Solar Assessment of Roofs (SolAR)

Specification

SolAR is an intelligent geographic database containing every roof in England and Wales that is potentially suitable for the installation of solar panels. It contains a variety of information about each roof that determines the level of suitability for that roof, including size of usable area, pitch and aspect.

The **SolAR** database has been compiled from up-to-date high-resolution stereo aerial photography and other geographic data, including digital surface models and solar radiation data. **SolAR** can be linked to address databases allowing buildings suitable for solar panel installation to be identified. It has been designed in an open format to allow incorporation into almost any software, from Microsoft Excel and Access to more advanced GIS, and SQL. It can be used within Google Earth and even though web interfaces.

Technical Details

- Approximately 22 million properties assessed
- All of England and Wales
- Only USABLE roof area is included
- Chimneys, dormer windows & large skylights are excluded
- Only roofs with a usable area greater than 10 sq m
- Only roofs orientated between 110° and 250°
- Only pitched roofs between 0° and 45°
- Potential obstructions are evaluated and flagged
- Residential and commercial properties are included

There are two types of deliverable:

1. A simple point database containing all attributes as shown in Table 1 (overleaf). The database also contains the geographic location (easting/northing) of the centre of the usable roof area.

Formats:

a. Excel spreadsheet or other database format, example shown in table 2 overleaf

b. Google Earth KMZ, example shown in Figure 1

c. GIS point file (e.g. ESRI , MapInfo, DWG)

2. For the advanced user the data can be supplied as 3D polygons depicting the size of the roof. The polygons are accurately and geographically located in a 3D space. They are attributed with the same information as the point file (also shown in Table 1).

Formats:

a. GIS or CAD (e.g. ESRI, MapInfo, DWG), example shown in Figure 2

The data can be supplied in discrete geographic regions (for example a postcode sector, county or region), and it is possible to purchase data to your own specification, for example only buildings over 30 sq m or with narrow aspect criteria.

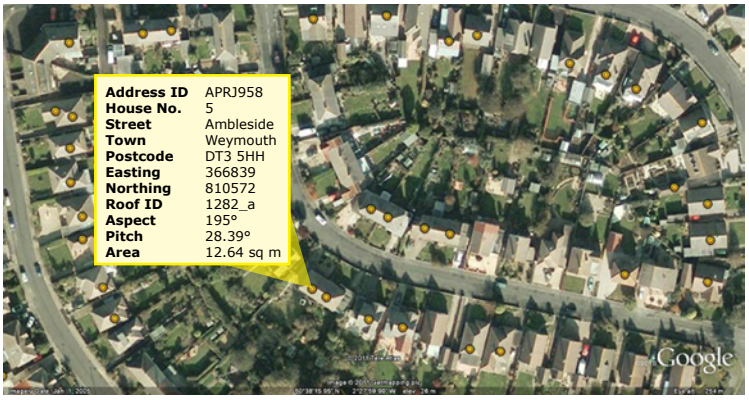

Fig 1 KMZ file displayed in Google Earth

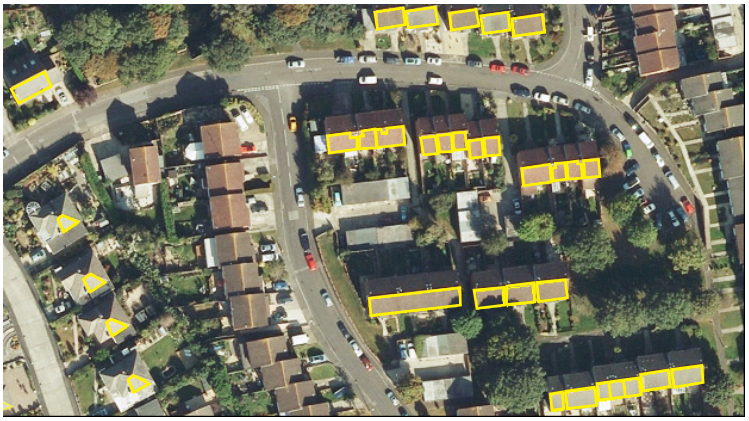

Fig 2 3D polygons depicting usable roof sizes

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Data Attributes

Address_ID	Unique ID for the address
CompanyName	Name of company resident at the address (if applicable)
HouseNumber	House Number (if applicable)
FlatNumber	Flat number (if applicable)
HouseName	House name (if applicable)
Street	Street
Address2	Other address field (eg village/area)
Town	Postal Town
Postcode	Full Postcode
Easting	Full OSGB coordinate of the Easting (X)
Northing	Full OSGB coordinate of the Northing (Y)
RoofID	Unique ID for each roof
Aspect_Deg	Aspect direction in degrees from north (0)
Pitch_Deg	Pitch of roof slope in degrees from horizontal (0)
Area_Sqm	Area in square metres of usable roof
Irradiance_kWh/m2	Estimate of the approximate irradiance on the roof over a year
Obstruction	Indication of presence of potential obstruction (YES/NO)

Table 1 Database attributes

Address_ID	CompanyNam	HouseNum	FlatNum	HouseNam	Street	Address2	Town	Postcode	Easting	Northing	RoofID	Aspect_Deg	Pitch_Deg	Area_Sqm	Irradiance	Obstruction
APRJ958-G5AR57200H4		10			AMBLESIDE		WEYMOUTH	DT3 5HH	366839	81057	1282_a	214.96	28.39	12.64	960.79	No
APUT958-G5A55720GH4		19			AMBLESIDE		WEYMOUTH	DT3 5HH	366781	81074	1309	214.84	24.73	30.35	961.813	No
APKW958-G5AQ5710GH4		9			AMBLESIDE		WEYMOUTH	DT3 5HH	366823	81016	363_a	198.94	25.35	10.84	967.983	No
AP1C958-G5AT5720GH4		8			AMBLESIDE		WEYMOUTH	DT3 5HH	366845	81044	1280_a	216.82	25.38	11.64	973.839	No

Table 2 Example database extract

Advantages of the SolAR Methodology

SolAR has been created using the most up-to-date and accurate high-resolution stereo aerial photography. The methodology used to create **SolAR** has been developed after extensive research and was found to produce the most accurate results. Using stereo imagery means that inaccuracies with measurements when using 2D imagery, incurred due to loss of perspective, are avoided. These could be as much as 15-20%. This methodology also identifies skylights, dormer windows and chimneys and excludes these areas from any analysis as unusable space, again producing more accurate results.

LiDAR (Digital Surface Model) – whilst LIDAR can be highly accurate it is still reasonably coarse in detail when compared to aerial photography. Higher detail LiDAR is available but it is very expensive and coverage is sparse. From our own research even the higher detail data is not sufficient to produce accurate results. Analysis of LiDAR is usually automated; due to the nature of the data it is very easy, with the push of button, to produce slope analysis and solar irradiation calculations. However relating these calculations to the exact roof areas is highly problematic. It is possible to segment the data using 2D building polygons, however these will never match exactly due to inaccuracies in both datasets, this means that potentially non-roof areas (i.e. the walls of the buildings) are inadvertently taken into account, and will skew the results.

2D Aerial Photography (such as that seen on Google Earth) – The 2D nature of the imagery means that the measurements of the roof area will be inaccurate due to the loss of perspective. It should be noted that Google terms of service **do not** allow the user to make derivative works from the aerial photography. This restriction applies to the Google Earth API, Google Earth and Google Earth Pro.

Download a FREE SolAR Sample at www.bluesky-world.com/solarsample or call 01530 518 518