate and rebuild features to ensure they meet your accuracy requirements
    - u Eliminate extra file conversions
  - u Improve GPS position accuracy by post-processing data

# Thank You

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**For more information:**

[www.Trimble.com](http://www.Trimble.com)  
[www.ESRI.com](http://www.ESRI.com)