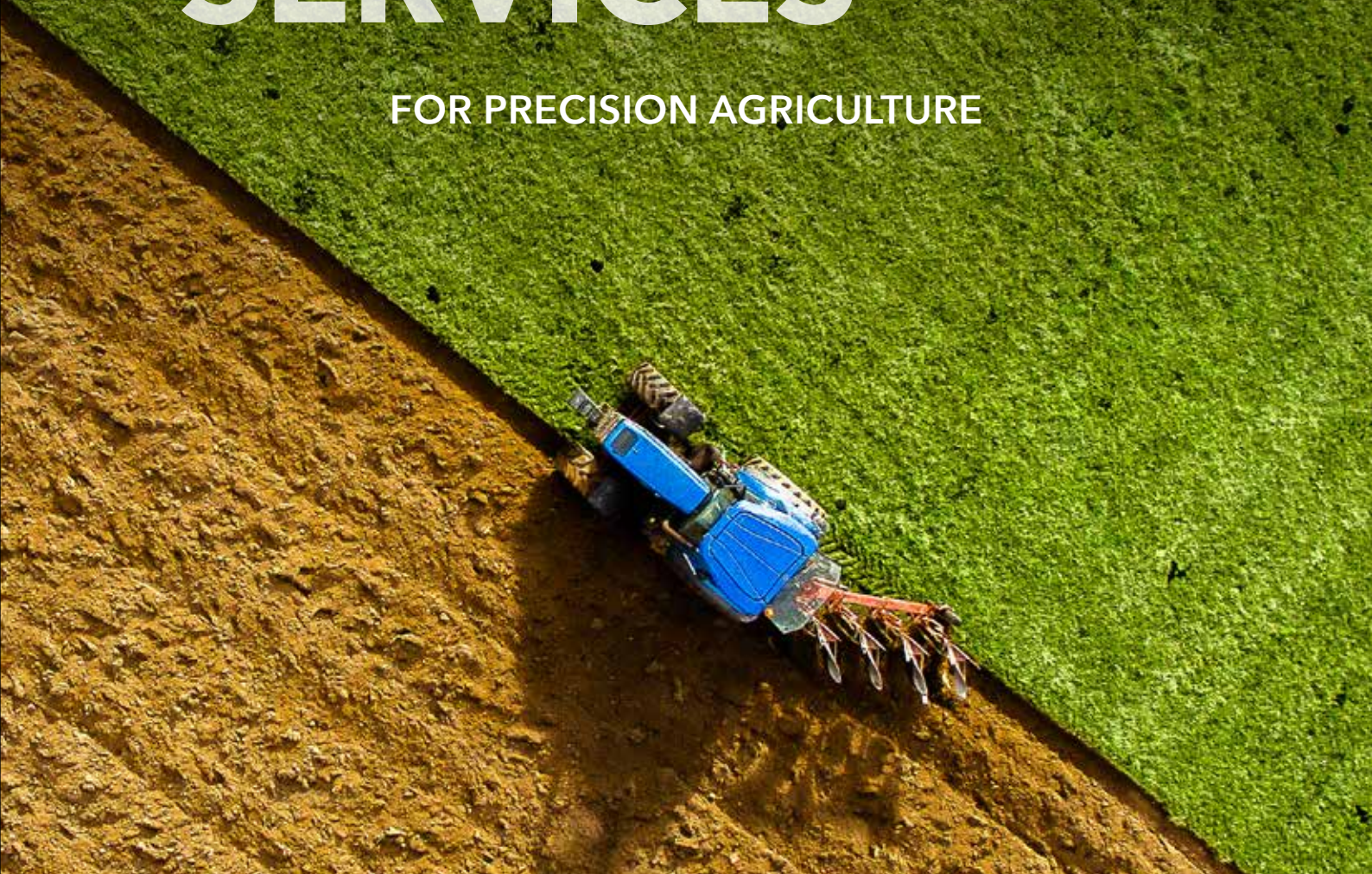


SPIRENT PROFESSIONAL SERVICES

FOR PRECISION AGRICULTURE



Move forward with confidence

Spirent Professional Services can accelerate and de-risk the testing regimen of your core positioning, navigation and timing (PNT) solutions that support precision agriculture systems and equipment:



Automated steering: Using GNSS to deliver robust PNT capabilities that enable automated operations to cm-level accuracy, and smooth the path to full vehicle autonomy



Drone-based yield monitoring: Using differential GNSS positioning technologies like RTK and PPP to enable drones to map and monitor farmland to a high degree of precision



Variable-rate technologies: Using GNSS-referenced positioning sensors and digital mapping to apply the right treatment at the right time to each plant or animal, to maximise yield

With Spirent's industry-leading PNT and test expertise readily available through a portfolio of Professional Services, you can assure the safety, functionality and integrity of your PNT solutions throughout the full product lifecycle.

Professional Services Portfolio



Lab as a Service

Assure your solutions in a world-class PNT test lab

Spirent will test your PNT solutions in our fully equipped UK lab, using high-end simulators, interference generators, RF Record & Playback systems, and Spirent software for scenario definition, test execution and test results reporting.

Lab as a Service is a simple, 3-step process:

1. We define the testing scope jointly with you
2. You ship your device(s) to our lab and we execute the agreed tests
3. We deliver the results to you in a full test report

If required, we can also set up a temporary test facility at your premises using our own equipment.

LAB TESTING COMPETENCIES

1 Standards Conformance Testing

Measure conformance and performance against key standards such as RED, ETSI, RTCM or RTCA.

2 Benchmarking

Compare your own or a supplier's solution against the rest of the industry to improve your performance.

3 Performance Testing

Lab testing to understand your PNT performance across global conditions (also for correction services).

4 Integrity Testing

Ensure your solution is robust to all (un-/intentional) perturbations in the agricultural field operations.



Installation and Onboarding

Get up and running fast with your Spirent equipment

Get your new Spirent investments up and running fast with our expert installation and onboarding service.

Spirent engineers will work at your premises to set up and configure your equipment, and provide customised integration with your existing third-party software and hardware.

Combine with a Spirent training programme to leverage the full value of your Spirent investment from day one.



Training

Accelerate your learning curve

Maximise the return on your Spirent investment with standard or tailored training courses for your test team. Spirent experts will deliver a course at your premises, at our UK premises in Paignton, Devon, or via videoconference.

A typical course is delivered over two days and includes:

- One day of training in the use of your Spirent hardware and software
- One day of tailored training geared to the specific objectives of your test programme

You'll quickly gain inhouse expertise to unlock the full value of your Spirent equipment.

SAMPLE COURSES

Training Name	Core Functionality	Customer-Specific Add-ons
SimGen Crash Course	1 day	N/A
SimGen Training	2 days	1 day
SimTest Training	1 day	1 day
SimReplay Training	1 day	1 day
GSS6450 Training	1 day	1 day
Sim3D Training	3 days	N/A
Sim3D + SimGen Package	5 days	1 day

Scenario Provisioning

Test faster and more reliably with Spirent-built scenarios

Choose existing test scenarios from Spirent's extensive database built up over years of PNT testing, or have Spirent build custom scenarios according to your test requirements.

This service is tailored to your needs and budget, with options including:

- Scenarios for any Spirent GNSS simulator
- Scenarios generated on a Spirent simulator and recorded with an RF Record & Playback system
- Real-world recordings captured in a location of your choice on an RF Record & Playback system

Scenario Group	Contents	Benefits for Your Programme
RTK	RTK corrections (MSM or legacy) via serial connection are provided to the rover (from a simulated base station) along with the GNSS RF signal	<ul style="list-style-type: none"> • Test, verify and benchmark RTK performance accuracy in a repeatable controlled environment
RAIM	Available for each singular constellation and combinations: one SV has a pseudorange error inserted during normal operation	<ul style="list-style-type: none"> • Test and assure the functionality of your RAIM implementation • Improved user experience
Interference	Interference scenarios with various interference waveforms and frequencies and power levels	<ul style="list-style-type: none"> • Test, verify and benchmark RFI responses (e.g. loss of lock, position accuracy) • Improved solution integrity

'Ready to play' scenarios include test packs for GNSS reception in different geographical regions, as well as standards conformance including RTCM (for RTK solutions) and RTCA DO-229 (for drones).



Test as a Service

Accelerate and de-risk your GNSS testing

One or more Spirent test engineers will work onsite with your lab team to set up, manage and conduct the PNT testing element of your overall test programme.

Our end-to-end service can include:

- Test strategy
- Scenario definition and creation
- Test execution
- Test environment management
- Analytics and reporting

Engagements are tailored to your requirements: short-term to fulfil a specific need, or longer-term to manage and oversee a complete PNT test programme.

USE CASE: RTK LAB TESTING

A leading precision agriculture OEM was facing a large cost increase due to extensive field trials for an MSM RTK-enabled product.

The OEM asked Spirent to support their team in moving more testing into the lab. Spirent deployed two experienced engineers for four months to define a test strategy including scenario generation and execution, specifically for RTK performance.

As a result, the OEM achieved significant cost savings as well as programme acceleration.



PDOP Value
Low High

Environment Assessment

De-risk your real-world operations

Spirent engineers will assess your operational environment to uncover issues affecting GNSS performance for your precision agriculture deployments in the field. Depending on your needs, we'll apply:

- Multipath analysis using 3D simulation
- Signal obscuration site survey
- RFI site measurements
- DOP analysis based on simulation

You'll get a detailed report that you can use to understand optimal operation schedules in your field deployments or to determine optimum antenna placement (e.g. for RTK ground stations).

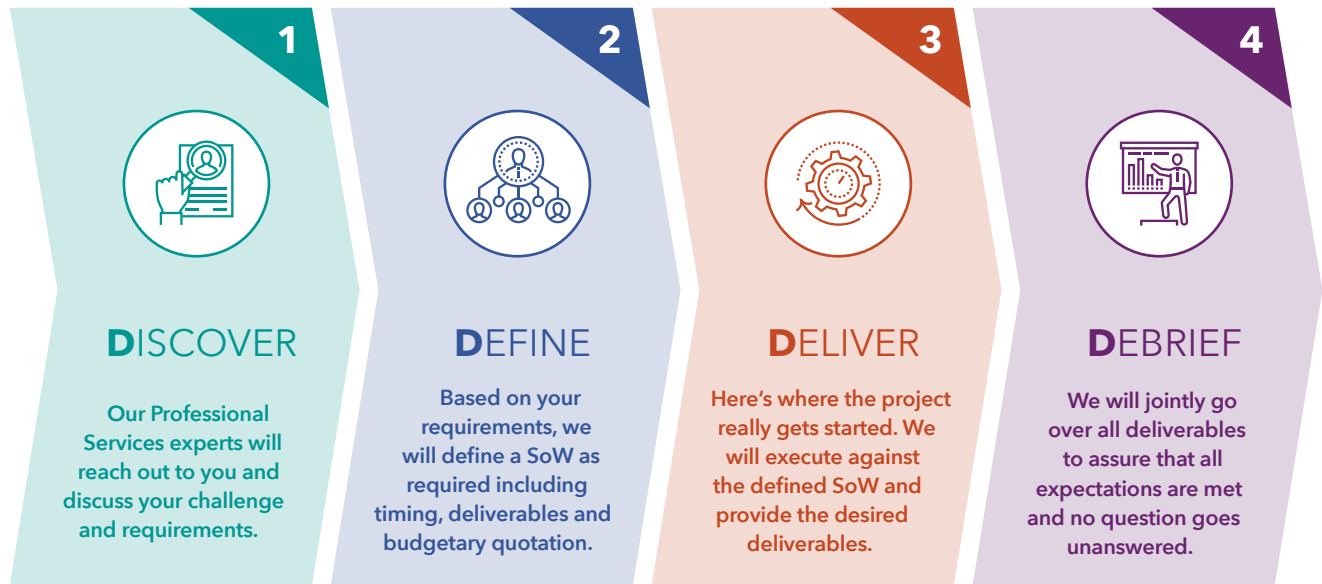


Tailored Services

Test expertise tailored to your needs

If you have a PNT test requirement that isn't covered in any of the services outlined in this brochure, Spirent can still provide a solution. Contact us to discuss your needs and to see how our experienced PNT test engineers and consultants can help.

Next Steps



Positioning you for success

Spirent has spent over 30 years at the forefront of PNT, working with government, military, space, industry and leading precision agriculture OEMs to evaluate and test PNT solution performance.

Our test engineers and consultants have many years of professional test experience, combined with in-depth knowledge of PNT testing hardware and software. We can help you get started faster and make full use of Spirent's expertise to assure every aspect of your product's PNT capabilities.

Contact us to discuss your PNT test programme today.



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OUR PARTNERS



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www.spirent.com

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