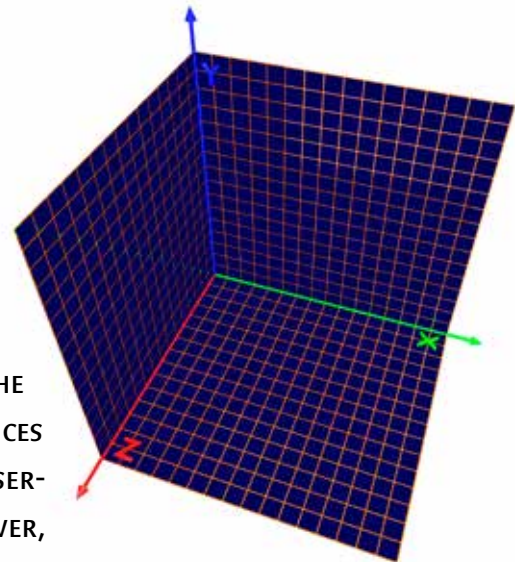


OBSERVATION COORDINATES

David Goodwin, National School of Surveying



IN NEW ZEALAND'S SURVEYING PAST, THE TECHNOLOGY OF THE DAY CAPTURED DATA IN THE FORM OF DIRECTIONS AND DISTANCES AND IT WOULD HAVE MADE MORE SENSE TO USE THE TERM "OBSERVATION VECTORS" THAN "OBSERVATION COORDINATES". HOWEVER, TODAY BOTH OUR DATA CAPTURE AND INFORMATION DISPLAY TECHNOLOGIES ARE MORE IN LINE WITH COORDINATES, FROM WHICH VECTORS CAN BE INFERRED WHERE NECESSARY.

Don Grant, the outgoing Surveyor General, asked in Issue 77 whether the best 1950s cadastral system is still the best form of cadastre for New Zealand in the 21st century, and although we would have to answer "no" to that, the details of how to change our survey rules and reform our admirable but vector-based Landonline system are not trivial. I would argue that, as we position ourselves for a 3D National Cadastre and aspire to smart and robust data for our towns and cities, six principles emerge that we should consider seriously if we want our national cadastre to catch the same wave on which smart phones and Google Earth are riding:

1. Retain the monument-based cadastre principle.

Physical marks, if unmoved, should continue to have the greatest weight in evidence not only on grounds of equity but also on practical grounds including earth movement.

2. Require an observation coordinate file of both surveyed and adopted marks to accompany each submitted survey and be made available for subsequent surveys.

This would give the same accuracy for surveys going into the system and coming out, it would prevent copying errors and avoid repetition of work in ray-trace and missing line calculations, and it would be in a format uploadable to GNSS, Total Stations and CAD. Such coordinates would not be "legal coordinates," they would merely be survey evidence from a particular epoch in the same way that vectors currently are. More details are given in the article "An alternative cadastral survey dataset" in the New Zealand Surveyor, No. 300, 2010.

3. Vectors should no longer be required on survey plans. Depiction of vectors made sense where

positions were still captured as vectors in the past, but is anomalous in conjunction with technologies such as GNSS (again, see samples in NZ Surveyor No. 300).

4. Survey marks in an approved CSD that are surveyed, checked to a prescribed standard and accepted as not having moved enough to make a material difference to property rights, should supersede earlier evidence.

Where marks have coordinates on a more recent survey, there should be no need to go back to earlier origin information, which will, in general, be inferior.

5. All new boundary marks and also resurveyed old marks should have well-defined centres. In other words, either new generation marks should be used or else wooden pegs should be tacked. This has nothing to do with imposing unrealistically high boundary standards, it would solely be a means of densifying control for use in redefinition or partition surveys.

6. Similarly, boundary marks and witness marks should always be surveyed and checked from an independent set up, and the resulting best weighted position should be given equal status with control such as traverse stations. The independent coordination requirement is no longer onerous given the ease of GNSS and Total Station fixes, and there is no reason why the resulting position should be inferior to the control used. This requirement would densify control and so (a) give more options for finding which marks are disturbed and which unmoved and (b) in some cases would avoid detailed mathematical modelling where there is earth movement.