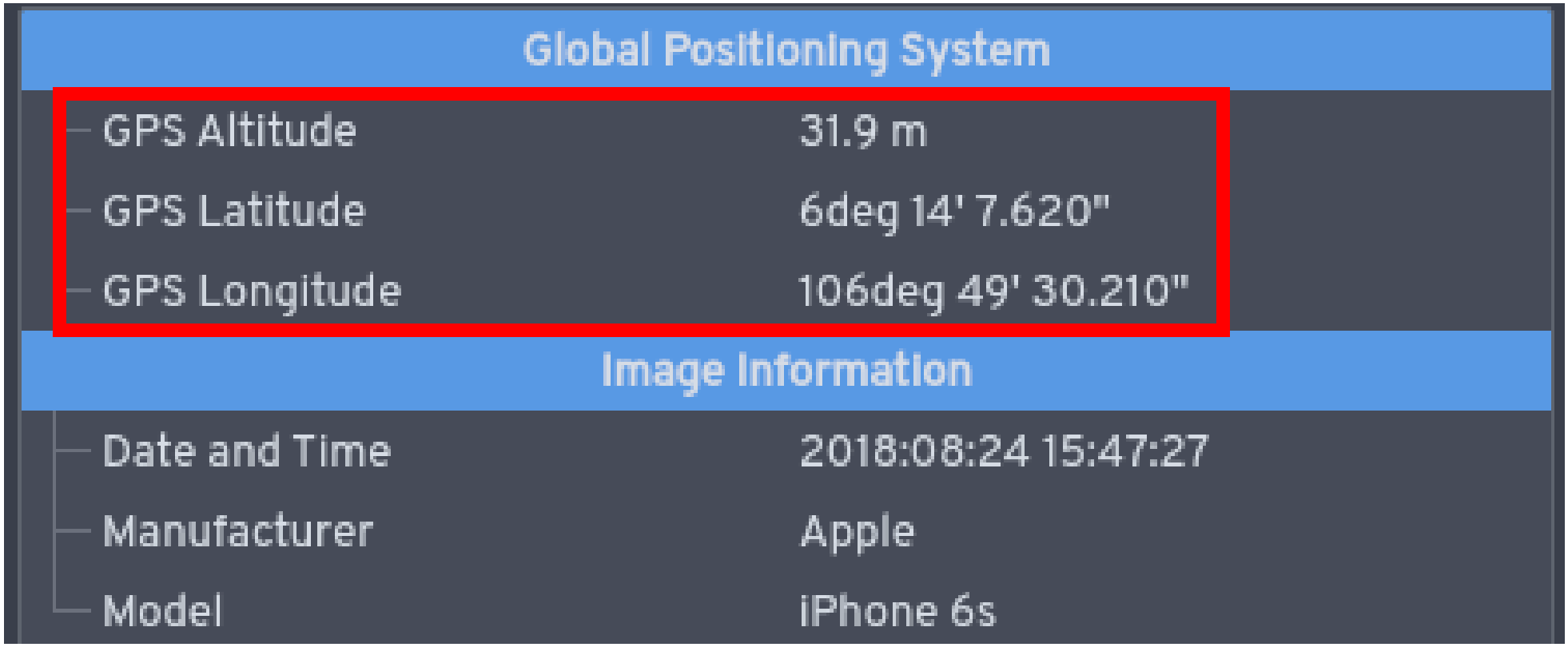
EXIF and Image File Metadata

Metadata is data that provides information about other data.
In the context of digital image files, each file has a plethora of metadata information which is generated when the picture is taken, including:

Global Positioning System	
GPS Altitude	31.9 m
GPS Latitude	6deg 14' 7.620"
GPS Longitude	106deg 49' 30.210"
Image Information	
Date and Time	2018:08:24 15:47:27
Manufacturer	Apple
Model	iPhone 6s
Photograph Information	
Aperture	F2.2
Exposure Bias	0 EV
Exposure Mode	Auto
Exposure Program	Auto
Exposure Time	1/874 s
Flash	No, auto
FNumber	F2.2
Focal Length	4.2 mm
ISO Speed Ratings	25
Metering Mode	Multi-segment
Shutter speed	1/874 s
White Balance	Auto

EXIF and Image File Metadata



Where the image was taken (GPS Coordinates)

EXIF and Image File Metadata

When the image was taken (date and time),

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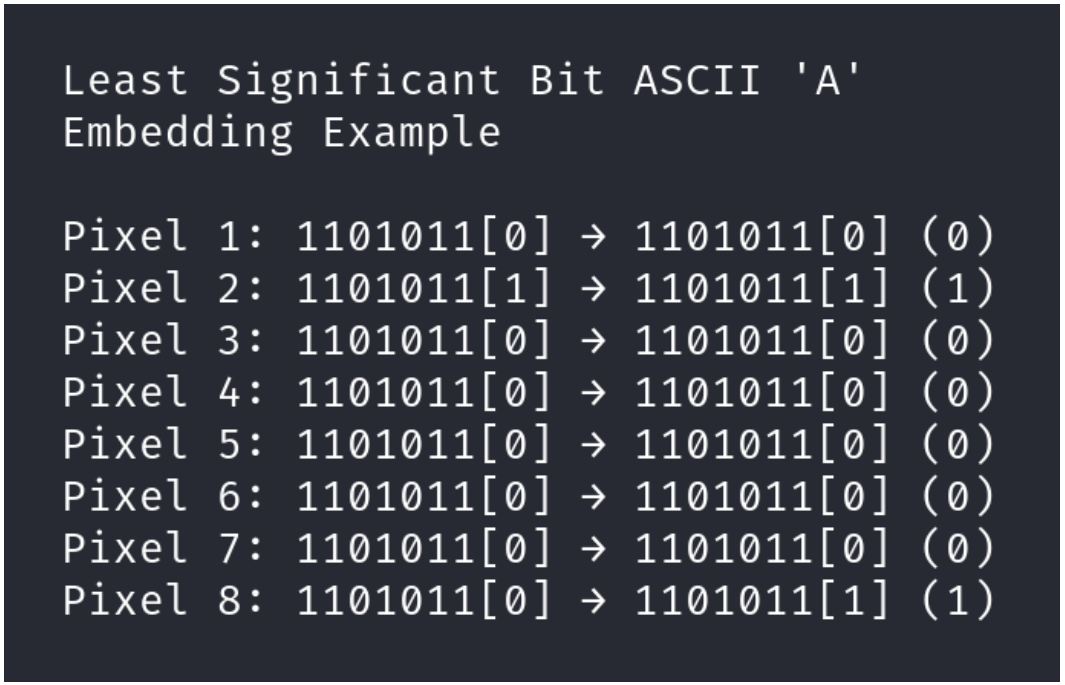
And the type of device used to create the image (manufacturer and model).

EXIFtool for Picture File Exif Output

```
└─$ exiftool red.png
ExifTool Version Number         : 13.00
File Name                       : red.png
Directory                       : .
File Size                       : 796 bytes
```

A common program used for inspecting a picture file's Exif data is Exiftool, and it will output all of the file's Exif metadata

Least Significant Bit (LSB) Steganography



The Exifdata gives us a hint towards LSB, which is a steganography technique used to hide data in picture files

Least Significant Bit (LSB) Steganography

```
Least Significant Bit ASCII 'A'
Embedding Example

Pixel 1: 1101011[0] → 1101011[0] (0)
Pixel 2: 1101011[1] → 1101011[1] (1)
Pixel 3: 1101011[0] → 1101011[0] (0)
Pixel 4: 1101011[0] → 1101011[0] (0)
Pixel 5: 1101011[0] → 1101011[0] (0)
Pixel 6: 1101011[0] → 1101011[0] (0)
Pixel 7: 1101011[0] → 1101011[0] (0)
Pixel 8: 1101011[0] → 1101011[1] (1)
```

The method of embedding the hidden data is to modify one bit of data in a set of pixels in the picture file

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Pixel 7: 1101011[0] → 1101011[0] (0)
Pixel 8: 1101011[0] → 1101011[1] (1)
```

This is an example of embedding ASCII 'A'