Commercialization plan/ go-to-market plan: On US navy's W-band nano satellite antennas
[group project, only showing the part that I wrote; no confidential information included]

Executive Summary

For the commercialization of W-band nano satellite antennas, we propose producing a W-band nano satellite cross-link system and targeting forthcoming satellite internet providers. We recommend a value chain strategy, while also leveraging the IP of the technology, which improves upon the current value chain by providing a turnkey solution offering improved performance relative to the current options for satellite manufacturers. We believe the best company to commercialize the technology would be a satellite manufacturer that is going into the satellite internet market. The value to this technology would be that because the technology allows for more bandwidth at higher speed, fewer satellites are needed for the same amount of data transmitted. This would reduce the cost of the satellite network significantly.

Hypothesis / Potential Applications

We developed a number of different hypotheses for this project. Initially we looked at RFID Tag readers, radar tracking and detection for autonomous vehicles and UAVs, and cross-link satellite communications. Based on our customer discovery interviews we determined that the cross-link satellite antenna would be the best application for W-band antennas. The detection of RFID tags was found to be challenging due to the fact that RFID tags operate at a significantly lower frequency. The receiver antenna for the standard types of RFID tags would need to adopt a larger design which would make the application unfeasible. For autonomous vehicle detection, only the phased array could be used to its ability to electronically scan a wider range than the feed horn design; however, the advantages to current technology being used is unknown and the phased array may be too expensive of a technology for mass production of autonomous vehicles.

We decided that the best path forward to commercializing the technology would be to develop a turnkey solution of the phased array and feedhorn, with the required supporting hardware, that can be installed on nanosatellites for the purpose of cross link satellite data transfer. Cross-link satellite communication can be used for several purposes; however, a promising near-term application is to create a cluster of internet connected satellites to provide broadband internet to Earth. Currently there are three companies that have announced projects to develop satellite broadband infrastructure and become internet service providers: Google, Facebook, and SpaceX. On March 29, 2018 the FCC authorized a US-license for a satellite constellation providing broadband services through low earth orbit (LEO) to SpaceX, which marked the first license of its kind.

The Market/Competitive Analysis

The global satellite business comprises a $260B industry, of which nano satellites are the fastest growing segment. As discussed, many companies are pursuing satellite internet capabilities, but SpaceX is paving the way and projects over 40 million users by 2025.

As a turnkey solution provider, our competition in the market include any data transmission companies aiming to sell internet connectivity services to big companies like Google, Facebook and SpaceX. Some of the major competitors include:

Myriota: remote & low cost IoT connectivity provider. The company got a $15m series A funding from Boeing's VC arm. It is using a UHF bandwidth, sending a Linksys Wifi router into space on a 3U nanosatellite.

- Competitive advantage against Myriota: Higher bandwidth with faster data transmission speed, more scalable technology (feedhorn tech).
- Disadvantage: Myriota's Linksys Wifi router is likely to have a much lower cost on the manufacture and implementation compared to w-band antenna lowest budget.

Echodyne: compact radar and sensor provider. The company received its $15m series A led by Bill Gates and another $29m in series B. It has a wide customer base for drones, UAVs and machines. The company is using a metamaterial electronically scanning array from L to W band.

- Competitive advantage against Echodyne: Much higher bandwidth with faster data transmission speed, more scalable if using feedhorn in the turnkey solution. (Not sure if there will be tech advantage if using phased array in the turnkey solution).
- Disadvantage: W-band will have a higher cost compared to Echodyne's connectivity service.

one-stop cube and nano satellite shops:

- Competitive advantage against online nanosat shops: more consistency in manufacture and quality, higher bandwidth and faster data transmission rate; more antennas can be fit into the bundle.
- Disadvantages: the price will be 10X higher than the current models in the shop; less customizability for individual needs.

Qualcomm: and other 5G infrastructure providers

- Competitive advantage: almost none, except the W-band antenna works better for ground-space data transmission. Qualcomm's 5G projects 100X the data transmission speeds with lower cost than our turnkey solution, but this tech might not come to the market in the next 5 years.
- Disadvantage: Data speed and cost.