

Christchurch 0.05m Urban Aerial Photos (2021)

Title

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Creator

Toitū Te Whenua Land Information New Zealand

Date

2021

Description

Orthophotography within the Canterbury Region captured in 11 February 2021. Coverage encompasses Christchurch CBD. Imagery was captured for Environment Canterbury by Landpro Ltd, 13 Pinot Noir Drive, Cromwell 9310, New Zealand. Data comprises: • 95 ortho-rectified RGB GeoTIFF images in NZTM projection, tiled into the LINZ Standard 1:500 tile layout • Tile layout in NZTM projection containing relevant information. The supplied imagery is in terms of New Zealand Transverse Mercator (NZTM) map projection. Please refer to the tile index layer for specific details, naming conventions, etc. Imagery supplied as 5cm pixel resolution (0.05m GSD), 3-band (RGB) uncompressed GeoTIFF. The final spatial accuracy is $\pm 0.2\text{m}$ at 90% confidence level in clear flat areas. Index tiles for this dataset are available as layer [Christchurch 0.05m Urban Aerial Photos Index Tiles (2021)](<http://data.linz.govt.nz/layer/106917>)

Source

Data Acquisition The Camera Imagery for this schedule was acquired using the Leica ADS100 line scanning camera with SH100 sensor head. The camera was fitted to a Leica PAV100 HP high performance gyro-stabilised mount. Flight Planning Careful consideration was given during flight planning to geographic location, terrain, topographical characteristics of the area, acquisition efficiency, final output resolution and meeting the various requested orthophoto quality specifications. Environmental Specification All imagery was captured without the presence of cloud or cloud shadow within the specified areas of interest. Where affected, all coastal, harbour, and tidal regions were captured during low tide periods, this being defined as the period 2 hours either side of low tide. Imagery covering coastal areas extends from the tide line during low tide periods out to 100 meters. Imagery of harbour areas extends out to 100 meters from the perimeter of the harbour. Rivers were captured during times of appropriate flow/stage height/rainfall restrictions as specified by the client. These criteria were set to avoid periods of high river flow (flooding), rather than to target abnormally low river flows. Elevated Feature Displacement The Christchurch area was flown with a minimum of 40% side overlap as limited by the Nadir sensor. Wherever practical, high side overlap was used to minimize the effects of elevated feature displacement in urban areas. Ground Control A total of 224 new ground control points were observed for use with the aerial triangulation and bundle adjustment of Schedule E areas. Data from Global Survey's and LINZ CORS sites, along with several existing LINZ benchmarks, were used in Leica Infinity software to process and check the ground control. Data Processing Landpro partnered with Hexagon Geosystems for image processing. Software GNSS/IMU processing: Novatel Inertial Explorer AT, SGM/Orthophoto Generation: Leica Xpro, DTM Filtration, QS2 & LAS Tool Environment DTM Preparation: TerraSolid, Global Mapper Seamline Generation: QS2 & Image Manager, Sweep and seamline editing, QM2, Inpho Orthovista DTM Editing: DTM Editor Tool, Tile Extraction, QS2 Delivery Manager Map Projection and Datum All spatial data for this project is supplied in the New Zealand Transverse Mercator (NZTM2000) projection in terms of the New Zealand Geodetic Datum 2000 (NZGD2000). Aerial Triangulation (AT) No abnormalities or complications were encountered during this phase. All aerial triangulations are carried out to ensure accuracies in the region of 1xGSD value. This was achieved with all adjusted RMS residual values in the desired region of $\pm 7.5\text{cm}$, ensuring excellent overall quality and spatial accuracy DEM for Orthophoto Point Cloud Generation XPro uses Semi-Global Matching (SGM) for high-resolution DSM computation. A ratio of 1:1 was used for generation resulting in a 7.5cm GSD resolution point cloud. Point clouds are output as RGBN encoded LAZ files. Point Cloud Filtration SGM filtration was done in Batch Converter and consisted of two processes following one after the other: • Lasground - Filter of input data and extract ground points from input point cloud • Lasclip - Removal of ground points inside polygons with buildings DEM Preparation The resulting point cloud was used to produce a 32bit floating raster DEM for use in orthophoto generation. The following accuracy requirements have been met for this DEM: • Vertical Accuracy ≤ 1 metre (@ 90% confidence) • Horizontal Accuracy ≤ 2 meters (@ 90% confidence RGBN Orthophoto Production Individual radiometric

profiles were checked for each strip ensuring optimal results across the final ortho-mosaic. No complications were encountered during orthophoto generation, mosaicking and tiling. Various quality checks including accuracy, colour, contrast, sharpness, seamline positioning, refraction and generation artifacts were performed and found satisfactory on the final orthophoto tiles. Peripheral Imagery Peripheral imagery has been orthorectified with the same DEM used to generate the primary AOI orthophotos. As such, these DEMs may not cover the entire area of peripheral imagery and associated artefacts may be present.

Coverage

-43.54285980134345 172.6108300675733 -43.52006557744965 172.6525502323925

Identifier

<https://data.linz.govt.nz/layer/106915-christchurch-005m-urban-aerial-photos-2021/>

Type

grid

Language

eng

Subject

imageryBaseMapsEarthCover