

**Before the
National Telecommunications and Information Administration
Washington, D.C.**

Request for Input on the National Spectrum)
Strategy Implementation)

COMMENTS OF ZIPLINE INTERNATIONAL INC.

Zipline International Inc. (“Zipline”) submits these comments to the National Telecommunications and Information Administration (“NTIA”) on the Request for Input on the National Spectrum Strategy Implementation (November 29, 2023).

I. Introduction

Zipline is a U.S. company whose mission is to transform logistics and delivery systems to serve all people equally, regardless of location. Zipline designs, manufactures, and operates the world's largest autonomous commercial on-demand delivery system. We have used our electric, lightweight, autonomous aircraft to fly over 60 million miles and complete over 850,000 commercial deliveries around the world. Today, Zipline’s global delivery network provides 24/7 drone logistics in seven countries across Asia, North America, and Africa. We make a long-distance delivery—up to 110 miles round trip—approximately every 70 seconds. And we are one of five uncrewed aircraft system (“UAS”) operators certified by the U.S. Federal Aviation Administration (“FAA”) as a Part 135 air carrier.

From powering Rwanda’s national blood delivery network and Ghana’s COVID-19 vaccine distribution, to providing on-demand home delivery for Walmart, and enabling leading healthcare providers to bring care closer to home, Zipline sees every day the impact that national scale instant logistics can have to increase access to medicine and commerce. And by

transitioning to clean, electric logistics solutions, we are decarbonizing delivery, decreasing road congestion, and reducing fossil fuel consumption. Each of our flights produces about 97 percent less CO2 emissions than the same delivery via a traditional ground vehicle.

In the United States, Zipline operates UAS delivery services in Arkansas and Utah and has agreements in place to expand into Washington, Michigan, Ohio, New York and other markets in the coming years. Since 2020, Zipline's U.S. hubs have provided rural and suburban families and health facilities on-demand access to specialty prescriptions, over the counter medications, groceries, retail items, fresh food, and personal protective equipment.

II. The Strategy Implementation should enable UA-to-UA deconfliction communications in the 5030-5091 band

Zipline appreciates the inclusion of strategic objective (1.2) in the National Spectrum Strategy to ensure spectrum resources are available to support private sector innovation now and into the future. To accomplish this objective, it is imperative that spectrum be dedicated to UAS operations. Based on the years of experience and tens of millions of miles flown by our multi-vehicle fleets, Zipline believes that uncrewed aircraft-to-uncrewed aircraft ("V2V" or "UA-to-UA") deconfliction communications are critical for scaling a safe and reliable UAS industry in the United States. We encourage the Federal Communications Commission ("FCC"), NTIA and FAA to take near-term action to enable V2V communications in the 5030-5091 MHz band.

A. V2V communication is a proven deconfliction mechanism

Zipline has flown more than 60 million miles and completed more than 850,000 commercial deliveries with zero midair collisions. These include dense operations flying up to 40 UA in an approximately 0.1 square mile area, or an equivalent density of roughly 400 UA per square mile.

Zipline uses two primary methods to deconflict our aircraft during these operations. First, we use strategic flight planning to limit congestion in a given area. Then, within a given area, V2V communications allow aircraft to identify and avoid one another. These V2V communications, which are low latency and do not depend on ground infrastructure, contain aircraft identification,

position, velocity, and time information.

B. V2V band planning

With regard to the 5030-5091 MHz band, V2V deconfliction will best be accomplished by dedicating 20 contiguous megahertz to V2V communications. This allocation would support approximately 100 aircraft from one or more fleets to communicate, and deconflict with, one another in a given area using reliable, affordable, and accessible radio equipment. These UAs would be able to send messages multiple times per second, with message sizes on the order of 200 bytes, that include identification, state, and intent information, along with appropriate security overhead.

C. V2V spectrum licensing and service rules

The greater the participation in V2V communication, the more effective it is for airspace deconfliction. In order to achieve broad adoption, we recommend access and service rules for V2V communications that promote interoperability. These include:

- Spectrum dedicated to V2V communications should be licensed by rule;
- V2V service rules should support the use of radio equipment that is reliable as well as light and affordable enough to include in small UAs that measure weight in grams and economic margins in dollars;
- Remote ID broadcasting should be allowed within the V2V spectrum to enable efficient use of radio hardware on the UAs; and
- V2V communications should be open to both UAS operators and other airspace users such as traditional aviation and new urban air mobility providers (air taxis, etc.).

The Strategy Implementation should direct additional technical requirements for these V2V communications that are based on the guidance and recommendations of UAS industry-driven standards organizations working on V2V deconfliction.

III. The Strategy Implementation should expand UAS access to flexible-use spectrum

Zipline also strongly supports maintaining and expanding UAS access to flexible-use spectrum. UAS access to flexible-use spectrum—including unlicensed and cellular bands—provides a valuable platform for telecommunications innovations that enhance overall airspace safety and expand the range of communities that can benefit from UAS services. Around the world, Zipline is able to provide millions of people in rural and remote communities with instant, on-demand access to lifesaving and life-enhancing products. These services are enabled by a wide variety of spectrum uses that vary by country and community based on both local rules and telecommunications infrastructure (or lack thereof).

We believe strongly that expanding UAS spectrum access will reinforce and extend decades of leadership and policymaking to expand connectivity to rural, remote and tribal communities—so that location does not determine access.

IV. Conclusion

Zipline applauds the White House and NTIA for creating a Spectrum Strategy that will support safe, sustainable, and socially beneficial UAS operations, and we appreciate NTIA taking into account our input on this vital issue.

Thank you for your time and consideration.

Respectfully,

Conor French
Chief Regulatory Officer
Zipline International Inc.