

C-5529 Precision Agriculture Infrastructure Grant (PRO-AG) Grant Application

Devices and Technology Subprogram

Ruskamp Farms, Inc

582 B Rd. Dodge, NE 68633

402-380-2236

ruskampfarms@outlook.com

Attachment A.

Business Plan:

Executive Summary:

The use of technology and precision equipment in agriculture continues to evolve and is crucial for the day-to-day operations and overall success of a farming business. Ruskamp Farms, Inc continues to adapt these new technologies and implement improvements within our operations. The funds from the PRO-AG grant will be assisting with the project Ruskamp GPS, which is the implementation of a new John Deere GPS system. The key components of this GPS system are: Automated Guidance Systems, Variable Rate Technology, Mapping and Monitoring, Yield Monitoring, Data Analysis and Decision Support, Remote Sensing, and Farm Management Software Integrations. This system will be utilized on our John Deere tractor, which pulls our air seeder planting small grains and cover crops both for ourselves and other local producers. The system will help us plant cover crops more accurately, efficiently, and ultimately provide more value for us and for our customers.

Project Proposal:

Ruskamp Farms is looking at purchasing a John Deere GPS system which consists of a G5Plus Universal Display, a StarFire 7000 Universal Receiver, and a JDLink Modem. This will be a newer and more advanced GPS system than the one we are currently using, allowing us to utilize the StarFire 7000 Receiver with RTK, a correction system with sub 1 inch accuracy. The G5Plus Display will allow us to document every field task and application we make as well as using the JDLink Modem to seamlessly transfer this data back to the John Deere Operations Center. Since our current system is used in our combine, we can't seed cover crops or small grains and combine at the same time. This causes a bottleneck logistically ultimately resulting in less efficiency as well as planting the small grains later than ideal. For example, each day that hard red winter wheat planted in the fall is delay from planting, grain yield declines by 1%. The same is true for the impact and the effectiveness of cover crops. With utilizing this new and additional GPS system, we will be able to perform 2 operational tasks simultaneously, harvesting and seeding. This will also equate to an increased need for labor resulting in an available position to be filled by an addition part time employee or even a neighbor.

Timeline:

The timeline is listed below with Day 1 being the day that we get notified of the approval of the grant. Also, since I have already have an account setup with the dealership and I've been quoted the summary for the GPS system, the process is streamlined.

Day 1: Get notified of the grant approval for the project.

Day 2: Contact Platte Valley Equipment in Nebraska to place order for the GPS system.

Day 14: Receive the GPS system and start the installation process onto our tractor.

Day 15: Operate the system to get familiar with it and test for any malfunctions.

After installation and testing of the equipment, it will be ready to be used. Ultimately, the funds from the grant would be used and starting to return an impact within 30 days.

Sustainability:

We at Ruskamp Farms have continued to see more and more local producers starting to adopt the use of cover crops and soil health practices. Regardless of the government administration policies or any other outside influence, I believe producers are seeing the need and benefits of using cover crops to help improve their soils which in return helps build profitable and sustainable businesses long term. The GPS equipment itself has a longevity of over 10 years. I know this because our first GPS system is still in operation, and it was purchased in 2012. This new technology is also very user friendly making it easy to install any software upgrades to continually enhance its performance and longevity.

Budget:

Equipment Cost

John Deere G5Plus Universal Display	\$9,695.00
John Deere StarFire 7000 Universal Receiver	\$5,800.00
John Deere GPS Receiver Mounting Bracket	\$108.00
John Deere JDLink Modem w/ universal Harness	\$200.00
Total:	\$15,803.00

Funding:

Pro Ag Grant – 55% of the cost	\$8,691.65
Ruskamp Farms, Inc – 45% of the cost	\$7,111.35
Total:	\$15,803.00

Financial Projections

This is the projections for the first year.

Income:

Pro Ag Grant	\$8,691.65
Acres planted with the tractor and air seeder (1,100 acres x \$19/acre)	<u>\$20,900.00</u>
Total Income:	\$29,561.65

Expenses:		
Purchase of the GPS system		\$15,803.00
Tractor Cost (opportunity cost) 1,100 acres / 22 acres per hour = 50 hours		
Tractor Cost per hour (50 hours x \$65/hour)		\$3,250.00
Air Seeder - (opportunity cost) \$6 per acre x 1,100 acres		\$6,600.00
Fuel - \$2.00/acre x 1,100 acres =		\$2,200.00
Labor - \$20 per hour x 50 hours =		<u>\$1,000.00</u>
	Total Expenses:	\$28,853.00

Gross Profit 1 st year (equipment being paid in full)	Profit/Loss	\$708.65
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Scenarios:

1 st year without the Pro Grant	Total Income	\$20,900.00
	Total Expenses	<u>\$28,853.00</u>
	Profit/Loss	(\$7,953.00)

2 nd year after paying for equipment in full (Acres stay the same at 1,100)	Total Income	\$20,900.00
37% Profit Margin	Total Expenses	<u>\$13,050.00</u>
	Profit/Loss	\$7,850.00

2 nd year after paying for equipment in full (Increase acres to 1,600)	Total Income	\$30,400.00
37% Profit Margin	Total Expenses	<u>\$18,967.00</u>
	Profit/Loss	\$11,433.00

5 th year, Potential Growth (Increase acres to 3,000)	Total Income	\$57,000.00
37% Profit Margin	Total Expenses	<u>\$35,583.00</u>
	Profit/Loss	\$21,417.00

Cost Benefit Analysis:

As with any projection, these are just estimates and numbers can change. I believe these financials are well within reason and easily attainable. With time, as more producers adopt the use of cover crops, there will be an increase in acres covered by the machine. However, this is not only making Ruskamp Farms more profitable but also the producers who are utilizing the cover crops. I believe that if done properly, with the right agronomic and soil health practices, those who utilize cover crop will see an economic gain as well.

Attachment B.

Legal:

Legal Capacity:

Ruskamp Farms, Inc will need to renew the SF-RTK subscription each year. The two main activations within the G5Plus Display are section control and auto-trac, these activations will not need to be renewed each year. No other permits, certifications, or qualifications are needed.

Attachment C.

Technical Summary:

Technical Capability:

Ruskamp Farms currently utilizes an older GPS system that was retrofitted with a Wireless Data Transfer kit that helps streamline the transfer of data from the machine back to the John Deere Operations Center for proper data management and record keeping. I fully understand how to utilize the Operations center to manage the data and analysis is for agronomic and economic assessments. I have also worked on creating systems and processes that clearly outline how to properly operate these systems to ensure accurate data is recorded and transferred.

Program details:

Ruskamp Farms, Inc. will use this grant to help fund the purchase of a new John Deere GPS system which will be utilized in conjunction with our tractor and air seeder to custom plant small grains and cover crops for other local producers as well as within our own operation. The goal with implementing this new technology is to cover more acres within a smaller and more crucial window along with having the capability of keeping accurate data record keeping.

Expected Life:

I foresee the life expectancy of this equipment to be around 8-10 years if not more. With the ability to easily transfer and install any new software updates to the equipment, the overall functionality of the equipment will be easily maintained and kept in proper working condition. I also believe with proper care of the system (taken from equipment when not needed or stored inside, or kept clean), it should have a working life of at least 10 years. I can confidently say this because our first GPS system is the original equipment and still functional.

Maintenance Plan:

This new John Deere GPS system will require minimal external maintenance. Physically, the equipment will need to be kept clean, free from dirt or dust but also from water. As long as the equipment stays sealed, this shouldn't be an issue. Internal maintenance will consist of updating the software when needed.

Attachment D.

Cybersecurity:

Security measures will be implemented to ensure privacy of data collected within the John Deere Operations Center. Measures such as, keeping the login info for the John Deere Operations Center secure and only allowing qualified professionals to have access. This will protect the data collected not only from our operation but mostly the data collected from our customers.

I also feel confident in the security of the John Deere Operations Center, especially with the vast number of clients they have. Here is what John Deere had to say regarding Digital Security (as cited from the following website: <https://www.deere.com/en/our-company/digital-security/>):

“When people entrust data to John Deere, we're committed to fulfilling the faith they've placed in us. As data and connectivity become a greater part of our work at Deere, and for our customers' operations, so too does securing it against threats. That's why we have dedicated, full-time cybersecurity teams around the globe who are committed to protecting our customers, dealers, products, and infrastructure. We continuously strengthen that commitment by investing in the latest tools and technologies, by incorporating industry best practices, and by consistently building upon new and longstanding partnerships with trusted third-party security experts.”

Attachment E.

Match Documentation:

Match Percentage:

Ruskamp Farms, Inc. is willing to match 45% of the total cost of the project. The breakdown for the funding would be as follow:

Ruskamp Farms, Inc –	45% = \$7,111.35
Pro Ag Grant –	55% = \$8,691.65

Attachment F.

Monitoring and Evaluation:

Project Monitoring:

With the use of the John Deere Operations Center, I can generate custom reports from the ‘Work Analyzer’ which will be able to clearly define the number of acres we have planted for each client, and each crop type. Other metrics available consists of, Productivity, Speed, Fuel Used, Variety Planted, and Average Population.

Other tools that can be used in monitoring the project is QuickBooks. Our accounting system can be used to determine the financial impact from custom acres planted for other local producers.

All these metrics can be used to determine the overall scope and success of the project.

Economic Benefit:

The Pro Ag grant will help Ruskamp Farms, Inc. continue to improve its efficiency with innovations such as this new John Deere GPS system. By improving the bottom line and profitability of Ruskamp Farms, Inc. it will also provide an additional position or task on the farm that will need to be filled, potentially by a part-time hired hand or even a neighbor looking to keep busy in an off season. Referring to the projections listed previously, with the example of covering 1,110 acres at 22 acres per hour, that equals 50 hours at minimum of labor. With a labor rate of \$20 per hour that would equal \$1,000 minimum of additional revenue available to the person who operates the drill. This number could also rise with the increase in acres that the machine covers.

In addition to the economic benefit from the operational standpoint, there are numerous financial benefits to the producer utilizing cover crops. Some of the benefits include, weed suppression (less herbicide cost), increase organic matter (better water holding capacity resulting in better yields in drought years), more active soil biology (decreased fertilizer inputs), and additional forage for livestock (less costly forage). Cover crops also allow producers to take advantage of sunlight during the winter and early spring months when often field are left bare. This sunlight can be captured and turned into a living plant that helps build soil health as well as can be harvested for livestock feed without affecting the cash crop. For example, on our own farm, we planted cereal rye after harvesting corn silage in the fall. This rye grew in the fall and then started growing in the spring. We chopped the rye as a forage for our cows in mid-May, we received 5 tons an acre of forage with a value of \$35/ton which equals \$175/acre of additional revenue strictly from the cover crop.

Additionally, as of today, there are various cover crop programs that will pay anywhere from \$20-\$30 an acre. This mitigates the cost of application and helps producers start to adopt these practices and can put immediate money back to their operations.

Continued Economic and Technological Impacts:

With continue adoption of precision technology within the ag industry, the opportunities will only increase with time. For example, some crop insurance companies are starting to accept planting and harvesting records from equipment capable of recording application records such as the John Deere GPS system that the Pro Ag Grant will help fund for Ruskamp Farms, Inc. This allows the producers that utilize this equipment to use the planting map for actual planted acres for accurate crop insurance reporting and for paying premiums only on planted acres, not on outdated FSA maps. Not to mention if this technology is used in the combine to record yield data that can be easily and accurately verified and presented to crop insurance, producers will see quicker payouts on claims as well as more accurate. On a similar note, any producers planting cover crops with this equipment that records all the application data, can use these maps and data to apply for various cover crop programs that will only continue to increase in the future. All of this will ultimately put more dollars back in the pocket of farmers and ranchers which are the backbone of rural communities.

Water Conservation:

While I have stated there are many economic benefits of using cover crops, there is an overwhelming number of benefits for the soil and water conservation. The key thing to note with cover crops is they are grown in between cash crops, utilizing the sun to produce biomass and root growth in the soil during a time of year when normally the soil would be bare. The benefits can be seen visually above ground however most of the true benefits are below the surface in providing a living root in the soil year-round, feeding the soil microbes ultimately increasing soil organic matter. With more active soil biology and with keeping a living root in the soil as much as possible, there will be cycling of nutrients within the soil. Causing two benefits; less leaching of nutrients into the water system and less synthetic fertilizers needing to be applied, which in return has many positives. All of this can be achieved by planting cover crops accurately and timely. With the help of the Pro Ag Grant, Ruskamp Farms, Inc. will be able to purchase a new John Deere GPS system, which will make us capable of achieving accurate planted seeds resulting in less waste and an earlier planting date resulting in more biomass and better efficiency of the cover crops.