

# Stewart Surveys

## UNMANNED AERIAL VEHICLE (UAV) SURVEYING

Stewart Surveys now has a MAVinci SIRIUS UAV for mapping of large areas producing accurate survey models and high quality photography.



### Description

The UAV is a light unmanned aircraft with an on board high resolution camera that can capture overlapping images at about 2cm pixel size and flying at 120 metres or less. The UAV is operated under line of sight by an accredited pilot and CASA approved controller.

The UAV flights are mostly autonomous or automatic while in the air and are continuously monitored by the ground controller who can take manual control and land the plane at any time.

UAVs provide faster data and safer acquisition methods. They produce high resolution aerial photographs and detailed digital elevation models.

Our chief controller holds full CASA accreditation, with a pilot's license, controller's certificate and operation certificate (ARN 816178)

### Survey Applications

The system is designed for a wide range of survey modelling and photographic applications including:

- Development Sites
- Topography and Digital Terrain Modelling
- Asset Mapping
- Flood Mapping
- Accident Sites
- Farm Plans
- Irrigation Layouts
- Environmental Mapping
- Progress Reporting and Monitoring of Civil Works
- Corridor Surveys of Roads, Pipelines and Power Lines
- Inspections of isolated and dangerous sites
- Earthworks photography, mapping and volume calculations.

### Advantages of using a UAV System

- Site work is carried out faster and more efficiently.
- There is a greatly reduced exposure to risk for surveyors
- Inaccessible and hazardous areas can be surveyed remotely
- Built in fail safe procedures in operation
- Operates in poor weather conditions including cloudy days and winds up to 50kph
- Cost efficient compared to conventional methods.
- Quick turnaround of survey data. Overnight processing.
- No disruption to operations as there is no interaction with vehicles and equipment.
- Battery powered aircraft
- More accurate than conventional piloted aircraft because it flies slower and lower
- UAVs massively reduce the turnaround time and cost of acquiring aerial images and survey data.



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## Workflow

- Ground control: GPS/GNSS survey equipment is used to place targets with known co-ordinates in selected positions. For sites where flying is going to be an ongoing process this only needs to be done the first time and targets are left on site.
- Flight Planning: A landing and take-off position is selected on site. The flight planning is carried out using MAVinci Desktop flight planning software The flight path is uploaded to the SIRIUS UAV.
- Take-off: At the desired take off position the SIRIUS UAV is launched it into the air by the controller.
- Flight: The SIRIUS UAV will automatically fly the pre defined route by making parallel sweeps taking multiple images with the high resolution on board camera. .
- Landing: When the flight plan is completed the UAV returns to the programmed landing area and the controller lands the plane and downloads the data for processing.
- Postprocessing: Photographs are downloaded and processed through Agisoft software. The software aligns the photographs and reduces the models to produce digital terrain model, contours and a geo-referenced photo-mosaic.

## Outputs & Deliverables

- The Point Cloud is output in las, txt or xyz file format
- A dxf with the tin file in Autocad format.
- Geo referenced Ortho-Mosaic photographic (tiff or jpeg)

## Calculations

The output data is then ready for upload to CAD, GIS or other software for modelling, mapping, further design and calculations including stockpile and pit volumes, preparation of contour and feature plans..

## Services

Stewart Surveys are able to provide a full UAV surveying service including ground control, photography, processing, survey design and modelling.

