

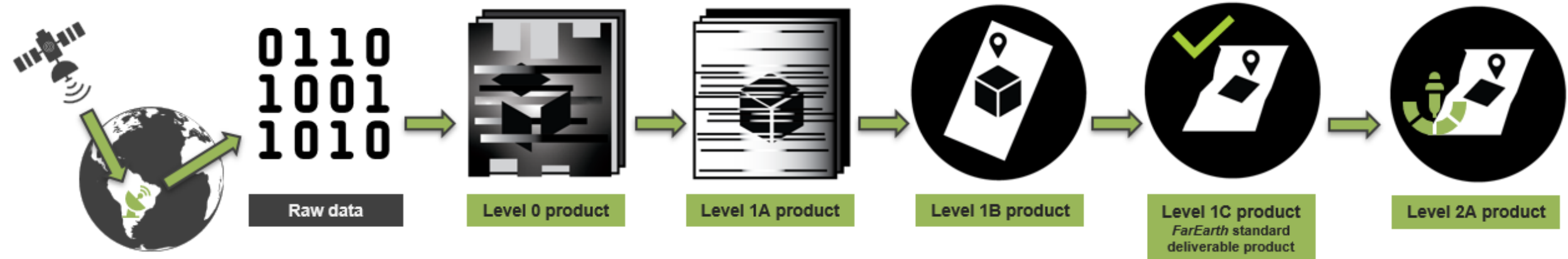
# FarEarth for SmallSats

## Product level definitions



Small satellite image data received from a ground segment undergoes multiple processing stages to produce usable image data products. Each stage provides products with varying amounts of data manipulation and advancement toward a usable image.

*Note: Pinkmatter uses the following definition for the product levels.  
The processing level and output data formats can be tailored to operational requirements.*



<ul style="list-style-type: none"> <li>• Reformat raw telemetry data</li> <li>• Preserve data integrity</li> </ul>	<ul style="list-style-type: none"> <li>• Systematic corrections</li> <li>• Sensor geometry</li> <li>• Radiometric calibration</li> <li>• Georeferencing (RPC)</li> </ul>	<ul style="list-style-type: none"> <li>• Band alignment</li> <li>• RPC refinement</li> <li>• Terrain correction (Orthorectification)</li> <li>• Digital numbers to TOA radiance or reflectance</li> </ul>	<ul style="list-style-type: none"> <li>• Ortho product</li> <li>• Map projected</li> </ul> <p><b>FarEarth standard deliverable product</b></p>	<ul style="list-style-type: none"> <li>• Radiometric atmospheric correction</li> <li>• Surface reflectance</li> </ul>
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# Product level definitions

*FarEarth standard deliverable product*

Level 0 product	Level 1A product	Level 1B product	Level 1C	Level 2A
<p><b>Product contains</b></p> <ul style="list-style-type: none"> <li>Image and ancillary data, such as attitude, ephemeris, scanline times, temperature, etc., from raw telemetry</li> <li>Data integrity preserved</li> <li>Pixels in DNs</li> <li>For archive and internal processing</li> </ul> <p><b>Processing includes</b></p> <ul style="list-style-type: none"> <li>Communication artefacts eliminated</li> <li>Extraction of imagery and ancillary information from raw telemetry data</li> <li>Any sensor-specific requirements</li> </ul> <p><b>Product format</b></p> <ul style="list-style-type: none"> <li>HDF5 file containing telemetry and ancillary data</li> </ul>	<p><b>Product contains</b></p> <ul style="list-style-type: none"> <li>RPC files</li> <li>Pixels in TOA radiance</li> <li>Conversion coefficients for at-sensor radiometric units per band</li> <li>For archive and internal processing</li> <li>Geolocated, but unprojected imagery</li> </ul> <p><b>Processing includes</b></p> <ul style="list-style-type: none"> <li>Refine, update, and populate metadata</li> <li>Identification of transmission errors and defective detector artefacts</li> <li>Refined ancillary data</li> <li>Radiometric calibration</li> <li>Geometric modelling</li> <li>Geolocation (RPC)</li> </ul> <p><b>Product format</b></p> <ul style="list-style-type: none"> <li>GeoTIFF image per band</li> <li>RPC file in txt</li> <li>Metadata in GeoJSON</li> </ul>	<p><b>Product contains</b></p> <ul style="list-style-type: none"> <li>Unprojected, but band-aligned imagery</li> <li>Refined RPC model (orthorectification)</li> <li>For archive, internal processing, and advanced use cases</li> <li>Pixels in TOA reflectance (or radiance)</li> </ul> <p><b>Processing includes</b></p> <ul style="list-style-type: none"> <li>Geometric model for band alignment</li> <li>DNs converted to TOA radiance and reflectance values</li> <li>RPC refinement per band (alignment, radiometric unit conversion, etc.)</li> <li>Bad detector corrections</li> <li>GCP collection</li> <li>Ortho model generation (RPC)</li> </ul> <p><b>Product format</b></p> <ul style="list-style-type: none"> <li>Single GeoTIFF/JP2000 image for all bands of the same resolution</li> <li>RPC file in txt</li> <li>Metadata in GeoJSON</li> </ul>	<p><b>Product contains</b></p> <ul style="list-style-type: none"> <li>Map projected, orthorectified image data in UTM/WGS84</li> <li>Pixels in TOA reflectance (or radiance)</li> <li>Geometric quality products</li> </ul> <p><b>Processing includes</b></p> <ul style="list-style-type: none"> <li>All corrections applied</li> <li>Map projection</li> <li>Geometric quality assessment</li> </ul> <p><b>Product format</b></p> <ul style="list-style-type: none"> <li>Single GeoTIFF/JP2000 image for all bands of the same resolution</li> <li>Metadata in GeoJSON</li> </ul>	<p><b>Product contains</b></p> <ul style="list-style-type: none"> <li>Pixels in surface reflectance</li> <li>Map projected, orthorectified image data in UTM/WGS84</li> </ul> <p><b>Processing includes</b></p> <ul style="list-style-type: none"> <li>Radiometric atmospheric correction</li> </ul> <p><b>Product format</b></p> <ul style="list-style-type: none"> <li>Single GeoTIFF/JP2000 image for all bands of the same resolution</li> <li>Metadata in GeoJSON</li> </ul>

Note: Level 1B represents the first stage, where pixel data is modified permanently  
 \* Rational Polynomial Coefficients (RPC) \* Ground Control Points (GCPs) \* Digital Numbers (DNs) \* Top-of-Atmosphere (TOA)

