SBIR TRANSITION

SUCCESS STORY

DARPA SBIR INVESTMENT:	SBIR TOPIC NUMBER:	PHASE III FUNDING:
$1.7M	HR0011SB20224-04	$50M

The Challenge

As sophistication grows in communication systems and frequency bands rapidly expand, the need for quicker and more efficient connectivity has increased exponentially. DARPA cited a need for volume production of traveling wave tube amplifiers (TWTAs), which enhance signal strength and improve efficiency in wireless communications but previously had lengthy and expensive production times. Researchers at Elve answered the call with a new manufacturing process for TWTAs.

Technology | Transition

Backed by a $1.7M DARPA Small Business Innovation Research (SBIR) award, Elve focused on ways to cut costs and time from the TWTA production process. Previous attempts at building TWTA prototypes took more than a year, so Elve experts took a new production approach. By simplifying the design, flattening elements of the amplifier package, and streamlining the manufacturing, Elve drastically reduced the timeline and produced a prototype in about two weeks. Further, to ensure compatibility with different frequences of secure communications, the company made several versions of the amplifiers. The company's production innovations quickly drew the attention of private investors; Elve raised $15M in Series A funding in 2023 and in the spring of 2026 closed on another $35M in Series B funding.

The increased importance of secure, high-frequency connectivity for military communications made Elve's product a crucial match for the requirements outlined by the Department of War (DoW), said Diana Gamzina, Elve's founder and chief executive officer.

"A lot of secure communications occur at high frequencies; they are the backbone of connectivity for defense and commercial stakeholders," Gamzina said. "In many ways, connectivity is as important as energy and clean water. You might start with smoke signals, because you need to connect with somebody to tell them where the clean water is. Connectivity is rarely talked about at the same level of importance."

Although the TWTA technology has been used on lower frequency platforms for wireless communications for many decades, by amplifying the "pipe" size of communications data rate between data sources on Earth and satellites, Elve's revamped TWTA manufacturing positioned its TWTAs to serve modern systems that demand capacity only available at higher frequencies (such as Q/V, E/W, D, F, and G bands of communication).

Benefits to National Security

- Accelerates the production process for TWTAs and provides a more cost-efficient method of supply for the DoW.
- Supports warfighter advantage with stronger and more efficient communications used in electronic warfare, radar, and satellite systems.
- High-power amplification of communications that supports DoW's goal of spectral dominance and provides reliable performance in austere environments.

About Elve

Elve designs and manufactures high-power millimeter-wave amplifiers for communications, defense, and scientific applications. The company was founded in 2020 with 10 employees and received its first DARPA SBIR award in 2022.

After DARPA's involvement and investment, Elve opened its first factory in 2024 and has grown to nearly 60 employees. The company is building a second factory near its headquarters in Davis, CA in anticipation of future sales and the facility should open sometime in 2027.

"DARPA told us we solved a multi-decade problem for TWTAs. It was an innovative way for DARPA to frame the program, and the SBIR award really transformed our entire capability."

- Diana Gamzina, founder and chief executive officer, Elve

Future

Elve's technology has numerous dual-use applications with current deployments focused on Earth-space communications, and the company expects to reach a formal agreement for its amplifiers with the DoW by the end of 2026. Elve is exploring opportunities in the radar, imaging, spectroscopy, biotechnology, and energy industries. In March 2026, Elve demonstrated its TWTA technology with Nokia's Wavence radios. Test results of Elve's technology on Nokia radios demonstrated more than 10 times the transmission power of the most powerful millimeter wave radios in commercial markets, according to Elve officials.

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