Position Statement

Queensland Spatial Information Council

Queensland Government

Imagery and Mapping Acquisition in Queensland

Recognising that:

- The State Government needs to optimize the acquisition of imagery and mapping across whole of Government in terms of cost, technology, fit for purpose and
- Imagery and mapping acquired by the State Government should deliver maximum benefits to as wide a range of users of spatial imagery and mapping as possible
- Imagery and mapping acquired by the State Government needs to be based on sound user needs data and credible analysis

ASIBA recommends that:

Imagery, DTM and mapping acquisition programmes developed by the Queensland Government be based on the following principles —

- Optimization of acquisition plans to meet multiple needs and benefit multi-user applications including those of the community, state and local government and industry
- Recognition of industry needs for base data to provide value added services and products needed by business, government and the wider community
- Utilisation of the best available and most appropriate capture and mapping technologies to optimize cost and efficiency
- Optimisation of resolution, accuracy, areas of coverage and costs to maximise outcomes and benefits from available funding
- Utilisation of advances in technology and specifications to deliver the most cost effective solutions
- Encouragement of data warehousing, collaboration and multi-use principles of data sharing that involve the government and industry
- Establishment of a procurement regime that is open and transparent, technology neutral and vendor independent
- Encouragement of the development of advanced spatial technologies and innovative solutions in the Australian Spatial business sector

And further recommends that:

Imagery, DTM and mapping acquisition programmes developed by the Queensland Government make the most cost effective use of all available resources in public and private sectors through knowledge, awareness and recognition of —

- The role of the State Government as custodian of spatial data gathered via State funded programmes and the opportunities for value adding to that data by all sectors
- The capacity available in industry to provide data capture, warehousing and distribution services for all types of imagery and mapping.
- The imagery, DTM and mapping acquisition programmes carried out by other levels of government and industry generally

Attachment A provides supporting data for this Statement

Attachment A — Strategic Framework

Development of a strategy for imagery, DTM & mapping acquisition should be based on an agreed framework. This should underpin any State wide programme or funding proposal. The framework should define the principles, roles, aims, production strategy, custodianship and implementation directions

Imagery and Mapping Acquisition

Purpose

- Sustainable Natural resource management, including
    - Land
    - Vegetation
    - Environment
- Urban & Regional planning
- Rural productivity
- Emergency Services
- Asset management
- Infrastructure development

Aims

- To develop a strategy for imagery acquisition & mapping to benefit the widest possible range of users
- To optimise the image resolution, accuracy requirements, areas of coverage spectral range, currency and costs to maximise outcomes and benefits from available funding
- To apply appropriate specifications for image resolution and accuracy that deliver products that are appropriate for different regions of the State and applications
- To use advances in technology and vendor neutral specifications to deliver the most cost effective solutions and meet measured needs

Digital Terrain Model (DTM) acquisition

Purpose

- Catchment & Property management plans
- Engineering design & planning
- Natural resource management
- Drainage studies
- Urban & Regional planning
- Flood modelling studies
- Urban development
- Emergency Services
- Coastal zone studies
- Asset management
- Infrastructure development

Aims

- To develop a strategy for DTM acquisition & mapping to benefit the widest possible range of users
- To optimise the accuracy requirements, areas of coverage and costs to maximise the outcomes and benefits from available funding
- To apply appropriate specifications for DTM accuracy that deliver products that are appropriate for different regions of the State and applications
- To use advances in technology and vendor neutral specifications to deliver the most cost effective solutions and meet measured needs

Data Management, Distribution and User Access

Purpose

- Improved data management by government, business and other authorities to support wide usage of data and greater accessibility
- Improved distribution of data to allow users to know what is available and how to access it seamlessly.
- Improved user access to data using new distribution and access technologies and the internet
- To encourage more open access to spatial data bases through OGC interoperability structures

Aims

- To recognise that data is only valuable if it is accessible and must be affordable to realize its true value
- To ensure spatial data is efficiently managed and stored to facilitate maximum use
- To ensure effective data distribution opportunities to allow as many users as possible to use spatial information
- To maximise the use of spatial data by government, industry, business and the wider community
- To support open GIS (OGC compliant) structures to widen access and interoperability
- To recognise the role of the private sector in wider data distribution

Optimising imagery, DTMs and mapping:

Optimising imagery and mapping aims to provide quality, value, affordability and user benefits all within a budget. Aerial or satellite imagery and mapping costs are very sensitive to resolution and image scale. The aim is to maximise the benefits from available funding for imagery & mapping. By optimising the parameters, available funds can be used to provide wider imagery & mapping coverage.

There are six parameters that have a significant impact on an image acquisition & mapping strategy:

Parameter	Description	Comments
Resolution	the detail you can see (or need to see) in the imagery or ortho photo	This will broadly vary for different regions (urban, coastal-intensive land use, agriculture/ grazing, forest, remote) and different applications to get the best value; the challenge is also to avoid imagery & mapping at higher resolutions than is practically & realistically needed.
Coverage	the area of each region that your require imagery and mapping over; these regions also can correspond to the extents of different imagery resolutions and accuracies	By carefully defining the limits of these regions the overall imagery & mapping can be optimised to deliver a sustainable, realistic and cost effective solution
Accuracy	the positional accuracy you require from mapping , or the height accuracy needed.	This will broadly vary for different regions (urban, coastal-intensive land use, agriculture/ grazing, forest, remote) and different applications. To get the best value; the challenge is also to avoid imagery & mapping at higher accuracies than is practically & realistically needed.
Cost and Value	relates to getting the best value for money and maximising the area covered for the available budget	This is achieved by recognising that costs are directly related to resolution, areas of coverage and accuracy. The overall imagery & mapping programme should be optimised to deliver a solution that is within available funding limits and maximises the benefits to a wide range of users
Spectral range	this refers to the wavelengths recorded. Most aerial imagery and high resolution satellite imagery records visible bands (red, green and blue) and can also record imagery in the near infra red range	Infra red bands (near, shortwave and thermal infra red) provide more information for analysing vegetation, the presence of water etc. The far infra red band and other spectral bands are only available on lower resolution satellite imagery
Temporal analysis	this refers to the ability to analyse imagery recorded at different times to assess changes	Temporal analysis can be affected by differing illumination which is more of a concern with aerial photography than with satellite imagery.

Resolutions, accuracy, mapping scales and costs:

Broad guide

The following information can only be a broad guide. It has been generalised and abbreviated to make it readable. Clearly it cannot cover the range of imagery and mapping technologies, accuracy variations and cost alternatives in full detail.

It is provided to relate the key factors of accuracy, coverage, resolution and cost.

It is intended to assist in developing the appropriate resolutions, accuracies and coverage that will best suit the overall needs of the State as well as a wide range of users.

Comparative Data: Imagery & mapping scales, resolutions and accuracy

Mapping Scale (Output products)	**Resolution: Image Pixel Size: metres**	**Image Mapping Accuracy: (rmse accuracy) metres**	**Digital Terrain Model Accuracy (rmse surface accuracy) metres**	**Applicable for :**
1:100,000 to 1:50,000	25 m to 12.5m	+/- 50 m to +/- 25 m	+/- 10 m	State, Remote regions, Channel Country
1:25,000	12.5 m to 7.5 m	+/- 12.5 m	+/- 5 m	Forest, Grazing, Rural Land mgt
1:10,000	2.5 m	+/- 3m	+/- 4 m	Agriculture Land mgt
1:5,000	1.25 m	+/- 2 m	+/- 3 m	Intensive agricultural land use, rural living,
1:2,500	0.6 m to 0.75m	+/- 1 m	+/- 2 m	Rural & Coastal development, Towns, Urban areas, Planning
1:1000	0.15 m to 0.30m	+/- 0.3 m	+/- 0.5 m	Urban areas, engineering, assets, infrastructure
1:500	0.10 m	+/- 0.2 m	+/- 0.25m	Engineering projects, flood & drainage studies

Note: the “Image Pixel Size” description refers to digital imagery and the relevant equivalent description should be used for film imagery.