Surveying the world of tomorrow - From digitalisation to augmented reality
COORDINATES OF BOUNDARY POINTS IN NORWAY

Helge Nysæter
Norwegian Cadastral System

- German style cadaster (title system)
  - Land register
    - Parcel no. + owner
    - complete and guaranteed
  - Cadaster
    - Boundaries shown in map
    - Incomplete, not binding
    - Surveying mandatory when subdividing property
Measurements and calculations

### Output from Trimble Survey Controller job

<table>
<thead>
<tr>
<th>Parcel_38_5</th>
<th>26102015 002</th>
<th>$11</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRS base:</td>
<td>60.38591°, 5.15303°, 80.864m</td>
<td></td>
</tr>
<tr>
<td>G1</td>
<td>6700584.839 288000.599 33.087</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>0.00006429 0.0002664 0.00015849 0.00000709 0.000004454 0.000002087</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>26102015 10:35:04 16 1.45 0.000 11 94</td>
<td></td>
</tr>
<tr>
<td>WA Fixed</td>
<td>Prec:0.006/0.011 PDOP:1.5 Pos:11 SVs:16 UTC:10:35,26/10-2015</td>
<td></td>
</tr>
</tbody>
</table>
Covariance values for weighting

- Coordinates (NEH) not independent
- Covariance matrix used for weighting, like in static GNSS-surveys
  - Not mandatory according to govt. standards, but the software used by the municipalities calls for these values.
Effect of covariance values for weighting

< 1 cm!
Blunder detection and reliability analysis justified
Conclusion

- In Norway, we use all the tools every time!
  - There should be no possibility of errors (one may think).

- But what if the tools are too complicated, too expensive, and some of them of no benefit at all?

- A professional surveyor would know which tool to be necessary in each different case.