



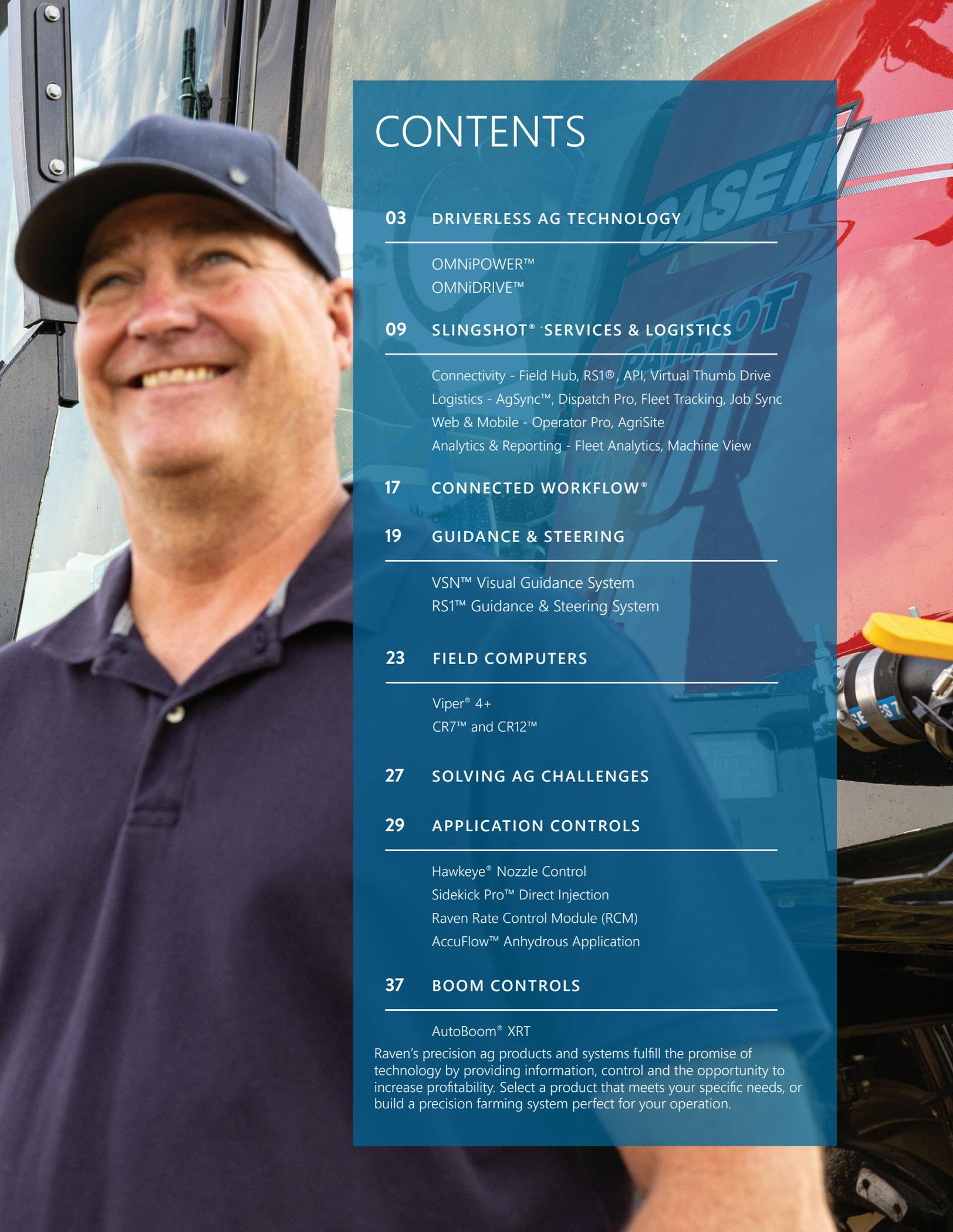
PRODUCT CATALOG



“Raven’s precision ag technology is one that will change custom application as we know it.

Brandon - West Central, Illinois





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Raven's precision ag products and systems fulfill the promise of technology by providing information, control and the opportunity to increase profitability. Select a product that meets your specific needs, or build a precision farming system perfect for your operation.

OMNi™

BOLDLY GROW™ ON THE PATH TO AUTONOMY

Autonomous farm solutions allow you to connect, control, and optimize all aspects of your agricultural ecosystem. Autonomy enhances decision-making, because it gives you total farm visibility. Many farmers are already taking advantage of farm autonomy's efficiency gains.



TECHNOLOGY THAT AUTOMATES YOUR CURRENT FARM EQUIPMENT

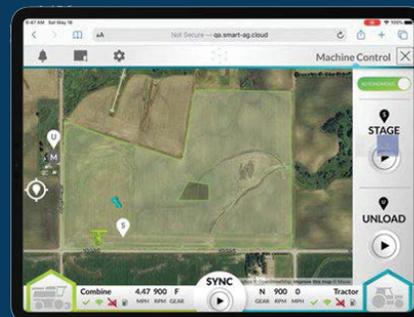
Raven's new approach to Driverless Ag Technology delivers easy-to-implement autonomous farm solutions. They help the farmer maximize time, safety, and efficiency as the equipment does more of the heavy lifting.

Now, the farmer can do more, get more, and give more with every minute of their day.

These growth platforms are called OMNiDRIVE™ and OMNiPOWER™. And they are like nothing you've ever seen before.

HOW CONNECTED IS YOUR FARM?

- Tablet-controlled, cellular connectivity
- Cloud-based data backup and storage
- Real-time machine location monitoring
- Autonomous completion of tasks

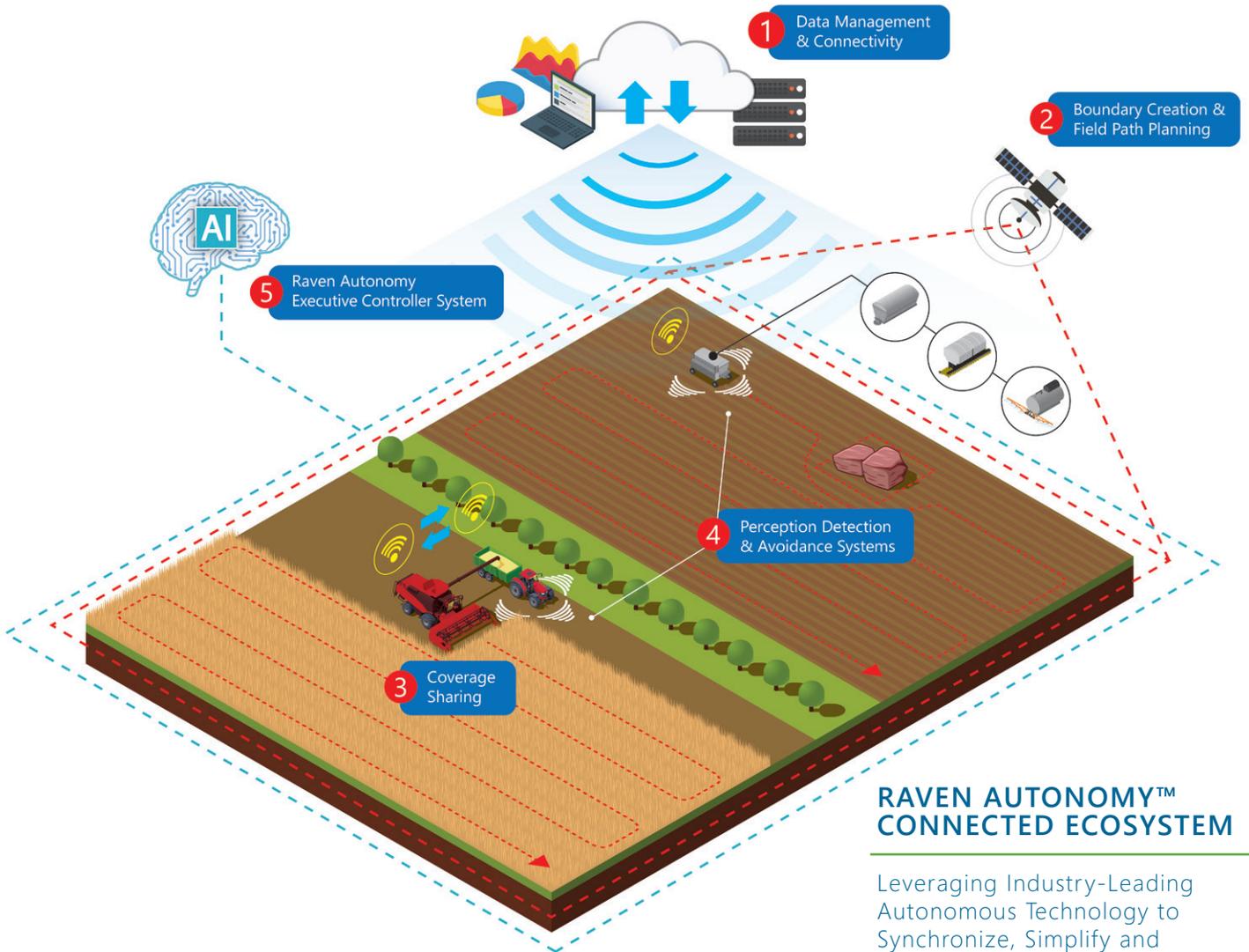


WHY RAVEN AUTONOMY™?

Reliable consistency with less human variabilities

Industry-leading perception, detection, and avoidance systems

Fully-integrated boundary creation and field path planning



OMNiPOWER™

ONE POWER
PLATFORM

MULTIPLE FARM
FUNCTIONS

NO DRIVER REQUIRED



HOW DOES OMNiPOWER WORK?

OMNiPOWER is controlled remotely by the farmer.

- The farmer sets a path plan that tells OMNiPOWER where to go (and where not to).
- The farmer loads the appropriate implement onto OMNiPOWER, which then sends it on autonomous missions via a tablet connected to a cellular network.
- Path plans cover every inch of each field.
- Path plans must be farmer-approved.
- OMNiPOWER recognizes boundaries, retains obstacle information, and operates to sub-inch accuracy.

WHAT IS OMNiPOWER™?

OMNiPOWER is an autonomous, driverless power platform that is farmer-controlled from a tablet. It replaces traditional farm equipment with a single unit that hosts many different implements like sprayers and spreaders, allowing it to perform many different tasks.

OMNiPOWER is tested and proven to safely and effectively improve efficiency and productivity.



**GET MORE. DO MORE. GIVE MORE.
OMNiPOWER MAKES MORE POSSIBLE.**

- Improves operational consistency
- Enhances crop quality
- Allows for a reallocation of resources
- Reduces the potential for 24/7 operations
- Makes the entire operation more efficient

OMNiPOWER IMPLEMENTS

- New Leader NL5000 G5 Crop Nutrient Applicator Spreader
- Pattison Liquid Systems Connect Plus 120 Sprayer
- More OMNiPOWER implements will be launching soon.

OMNiPOWER™ FEATURES

- Grows with you with implements for many tasks
- Easy implement changeover (about 10 minutes)
- Short- and long-range sensors detect obstacles for safe operation
- Operate one or multiple OMNiPOWER units using a single tablet device
- Run in autonomous mode in fields or by remote control in yards or equipment sheds
- Allows path plan alterations at any time to satisfy changing field conditions



OMNiDRIVE™

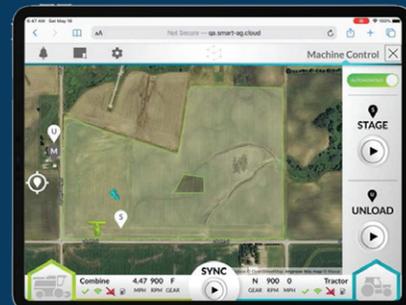
REMOVE DEPENDENCY, TAKE CONTROL

OMNiDRIVE™ is an easy-to-integrate aftermarket system that may install on your current tractor.



HOW DOES OMNiDRIVE WORK?

OMNiDRIVE™ is operated via an intuitive, tabletbased user interface, compatible with iPad®, Android™, and Windows®. Using the OMNiDRIVE portal, you create boundaries for the system. Then you can offload at defined staging and unloading areas, and re-sync to deploy the next mission.



WHAT IS OMNiDRIVE™?

OMNiDRIVE™ is the first Driverless Ag Technology for grain cart harvest operations. It allows you to monitor and operate a driverless tractor from the cab of the harvester. With OMNiDRIVE, you can set a field plan, stage locations, adjust speeds, monitor location activity, and command the tractor pulling a grain cart to sync with the harvester as it offloads on the go. OMNiDRIVE will then return the tractor to a predetermined unloading area. All without a second driver.



WHY OMNiDRIVE™?

- 340+ hours in labor reallocation to complete fall maintenance and tillage
- Harvester seamlessly controls the speed, sync, and staging of the driverless grain cart



OMNiDRIVE™ FEATURES

- Boundary setup/modification and predictive path planning
- Remote operation management
- Manual or autonomous tractor operation
- Machine-to-machine sync and transfer precision controls for accurate, even distribution
- Perception system uses camera and radar technology to keep people, animals, and equipment safe, and unharvested crops undisturbed

RAVEN

OMNi
DRIVE™

SLINGSHOT® SERVICES & LOGISTICS

TECHNOLOGY SOLUTIONS ENHANCING EFFICIENCY, INCREASE ACCURACY, AND MAXIMIZE YOUR BOTTOM LINE

The Slingshot platform is the backbone of our efficiency-enhancing portfolio. Combining our software capabilities and high-quality hardware allows us to create a Connected Workflow™ that syncs operations from the office to the field. And, that gives you the ability to see your business differently and find new ways to run it even better than before.



YOUR CONNECTED ECOSYSTEM



CONNECTIVITY

- High speed wireless connectivity in the cab for fast delivery of VRA maps, work orders, as-applied files and other important information in real-time
- Compatible on most major cell carrier networks worldwide
- API connects your software partners of choice for agronomy mapping, accounting, ERP, blending, orders and prescription creation

LOGISTICS

- Transfer work orders to the cab quickly and get completed jobs back from the field in real-time
- Know where your equipment and assets are and what they're doing to maximize efficiency
- Viper® 4+ or Operator Pro app, automatically ensures jobs are in the field computer correctly, the operator is in the right field and product is applied correctly

REPORTING & ANALYTICS

- Summarizes productivity across operators and assets
- When the application is complete a report is generated and synced automatically
- Real-time fleet monitoring, machine metrics and system performance stats
- Machine work, idle, and down time accessible 24/7

SLINGSHOT WEB & MOBILE APPS

- Web and mobile apps offer flexible connectivity 24/7 to customers, employees, and partners when away from the operation
- Promotes easy collaboration and data sharing for all levels of the operation and their customers

CONNECTIVITY



RELIABLE WIRELESS CONNECTIVITY HAS BEEN THE FOUNDATION OF SLINGSHOT'S SUCCESS FOR OVER 10 YEARS.

- High speed wireless connectivity in the cab for fast delivery of VRA maps, work orders, as-applied files and other important information in real-time.
- Compatible on most major cell carrier networks worldwide.
- API connects your software partners of choice for agronomy mapping, accounting, ERP, blending, orders and prescription creation.



FIELD HUB 2.1

Connects your precision ag hardware to Slingshot's suite of services

The core of the Slingshot experience is the Field Hub. A small device that fits neatly into the cab of your vehicle, the hub connects your precision ag hardware to the internet with ease. It also has WiFi that allows other devices in the cab to enjoy high speeds on one data plan. Get up to 4G LTE speeds on major phone networks in North America, Europe and around the world.



RAVEN RS1™

Unrivalled high-speed wireless connectivity and RTK corrections

RS1 is a fully scalable GPS solution that combines autosteer, GPS, and Slingshot® into one intuitive, easy-to-use unit. Incredible accuracy at both high and low speeds with quick line acquire improves efficiency and gives you the power to cover more acres in a day.

Best-in-class diagnostics gather machine performance data while you work, alerting Raven of issues and connecting you to support as you need it.



Reliable wireless connectivity has been the foundation of Slingshot's success for over 10 years. Although there are many options to choose from, we recommend the following solutions for you to get connected:

SLINGSHOT API

A culture of collaboration with leading agriculture software and application providers

One of Slingshot's most powerful tools is less obvious than our Field Hub or Raven Hardware, but it will change the way you do business: the Slingshot® API.

API is short for "Application Programming Interface." It's a software-to-software interface that lets one software system communicate with another. The value this kind of interface can produce for end-users is enormous.

You don't have to be a programmer to appreciate the nearly endless ways you can put the Slingshot® API to work for you on your terms. You'll see it in the features and performance of new products or services software companies can now develop specifically for your own operation.

VIRTUAL THUMB DRIVE

Eliminate the thumb drive and connect all displays

VTD is a feature that allows easy data transfer between field computers with the CRX Operating System. The data generated in the field by the machines is stored in the cloud, and all information can be transferred to the field computers through the VTD. When creating and linking the cloud account to the field computer, users can transfer data between VTD without the need for a physical USB drive.

SLINGSHOT LINK

Simplify management of precision ag hardware in the field

Through the Slingshot Field Hub, Slingshot Link allows Raven to send Raven Operating Software (ROS) updates wirelessly to compatible Viper® 4 field computers. This ensures instant access to the latest and greatest features and enhancements to Viper® 4 as well as important diagnostic information.

Through your Slingshot account, you can also access a suite of tools to help manage in-field devices as well as software upgrades and updates for your entire fleet.

- Online tools for management and support of field deployed hardware
- Prevents problems before they happen
- Speeds up diagnostics and resolution of problems when they do happen
- Supports the customer with less effort and faster resolution
- Increase operational intelligence
- Simplify management of fleet hardware
- Increase visibility of deployed system

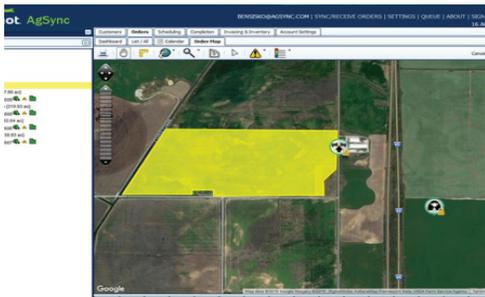


LOGISTICS



SEE EVERYTHING, MANAGE ANYTHING, AND SUPPORT EVERYONE IN REAL TIME

- Complete jobs efficiently and consistently with confidence knowing your customer data is readily available to you via a simple, easy-to-use platform.
- Transfer work orders to the cab quickly
- Get completed jobs back from the field in real-time
- Know where your equipment and assets are and what they're doing to maximize efficiency
- Viper® 4+ automatically ensures jobs are in the field computer correctly, the operator is in the right field and product is applied correctly



AGSYNC™

A flexible, scalable, and connected toolset

With the brawn of AgSync's feature set added to our industry-leading connectivity and data transfer, Slingshot sets the standard for planning, compliance, efficiency, accuracy, flexibility, support, safety, insight and more.

- Work Order Management
- Dispatch & Asset Control
- Reports & Notifications
- API Web Service



DISPATCH PRO™

The unmatched scheduling platform

We know having to manage multiple people, and pieces of equipment across many locations is difficult. Which is why Dispatch Pro was created specifically for you. To lessen or eliminate many of those burdens.

- View in-route, active and idle equipment status
- Know when assets are not working, reassign to where needed
- Dispatch across locations
- Work syncs immediately to Viper 4+ or the Field Ops app
- Custom CSV report
- Order History timeline



Reliable wireless connectivity has been the foundation of Slingshot's success for over 10 years. Although there are many options to choose from, we recommend the following solutions for you to get connected:

FLEET TRACKING

Expanded fleet tracking suite

Slingshot Fleet Tracking provides accurate machine running data in real-time while wirelessly tracking location and information about trucks, vehicles, trailers, tanks and other moving assets. Ag retailers and enterprise growers can gain a holistic view of their entire operation and mobile inventory.

JOB GENERATOR

Increase efficiency and reduce risk

Job Generator lets you create Viper® 4 jobs from the office. Pre-populating the job setup allows you to ensure that everything is entered correctly. You can even draw field boundaries to make sure that the job gets applied in the correct field.

This ensures you get the machine to the right location, with the right products, and your application reports are recorded accurately.

Slingshot connection, either through Wi-Fi or a Slingshot Field hub, and a subscription is required.

SLINGSHOT RTK

Microscopic accuracy with massive range

With a single base station, you can deliver RTK correction data over the Internet through those towers to vehicle operators. Slingshot® is compatible with major cell phone technologies.



JOB SYNC

Deploy two or more machines of any color in perfect concert

Easily share your coverage and guidance information between multiple machines in the same job, including section control to avoid skips or overlaps. Job Sync Live View allows you to see live progress of the work being done on the web in real-time so you can stay up to date on how close a job is to completion.

- Shared Coverage - multiple at once, or one at a time
- Fault Tolerant Data Channel Connection - if there is an interruption in network connectivity coverage is re-synced when connection is restored
- Machine-to-machine job status widget - know who else is currently in or has been in the job
- Live Web Viewer
- Joining a job is as easy as starting a regular job.

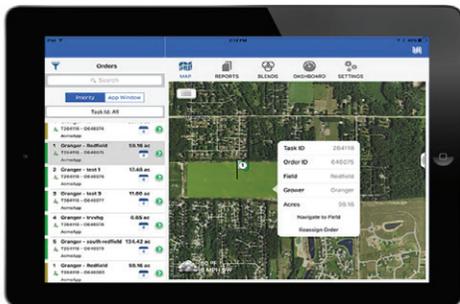


WEB & MOBILE APPS



SOLUTIONS THAT INCREASE EFFICIENCY AND IMPROVE ACCURACY

Our web and mobile apps offer flexible connectivity 24/7 to customers, employees, and partners when away from the operation. This suite of solutions promotes easy collaboration and data sharing for all levels of the operation and their customers.

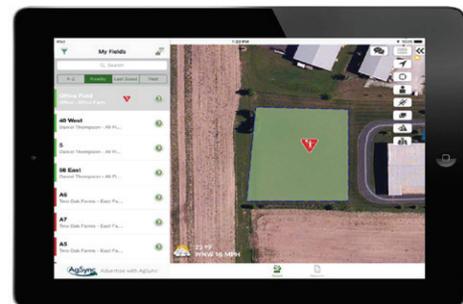


OPERATOR PRO™

Keep everyone informed, whatever their location

It's like mission control in the palm of your hand: Operator PRO is an app for users in the field that covers their entire workflow, including application and completion, delivery and load, and blend and sales ticket.

Operator PRO lets users remotely see and organize work orders in an easy-to-use interface. Operators can track and share spray movement data for as-applied maps, as well as review their own completed field records and edit if necessary.



AGRISITE™

Connecting you to the field

AgriSite's mobile app puts a tech arsenal in the palm of your hand. Crop scouts can use it to navigate to fields, log geo-referenced site observations, record crop information, and capture pictures. You can then send electronic reports to the AgriSite for Scouting web app for agronomist review. It's an essential tool for agronomy management.

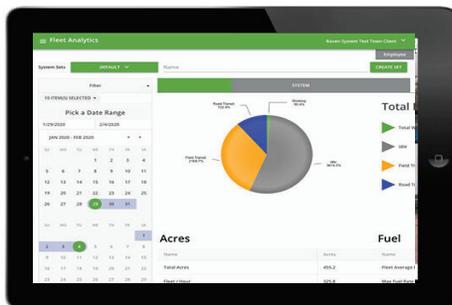
The AgriSite app puts AgSync in your hand with mobile tools which allow users to create customers, farms, fields and orders. New is the ability to dispatch right in the app.

ANALYTICS & REPORTING



MAKE CONFIDENT, DATA-DRIVEN DECISIONS

Have access to real-time information so you can make confident, data-driven decisions at all levels of the operation any time of the day. Stay informed on your operators and assets from the beginning of a job through completion.



FLEET ANALYTICS™

Complete visibility of your operation

This robust reporting tool provides insight on an operation's entire fleet and system. Analyze current and past Slingshot® work orders and report back on data such as acres covered or machine usage. In addition, notifications alert users on system events tied to any Raven hardware connected to the machine. The alerts are completely customizable by user type, criticality, location, and system.



MACHINE VIEW™

See everything in real time

Machine View gives you simple, powerful control over the performance of your entire fleet of Field Computers and Field Hubs by letting you monitor their current status, including signal strength, and historical data like vehicle path history.

From Machine View you can select any Slingshot Field Hub sold or owned by your dealership to see last positions and check signal strengths, battery voltage, direction (latitude/longitude) and velocity. You can even customize your map preferences and check Fleet View from anywhere you can get online.

WHAT WOULD 20% MORE EFFICIENCY MEAN FOR YOUR CUSTOM APPLICATION OPERATION?

On average, 20 percent is what ag retailers are finding when they use our Connected Workflow™ solutions in their operations, and sync their office to the field and then back again. Through work order generation, product application, and invoice creation, everything runs faster and more precisely than ever before. It's all thanks to the integration of Raven's suite of AgSync™, Slingshot®, and Viper®4+ which are designed to work together and with your existing systems to create a closed loop and seamless process.

That's real efficiency that comes from visibility, control and accuracy, all rolled up into a complete system that is also easy to use. And it could all be yours, if you come Find Your 20 today.

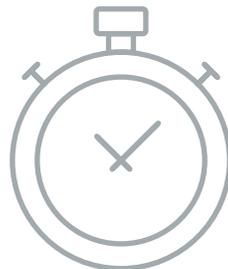
INTEGRATIONS AND APPLICATIONS TO SUIT YOUR SITUATION

We understand your systems need to work together seamlessly to get the benefit of technology. Our solution is designed to fit within your existing operating and inventory software, agronomic software, scouting apps and other systems as necessary. If needed, our robust offering of APIs and custom software integrations can plug in and get you rolling. Many integrations are already completed for the most popular programs being used by retailers today.

OUR PROCESS MAKES YOUR LIFE EASIER

We'll help tie together your workflow. And, by using our system and following our process, you'll always know your numbers.

A Connected Workflow allows you to quickly analyze these three key figures and better manage your efficiency.



➤ WORK TIME

➤ IDLE TIME

➤ TRANSIT TIME

Visit ravenslingshot.com/connected-workflow for more information.

WHAT'S A CONNECTED WORKFLOW?

For ag retailers looking to improve their profitability, Raven's solutions seamlessly connect and control office and field activities to increase both efficiency and accuracy for an improved bottom line.

Raven's Connected Workflow ensures a simple process from planning and work order generation to field application and invoice creation. And, provides the opportunity to make decisions that improve your operation.

Agriculture is always moving. But now you can move just as fast. Syncing information from office to field and back again has never been easier than with Raven's Connected Workflow and there's never been as much efficiency to gain.



RAVEN'S CONNECTED WORKFLOW™



01 ASSIGN **02 ALIGN** **03 APPLY** **04 APPROVE** **05 ANALYZE**

01

AgSync and the AgriSite mobile app makes scheduling, work order creation, dispatch and asset control efficient and adaptable to ever-changing conditions. APIs make connecting with partner ERP, agronomy, soil, and prescription creating systems simple.

02

Slingshot transfers work orders to the cab in a snap. And, makes getting completed jobs back from the field just as easy.

03

Operator Pro™, on either a tablet or integrated into Viper 4+, automatically ensures jobs are in the field computer correctly, the operator is in the right field and product is applied as precisely as possible.

04

When the job is complete an application report is generated and synced automatically. The grower can be notified throughout the entire process. Once the job is approved, billing can happen as soon as you'd like. Never forget to bill an application job again.

05

The system helps you see your operation in real time. At all times. That means better information to make better business decisions is always at your fingertips.

VSN™

EXPAND YOUR FIELD OF VISION

The latest technology advancement from Raven, VSN™ transforms machine guidance through emerged crops.

This patent-pending 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, covering more acres in a day and essentially providing an easier machine operation leads to a quick return on investment to maximize yield profitability.



VSN SOLUTIONS

- Reduces operator fatigue and crop damage
- Tracks machine paths accurately to the actual planting vs. theoretical
- Allows machine ability to automatically adjust to planting inconsistencies or adjustments
- Enables faster vehicle speed
- Works in areas of limited GPS/GNSS coverage — next to tree lines, ditches, hills, etc.



CROP TYPES



CORN



SOYBEANS



COTTON



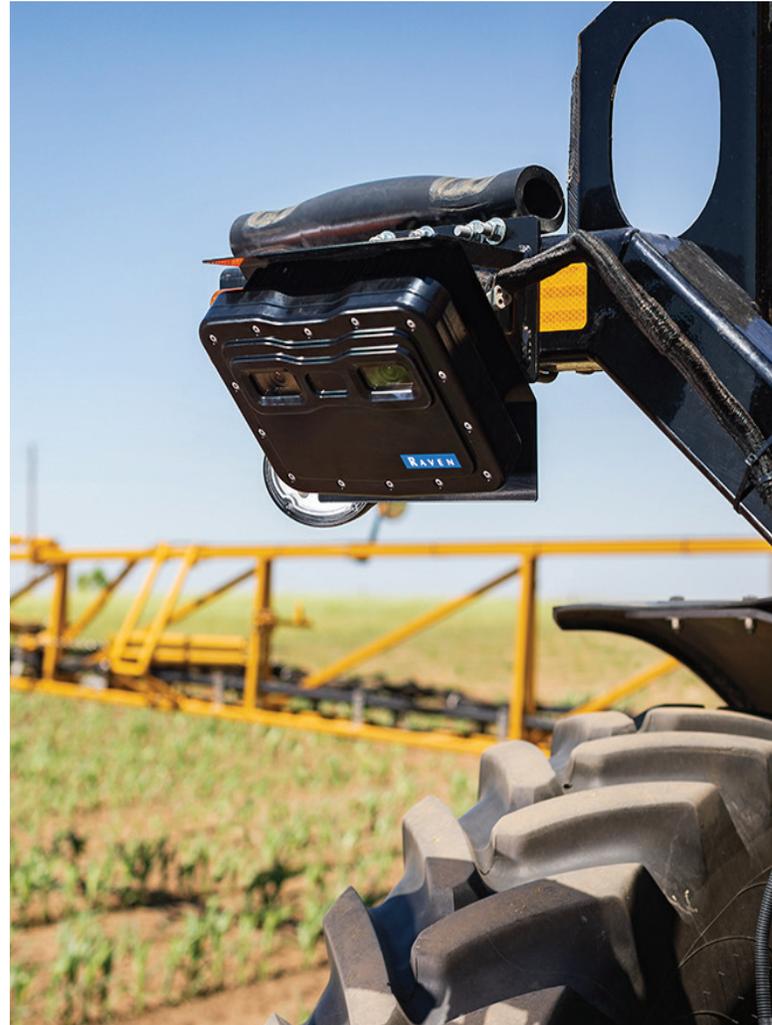
SORGHUM

CROP HEIGHT RANGE	4 in (10 cm) to approx. 90% canopy VSN only 100% full canopy
ROW SPACING	20 - 40 inches (51 cm - 1 m)
WEED COVERAGE	<30%
VEHICLE SPEED	Up to 20 mph (32 kph)
SLOPE / TERRAIN	≤ 8°
CROSS WINDS	Up to 15 mph (24 kph)



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
- Live video row overlays in CRX and ROS platforms
- In-field calibration
- ISO UT user interface, custom control widgets
- Slingshot® telematics and OTA software update support
- Pair with Viper® 4+ and RS1™ or SC1™ guidance



THREE MODES OF PERFORMANCE

GPS/GNSS MODE

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

VSN MODE

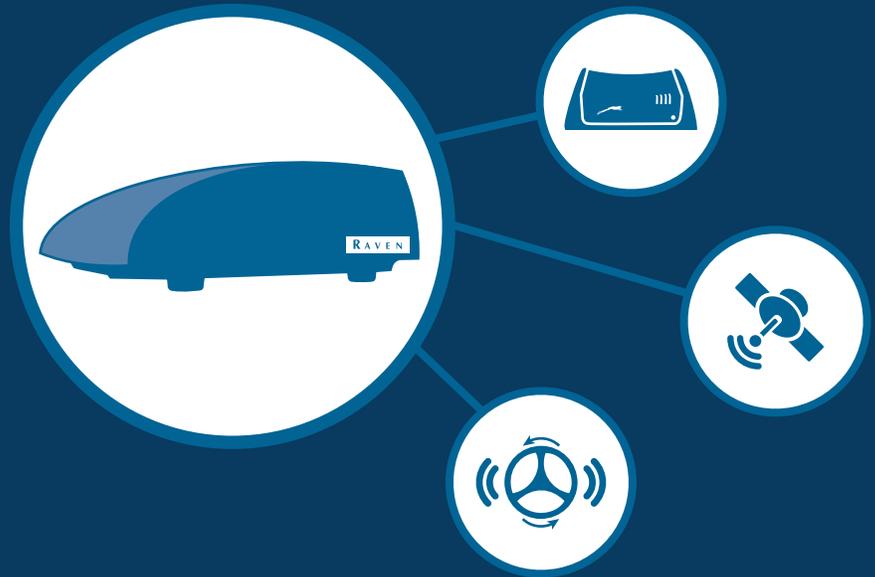
- Row guidance utilizing the image sensing of the VSN camera
- Guides machine when camera quality is above user-defined threshold

VSN+ MODE

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

RS1™

THE MOST
POWERFUL HIGH
SPEED STEERING
SYSTEM IN THE
INDUSTRY



INCREDIBLE ACCURACY AND POWER

RS1 is a fully scalable steering solution that combines Slingshot®, GPS, and autosteer into one intuitive, easy-to-use unit. Incredible accuracy at both high and low speeds with quick line acquire improves efficiency and gives you the power to cover more acres in a day.

Best-in-class diagnostics gather machine performance data while you work, alerting Raven of issues and connecting you to support as you need it. The unit is designed with a simple set up and integrated help guides, enhanced further by Slingshot - providing remote support, file transfer, OTA software updates and fleet management and logistics.



RS1 provides multiple methods of system connectivity including Cellular, Wi-Fi, or Ethernet.

slingshot. SLINGSHOT® READY

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



FEATURES & BENEFITS

- Compatible with Viper® 4+, CR7™ and CR12™ field computers
- Remote performance monitoring and support through Slingshot®
- Enhanced Steering Performance in a wide range of terrain
- Enhanced 3D compensation for rugged terrain
- Simplified Field Calibration Procedure
- Enhanced Diagnostics and Health Tests
- Serial GPS Output (NMEA 0183) or Radar Output
- Multi-lingual support
- Compatible with both ISO Steer Ready and Raven Aftermarket Steering Controllers
- Wide temperature range for inertial sensors (-40° to +70°C)
- Fully scalable GPS solution



SC1™ STEERING

SC1 coupled with a Raven field computer and GPS solution of your choice is designed to provide cutting-edge, hands-free machine steering. Incredible accuracy at both high and low speeds with quick line acquire improves efficiency and gives you the power to cover more acres in a day.

With similar functionality and user interface as RS1, the unit is designed with a simple set up and integrated help guides. The compact ECU can easily be installed in the cab and out of site. Compatible with Viper® 4+, CR7™ and CR12™ field computers.

Visit ravenprecision.com for more information.

VIPER® 4+

TAILORED FOR PROFESSIONAL APPLICATORS

Viper 4+ integrates with Raven's full line of products into one networked platform that offers a capacitive touchscreen and an intuitive, tablet-style interface with swiping features and horizontal or vertical orientation.



Customize your Viper 4+ by user and machine - it's colorblind which means it works with equipment of every brand. Easy job set-up, fewer touches, and greater efficiency allow for extraordinary data management capabilities.

RAVEN OPERATING SOFTWARE

Raven Operating Software (ROS) gives operators the ability to customize screen layouts to fit your application and other user preferences. Grower, farm, and field file structures help ensure you get the data you need in an organized and meaningful manner. Machine and product profiles offer even further customization, making the Viper 4+ the perfect match for each unique operation and user.

FEATURES & BENEFITS

- Horizontal or vertical orientation
- Sleek design with 12.1" capacitive touchscreen and intuitive, tablet-like interface and state-of-the-art rugged magnesium alloy enclosure
- Dust-proof for tough environments
- 4 camera inputs for monitoring bin levels, blind spots, roadway operation and more
- Customizable user interface
- Set up machine and product profiles
- On-screen implement location with section status



SLINGSHOT® READY



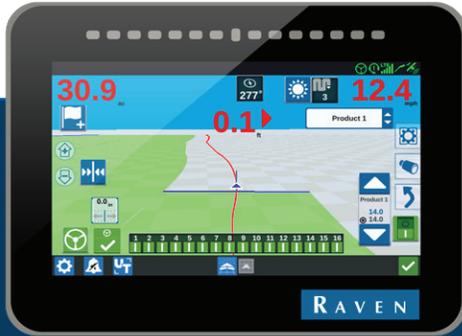
#BuiltForGoTime

Powered by Raven Operating Software and a high-speed processor, Viper 4+ harnesses the power of Slingshot for outstanding data management functionality, wirelessly update your field computer software, and increase efficiency with AgSync logistics.

You get powerful logistical tools for complete control of your ag retail operations. Getting the data you need, organizing it and turning it into meaningful information is faster and easier. And Slingshot gives you access to live remote support from Raven's team of experts.

For complete product information on Viper 4+ visit ravenprecision.com/viper4.

CR7™



The CR7 is a 7-inch lightweight field computer with customizable in-job layouts. 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 CR7 is compatible with Slingshot® file transfer and remote support, SmarTrax™ and SmarTrax™ MD autosteering, AccuBoom™, Raven serial consoles, and more.

CR12™



The CR12 is the latest field computer in the CRX display family, joining the CR7. Uniquely, the CR12 offers an extensive field planning feature, allowing the user to define AB-lines and reference lines of the field boundary. The user can then setup the complete field, including multiple headlands, spray tracks, greening zones and tracks with different working widths.

Like the CR7, the CR12 is compatible with Slingshot® file transfer and remote support, RS1™, boom leveling, Raven product control, and more.

FEATURES & BENEFITS

- Multiple language support and customizable units
- Ability to access settings page from inside a job
- Map-based navigation
- Auto field boundaries keep you organized automatically
- Interactive field/job list and map view
- Straight A-B, A plus heading, pivot, contour, and last pass guidance
- Sub-meter single frequency GPS and GLONASS (optional external)
- Scalable GPS (optional external)

CRX SOFTWARE

The powerful CRX operating system user interface features easy job set-up, fewer touches, and greater efficiencies, empowering the user with extraordinary data management capabilities. It boasts a simple widget concept, easily accessible settings, and ISO Universal Terminal and Task Controller capabilities.

For full product details and videos go to ravenprecision.com/cr7 or ravenprecision.com/cr12.



FIELD COMPUTER COMPARISON

	VIPER® 4+	CR12™	CR7™
DISPLAY FEATURES			
Screen Size	12.1 inches (30.5 cm)	12.1 inches (30.5 cm)	7 inches (17.8 cm)
Screen Resolution (Ratio)	1024 x 768 (4:3)	1024 x 768 (4:3)	800 x 800 (16:9)
Internal storage capacity	30 GB	30 GB	8 GB
Operating Temperature	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Orientation	User Configurable	Landscape	Landscape
Customizable Screen Layouts	✓		
Wi-Fi capable	✓	✓	✓
Camera Inputs	4	4	
SOFTWARE FEATURES			
Street Maps	✓	✓	✓
Guidance Patterns	4	4	4
Single and Multi VRA	🔒	🔒	🔒
Products	10	5	5
VRA Products	10	5	5
Sections	105	105	16
Bin Chaining	✓		
Operation Planning		✓	🔒
agX Integration	✓		
ISO XML GFF/Boundary	✓	✓	✓
Product and Machine Databases	✓		
User Configurable Product Profiles	✓		

✓ Standard Feature ⚙️ Coming Soon 🔒 Unlock/Subscription Required
 For a complete comparison and compatibility go to ravenprecision.com/compare.

CHALLENGES FACING GROWERS AND AG RETAILERS

WEED RESISTANCE

Weed resistance is driving the need for more effective and precise application of pesticides.



MISAPPLICATION

Misapplication in the field can lead to field claims or the need to go back and re-apply in certain areas, impacting your profitability and customer satisfaction.



Misapplication costs you time, money, and valuable resources, and can negatively affect crop yields. All of these factors contribute to input costs and the bottom line.



IMPORTANCE OF PRECISION APPLICATION

Ineffective spray application allows insects, weed pressure, or disease to damage crop yield potential.

Wrong or incorrect application rate can stress or damage crop.

Spray drift into adjacent fields results in unintended application and crop damage.

Proper application ensures chemical costs are minimized with less need for re-spraying.

WHY IS SPRAY PATTERN IMPORTANT?



DRIFT REDUCTION

Spray drift occurs when a pesticide moves through the air during or after application to a site other than the intended target.



EVAPORATION

The pesticide needs to sit on the intended target long enough to take effect.



DROPLET SIZE

The droplet size affects both efficacy and spray drift of the application.

WHY IS DROPLET SIZE IMPORTANT?



COARSE DROPS

Too large of a droplet can either roll off the leaf or not have the coverage needed to take care of the pest.

If you don't accurately and efficiently control the pest, you're sacrificing the potential yield of your crops and money in your pocket.



FINE DROPS

Fine spray droplet size, usually less than 200 microns, are the most light, remain airborne for an extended time, and are most prone to drift and evaporation.

The result is application to an area not intended to be treated and field claims to damaged crop.

CONVENTIONAL FLOW-BASED SPRAYING

Nozzles and tips are limited in range and effectiveness when used with conventional flow based product control, forcing you to:

- Limit machine speed based on nozzle selection, or
- Have a less effective application at certain speeds

Strictly flow based spraying does not take into account boom pressure, which at lower and higher speeds will impact spray pattern.

TURN AND HEADLAND COMPENSATION

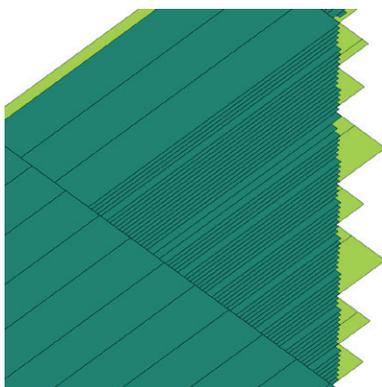
In addition, not controlling each nozzle by pressure can lead to misapplication when the machine turns.

Without turn compensation, you can over or under apply across the width of the boom, affecting the yield in that area of the field.

Over applying leads to chemical burned crops, while under applying leads to more pests.

SECTION CONTROL AND OVERLAP

A common base system provided on factory installation has 7 sections on a sprayer.



The outer end of the boom can travel up to three times the speed of the machine or inside of the boom when turning.

The inside of the boom gets too much product and the outside of the boom doesn't get enough – both instances are problematic for your crops.

HEADLAND



As you come out of the headland and increase speed the rate decreases causing product application deficiency.

HAWKEYE® 2

NOZZLE CONTROL SYSTEM

THE MOST ACCURATE NOZZLE CONTROL SYSTEM IN THE INDUSTRY

The most precise nozzle control system, Hawkeye® 2 ensures accurate droplet coverage up to 2.5 times more accurate out of the tip than comparable systems. It provides consistency across the boom which ensures precise droplet coverage, optimizing input costs. And Raven's legacy of performance and support means less downtime and more acres covered in a day.

The next generation nozzle control valve (NCV) builds upon the previous system: individual nozzle control reduces skips and overlaps; consistent droplet rate and size reduces drift and increases application quality; and turn compensation minimizes over and under application, achieving the ideal application rate across the boom.



FEATURES & BENEFITS

- Over 17% increased* flow per nozzle
- Support up to 192 nozzles
- Over 60% reduction of power consumption per nozzle IP69k rating per NCV
- Increased operating pressure of 10 to 120 psi
- Optional severe duty poppets for harsh chemical use
- Enhanced diagnostics
- Independent feedback loop to RCM
- Simplified LED light on NCV lets you know when there's an issue
- Blockage Detection per nozzle
- Exclusive cabling improves performance

- Increased durability, power reduction, diagnostic abilities
- Over-molded connection provides UV protection and strain relief

EASE OF USE

- Simple installation, setup, and calibration
- Fully integrated with machine application control systems that use one display in the cab
- Preset pressure settings allow for quick adjustments on the fly
- Single ECU controls rate, pressure and section shutoff, providing:
 - Ability to switch between Hawkeye2 and conventional mode
 - Mapping and data logging of each nozzle for more accurate mapping and record-keeping

*In comparison to Hawkeye 1



HAWKEYE 2 AND RCM

The Raven Rate Control Module (RCM) - Sprayer system is designed to provide multi-product rate control via an ISOBUS universal terminal (UT). Adding the Hawkeye® 2 nozzle control system to the RCM - Sprayer allows the machine operator to monitor and control pressure independently from the application rate without additional displays, controllers, or consoles

SCALABLE OFFERINGS

Hawkeye 2 base

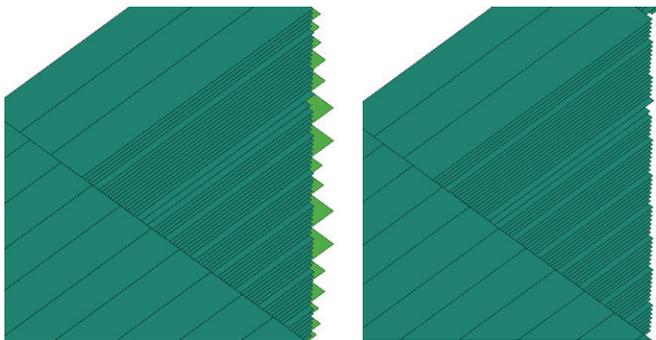
- PWM enabled with 16 virtual sections
- Turn Compensation
- Blockage Detection (go/no-go)

Hawkeye 2 premium

- Individual nozzle control up to 192 sections when paired with compatible field computer

ENHANCED DIAGNOSTICS

- Independent feedback loop to RCM
- Simplified LED light on NCV lets you know when there's an issue
- Blockage Detection per nozzle



The standard base Hawkeye 2 system along with virtual section unlock provides 16 sections without additional boom valves needed.

Upgrading to Hawkeye 2 HD provides up to 109 sections reducing the amount of overlap.

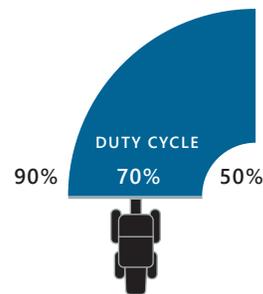
SIDEKICK PRO™ DIRECT INJECTION COMPATIBILITY

- Inject additional chemicals in the line as needed without worrying about tank mixing or clean-out at the end of the day
- Greater flexibility in your applications so you can handle weed resistance and other challenges
- Pair with Hawkeye 2 and use up to 5 injection systems on one machine through the Viper® 4+



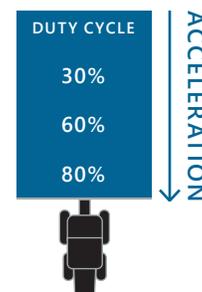
The Hawkeye 2 System is built on the ISOBUS communication platform which allows it to work with ISO Task Controllers, including the Viper® 4+.

TURN AND HEADLAND COMPENSATION



Hawkeye 2 uses turn compensation to minimize over and under applications. The turn compensation feature monitors the position of the sprayer, and once the unit starts to turn or make an arc, the individual nozzle valves adjust their duty cycle to maintain the proper flow for achieving the desired application rate across the entire boom.

HEADLAND



With Hawkeye 2, as you come out of the headland and increase speed the rate the individual nozzle valves adjust to their duty cycle to maintain proper flow to achieve the desired application rate across the boom.

SIDEKICK PRO™

DIRECT INJECTION SYSTEM

THE INDUSTRY STANDARD IN DIRECT INJECTION

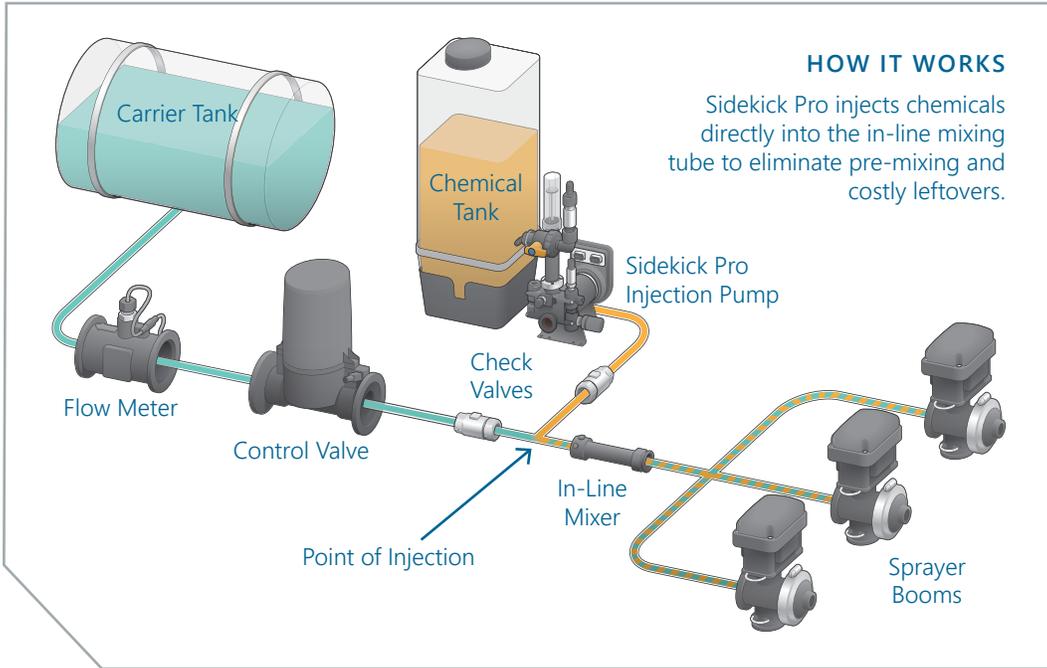
It's the direct injection system that sets a new standard for chemical applications of every type, with unprecedented precision, savings and safety.

Raven's Sidekick Pro direct injection systems help you save time and money on applications of herbicides, insecticides, drift agents and nitrogen stabilizer.



FEATURES & BENEFITS

- Up to 5 units on one machine, allowing easy switching between fields and applications with Hawkeye Nozzle Control
- No pre-mixing, tank mixing, cross contamination or clean out reduces waste from unused product
- 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
- Reduced chemical exposure means additional safety for the operator
- Adjust chemical concentration on the fly rather than spraying more or less of the entire mix
- Gives you greater flexibility with multiple chemicals in applications to tackle weed resistance and other challenges
- Two pump options: the low volume pump with a capacity of 1-40 ounces (0.03-1.2 L) per minute; and the high volume pump with capacity of 5-200 ounces (0.15-6.0 L) per minute
- High resolution encoder that provides smoother pump control
- and exceptional lock on target rate technology
- Remote closed-system calibration, eliminating the need for calibration catch tests and exposure to chemicals
- Automatic priming feature and real-time diagnostics
- Compatibility with additives that reduce maintenance on your application system
- ISO compatible pump



No tank mixing required - and with the industry's first remote and closed calibration and prime feature, you're ready to go in minutes!

RINSE ASSIST FOR DIRECT INJECTION

- Automatic rinse system that can clean the chemical out with the push of a button
- Three-way valve automatically opens to a rinsing agent tank
- Valve automatically returns to chemical tank position at the end of the rinsing cycle

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.

RAVEN RCM

RATE CONTROL MODULE

PROVEN LEADER IN OVER 200 APPLICATIONS

The Raven Rate Control Module (RCM) uses Raven's innovative control algorithms to make it the most precise application controller on the market and your solution for every season. The RCM is an ISOBUS product controller that can control up to five products in one ECU for both liquid and dry applications.

It fits a variety of applications — sprayers, spreaders, NH₃ (including AccuFlow™ HP+), air cart and generic applicators, and even planters and seeders.



USER FRIENDLY

We've simplified the setup, introduced integrated help content, and added advanced diagnostic information to quickly identify issues and reduce costly downtime.

Customizable user interfaces give the operator the flexibility to see and control what fits their needs, and configurable machine profiles allow the RCM to easily move between machines and implements without re-setting machine configurations.

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

FEATURES & BENEFITS

- Easily navigate and manage multiple products, tallies, and sensor data
- Diagnostic tests and reading to easily calibrate, tune and troubleshoot system
- Compatible with ISOBUS Universal Terminals and Task Controllers
- Multi-lingual support
- IP 67 environmental rating for the harshest of environmental conditions
- Integrated magnet mount option to easily attach and detach with any metal frame
- Dynamically configure run screen based on operator preferences to show most relevant data during operation



PULL-TYPE AND SELF-PROPELLED SPRAYERS AND LIQUID FERTILIZER APPLICATORS

- Single liquid product control
- Sidekick Pro™ ICD compatible up to 4 Direct Injection pumps
- Tank fill monitoring

PULL-TYPE AND SELF-PROPELLED SPREADERS

- Rate control up to 4 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

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

PLANTERS

- Section control up to 32 sections (Flexseeder, Air, Electric or OEM Clutches) with ground drive transmissions
- Seed rate control up to 4 hydraulic motor drivers 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

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 catch test calibration
- Independent control of multiple meters per product



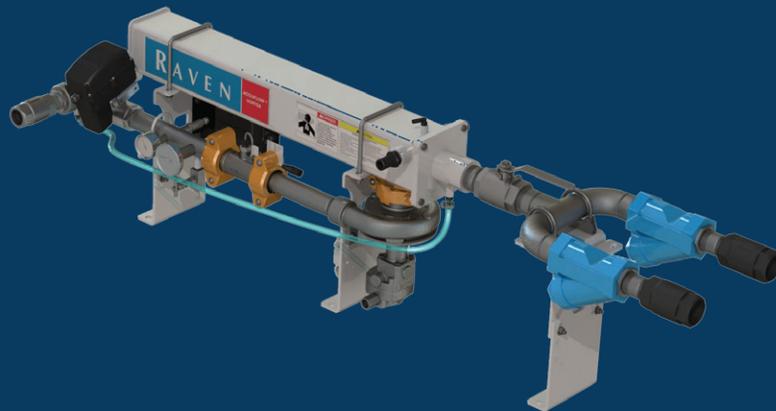
Utilize the Section Control Remote 2.0 to wirelessly turn on and off the pump, sections or individual nozzles paired with an RCM or Product Controller II ECU. Simply pair the remote with the UT and choose between section or nozzle control mode.

Raven continues to support a downloadable app to control the same functionality while the Section Remote 2.0 is designed for an extended range and connectivity to support diagnostic troubleshooting.

ACCUFLOW™

INDUSTRY-LEADING ANHYDROUS AMMONIA APPLICATION

AccuFlow is the most trusted anhydrous ammonia (NH3) application system on the market — and it earned that trust delivering superior accuracy, simple operation and unrivaled reliability.



Paired with your Raven control system, AccuFlow super cooling NH3 technology replaces the dual cooler system providing superior accuracy and control over your applications for higher yields, less waste, and lower input costs.

Raven's advanced NH3 cooler system is now available in stainless steel and with more capacity options!

	ACCUFLOW VORTEX 1-INCH VALVE	ACCUFLOW VORTEX 1 ½-INCH VALVE	ACCUFLOW HP PLUS WITH VORTEX COOLER
Capacity Range*	3-30+ GPM	3-50 GPM	3-80 GPM
Weight	190 lbs	196 lbs	280 lbs
Tractor Hydraulic Requirement	--	--	12 GPM @ 2,000 PSI
System Working Pressure	250 PSI		
Cooler Relief Valve Setting	350 PSI		
Temperature Range	-30° to +120° F		
Strainer Screen	40 mesh stainless steel		
Fast Valve Open/Close Time	≤ 2 seconds		
System Voltage	12-14.5 VDC		

*Systems were tested at 40°F and 60 tank PSI (Fall conditions).



FEATURES & BENEFITS

- Reduced from 50+ fittings in older dual cooler system to less than 30 fittings for the Vortex cooler
- Gruv-lock couplings
- Easier maintenance of the Flow Meter
- Less than 10 min to remove and re-install flow meter
- Only a single socket 7/8-inch wrench required
- Safety bleed down circuit
- Positioned at the front of the toolbar and empties into the vapor lines
- Additional needle valve for bleed down at the flow meter
- Operator is removed from the point of exhaust
- Faster bleed down - 30 min or less for full bleed down
- Refrigerant Line Y-Strainer

- 1/2-inch strainer placed in the refrigerant or coolant line designed to catch debris before it can reach the orifice of the cooler

HP PLUS SYSTEM

- Two Stage Valve Control System
- When flow demand exceeds a fully opened valve, the HP pump is triggered to reach the desired rate
- Dynamic Valve Control
- The Control Valve is commanded to react at a slower speed for lower rates and at a faster speed for higher rates

STAINLESS STEEL COOLERS

- Compatible kits - same as other coolers
- Stainless steel inner tube and encasement around the inner tube
- Flighting inside the inner tube will not be stainless steel

COMPATIBILITY

	ACCUFLOW VORTEX 1-INCH VALVE	ACCUFLOW VORTEX 1 1/2-INCH VALVE	ACCUFLOW HP PLUS W/ VORTEX COOLER	DIRECT INJECTION	NUMBER OF SECTIONS	AUTO SECTION CONTROL OR ACCUROOM	VRA MAPPING	AS APPLIED MAPS	SLINGSHOT® REMOTE SUPPORT & FILE TRANSFER	DIAGNOSTIC TROUBLE CODES	SINGLE SCREEN MULTI-PRODUCT OPERATION
RCM with Viper® 4+	✓	✓	✓	✓	10	✓	✓	✓	✓	✓	✓
RCM with CR7™	✓	✓	✓	✓	10	✓	✓	✓	✓	✓	✓
Raven ISO Node with Non-Raven Display	✓	✓	✓	✓	6	✓*	✓*	✓*			
Raven CAN Product Control with Raven Field Computer	✓	✓	✓	✓	6	✓	✓	✓	✓		✓
4000/5000 SCS Consoles	✓	✓		✓	6						
440/450 SCS Consoles	✓	✓			3/6						

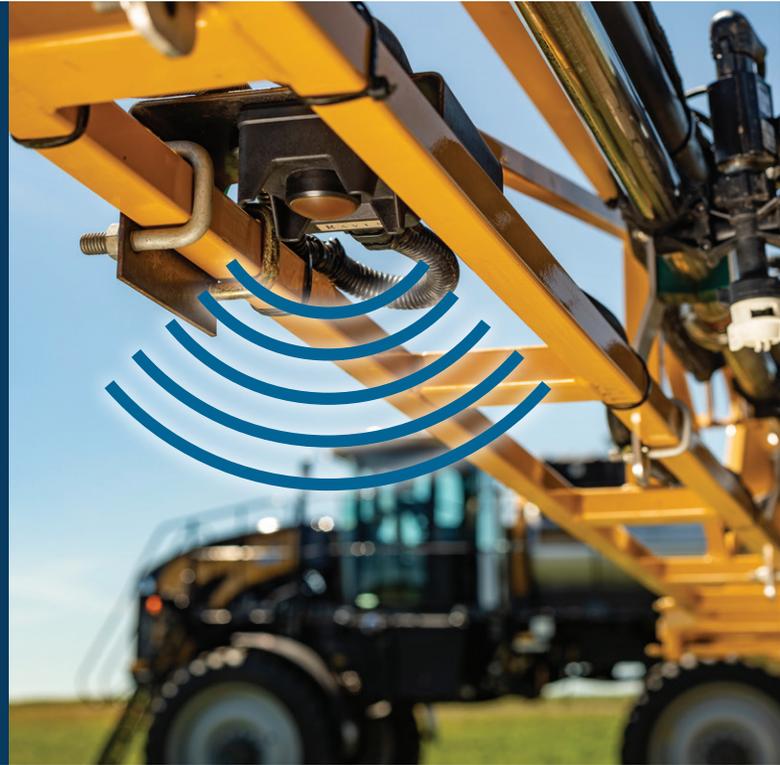
*Operation dependent on unlocks and capability of display.

AUTOBOOM[®] XRT

AUTOMATIC AND EFFORTLESS CONTROL

Raven's latest advancement in boom control is AutoBoom XRT. Industry-leading radar sensor technology uses simultaneous ground and canopy detection to maintain optimal spray height for maximum product efficacy.

Pressure-based control allows for smooth movement and quicker reaction time while center rack stability technology with optional dampers gives the operator complete control, maximizing boom life.



WHY IS BOOM HEIGHT IMPORTANT?



DRIFT

Having the boom too high will lead to spray drift.



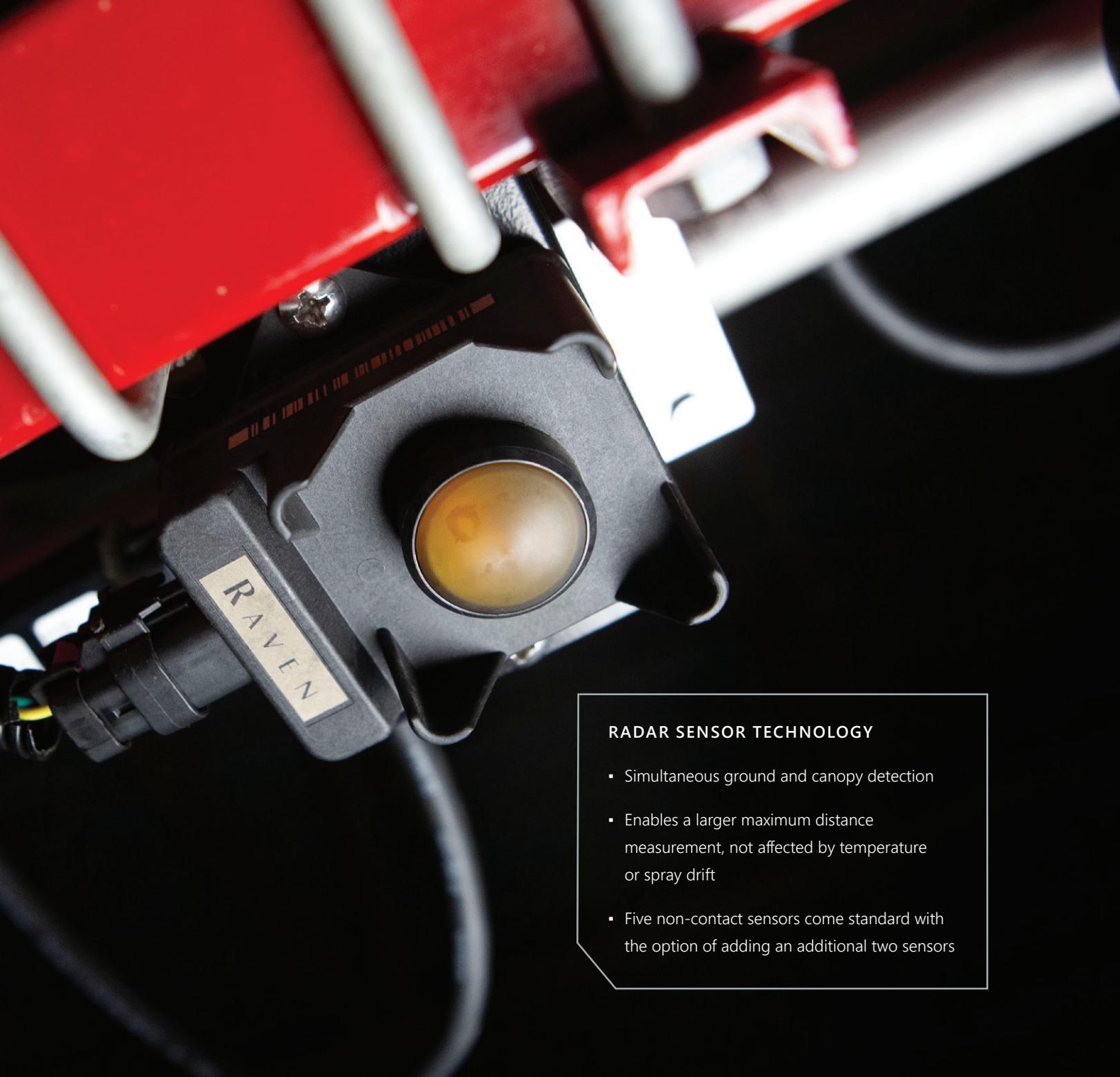
CROP DAMAGE

Having the boom too low can damage crops.



BOOM DAMAGE

Damaging the boom when running into the ground is a costly fix and causes machine downtime.



RADAR SENSOR TECHNOLOGY

- Simultaneous ground and canopy detection
- Enables a larger maximum distance measurement, not affected by temperature or spray drift
- Five non-contact sensors come standard with the option of adding an additional two sensors

FEATURES & BENEFITS

- Full boom management solution maintains optimal spray height for maximum product efficacy
- Faster Sampling and Update Rates than standard ISO AutoBoom
- ISOBUS compatible
- Weather-proof for tough environments
- Center rack stability technology with optional dampers:
- Pressure-based for smooth movement and quicker reaction time
- Machine chassis roll sensing
- Complete control maximizes boom life



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R A V E N

 Please Recycle