# Precision Farming

ravenind.com

RAVEN

### Raven Service

At Raven, we believe in best-in-class customer experience. Our experienced service team is ready to assist you, and has the ability to perform remote support. We keep you going when it counts.

### Helping Farmers Serve the World

Our enduring vision to feed a growing world population using innovative technology has never been more relevant. Farmers today are under constant pressure to produce more with less. To help growers maximize yields and ROI with less labor and economic resources, we are dedicated to advancing farming through technology and innovation.

# Contents

# CR12®+

## Knows your every row - especially on uneven terrain.

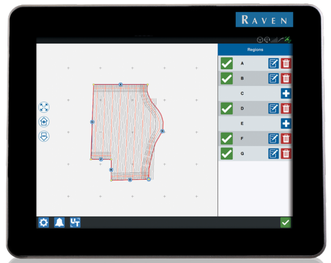
Uniquely, the CR12+ offers an extensive field and operations planning feature, allowing the user to define AB-lines and reference lines of the field boundary. The user can setup the complete field, including multiple headlands, spray tracks, greening zones and tracks with different working widths.

This powerful operating system features easy job set-up, fewer touches, and greater efficiencies, empowering the user with extraordinary data management capabilities. A simple widget concept, easily accessible settings, and ISO Universal Terminal and Task Controller capabilities make this mighty unit an affordable plug-and-play system. The CR12+ is compatible with Slingshot™ file transfer and remote support, RS1™ receiver, boom leveling and more.

**CRx Features Overview**

New Holland

Case IH



**Specifications:**

- 12.1" (30.5 cm) Capacitive touchscreen
- IP65 (Dust and splash proof)
- 32 GB internal storage
- 4 GB RAM
- RAM mount
- CE and E-mark certified
- 28 sec. boot up time

**Functionality:**

- Simple, customizable user interface
- ISO Universal Terminal
- Map based navigation
- Interactive field/job list and map view
- Multiple language support and customizable units
- 255 sections via ISOBUS
- Slingshot™ file transfer and Remote Support
- Slingshot™ Over The Air Software Updates
- Easy backup/recovery of the system
- Boundary & guidance line options
- Straight A-B, A+, Pivot, Contour, Last Pass Guidance, Multiline Guidance

## Four Distinct Mainscreens:

1. Start-up screen with map based navigation.
2. Easy to use settings page.
3. Guidance screen with customizable layout for every user and operation.
4. ISOBUS UT screen with integrated Task Controller.

# CR7®+

## The lean, clean, cost-efficient machine

The CR7+ is a 7" (17.8 cm) lightweight field computer with customizable job layouts. A simple widget concept with ISOBUS UT and Task Controller capabilities make this compact unit an affordable, scalable plug-and-play system. The CR7+ is compatible with Slingshot™ file transfer and remote support, RS1 and SC1 autosteering, AccuBoom™ and more.




### Specifications:

- 7" (17.8 cm) Capacitive touchscreen
- Integrated lightbar
- IP65 (Dust and splash proof)
- 7-36 VDC Input - 850mA
- Weight: 635 grams
- RAM mount
- 32 GB internal storage
- 4 GB RAM
- CE and E-mark certified
- 30 sec. boot up time

### Functionality:

- Simple, customizable user interface
- Multiple language support and customizable units
- ISO Universal Terminal
- Map based navigation
- Interactive field/job list and map view
- Slingshot™ file transfer and Remote Support
- Slingshot™ Over The Air Software Updates
- Easy backup/recovery of the system
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4. ISOBUS UT screen with integrated Task Controller.

# Easily connect, command control, and improve every farming function


## Total system control

Raven offers a choice of multi-function field computers to suit your operating needs. Easily improve virtually every farming function with command and control from Raven field computers. Get more with variable rate applications, auto-steering, automatic boom height and section controls, GNSS-guided on-off planter controls, record keeping, mapping, and wireless communications.

| | CR12®+ | CR7®+ |
|---|---|---|
| **DISPLAY FEATURES** | | |
| Screen size | 12.1 inches (30.5 cm) | 7 inches (17.8 cm) |
| Resolution | 1024 x 768 | 480 x 800 |
| Ratio | 4:3 | 16:9 |
| Brightness | 1200 CD/M2 | 850 CD/M2 |
| Internal storage capacity | 32 GB | 32 GB |
| Operating temperature | -20°C to +70°C | -20°C to +70°C |
| Power supply | 4-35 V | 7-36 V |
| IP rating | IP65 | IP65 |
| Orientation | Landscape | Landscape |
| Wi-Fi capable | ✓ | ✓ |
| Camera inputs | 4 | |
| **SOFTWARE FEATURES** | | |
| Language support (29) | ✓ | ✓ |
| Street maps | ✓ | ✓ |
| Guidance patterns | 6 | 6 |
| Single and multi VRA | 🔒 | 🔒 |
| Slingshot™ ready | ✓ | ✓ |
| ISO UT | ✓ | ✓ |
| ISO task controller | 🔒 | 🔒 |
| Field and operations planning | ✓ | 🔒 |
| Virtual thumb drive | 🔒 | 🔒 |
| Implement steering (GNSS & Camera) | ✓ | ✓ |
| Crop registration | 🔒 | 🔒 |
| Autoturn | 🔒 | 🔒 |

✓ Standard Feature 🔒 Unlock/Subscription Required

For more information go to ravenind.com/products/displays


# The industry's only 3-in-1 guidance system

## RS1™ and SC1™ Steering

RS1 is a fully scalable steering solution that combines GNSS, a modem, and autosteer into a complete connectivity solution. Industry leading accuracy at both high and low speeds combined with quick line acquisition improves efficiency and allows you to cover more hectares per day.



### Incredible Accuracy and Power

Best-in-class diagnostics gather machine performance data while you work. The unit is designed with a simple setup and integrated help guides, and is providing remote support, file transfer, over-the-air software updates, fleet management and logistics.

Get unrivaled high-speed wireless connectivity, cellular-enabled technology, uninterrupted signals/data transfer, industry-leading wireless RTK corrections, vehicle tracking, and access to live remote support from Raven's team of experts.


### SC1™ Steering

SC1 is equivalent in performance to the RS1 with the ability to be combined with your existing GNSS receiver. With SC1, you get all of the benefits of Raven technology packages while using the same receiver.

- Enhanced steering performance
- Enhanced 3D compensation for rugged terrain
- Simplified field calibration procedure
- Interface VSN® steering with Raven display

### RS1™ Steering & Connectivity

- Compatible with CR7®+ and CR12®+
- All-in-one concept - easy installation
- Integrated steering controller
- Integrated GNSS receiver and antenna
- Scalable GNSS solutions:
  - SBAS
  - GS-Lite
  - Satellite GS pro
  - RTK-L
  - RTK pro
- GPS, GLONASS, BeiDou, Galileo
- Optional integrated dual-sim GSM modem
- Slingshot data transfer, diagnose & support
- Easy-to-use calibration wizard
- High quality steering
- Continuous backwards driving
- Compatible with ISOBUS 11783 Virtual Terminal
- Multi-lingual support

# More GNSS Receivers


## 500S™

500S is an affordable, entry-level GNSS receiver. It tracks GPS, GLONASS and BeiDou for improved strength in any environment. Fixed or magnetic mounting options make it ideal for portable and dynamic applications.


## 700S™

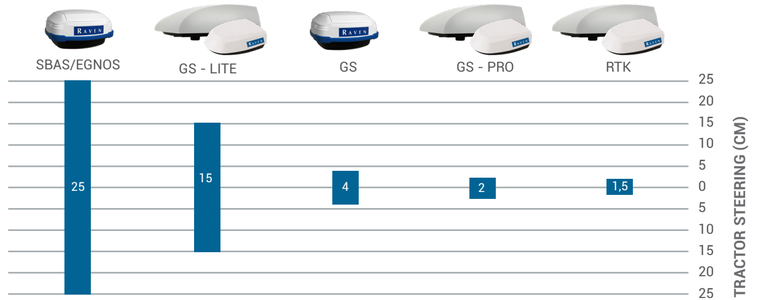
700S is an advanced GNSS smart antenna from Raven. It comes standard with GLONASS and autonomous dual-frequency GL1DE®, SBAS and optional GS-Lite, GS-pro and RTK.



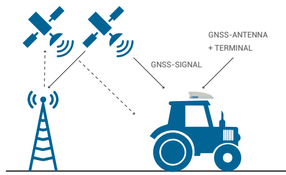
## Raven RS1 On-Line Steering Comparison

Performance data from your GNSS receiver and navigation controller is collected to ensure highly accurate diagnostics while you operate your equipment. The unit has been designed for simplified set-up via the UT display, which includes help guides. Thanks to its built-in modem, the RS1 offers remote assistance, file transfer, live software updates and a fleet tracking solution.

With the RS1, you can benefit from unrivalled wireless connectivity, uninterrupted data transfer, cellular RTK correction and live remote tracking of your equipment. Easy access to remote assistance from your local Raven expert will give you peace of mind during the learning phase of your new equipment.

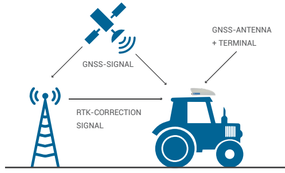



NOTE: Achievable accuracy and convergence time may vary based on capability of receiver, antenna, ionospheric activity, and multipath environment




### How Satellite Correction Works

- Base and tractor receive GNSS
- Base knows exact position and sends current correction back to correction satellite
- Tractor receives correction from correction satellite




### How RTK Correction Works

- Base and tractor receive GNSS
- Base knows exact position and sends current correction direct to tractor via radio or internet
- Tractor receives correction from base

# Brand independent and flexible steering solutions

## Focus on your operation and let Raven take care of steering

Raven steers your tractor effortlessly and with unprecedented precision. While adjusting the planting distance of your potato planter, Raven will maintain a perfect row spacing and remind you that the next pass is a tramline. When every minute counts, Raven helps man and machine deliver peak performance.

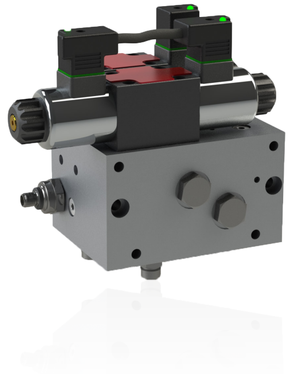
### Features and Benefits

- Automatically steer from a speed of 72 m/hour to 42 km/hour
- Effortlessly transfer system between vehicles
- Steer perfectly in reverse, around curves, or with heavy front implements
- A contactless steer angle sensor ensures trouble-free and accurate measurement, even under challenging conditions
- The proven, flexible ISOBUS system ensures that the Raven system is easily expandable with implement steering or other ISO solutions (UT, section control, task controller)

### Steer-Ready

Raven can also connect with steer ready tractors and machines directly from the manufacturer, including:

- Amazone
- Case IH AccuGuide™
- Challenger®
- Claas Autopilot™ and OSI
- Deutz Fahr Agrosky
- Fendt VarioGuide
- JCB
- John Deere AutoTrac™
- Kubota
- Massey Ferguson Auto-Guide™
- New Holland IntelliSteer®
- Steyr S-Tech
- Valtra Auto-Guide™
- Versatile

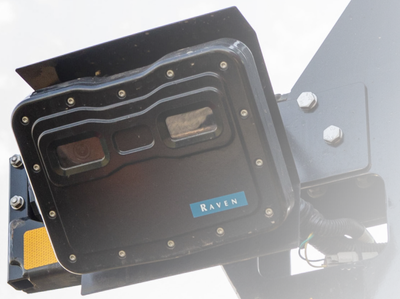


### Hydraulic Manifold

Raven's exclusive hydraulic valve can be retrofitted to almost any machine - hydraulic block (manifold) with load sense as well as with open center systems. This enables you to equip all machines with hydraulic GNSS steering.

### DirecSteer

Raven's DirecSteer is an electric drive steering solution that allows users to pay more attention to other parts of their operation. DirecSteer is a smart motor with internally controlled torque and electrical current, that works all while contributing to a simple, safe, and silent operation. Compatible with most tractor platforms, DirecSteer is a smart mounted system with an easy to operate control panel and widgets.




# Raven's cutting-edge visual guidance and steering technology


## VSN® Visual Guidance

Exclusive radar sensors and a visual guidance camera guide sprayers, spreaders, tractors, and other machines independent from a GNSS system.

This innovation utilizes a non-contact stereo vision camera to navigate crop rows, allowing the operator to focus on all other aspects of effective application control. Minimizing crop damage and covering more hectares in a day result in a quick return on investment.



## VSN® Solutions

- Reduces operator fatigue and crop damage
- Guides machine accurately to the actual planting vs theoretical
- Allows to automatically adjust to planting inconsistencies
- Enables faster vehicle speed
- Works in areas of limited GPS/GNSS coverage, i.e. next to tree lines, ditches, hills, etc.
- Accurately operate in full canopy crop conditions

## Features & Benefits

- Enhanced machine control for sprayer efficacy
- Reduces operator fatigue and crop damage
- Uses state-of-the-art image sensor and processing technologies to deliver quick response rate and better control
  - Crop types: corn, soybeans, cotton, and sorghum
  - Complete solution from 5 cm to full canopy
  - Row spacing 12 cm - 75 cm
  - Weed coverage ≤30%
- Performance
  - Vehicle speeds exceeding 40 km/h
  - Terrain grades of up to 8 degrees
  - Cross winds up to 24 km/h
- Live video row overlays in Viper 4+ and CR12+ platforms
- In-field calibration
- ISO UT user interface, custom control widgets
- Software update support (OTA)
- Automatic fall-back to GNSS in areas not planted or without crop

## 3 Modes of Performance

### GPS/GNSS MODE

- Uses GNSS and guidance lines
- Traditional steering/ path planning

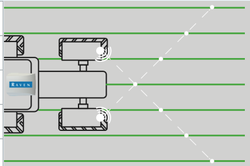
### VSN MODE

- Row guidance utilizing the image sensing of the VSN Camera
- Guides machine when camera quality is above user defined threshold

### VSN+ MODE

- Fall back to GNSS guidance (quality below user defined threshold)
- Ability to use GNSS for line acquire and then transition to VSN Mode

| | |
|---|---|
| CROP HEIGHT RANGE | 5 cm to full canopy |
| ROW SPACING | 12 cm - 75 cm |
| WEED COVERAGE | ≤30% |
| VEHICLE SPEED | 1 - 40 km/h |
| SLOPE / TERRAIN | ≤ 8° |
| CROSS WINDS | 0 - 24 km/h |



- Radar sensors for full canopy mode
- Non-contact row steering solution


# Implement Steering

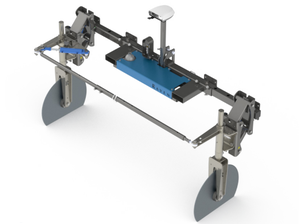
Varying soil conditions, uneven loads, or hilly terrain have a major impact on implement performance. Tractor steering only is not sufficient to provide the required correction for the implement.

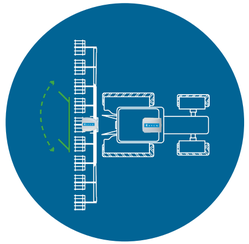
Implement steering provides unmatched precision and is the core of premium quality vegetable and organic cultivation.

Planting, seeding, and cultivation are carried out with unprecedented precision. Crop damage is eliminated.

Raven's implement steering is operated with a central CR12+ field computer while tractor and implement positions are recorded via two separate RTK-GNSS antennas. Since the implement often moves differently than the tractor, both parts of the system have their individual gyroscope (slope compensation module). The tractor is controlled hydraulically.

Implement steering is suitable for all types of machines. Raven offers the perfect solution for a wide range of implements. There is pratically no machine Raven cannot steer.





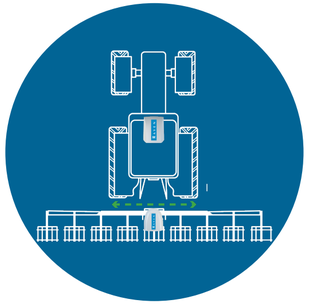
## Disc Steering

Raven has over a decade of experience with disc steering and can confidently call itself the market leader in this segment.

Depending on the size and type of implement, at least one disc coulter is installed behind the implement. For small drills and other light implements, a single disc is often sufficient. Large, heavy-weight machines require at least two steering disks that are connected to each other by a rod. In the case of folding devices, the rod is replaced by two interconnected hydraulic cylinders. Raven's disc system prevents the device from slipping to the side. The tractor and implement are no longer offset, but rather operate in one line.

## Advantages:

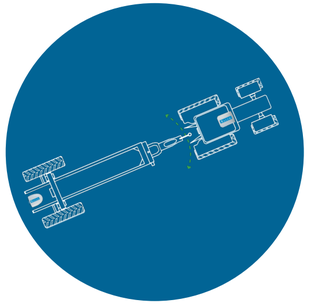
- High accuracy cultivating, even with slopes
- Both tractor and implement are working on the exact same refrence line
- Tractor and implement steering are completely independent, offering high accuracy
- Control with only one screen in the cabin
- TWIN DISC can be moved between different machines
- Increase productivity and save labor-cost



## Sideshift Steering

Raven's side shift steering is a hydraulic cylinder between tractor and implement. The second GNSS antenna is mounted on the implement and detects its position. Based on this position the cylinder will be adjusted to the left or right.

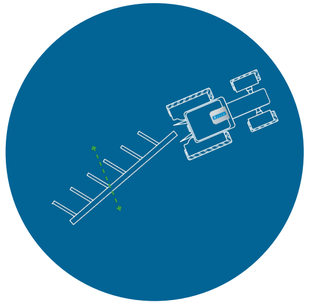
The cylinder can be attached directly to the implement. This way, little space is lost and the machine can still be mounted as close as possible to the three-point mount.



## Movable Hitch Steering

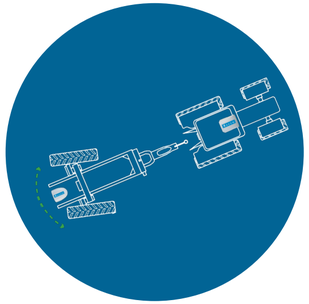
Movable hitch steering systems, such as hydraulic couplings give the operator more control over the position of the implement and its drift, even when the implement moves in the opposite direction of the tractor. Movable hitch steering offers the flexibility to adapt the control system for towbars to your active implement control.

Double cylinders work in both directions to prevent the implement from causing crop damage. You get up to 65 cm of correction in both directions to stay in line.



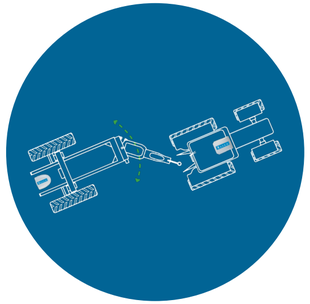
## Plough Steering

A straight, clean plough line is the ideal preparation for the coming season. A fine seedbed offers all plants the best emergence conditions. A level seedbed promotes a homogeneous crop emergence, which makes weed control easier and more effective.



## Steering Rear Wheels

For pulled-type machines with steered axles, integrated implement guidance is the perfect solution. With GNSS steering at the rear axle, the implement is controlled accurately. Raven is able to integrate into existing hardware on virtually every implement.



## Drawbar Steering

If a machine (i.e. planter) already has a drawbar steering, we can seamlessly mount our steering system on the existing hydraulic cylinder

# Plug and Play

## ISOBUS

ISOBUS is the standard communication protocol for agricultural equipment manufacturers that allows computers, tractors and implements from every brand to communicate seamlessly with each other. Raven's fieldcomputers are fully ISOBUS compatible and standard UT (Universal Terminal) unlocked.

Equipped with the standard ISOBUS IBBC connector, every ISOBUS implement can plug into our ISO display and get the same user interface (UI) and workflow on our display.



### ISOBUS

ISOBUS delivers value to the farm from day one. After a machine is upgraded with a Raven display, full ISOBUS capabilities are equipped as well.

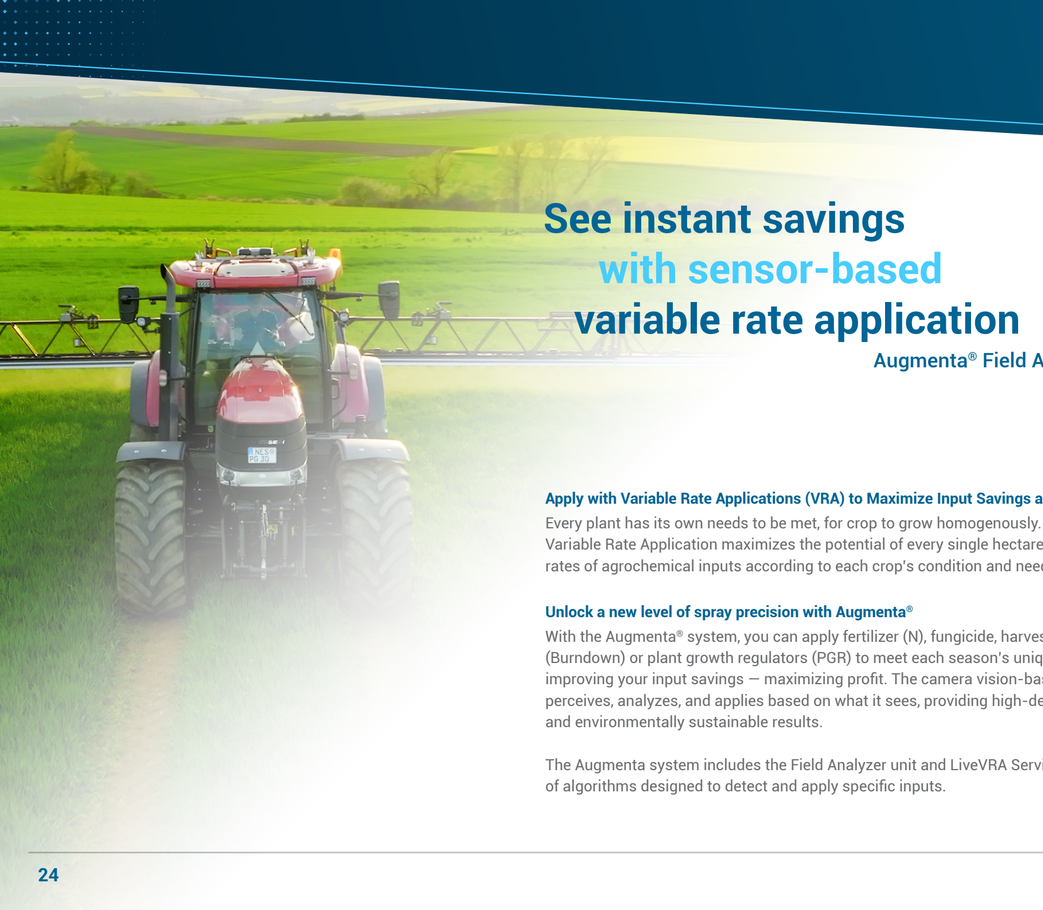
ISOBUS enables automatic section control and speed-dependent rate control, increasing operational efficiency. Raven's field computers control up to 5 products with ISOBUS, increasing operational efficiency with variable rate and sectional controls.

Our products are fully scalable and upgradeable. If you need to control the implement this season and want to add autosteering next season, you can configure your solution to fit your needs.

### Split Screen

Raven's CRx software provides a high level of flexibility. The layout is fully editable, which enables the user to set up the optimal layout for a wide range of applications. The editable screen is fully ISOBUS capable and can control 255 machine sections and/or implement control rates. The interactive ISOBUS widget allows full control of ISOBUS implements.

Beside the supported ISOBUS AUX-N functionality, implement control is possible with the CRx software and any ISOBUS joystick. In parallel to Raven's specific widgets for implement control, the user can navigate through the ISOBUS implement screen.



# See instant savings with sensor-based variable rate application

## Augmenta® Field Analyzer

### Apply with Variable Rate Applications (VRA) to Maximize Input Savings and Secure Yield

Every plant has its own needs to be met, for crop to grow homogenously. Automated Real-time Variable Rate Application maximizes the potential of every single hectare by applying different rates of agrochemical inputs according to each crop's condition and needs.

### Unlock a new level of spray precision with Augmenta®

With the Augmenta® system, you can apply fertilizer (N), fungicide, harvest aids, herbicide (Burndown) or plant growth regulators (PGR) to meet each season's unique demands while improving your input savings — maximizing profit. The camera vision-based technology perceives, analyzes, and applies based on what it sees, providing high-definition field analysis and environmentally sustainable results.

The Augmenta system includes the Field Analyzer unit and LiveVRA Services, which are sets of algorithms designed to detect and apply specific inputs.

## Augmenta® Field Analyzer

The Augmenta® Field Analyzer utilizes computer vision and machine learning (CVML) to translate visual data into agronomic insights and implement real-time variable-rate applications. The multi-spectral computer vision and machine learning (CVML) unit:

- Provides and applies the best variable rate application (VRA) as the operator simply drives.
- Easily installed on most common tractor and sprayer platforms.
- Perceives and analyzes specific agronomical factors with a 42 meters field of view.
- Translates its analysis into variable rates that are automatically applied, optimizing input use and improving profits.
- Can optimize applications for specialized LiveVRA Services: fungicide, in-season nitrogen, plant growth regulator (PGR), herbicide (burndown), and different types of harvest aids (dessiccants, defoliants, boll openers).

## Augmenta® Key Features and Benefits

Experience a new level of spray precision with Augmenta's cutting-edge camera vision system, which integrates the best features of the most advanced precision farming technologies on the market.

- **All-in-One Cab-Mounted Device**: Augmenta presents a streamlined solution with an all-in-one cab-mounted device that efficiently controls the entire boom.
- **Input Savings**: Realize significant input savings, contingent on crop conditions, application rates, and other factors.
- **Long-Term Sustainability**: Augmenta supports improved long-term sustainability practices, aligning with environmental stewardship.
- **Minimized Chemical Waste**: Contribute to environmental responsibility with Augmenta's technology, minimizing chemical waste through accurate application.
- **Easy Installation**: Enjoy the simplicity of installation with a single cab-mounted sensor, ensuring hassle-free integration into your existing setup.
- **Extensive Field of View**: Benefit from an expansive field of view, reaching up to 42 meters, providing comprehensive coverage for effective monitoring.
- **Diverse LiveVRA Services**: Access specialized LiveVRA services, including in-season nitrogen management, fungicide application, plant growth regulators, and harvest aids.
- **Remote Monitoring and Analysis**: Stay connected and informed from anywhere with in-cab and web-based applications, enabling you to monitor results and make informed decisions.
- **Comprehensive Crop Health Data**: Gain valuable insights with Augmenta, offering detailed crop health data, high-definition snapshots, and in-depth analysis. Receive Vegetation Index Reports and Virtual Fertilization Maps for a comprehensive understanding of your crop's condition.

Augmenta redefines precision in variable rate applications (VRA), delivering unparalleled efficiency, sustainability, and performance.

## Compatible Crops

Augmenta works for a variety of crops, including:

- Wheat
- Barley
- Corn
- Cotton
- Rapeseed/Canola
- Soybeans
- Beans
- Legumes


**5 cameras** (NIR, Red-edge, Red Narrow Multispectral cameras + 2 RGB Cameras) contribute to high-resolution data collection (12 pixels/cm) within the maximum field of view of 42 meters.

**Embedded sim-card and wi-fi connectivity** allow one to use the system anywhere and receive over-the-air updates.

## Paving the way for profitable sustainability

Augmenta maximizes nutrient effectiveness by automatically controlling application rates, increasing both profitability and sustainability. It saves money by using the minimum quantity of inputs required to optimize your variable rate application while also minimizing harmful environmental impacts.

## Contact your local Raven precision technology dealer to learn more about Augmenta

> *"We, in a very, very short time, trust that Augmenta is going to put the right amount of chemical in the right spots, bring the crop in even, and we just go spray the whole thing. We don't think twice about it again."*
>
> ***— Brady Fahlman, Farmer, Holdfast, SK***


# Your all-season all-purpose rate controller




## Rate Control Module (RCM)

Product efficacy is more important than ever before. RCM is the most powerful and flexible ISOBUS rate controller on the market with an intuitive and easy to follow menu structure. The ability to setup and save various application modes optimizes the application of any input.

The RCM covers a wide variety of applications - up to five product liquid and granular control, NH3 (including AccuFlow™ HP+), air carts, planters, seeders, and generic applicators. Sixteen-section control eliminates expensive skips and overlaps for all phases of your operation, from spraying to NH3, and fertilizer application to planting.

The RCM is compatible with many ISOBUS virtual terminals on the market, including the Viper™ 4+, CR7®+ and CR12®+.

## Specifications

- Powerful multi-use product controller
- Granular and liquid use simultaneously
- Up to 4 ICD injection pumps
- Easy intuitive wizard setup
- Multilingual
- Controls up to 5 products per unit

## Features & Benefits

- AEF certified
- Liquid product control
- Section control up to 16 sections
- Tank fill monitoring
- Dry applications
- Spreader and air cart profile
- Liquid applications NH3 product control
- Control up to five product applications and 16 planter sections
- Intuitive user interface and diagnostic features
- Certified worldwide with regulatory marks for CE, RCM, IC, FCC, E-Mark, CNC Mark, ANATEL, ICASA, Ukr-sepro, and SRRC
- IP67 environmental rating for the harshest of environmental conditions

## Pull-Type and Self-Propelled Sprayers and Liquid Fertilizer Applicators

- Single liquid product control
- Compatible with up to 4 Sidekick Pro™ direct injection pumps
- Tank fill monitoring

## Pull-Type and Self-Propelled Spreaders

- Rate control up to 5 products
- Section control up to 12 On/Off sections
- Spinner/Fan RPM monitoring and control
- Control auxiliary functions such as gates or oilers
- Pair with 3rd party scale solution for simplified product calibration; includes in-cab monitoring

## Planters

- Section control up to 32 sections (Flex-seeder, Air, Electric or OEM clutches) with ground drive transmissions
- Seed rate control up to 4 hydraulic motor drives with turn compensation and up to 24 planter sections
- Seed rate control up to 16 electric or hydraulic motor drives with turn compensation and section control
- Fan/Vacuum pressure, scale, bin level and hydraulic/air down pressure monitoring options
- Liquid/Dry fertilizer add-on control via additional RCM

## NH3 applicators

- AccuFlow™ HP+ Boost Pump
- Rate control up to 2 additional dry or liquid products
- Section control up to 10 NH3 sections; 14 sections total
- Temp sensor option for monitoring and alerting of liquid/vapor state
- Sidekick Pro™ ICD compatible

## Seeders, Air Carts, and Generic Applicators

- Rate control up to 4 products with 16 sections or 5 products with 12 sections
- Section control up to 16 On/Off sections
- Support up to 2 fan RPM sensors; 6 pressure, bin level and/or shaft sensors; implement height switch
- Scale monitoring and user aided as-applied calibration
- Compatibility with Raven Run Blockage Monitoring (RBM)
- Compatibility with Raven ISOBUS auxiliary display for remote test calibration
- Independent control of multiple meters per product


# Spray without the costly chemical leftovers

## Sidekick Pro™ Direct Injection System

The Sidekick Pro™ Direct Injection system drastically increases the half-life of the active matter in your crop protection product by bringing the active matter in contact with the clear water only at the time of application. This increases the efficacy of spray applications, costly waste, and eliminates the need for expensive stabilizers and conditioners.

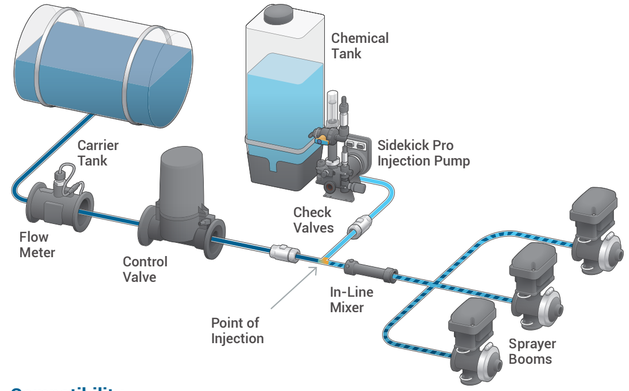


## Features and Benefits

- Two different types of pumps; 0.03-1.2 L/min and 0.15-6 L/min
- Up to 5 units on one machine, allowing easy switching between fields and applications
- Compatible with Hawkeye® Nozzle Control
- ISOBUS compatible
- No pre-mixing, tank mixing, cross contamination, or clean out, which reduces waste from unused product
- Time-sensitive chemical mixtures don't require mixing in the tank, which decreases susceptibility to wasted product in rainy or windy conditions
- Powerful positive displacement pump which injects on the pressure side, closer to the boom, for faster response time
- Eliminates waste for more environmentally friendly practices
- Flexibility with multiple chemical applications
- Reduced chemical exposure means additional safety for operator
- Adjust chemical concentration on the fly rather than spraying more or less of the entire mix
- Gives you greater flexibility in applications to tackle weed resistance and other challenges
- Automatically flush Sidekick Pro pump with Rinse Assist for increased reliability and fewer service issues

## How It Works:

Sidekick Pro injects chemicals directly into the in-line mixing tube to eliminate pre-mixing and costly leftovers.




## Compatibility

| | Sidekick Pro | Sidekick Pro ISO | Sidekick Pro ICD |
|---|---|---|---|
| **Product controllers** | | | |
| Raven Product Controller | ✓ | | |
| ISO Product Controller I | | ✓ | |
| ISO Product Controller II | | | ✓ |
| Raven RCM | | | ✓ |
| **consoles** | | | |
| Viper™ 4+ | ✓ | ✓ | ✓ |
| CR7®+ and CR12®+ | ✓ | ✓ | ✓ |
| SCS 5000 | ✓ | | |
| SCS 4400 | ✓ | | |
| SCS 4600 | ✓ | | |
| 3rd Party ISO Consoles* | | ✓ | ✓ |

*Subject to 3rd party ISO console capabilities.

# The industry's most precise PWM system

## Hawkeye® 2 Nozzle Control

PWM is the cutting-edge technology in spray applications, and is quickly becoming the standard in the ag industry. Over 5.000 sprayers equipped with Raven's PWM system operate in fields across the globe. Our vast experience with PWM technology allows us to provide the most precise, reliable, and easy to install systems.

### Features

- Turn compensation – consistent rate across the whole boom even on turns
- Consistent spray pattern and droplet size at various speeds reduces the need of changing nozzles
- Hawkeye HD – individual nozzle shutoff on overlaps reduces crop damage and waste of chemicals
- Variable operation modes – use the system for all operation modes

### ISOBUS

Hawkeye 2 is a full ISOBUS compatible system and can be used with the ISOBUS compatible Viper 4(+) as well as with your existing ISOBUS terminal. Hawkeye 2 controls the application rate of the full sprayer and replaces the existing application controller.

### The Importance of Droplet Size

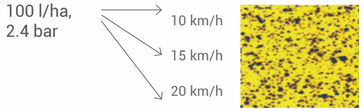
Every chemical has a recommended optimal droplet size. A small droplet size has the advantage of better coverage, but at the same time can drift away more easily into adjacent fields resulting in unintended application and potential damage. Large droplets might not hit the target or do not create necessary coverage.

Traditional flow or pressure-based control systems depend on the ideal operation speed and rates of your machine to keep the optimal droplet size. This limitation leads to an ineffective spray application.

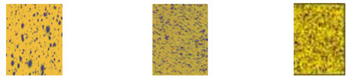
Raven's Hawkeye PWM system ensures optimal coverage of your crop and minimizes cost for crop protection products, with no need for re-spraying.

# Why you want to operate with Hawkeye® 2


### With Hawkeye® 2: Consistent Spray Pattern at any speed by controlling flow and pressure




### Without Hawkeye®: Changing spray pattern at varying speeds caused by changing pressure and flow

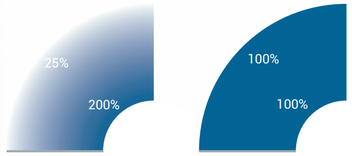


100 l/ha, 8km/h, 100kpa

100 l/ha, 15km/h, 250kpa

100 l/ha, 25km/h, 600kpa

### Turn Compensation




without Hawkeye

with Hawkeye

### Pulsing Per Nozzle

With Hawkeye® 2, the spray pressure is always kept constant. The application rate (l/ha) is controlled with PWM valve technology. With PWM technology, every valve is turned on and off. The Hawkeye® 2 system automatically changes the on-time and off-time of each valve to achieve the desired dosage.

As a result, one nozzle is now able to cover a range of varying rates, while the pressure remains constant and as a result the droplet size does not change.

The Hawkeye® 2 valves are extensively tested for reliability. Each valve has its own diagnostics system, so any potential failures are detected automatically.

### Equal Distribution

With the Hawkeye 2 system, the nozzles are only open for a portion of the total time. To ensure an equal distribution and coverage, the odd and even nozzles alternate when switching.

### Specifications

- Nozzle by nozzle section control
- Turn compensation is standard
- Diagnostics per nozzle such as blockage detection
- Multiple adapters available for a wide range of nozzle bodies
- Up to 192 individual nozzles
- Max application rate per nozzle: 5.5 l/min
- Working pressure: 8 bar max.
- Suitable for most liquid fertilizers

# Built for Go Time

## Slingshot™

Slingshot is a suite of connected hardware, software, and logistical services that optimize planning, executing, and recording field applications.

Slingshot delivers unrivaled connectivity to RTK correction signals, online services, sophisticated data management capabilities, precision ag equipment and live in-field support and service.

### Job Generator

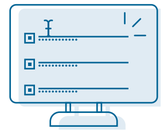
Set up jobs in the office and dispatch to Viper™ 4 field computer.

- Set up nearly all parameters of an operation ahead of time
- Reduce the risk of a costly misapplication
- Avoid errors and miscommunication
- Ensure operator goes to correct field
- Include the products, rates, field locations and entry points, RX maps
- Compatible with ROS and CRx software platforms for Viper™ 4/ Viper™ 4+, CR7®+ and CR12®+

### Job Sync

Share live coverage between machines in the same job.

- Keeps everything in sync
- Shared coverage - multiple at once, or one at a time
- Fault tolerant data channel connection if there is an interruption in network connectivity coverage
- Re-sync when connection is restored
- Machine-to-Machine in job status widget so you know who else is currently in or has been in the job
- Joining a job is as easy as starting a regular job



### Analytics

Suite of tools for fleet productivity and machine telematics.

**System events**

- Receive notifications on DTCs (Diagnostic Trouble Codes) on location and timestamped system events
- Customizable by user account, location or grouping, per machine or per product

**Fleet analytics**

- Reporting metrics on total hectares, total working hours, hectares per day, hours per day, and fleet or machine hourly or daily average


## Slingshot™ RTK

- Provides reliable RTK corrections streaming
- Compatible with Slingshot RTK Base Stations and CORS RTK Networks
- Cellular delivery overcomes satellite and line-of-site radio limitations
- Patented dual corrections streaming for rapid interruption recovery
- Primary and diversity cellular antenna for superior performance
- Always up to date with remote updates and management
- Requires Slingshot Field Hub or RS1

## Fleet View

- A simple tool to see where everything is at a glance
- Each Slingshot device reports its position every 30 seconds
- Know where your fleet is at all times
- See if they are in jobs, idle, or active
- Keep track of everything with full screen view
- Historical tracking for path recreation
- Route work to the machines that are closest to the field

## Slingshot Link

- See what software your field computer equipment is running and send updates right from your desk
- Download latest software directly on your machine – no thumb drives
- Manage software versions from the office
- Stay current on all features and functionalities and maintain a consistent fleet
- Supports Viper™ 4/Viper™ 4+, CR7®+ and CR12®+, and RS1™

## File Transfer

- Record and invoice work quickly and accurately
- Get application data back to the office without chasing thumb drives
- Send VRA maps to field computers
- Invoice your work sooner
- Reduce the risk of data loss

## Remote Support

- See exactly what the operator sees and identify the issue more efficiently
- Use as a training tool for the operator
- Live view of field computer display
- Reduce machine down time
- Dealer, owner, and Raven can also log in and help, with permission

## How to Access Slingshot Services

- Slingshot Field Hub
- RS1™ Guidance & steering system
- Viper™ 4/Viper™ 4+, CR7®+, or CR12®+ field computers
- Create an account or log in via RavenSlingshot.com

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