HB1519-Support
Senate Transportation Committee
3/22/23
Sarah Hall Lovas

Chairman Clemens and Senate Transportation Committee Members: My name is Sarah Lovas and I am an agronomist from Hillsboro, ND. Please support HB 1519. I am an agronomist who works for a precision agriculture company called GK Technology, Halstad, MN (www.gktechinc.com). I specialize in working with agriculture data and turning it into actionable items that farmers can use. These items include variable rate prescriptions for seed, fertilizer, pesticides, irrigation, lime and other agronomic inputs. I also create drain tile plans and surface drainage maps.

Autonomous vehicles are a critical part of the precision agriculture industry. Autonomous vehicles that are currently used in agriculture include Unmanned Aerial Vehicles (UAV's), telematics, as well as operator-assisted autonomous tractors.

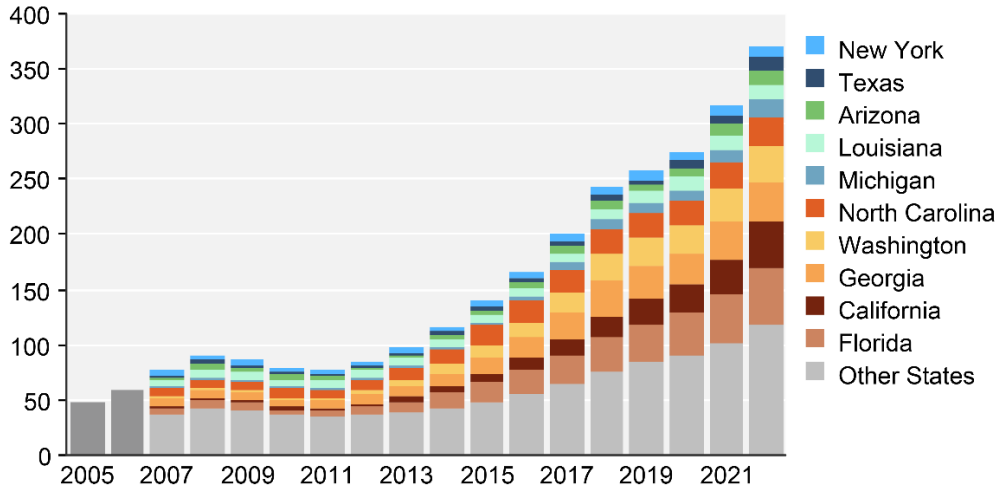
UAV's are used in agriculture to produce imagery and sensor data that can be used to affect decisions. The data produced includes, but is not limited to high resolution imagery, thermal data, high resolution infrared data and multi-spectral data. Currently, these types of data are used to produce useful information such as crop stand counts and difference of relative chlorophyll content. These data can help determine where extra fertilizer might be needed or if a crop needs to be replanted. Further research is needed to help us learn how to positively identify weeds, insect pests, and disease infestations with remote sensors on UAV's. These data could provide great opportunities for better agronomic decisions.

UAV's are also starting to be used in pesticide application. At this point in time, this is not a complete replacement for a ground sprayer or a spray plane. However, there are pesticides getting applied with UAV's as a site specific application such as field edges. Further research is needed to help with understanding the most efficient way to use UAV's for pesticide application as well as research that supports pesticides labels with proper UAV application language.

Autonomy is also becoming a larger part of daily farming activities on the farm. Autonomous field vehicles could be an important component of solving the farm labor issue current producers are facing. Many farming operations are struggling to find enough labor. To access enough

labor, many farming operations are utilizing the H-2A foreign worker program. From 2005 to 2022 the number of H2A workers has dramatically increased (see graph). Many farmers that I visit with are enthusiastic to adopt autonomous farm equipment to help with this farm labor issue.

U.S. H-2A (temporary agricultural employment of foreign workers) positions certified by State, fiscal years 2005–22



Note: State-level data are not available for fiscal years 2005–06. Individual States identified in the chart were the top 10 in the number of H-2A jobs certified in fiscal 2022. About 80 percent of job certifications result in visas being issued to H-2A workers—some employers do not follow through to hire H-2A workers and some workers fill two certified jobs.
Source: USDA, Economic Research Service using data from U.S. Department of Labor, Office of Foreign Labor Certification.

Autonomous farm equipment is not an unrealistic, far-fetched dream. It is beginning to become a reality. Currently there are operator assisted autonomy grain cart tractors. There is no operator in the grain cart tractor and the combine operator remotely operates the grain cart while unloading the combine. Then, the grain cart is sent to a staging area where the truck driver will load his own truck with the grain cart. These grain carts are not quite 100% autonomous, as they still have an operators in the field. However, neither to they have an operator in cab 100% of the time. This is already starting to save on labor.

Telematics are also a real part of current agriculture. According to the Merriam-Webster dictionary Telematics is the combination of information technology with telecommunications. Telematics is in agriculture is sending and receiving information remotely. Telematics in

agriculture is allowing allows farmers and ag retailers to remotely monitor their fleets of tractors, application equipment, and trucks. Telematics allows agronomists to send variable rate prescriptions directly to tractors and application equipment directly from my computer. Telematics can remotely alert the farmer or the local tractor dealership if there has been a breakdown with a piece of equipment. A couple of examples of current telematic platforms in agriculture include Raven Industries Slingshot (https://ravenind.com/products/connectivity-logistics/slingshot) and John Deere Operations Center (https://operationscenter.deere.com/).

The next step for autonomy is to combine some of the pieces of currently operator assisted autonomy (ie-the grain cart example) with telematics so that farming can truly become autonomous. One of the best and most realistic predictions of how we get to true autonomy is described by Raven Industries: https://ravenind.com/path-to-autonomy. This includes 5 steps: 1) Precision Farming (we have been doing this for years now; 2) Coordination and Operation- this is when two pieces of equipment can "see" each other and "coordinate" their activities. This would be when two combines or planters are in the same field and the monitor in both cabs can show the other piece of equipment's work; 3) Operator Assisted Autonomy – and example of this is the grain cart example above; 4) Supervised Autonomy – an autonomous machine that operated from outside the cab, but within the field for example from a computer in pickup cab; 5)finally-Full Autonomy.

To achieve full autonomy with farm equipment we need public research and collaboration with private companies. We also need help understanding the safety protocols and liability issues with fully autonomous farm equipment. These grants could go a long way to helping this become a reality

For these reasons, I fully support HB 1519 and ask for your support as well.

If you have any questions, please feel free to contact me:

Sarah Lovas
Sarah.e.h.lovas@gmail.com
701-866-1704