ABEM

GroundTEM Ralli

TRANSIENT ELECTROMAGNETICS

GUIDELINEGEO
Your guide to the subsurface

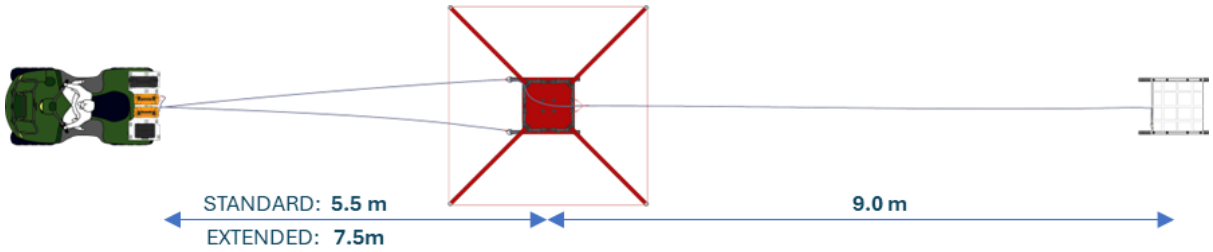
Quick Guide for distance test to determine tow-vehicle suitability

VEHICLE RECOMMENDATIONS

One of the biggest constraints upon where TEM survey can be undertaken is the effect of "coupling". This is the recording of noise signals which come from the TEM equipment generating currents in nearby conductive materials, that are not related to the geology or natural deposits we are trying to map. Mobile TEM requires a tow vehicle and minimizing the coupling effects from that vehicle are paramount to successful survey. Regular quad bikes (ATVs) are suitable for survey (for example, the model shown to the right).

Other, larger vehicles (including snow mobiles) can be problematic due to the increased metal content. This maybe from being physically bigger, having a large metal load-bed, or a large metal roll-bar / roll-cage.

In some cases it is possible to work with larger vehicles by using thee extended lead-in cables, which offset the Tx and Rx platforms further away from the tow vehicle.

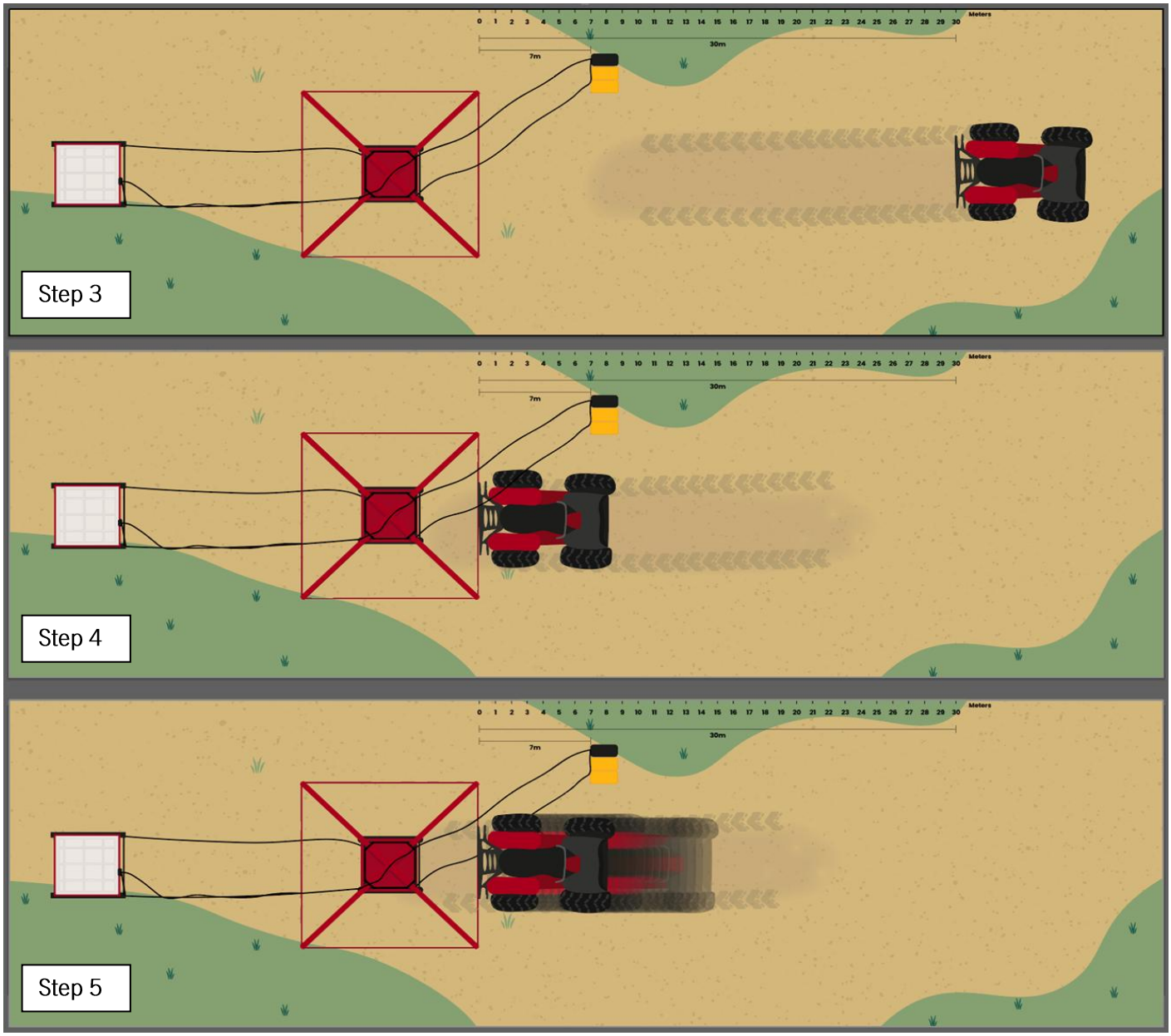


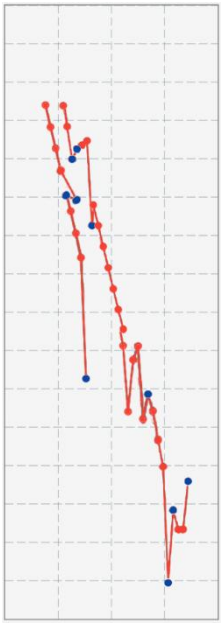
UNDERTAKING A DISTANCE TEST

The ATV distance test should be conducted where the earth signal is low (resistive ground) since minor ATV interference is more detectible in this scenario. The following page carries figures to illustrate some of these steps.

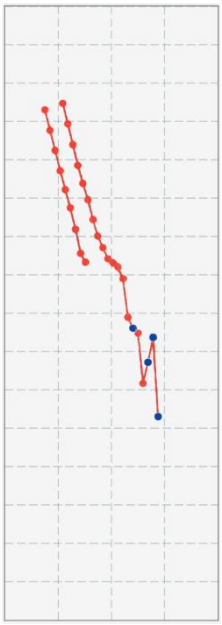
1. Setup the system as normal, but place the instruments, in the normal layout, on the ground or on plastic boxes at the end of the towing rope, instead of on the back of the ATV.
2. Important: Make sure that the transmitter and receiver cables are separated by a minimum of ~40 cm as when the instruments are mounted on the ATV.
3. Move the ATV far away (>30 m) and record one minute of data. Make a note of the line number/time interval. This is the Baseline response.
4. Move the ATV as close to the front of the transmitter frame as possible (0 m separation). Change the line number and record for one minute in this position with the ATV engine on.
5. Move the ATV in steps of ~0,5 m away from the transmitter front towards the instrument boxes and record one minute of data at each ATV location and note line number, time, ATV separation at each position. Continue this procedure until the ATV is ~7 m away from the transmitter front. Remember to make a measurement at the normal ATV position.
6. End the sequence as stated with the ATV far away.
7. A very basic conclusion is to look for a distance at which the bulk of the raw decay curves become smooth and undisturbed. For a more thorough analysis follow steps 8-10.
8. Import the data to Aarhus Workbench. Set the stack width to 40 s and turn off filters that eliminate data.
9. Plot the stacked data curve (AVE data) at the center time of the time interval for each ATV distance and compare them with the baseline measurements.
10. You should observe that when the ATV is too close to the frame the curve is disturbed, compared to the baseline response.

If no systematic dissimilarities between the response at the normal ATV distance (and longer distances) and the baseline response are observed, the ATV - TX-coil distance is sufficient for the specific ATV. You can evaluate the natural fluctuations of the TEM response by comparing the start and end baseline responses. Do not shorten the ATV-transmitter frame distance even if your test results show it is possible.

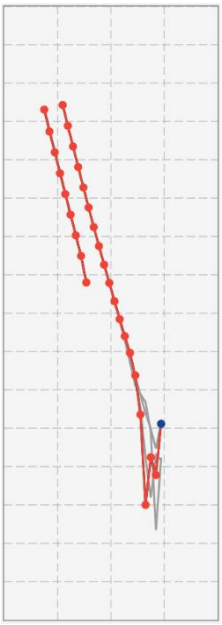




Severe coupling effects creating noise in raw data on the instrument



Limited coupling effects creating noise in raw data on the instrument



No coupling effects, smooth decays with some natural background noise at the late times

If standard lead-in cables are not long enough to remove coupling effects, contact sales@guidelinegeo.com to discuss extended lead-in cables