GNSS Guidance Update

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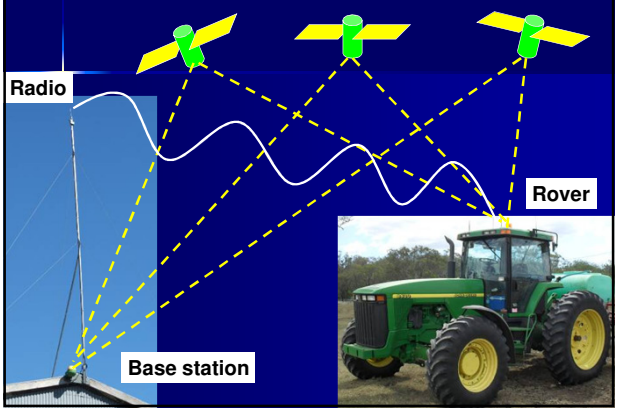
GPS/GNSS

Why do we need precision?

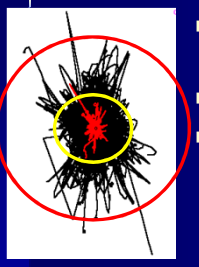
Accurate bed formation

Maximise # beds / pdk

Machine Auto-steer

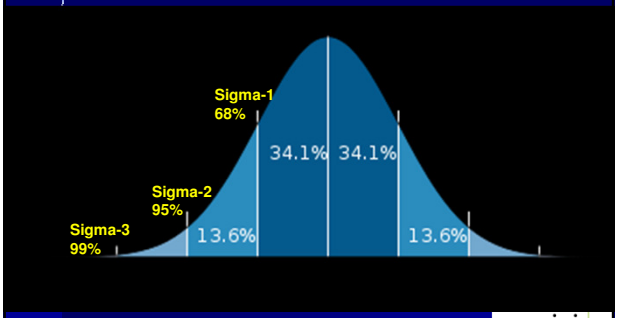


RTK Static accuracy

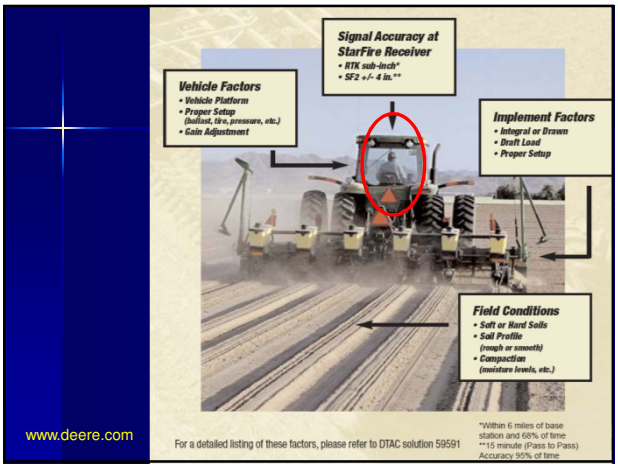


- JD +/- 1" 68% (Sigma-1) within 6 miles (10k) of base
- Trimble <1" Sigma-2
- Leica +/-5cm 99% (Sigma-3) within 6.5km of base

Static accuracy



Wiki

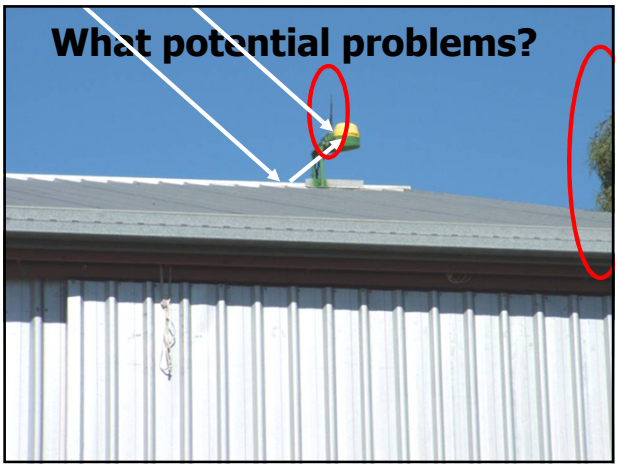


Can I talk to other base stations?

- Generally not, unless they are of the same company
- Manufacturers make sure you can't:
  - Proprietary communication formats
  - Radio differences
  - Hopping frequencies
  - Authorisation codes
  - Support

Radios

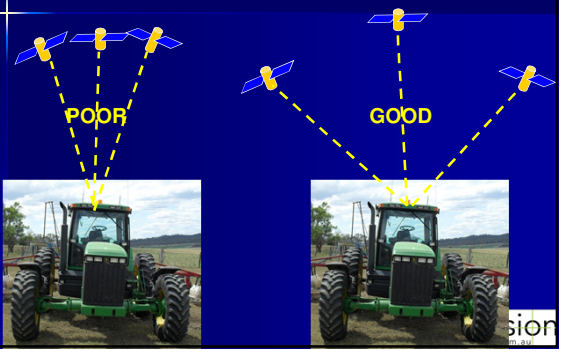
- UHF high powered (eg. Farmscan), 35W 300-3000MHZ
- UHF (Spread spectrum) low power, 1W 900MHZ (Leica, JD, Trimble)
- VHF 30-300MHZ (eg Trimble)
- Range from 6km to 25km



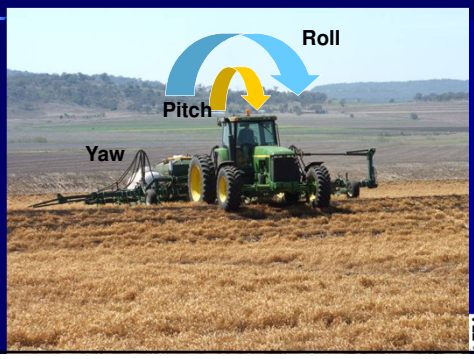
What normally goes wrong?

- Setup and tuning (operator error)
- Machine tracking issues
- Lose GPS contact
  - Poor DOP (Dilution of precision), trees, time of day – or lack of sats, solar flares
- Lose Radio contact
  - Base station range and signal degradation, trees, etc
- Hardware failure (relatively rare)
- Software glitches (common)
- Accidents (becoming common)

Dilution of precision (DOP)



Terrain



Steering options

From factory - CANBUS

Steering options

3rd party aftermarket hydraulic

Steering options

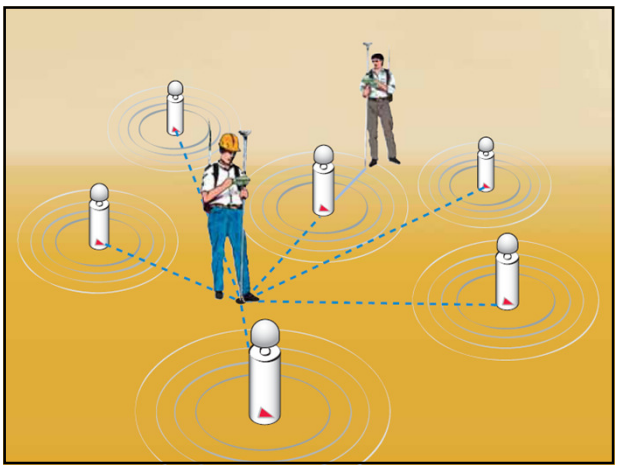
Steer assist (ATU, QuickSteer, TopCon or EZ-steer)

Steering options

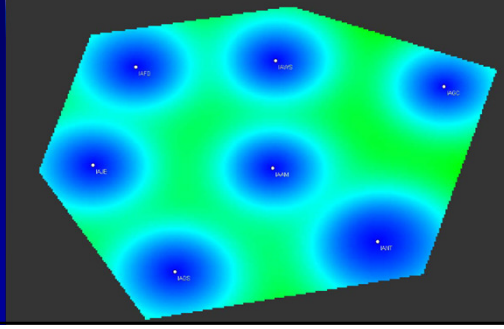
Implement steer

What is CORS?

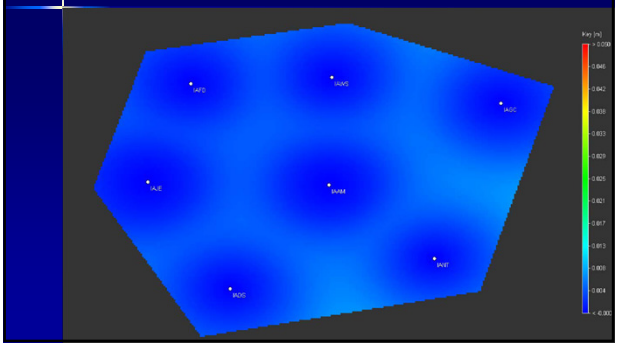
- Continually Operating Reference Station "Network" or NRTK
- Different to shared base station "arrays"
- Uses data from 3-6 base stations around the user (typically up to 70km apart) to a central processing centre
- NRTK data streamed direct to user using mobile phone/internet (NextG in Aust)
- Happens in <1 second



Single point coverage model



CORS Network coverage model



Advantages for Ag

- Open format – RTCM & CMR+
- Increased coverage @ 70km apart
- Reliability and redundancy
- Higher accuracy
- Less capital invested from ag
- Other users can help pay (e.g. mining, construction, surveying, government)
- Easier for contractors (in the future)

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Issues for Ag

- NextG coverage
- Relying on internet/connectivity
- Telstra = high data costs
- Lack of national pricing policy
- Difficulty in working with governments/private partnerships
- Needs a commercial national approach
- Not all companies can/want to conne

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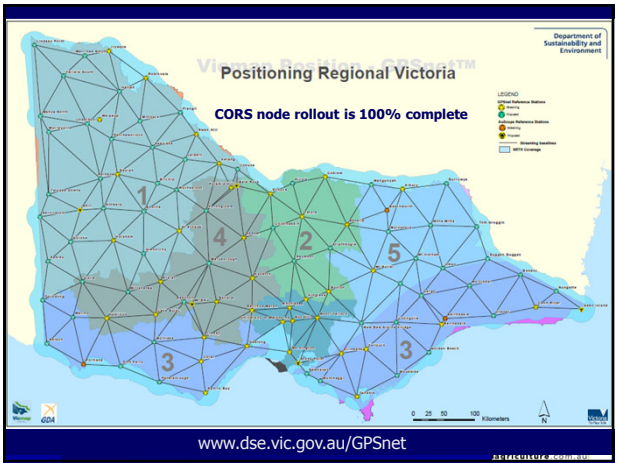
Ellinbank GPSnet CORS

Photo: Tas DPIW



Cost?

- Pricing varies between states
- "Surveyor" model –> need ag model
- Subscription fees range from $0.60/hr through to $2000/yr/unit
- Data plans around $39/month for moderate-heavy usage

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Summary -What should you buy?

- RTK is best option
- Definitely DUAL frequency
- CORS and GNSS compliant
- Trimble, Autofarm, Leica, JD, Topcon
- Best support offered

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Some observations

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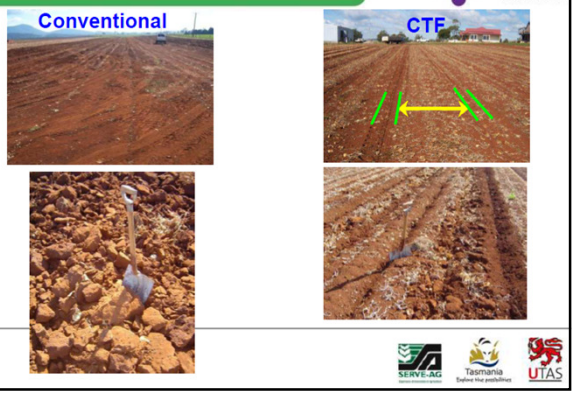

SERVE-AG Tasmania UTAS

Some observations

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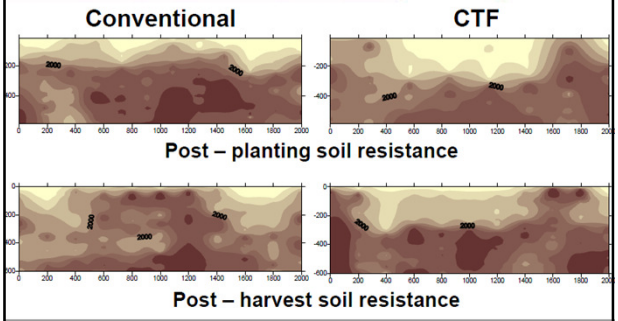

SERVE-AG Tasmania UTAS

Some observations

tiar

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Current TIAR Project

tiar

Demonstration of CTF potatoes at FRDS

- **Cultivation prepared Jun 08**
- **Potatoes sown Nov 08** - standard row spacing, various densities, 2 m wheel tracks
- **Harvest Mar 09**

SERVE-AG Tasmania UTAS

Current TIAR Project



Current TIAR Project


Current TIAR Project