Written Testimony of Mike Horton
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Subcommittee on Commodity Markets, Digital Assets, and Rural Development
Hearing on "American Innovation and the Future of Digital Assets: On-Chain Tools for an Off-Chain World"
April 9, 2025

Good afternoon Chairman Johnson, Ranking Member Davis and members of the subcommittee. It is a pleasure to be here to tell you a bit about the GEODNET Foundation and the great technology the GEODNET community has developed to help American farmers. By way of background, I am from Austin, TX and I received a Bachelors and Masters in Electrical Engineering from UC Berkeley. Prior to initiating the GEODNET project, I co-founded two successful startups in the field of navigation. I am a co-author on over 20 US patents related to navigation technology.

My first company, Crossbow Technology, started after leaving UC Berkeley, was a pioneer in the field of sensors, and the first to receive FAA approval for a new gyroscope sensor technology that improved the safety of civilian aircraft. I sold this business to Moog Aerospace in 2011. In 2018 I co-founded a new sensor company, Anello Photonics, which is a pioneer in the use of Silicon Photonics for navigation.

The Global Positioning System or GPS is known by most people as the way to find directions when driving today. GPS works using satellites.

Typical standard GPS accuracy is measured in feet not inches. Standard GPS is useful for finding a grocery store on a street full of shops, but GPS is not, by itself, capable of identifying where a specific plant is planted or help steer a tractor without running over the plants themselves. Image 1 shows how monitoring individual plant seedlings requires inch level absolute accuracy.

Image 1: 1” Accuracy to Locate Individual Plant Seedlings

To enhance GPS accuracy, Precise Positioning techniques are able to improve GPS location accuracy from several feet to sub-inch accuracy. With Precise Positioning, you can locate an individual plant in a field, you can accurately measure the width of a door frame on a construction site, and you can navigate a robot through a dense field reliably. Precise

positioning techniques require either a direct or indirect connection to one or more nearby GPS reference stations. A GPS reference station is a fixed GPS antennae mounted on a roof and connected to the internet. Image 2 illustrates what a GPS antennae installation looks like. For this technology to work at scale and across the country, a network of these GPS antennae is necessary. As I attempted to launch GEODNET it quickly became apparent that it would cost billions of dollars to place antennae around the country, capital that we did not have.

Image 2: Typical GEODNET Antennae Installation

Without going into great detail given limited time today, through my research I discovered that blockchain can solve this problem. I initially presented this idea of using blockchain as a foundational technology to build a large global network of these reference stations at the Institute of Navigation's - Global Navigation Satellite Systems Plus Conference in Saint Louis 2021 [1]. The presentation, authored by me and several industry colleagues, was awarded Best Presentation at the Conference, and the GEODNET whitepaper was subsequently published as a peer reviewed article in the Journal of Navigation [2].

Utilizing Blockchain technologies, the GEODNET network has grown quickly and is now the largest precise positioning network in the world with more than 15,000 registered stations [IMAGE 3]. In any given week, more than 10,000 professionals use the network accessing 6000 to 7000 GEODNET stations daily [3]. GEODNET's expansive coverage includes all major cities in the United States and Europe, as well as ever-expanding coverage in rural areas.

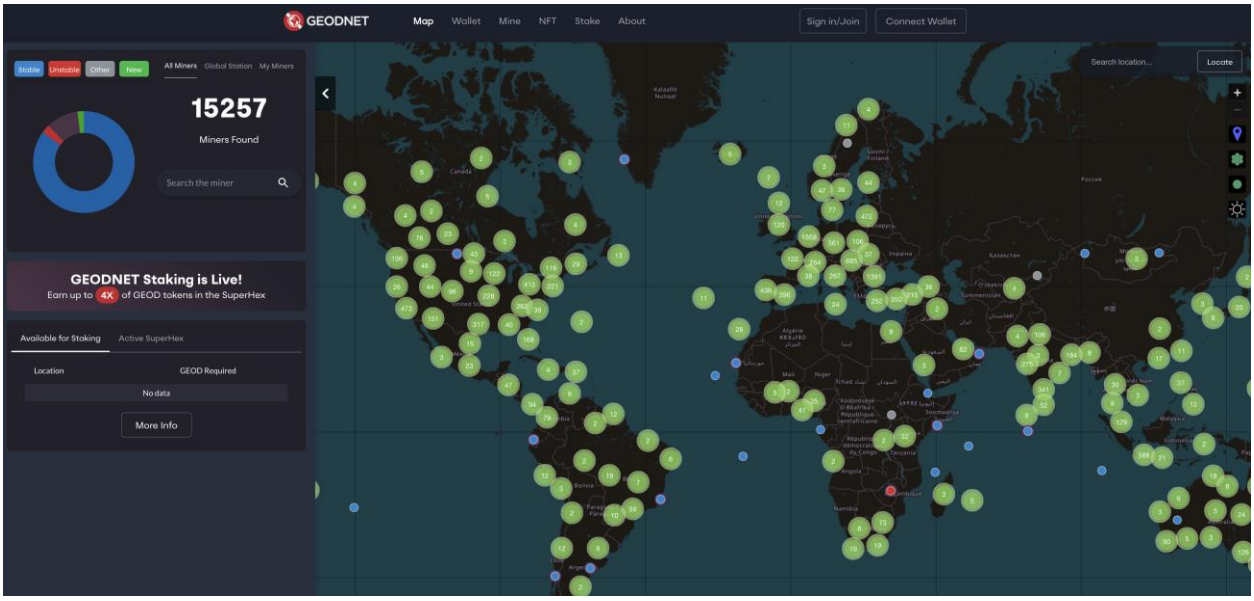

Image 3: The GEONDET Station Network as of Friday April 4, 2025

GEODNET is extremely useful because it offers the reliable high-accuracy positioning needed to conduct precision agriculture farm practices as well as the precision required by many robotics and drone systems.

In agriculture, GEODNET is beloved for its low-cost, accessibility to small and big farm operators alike, and its compatibility with both new and old equipment.

The USDA's Dale Bumper Small Farm Research center has been an active GEODNET node operator for over a year, and research staff has validated quality and accuracy on both new and old machines. The USDA has also conducted numerous studies on the benefits of Precision Agriculture. As an example, Image 4 shows a USDA study demonstrating the efficiency benefits of automated tractor guidance utilizing precise positioning.

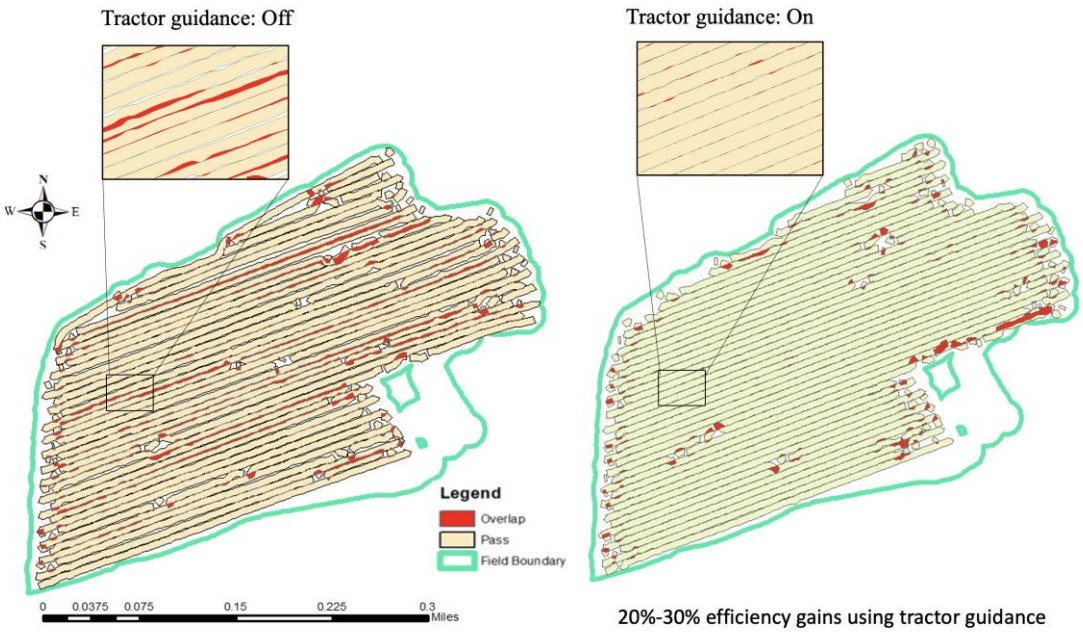

Image 4: USDA Study on Efficiency Gains from Accurate Tractor Guidance

To the end-farmer who requires the precise position signal, GEODNET subscriptions offer savings from 33% to 90% per annum as compared to centralized corporate competitors. Lower-cost allows more farmers to utilize precision agriculture practices resulting in reduced input costs, higher-yields, and reduced environmental waste. The relative adoption of precision agriculture practices is shown in Image 5 in a slide generated by the USDA.

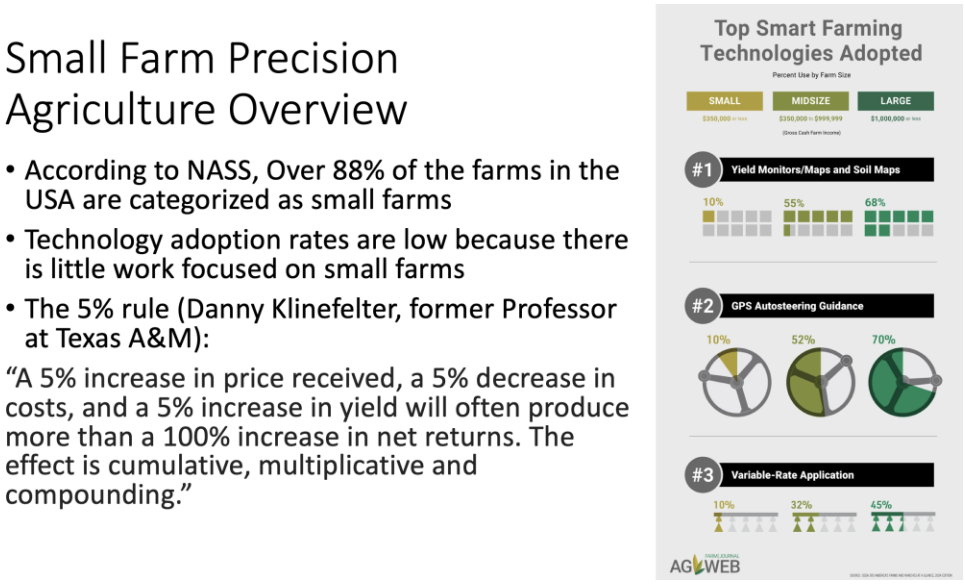

Image 5: Relative Adoption of Precision Ag by Farm Type and Application.

In the Southern states, where farms are diverse in size and scope, GEODNET provides small farmers with a return on investment (ROI) to use precision agriculture while higher-cost centralized solutions are out of reach, and creates significant savings for larger operations that are currently required to pay exorbitant per-unit subscription fees.
In the mid-west, GEODNET's unprecedented station density in places like Sioux Falls South Dakota, provides the best immunity to Solar Weather which in 2024 knocked more expensive precise positioning services offline during the critical planting season causing significant economic damage [4].

On the west coast, fully robotic farm practices are becoming popular and GEODNET is the solution of choice for two of the leading autonomous farming equipment companies.

The GEOD blockchain token is the key mechanism which allows the network to operate and grow successfully without capital infrastructure investment required from a centralized entity – corporate or government.

Customer usage of GEODNET precise positioning services requires the consumption or so called "burning" of GEOD tokens. On the other side, those GEODNET users who chose to purchase and operate a GEODNET compatible reference station, receive GEOD tokens in exchange for providing a high-quality location and stable internet for the station. This process is called token "emission" or "minting." Blockchain transactions emitting and burning these GEOD tokens permit both autonomous and decentralized network operation.

For this innovative digital infrastructure to function, GEODNET requires reliable blockchain technology. GEODNET itself does NOT run a blockchain, but it is an active user of blockchain networks. The GEOD Token is live on Solana and IoTeX Layer 1 chains, and the Polygon Layer 2 chain. The Smart Contract addresses are found below.

GEODNET has leveraged many technologies from the blockchain ecosystem including the creation of its native GEOD utility tokens used to consume GEODNET precise location services, specialized GEODNET location Non-Fungible Tokens used to facilitate a geographically well-structured and efficient network [6], as well as Decentralized Governance [7], Decentralized Finance [8], and Staking [9].

Image 6 provides an overall summary of the GEOD utility token.

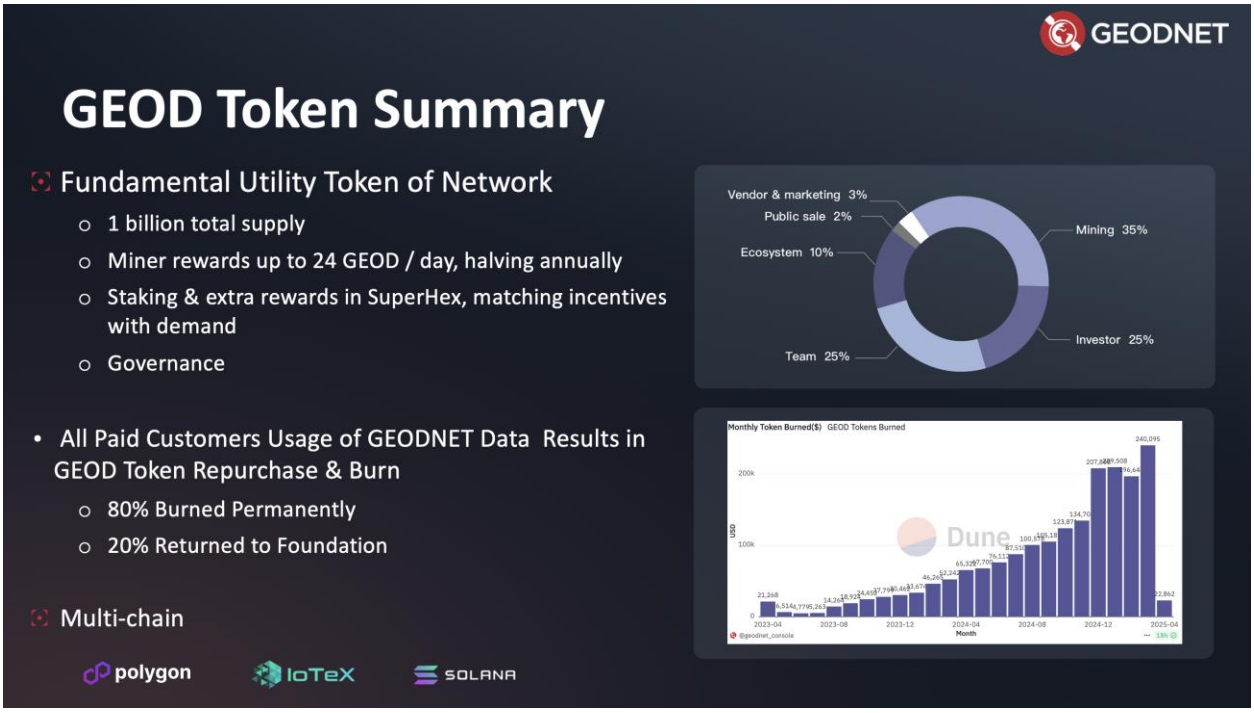

Image 6: GEOD Utility Token Summary

Because of blockchain technology, GEODNET has been able to grow quickly and scale the reach of the network across the country, including in typically underserved rural communities. This success is attributable to the fact that we were able to incentivize unrelated third parties to build out the network using the GEOD token, a digital asset. While we have been successful, it is imperative that future innovators have absolute clarity around how digital assets are to be regulated. A lack of clarity stifles innovation and discourages investment in the US. We commend this Committee's pioneering work in promoting legislation like FIT21 which seeks to provide clarity for companies like mine hoping to build innovative projects utilizing blockchain technology. Absent regulatory clarity that legislation will provide, it will be difficult for America to lead in this space. GEODNET encourages the committee to continue its work to enhance clarity on digital asset regulation so that high-utility applications of blockchain can thrive in the United States. Thank you.

References:

[1] Early Concept Presentation at ION GNSS+ 2021, St Louis
https://www.ion.org/publications/abstract.cfm?articleID=17882

[2] Peer-reviewed GEODNET White Paper, published in Journal of Navigation
https://navi.ion.org/content/70/4/navi.605

[3] GEODNET Station Map
https://console.geodnet.com/map

[4] Article on 2024 Solar Storm Impact to Farmers
https://www.farmprogress.com/planting/this-spring-s-solar-storm-could-cost-american-farms-500-million

[5] GEODNET Dune Dashboard which tracks on-chain network activity including usage revenue
https://dune.com/geodnet_console/geod-console

[6] GEODNET Location NFT awarded to first station to establish reliable coverage in a new region
https://opensea.io/collection/geodnet-location-nft

[7] GEODNET Governance Website
https://vote.geodnet.com/

[8] Example DeFi Swap Link for GEOD to USDC
https://raydium.io/swap/?inputMint=EPjFWdd5AufqSSqeM2qN1xzybapC8G4wEGGkZwyTDt1v&outputMint=7JA5eZdCzztSfQbJvS8aVVxMFfd81Rs9VvwnocV1mKHu

[9] GEODNET Staking portal utilized to create incentivized regions requiring additional GEODNET station coverage in a decentralized way
https://console.geodnet.com/stake

GEOD Smart Contract Addresses:

Solana:

https://explorer.solana.com/address/7JA5eZdCzztSfQbJvS8aVVxMFfd81Rs9VvwnocV1mKHu

Polygon

https://polygonscan.com/address/0xac0f66379a6d7801d7726d5a943356a172549adb

IoTeX

https://iotexscan.io/token/0x8e33229206f726993e4a7bf7da2347f3743bf8b4