

Leica mojoMini guidance system:

Guidance taken to a different level

Leica mojoMini is a competitively priced and entry-level parallel guidance system that adds the benefit of street navigation to a field guidance system. Our profi test report reveals how well it performs.

This is the first system that combines parallel field guidance and street navigation in a single package. And all this for a rival-busting price of €995 (excl. VAT). Reason enough for profi to take a closer look at Leica's mojoMini.

The product, which is purchased through direct selling, is shipped in a compact box containing the display with suction cup and

The €1,000 system is a very useful tool for spreading or liming jobs. We mounted the GPS receiver beneath the tarp roof on our tractor.

the power line that connects to the cigarette lighter. All items are easy enough to install. And if you take the trouble to clean the window before attaching the suction cup, it will hold securely in place for days on end. And secure it must be, because the touch screen needs to be pressed firmly by the operator before it responds.

As you power up the system you'll find that it is instantly ready to run - courtesy of the integral GPS receiver, although this deals with street navigation only. It is not accurate enough to give dependable guidance in the field.

This requires the 5Hz and 14-channel 'Leica GeoSpective Smart Antenna', which is actually a DGPS receiver with built-in antenna that uses the free correction signal Egnos. The unit can also be

mounted to plastic roofs, using double-sided tape and a metal plate supplied with the system. Communication between the receiver and the display is wireless and via Bluetooth, a smart solution that makes the installation of both units simple and easy. The receiver housing looks very sturdy. Not so the plug that connects the line powering the receiver and transmitting GPS signals to an RS323 interface. Although water-resistant, the connector looked rather flimsy to us. Yet Leica reassured us, claiming that it provided full functionality in any type of weather.

There is no on/off switch on the GPS receiver. Leica says the unit should be directly connected to the battery and switched on and off by the starter switch. Unfortunately though, the otherwise very comprehen-





After booting the system, users either press the parallel guidance or street navigation icons which appear on the start-up screen. Parallel guidance is the left icon. In addition, they can also choose to have a calculator or setup icon displayed in the bottom left corner of the screen.

sive PDF manual gave no indication of how to connect the four wires. So we had to contact the firm to find out which of the wires connected to which battery terminals. Get this wrong and you could be in real trouble! Finally, after connecting two wires to the battery, we grounded the two remaining wires to the starter switch and the live positive pole. Leica promised to include the information in the manual and code the wires properly to avoid confusion.

Complex as it is, this way of powering the system is designed to ensure the processor inside the receiver shuts down properly when the engine is shut off. At the same time, however, it actually discourages operators from transferring the system to another machine. Therefore, users who intend to operate the system on various machines may want to install a permanent loom on each machine involved (€300 excl. VAT). To be clear, it's not necessary to have the additional 'GeoSpective Smart Antenna' to use the street navigation feature within mojoMINI.

We won't spend too many lines discussing this feature. After all, street navigation systems have become widely available for iPhones and smartphones, some of them being free. Leica uses a customised version of the 'Destinator 9' navigation software. Unlike the guidance application, navigation is operated with the help of a stylus just like we used to have for our palm tops and pocket pcs in the past. It seems that finger touch control exceeds the processor capacity of the navigation system, which incidentally is also used in iPhones and smartphones (€40). The system often took several seconds before it opened the next field to enter the data. As for general handling and function-

ality, you have to exit navigation before you can adjust the brightness of the screen. The volume can only be adjusted with the stylus as well. Road lanes are very small with poor contrast. The system offers neither traffic jam nor speed camera warnings.



Work width and distance from the antenna to the implement need to be verified before you can start a job. Units are displayed in imperial and metric units. There is no option to select either.



The system combines lightbar guidance (at the top of the screen) with perspective view lines to make up for the small screen. The concept proved very effective and was indeed a great help for steering.

And if you expected that the mojoMini Destinator 9 would be customised for use in rural and remote areas, you'll be disappointed. In a nutshell - the navigation feature inside mojoMini is a nice thing to have and should get you back on track if you lose your way, but it certainly isn't very user-friendly, nor does it make for relaxing navigation.

Luckily, mojoMini performs much better in the field. First up, the buttons used to set up and operate the system are nice and large. Then there is a 100-page manual in PDF format that complements the hardcopy quick-reference guide supplied with the system. Also, most icons are clear and the navigation menu is simple.

The system is ready for guidance once the 'GeoSpective Smart Antenna' has communi-

cated the GPS signal wirelessly to the display via Bluetooth. Egnos reception is enabled and disabled from the main menu. We used Egnos for our test runs on Leica's recommendation, who claimed pass-to-pass accuracy was 15-20cm.

Two options help operators receive the best possible guidance from the screen:

One is the possibility to set the LED lights at the top of the screen to a 1-20cm width (20cm proved to be the best setting in our tests as all other settings left the screen unsteady). The other option is to define an advance or retard pattern for the current position to the effect that the display goes into either pushing or tracking view. In pushing mode, the LEDs mark the tractor's position relative to the ideal line whereas in tracking mode, they indicate the direction of travel.

When using Egnos correction, the system may erroneously show the indicated tractor position off its actual line after pausing. This is where the repositioning feature comes in: Drive the tractor into the correct track and tap on the screen, which opens the repositioning button. This nudges all programmed reference lines to align with the current track, making up for signal drift. This is a really excellent feature, you just have to know that it's there.

TEST ASSESSMENTS

How profi rated Leica mojoMini (parallel guidance only)

Installation	
Connector and power cable	+
Ease of installation	-
Space requirement	+
Operation	
Operating instructions	+
Menu navigation	+
Keypad	-
Field work	
GPS control	⊙
Establishing the reference line	+
Navigation	+
Finding the next line	+
Repositioning	++
Screen contrast and readability	⊙
Dimming function	⊙
Grading system: +++ = very good; ++ = good; ⊙ = average; - = below average; -- = deficient;	

Like all other systems tested previously, we tested the **mojoMini** in A-B mode only. The system also offers A+ heading, fixed-contour and pivot modes. After a bit of practice we quickly got to grips with **mojoMini**, courtesy of its straightforward layout and clear icons. However, it has to be said that a firm tap is necessary to operate the touch screen, and you have to hold the unit with your other hand to stop the suction cup coming off.

Contractors will appreciate the boundary function which records the boundary as the tractor travels the perimeter of the field and which is used to compute and show the area within the boundary. At the same time



mojoMini also records area covered. In addition, the operator can select the left or right border to compute the area within the boundary. Photos: Böhrnsen, Holtmann

you can view coverage directly on the screen as you open the outlet in the spreader hopper, for example. This is a great help to minimise overlapping and over-application. The boundary can be exported to an SD card and viewed in GoogleEarth on the office PC.

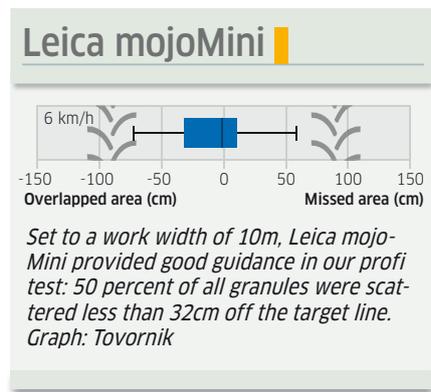
An area/job management feature is not available in **mojoMini**; this would probably be asking too much from a €1,000 software system. Yet, it allows storage and retrieval of the most recent job, a useful option when pausing to top up the fertiliser hopper, for example.

Screen layout and overview is excellent despite the small 4.3" screen size. Lightbar guidance is supported by a perspective view. All buttons automatically disappear after 20 seconds so that the full screen is available for guidance. The only exception is the speedometer icon at the bottom of the screen, which remains in place - excellent.

Whilst on the subject of the screen, we found that it was obscured by bright sunlight reflecting from the front or rear. There are no contrast and only few brightness setting options. An 'Invers' function dims the screen during night work, yet it still proved to be too bright. However, in reality night work is unlikely to be a typical application scenario for a parallel guidance system, because all guidance systems need to 'see' the horizon.



Available field guidance features are A-B, contour, A+ heading and pivot. The button down to the right activates boundary recording which includes field size computation.



Technicalities covered, we naturally want to discuss our measurements and results.

As usual, we had **Leica mojoMini** tested by two different operators. Both operators found the system easy to come to terms with in straight guidance mode. Working at 10m widths, pass-to-pass accuracy ranged between about 70cm overlaps and nearly 60cm misses. We need to stress though that 50 percent of all granules were scattered in an area from 32cm overlap to 11cm misses. This is a good result for an Egnos corrected system. More accurate results are almost impossible to achieve, because even a high-



The suction cup worked well in our test. The SD card stores field boundaries and area covered in kml format. Once imported to the office PC, data are mapped out in Google Earth.

ly focussed operator will tend to interfere with the steering as the tractor is rolling in undulating terrain. In fact, set to 'pushing view', the screen is likely to be less steady and provoke more interference from the operator.

Other points worth mentioning:

- The current bout number is indicated in the green arrow shown at the bottom of the screen.
- Once we were familiar with the screen settings, we found the headland view very helpful to catch the next line.
- The RS323 connector also serves to communicate the DGPS signals to further applications (e.g. Section-Control).

How we fared testing mojoMini: **mojoMini** is a guidance system that works reasonably well. Operation is intuitive, although the screen requires firm pressing at times. Screen contrast is not good in direct, full sunlight. The system provides area metering, boundary recording and exporting the boundary file in kml format as well as storing area covered. It also stores the last line number when coverage is paused. Transferring the system to another machine is awkward.

The repositioning feature is a real highlight; street navigation, on the other hand, is rather underwhelming. This said, priced at just under €1,000, **mojoMini** is the least expensive guidance system on the market and this money even buys an external GPS signal - all viable points that make it an intriguing system.

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