Persistent Scatterer Interferometry (PSI) Deliverables

The PSI data product is made up of several deliverables.

- Table of PS time series and average annual displacement rate
- Processing summary report (metadata)
- A raster of average annual displacement rates (provided on request)
- Reference multi-image reflectivity map (MIR) image (provided on request)

1) Table of PS time series and average annual displacement rate

This PS time series and average annual displacement rate are delivered as tabular data in dBase IV (.DBF) format. Additional data columns include the displacement values recorded relative to the master scene for each image date (zero displacement date). An example time series chart produced from tabular time series data is shown in the table below.

Field Name	Definition
CODE	PS unique identifier.
EASTING	Easting (m) (UTM, Datum and Ellipsoid WGS84)
NORTHING	Northing (m) (UTM, Datum and Ellipsoid WGS84)
RANGE	SAR image range pixel
AZIMUTH	SAR image azimuth pixel
HEIGHT	Height of PS point (m)
VEL	Average annual displacement rate (mm/year) in the line of sight of the satellite.
ST_DEV	Standard deviation (mm/year) of average annual displacement due to uncompensated atmospheric, deformation and height errors.
ERROR_HGT	Error in PS height (mm)
SERIES ONLY (one value per scene - for each PS)	
13-MAR-97	Displacement relative to master image date (mm), 13th March 1997.
…	…
24-OCT-03	Displacement relative to master image date (mm), 24th October 2003.

Table 1: PSI time series table structure.

2) Processing summary report (metadata)

The processing summary report gives a number of quantitative and some qualitative site specific information, such as number of scenes used, date range of analysis, reference scene, reference point location co-ordinates, listing of data used and basic ground motion statistics.

3) Raster of average annual displacement rates (provided on request)

This data layer can be produced in two forms: as a map of points showing the average annual displacement rate of each PS, or as an interpolated displacement rate map. The latter is produced by spatially interpolating the average annual displacement rate using a surface-fitting algorithm. The interpolation is carried out using a minimum curvature, surface-fitting algorithm for a distance up to 50m from any one PS point. Null cells are inserted in areas that are further than 50m from a PS point. The interpolated raster is supplied to visualise large-scale trends. Care should be taken in its interpretation, as the actual PS measurements were

made only on the PS point location itself (the centre of the interpolation circle), and raster values beyond this point do not represent real measurements. This raster image contains only an RGB colour value and is provided in the format detailed below. An accompanying legend object is provided for reference.

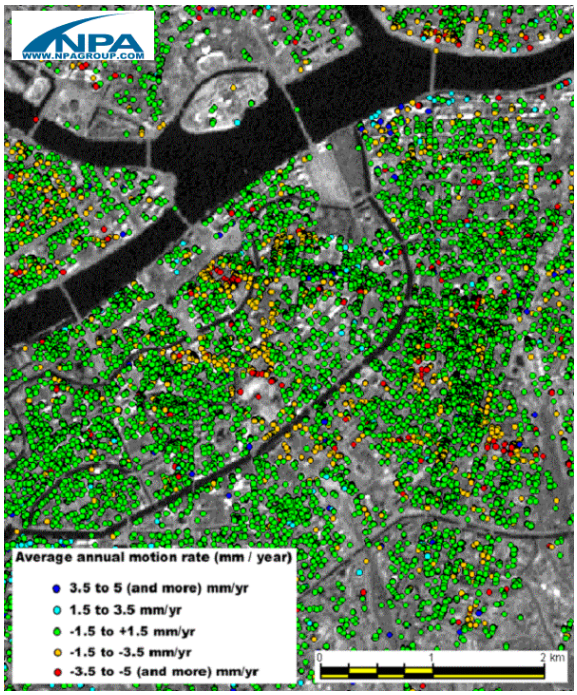

Figure 1: Extract of average annual motion (point) data for St. Petersburg.

Georeference	UTM (WGS84)
Data type	24-bit composite RGB
Byte order	N/A
Format	GeoTIFF
Georeference information	Integral GeoTIFF tags, Arc Info World file (.tfw) and text file of corner co-ordinates (.txg)
Colour table applied	Rainbow: Red-Orange-Green-Cyan-Blue
Colour classification of average annual motion rate (mm/year) applied	Standard: Red: < –5.0 to -3.5 Orange: -3.5 to -1.5 Green: -1.5 to 1.5 Cyan: 1.5 to 3.5 Blue: 3.5 to > 5.0 or as appropriate if very rapid displacements are present

Table 2: Average annual motion data raster format (GeoTIFF data).

4) Reference multi-image reflectivity map (MIR) image (provided on request)

The MIR image can be used as a basemap if the user owns no other reference data. The MIR image is an average of all individual SAR images used in the PSI analysis process and has a higher Signal to Noise Ratio than any individual amplitude image.

Figure 2: Multi-image reflectivity map of St. Petersburg.

Georeference	UTM (WGS84)
Data type	8-bit unsigned
Byte order	N/A
Format	GeoTIFF
Georeference information	Integral GeoTIFF tags, Arc Info World file (.tfw) and text file of corner co-ordinates (.txg)
Colour table applied	Greyscale
Contrast stretch applied	Linear

Table 3: MIR GeoTIFF raster format.