

**Distributed Ground Station Testimony  
Economic Impact Committee  
Chair - Senator Connie Triplett**

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Good Afternoon Madam Chair and members of the Economic Impact Committee. My name is Edward Nierode. I recently retired as the Director of Administration for Grand Forks County and am currently a teacher with Lake Region ~~Community~~<sup>State</sup> College and a Consultant to Grand Sky Development Company. I am here today on behalf of Mr. Thomas Swoyer, President of Grand Sky Development Company who could not be with us today.

We are not here today to discuss Grand Sky. We are certainly grateful for the investments that the State has made in Grand Sky and the Unmanned Systems Industry and we're putting those investments to good use.

The purpose of the testimony I am offering today is to offer insight into an entirely different concept that will leverage the investments made in unmanned systems to date and help the industry take the next step in its growth. The Unmanned Systems Industry is expected to reach approximately \$84B by 2020 and North Dakota is on the cutting edge of that industry. My goal is to provide an overview of what a Distributed Ground Station or "DGS" is, why it is important and some preliminary thoughts on who might use it and the benefits it can generate. Development of a DGS will help keep North Dakota remain at the forefront of the unmanned systems industry.

First, a Distributed Ground Station or “DGS” is a physical place. It may be a building or cluster of buildings, but it’s a place where people come to work every day. It can be located anywhere but generally they are located in close proximity to strong fiber optic communication networks. A DGS can be relatively small, perhaps a little larger than this room or they can be quite large encompassing hundreds of thousands of square feet. The United States Military has pioneered the use of Distributed Ground Stations and it is that model which we hope to use as a basis for moving forward.

About 20 years ago, the military realized that they had so many different sources of information that commanders in the field had difficulty assimilating and understanding what it is they had in front of them. A dizzying array of video, still photography and signals intelligence in multiple formats showing multiple things made it difficult to determine what was critical, actionable information and what was just interesting to see. Their solution was to have all this information go to a single place where professionals could sift through it, convert it into one useful stream of data and then resend it, as quickly as possible back to the commanders as actionable information. The word actionable is very important, it is important because the military DGS helps commanders make better and quicker decisions based on a variety of data sources than they had been able to in the past. We believe there is a very powerful civilian application to this model that can be developed and made operational here in North Dakota. Our belief is that we can take the best parts of this model and create a Civilian DGS in North Dakota.

According to a recent speech made by Governor Dalrymple, the State of North Dakota has invested roughly \$34 million in the rapidly growing Unmanned Systems Industry in North Dakota. This investment has come in many forms but the result has been that North Dakota is one of the leading places, if not THE leading place for the development of the unmanned systems industry. Here are some key things that we are learning:

- The rapid growth in the development and use of unmanned systems has created a virtual tidal wave of data that has been generated and continues to be generated ever day. This data comes in many different formats and is used in a variety of ways. The amount of data being generated is incredible but getting it to an end user, in a format that allows them to make decisions, in other words, actionable information, is still difficult. The unmanned systems industry is growing rapidly which means that the amount of data being generated will continue to grow rapidly, if not grow faster.
- Some of the industries that are embracing unmanned systems technology include, Agriculture, Energy production and distribution, Insurance, Law Enforcement, and transportation. These industries are important to North Dakota which is one of the reasons unmanned systems businesses are flourishing here. Examples of this include:
  - Lake Region <sup>State</sup> Community College's research into using UAS to decrease input costs while also increasing yields.

- A consortium of water Co-ops is exploring how to use UAS to improve leak detection
- Energy companies are hiring UAS firms to provide video monitoring and inspection of pipelines as well as security for production sites.
- Sugar beet farmers are experimenting with using UAS to improve crop performance and crop health.
- Both UND and NDSU have a large variety of programs that are looking at how to best integrate UAS into a variety of applications.
- Last but not least, Emergency responders are integrating UAS into search and rescue, mapping and using the aircraft to get better situational awareness to keep people safe.
- All of these examples illustrate a different need and have different solutions. But they all are using unmanned systems to generate data to be used for better decision making. That data is in different formats and is growing at a very fast rate.

Our thought is, if we could copy the military DGS model, but apply it to civilian uses, we could help all of these industries better utilize UAS technology while also helping grow a new industry in North Dakota.

To recap what it is...a DGS is a place where a large variety of data streams can be collected, analyzed, managed and then redistributed to end users quickly and easily so they can make the decisions they need to make. The good news is that the

information can come from anywhere in the world and be exported to anywhere in the world. This means that if developed, a DGS can be a very powerful catalyst to bring business to the state and create opportunities for North Dakotans to solve problems around the world.

In anticipation of this committee meeting and in an effort to provide you with meaningful testimony, we reached out to several state entities including the North Dakota Department of Emergency Services, the State Highway Patrol, the Department of Health and others. We were not able to meet with everyone but those we were able to meet with (Emergency Services and Health) were very receptive to the idea but understandably, all wanted to know more before making any sort of commitments. Some interesting anecdotes came out of the meetings:

- Emergency Services, Game and Fish and Agriculture all use different tools to map and track natural resources around the state from lakes and rivers for recreation to flood control to crops and irrigation. What if all the data collected from these efforts could be consolidated into one place and “layered” together to create new data sets that all could use? All the people we spoke with indicated that they would be very interested in learning more about the value that could be created.
- There is already some low hanging fruit that various agencies would be interested in taking advantage of including the integration of law enforcement and rural fire protection into an emergency services network that utilizes UAS at a substantially lower cost to all. There are a lot of permutations to this discussion, too many to go into for our purposes today

but to summarize, what if this Civilian DGS also had a deployable UAS capability that could be used in areas where it doesn't make sense for communities to invest in UAS training and development? This deployable asset could be used quickly and effectively to provide real-time information to emergency or disaster response.

There are a lot of potential benefits to having a single location to integrate a variety of data and communication sources and makes that information useable by an even wider group of end users in real-time so that better decisions can be made.

So far, we have discussed what a DGS is and just a few of the potential benefits that its development and use can provide. Nearly all the information we have provided so far centers around state entities, universities and state agencies using the DGS, but that is only a small part of the story. Private sector businesses need this capability and will use this capability too. The vast majority of data being developed through the growth of UAS is in the commercial space. Take as an example the video footage shot at the recent groundbreaking for Grand Sky. Nearly 400 giga-bytes of video and still imagery was captured during roughly 90 minutes of flight. 400 giga-bytes is the equivalent of roughly 80 Netflix movies streamed online. That may not be a lot in and of itself but it is only one drone for one and a half hours. When there is more than one UAS flying and when they fly for 24 hours or longer, the amount of data being developed will be staggering.

Commercial UAS usage is proliferating very rapidly in the fields of energy, agriculture, emergency response and law enforcement among other areas. A civilian DGS will not be successful if it is supported by only governmental entities or only

private entities. The collaboration of BOTH, a public/private partnership, will make a DGS stronger and economically sustainable. Based on this research, we believe that developing a DGS in a public / private partnership will yield the most effective and most sustainable operation. We have not explored this beyond the broad public / private partnership description, but we believe that this structure has the greatest potential for integration, job creation and long term viability.

To summarize:

- A DGS is a place where a variety of data and communication streams can be sent for storage, management, analysis redistribution and will allow multiple data streams to be combined so that end-users, who will pay for this service can get the information in a useful format that helps them make better decisions.
- The civilian DGS model is based on a military model but our goal is to make it available to private sector and state and local government users. It would also be available for federal government use, but our goal would be to keep information that goes in or comes out from being “classified” so that it can fulfill its mission more easily. That is the biggest distinction. Declassifying takes time. It is very difficult for a military DGS to be utilized for civilian purposes, including emergency and disaster response, with this declassifying in place.
- There is already a small pool of data providers and end users that expressed interest. These include several state entities that are interested in exploring how a DGS could better support their

operations and several private sector companies that have also expressed interest and are looking for ways to better manage the data they are creating.

- Recognizing that this is a new concept, it seems that a public / private partnership may offer an ideal structure to establish the operation. Additionally, it also seems to make sense to develop this concept on a small, pilot scale first. The military has shown that a DGS is scalable so we can start small and prove that it works, that it creates jobs and that it is self-sustaining in the long-run.
- There are several elements that we have identified that need to be considered. We're certain there are more but we have identified the following three key issues so far:
  - Privacy – we need to be continually vigilant to make sure that we protect people's privacy. Therefore, we need to consider how we handle data or imagery that might be legally collected for one purpose, but then could be used for a different purpose. What safeguards do we need to put in place and under what circumstances could data collected for one purpose be used for a different purpose?
  - Business model – preliminary research shows that there is demand for this type of capability, but is it economically viable in the long-run? What are the variables that influence the economic viability?

- Legislative authority and regulations – what rules need to be put in place to allow this effort to move forward that provide the flexibility to use the full capability in times of need but also provide safeguards for privacy?

Thank you very much for the opportunity to provide this testimony to the committee. If we can answer any questions, we would be pleased to do so.