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Xinxin Li

xl9911@rit.edu

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# RIT

## **Pawssenger--Enhance the experience of flying with pets**

By

**Xinxin Li**

A Thesis submitted  
in Partial Fulfillment of the Requirements for the Degree of  
Master of Fine Arts in Industrial Design

School of Design College of Art and Design  
Rochester Institute of Technology Rochester, NY  
May 7, 2024

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# **Thesis Committee:**

Prof. Stan Rickel – Thesis Advisor, Director of Graduate Industrial Design Program

Prof. Lorraine Justice – Associate Advisor, Professor of Industrial Design



*Figure 1. Pawssenger Pet-carrier for travel*

**Abstract:**

As demand for long-distance air travel with pets surges, airlines must adapt by enhancing accommodations for safe, comfortable, and sustainable pet transport over extended periods. This paper presents a proposed, innovative, comprehensive approach to redesigning airplane cabin and cargo spaces to create a more pet-friendly, eco-conscious experience for travelers on long-haul flights with animal companions.

A key innovation needed for pets accompanying owners in the cabin on lengthy journeys is seamlessly integrating lightweight, modular pet carriers into passenger seating units. These redesigned carriers prioritize ventilation, comfort, and easy access to food/water during extended travel. They eliminate cumbersome separate pet carriers while increasing space and convenience.

Larger pets traveling in cargo hold benefits from redesigned compartments focused on maintaining optimal environmental conditions throughout long flights. Improved temperature/humidity control, low-vibration insulation, and automated monitoring/delivery systems ensure ongoing comfort and safety. Modular, stackable units maximize cargo space while providing ample individual room per animal.

Throughout all design aspects, a cornerstone principle is prioritizing environmental sustainability. Renewable, low-impact materials are used for carrier construction, while modular components enable

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long-lasting use and easy maintenance or replacement of individual elements. Life cycle assessments guide material selections and manufacturing processes to minimize the carbon footprint of pet travel accommodations.

This new concept for pet carriers takes a holistic approach to addressing the unique challenges of long-distance pet air travel, considering the needs of owners, pets, airlines, and the environment. Design focused on extended journey requirements, seamless integration into existing systems, and eco-conscious practices elevate the entire long-haul experience for all passengers—both human and animal alike.

### **Keywords:**

Pet Air Travel, Long-Distance Flight Challenges for Pets, Pet-Friendly Design, Airline Design, Sustainable Pet Carriers, Integrated Seating, Improved Cargo Holds.

### **Introduction:**

Travel by air is a common mode of transportation for millions of people around the world. The structural amenities of airplanes have changed dramatically over the years, with the efficiency and comfort of human passengers becoming a primary concern. However, this development needs to consider an important group of travelers: pets and their accompanying owners. These travelers face unique challenges on long-haul flights, and specialized research and solutions are needed.

Bringing pets on airplanes is a growing trend, but it also poses a number of challenges for airlines, pet owners, and the pets themselves (1). As more and more people look to bring their beloved pets along on long-haul trips, there is a growing need for innovative solutions to better care for pets while prioritizing comfort, safety, and seamlessness during travel.

### **Problem areas:**

According to the United States Department of Transportation, over 2 million pets travel by air annually (2). Current airline pet policies and accommodations often need to be revised in several key areas. Rigid pet carriers that allow pets to be carried on board can be bulky and crowded, causing stress to the animal and congestion and inconvenience to passengers. Conditions in cargo holds are also a concern, as proper environmental control, monitoring, and humane treatment are all issues for pets unaccompanied by their

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owners (3). Existing solutions fail to provide a seamless and integrated experience for owners traveling with their pets. In this project, I wanted to bridge this gap by developing an integrated system that reconfigures the cabin and cargo areas with pet-centered and user-centered design principles to ensure their comfort, safety, and well-being. The aim is to dramatically improve the experience for all parties - pets, owners, and airlines. The motivation for this research stems from the growing trend of pet ownership and the frequency with which pets accompany their owners on air travel. Current air travel conditions for pets are often unsatisfactory, leading to stress and discomfort for the animals and their owners. This project delves into the key needs and pain points associated with long-distance travel for pets, focusing on the in-flight experience. It also develops an innovative and convenient pet carrier-to-in-flight connector solution for pet-carrying options, envisions the future purchase of a pet position with a seat option, connects the pet carrier to the in-flight accessory seat pet carrier, and improves the climate-controlled environment of the cargo hold with an optimal user experience in mind for a future of truly pet-inclusive, owner-friendly air travel by providing a comprehensive framework.

### **Problem Statement:**

How can we enhance the experience of flying with pets while ensuring the feasibility and safety of these animals during long-distance flights?

After clarifying the problem statement, I conducted a series of user interviews about bringing pets on board or checking in a large companion pet, as well as understanding the user experience and readiness throughout the journey to determine the project's feasibility. At the same time, I started a secondary survey, asking about the necessity and preparation for flying with pets, airport equipment measures, use of aircraft space and user experience during the journey, check-in space and emergencies, accidents, accident handling, etc. (3) insurance measures. Based on this information, I conducted face-to-face interviews with 10 people to solicit their feedback on the user experience of taking a pet on an airline and determine which items best supported the problem statement and which prototype they liked best. I created 35 different ideas in the form of sketches based on the scenarios and usage processes that users encountered when flying with their pets. These processes are "Before trip", "Drive" /airport transfer," "Airlines Cargo", "Security Check", "Wait at the airport," "Stay in-flight" Deplane," and "Drive/Transfer to destination". The design products are used in airports, aircraft, and on car the way to the airport.

### **Interview:**

Based on the travel process, I conducted 10 questions related to delve into pet ownership details,

experiences, and attitudes towards flying with pets. They cover pet information, reasons for or against air travel, preparations, pet behavior during flights, incidents of pets on planes, and the owner's perspective on their pet's suitability for air travel, aiming to gather insights for further design. I started a face-to-face interview with 16 users who travel with pets by air, soliciting their feedback on their experiences flying with pets in the past 5 years, as well as their expectations for improved facilities and coping methods. The interviews revealed that of the 6 users who chose to cargo their pets, half owned large dogs (such as German Shepherds, Golden Retrievers) or large cats (such as Ragdolls, Maine Coon) (4), and due to the limitation of pet spaces on flights, they had to resort to transporting their large pets in the cargo hold (5). Most users stated that if not necessary, they would not choose to cargo, as it means having their pets independently cargo for 8-16 hours, during which they cannot know the pet's condition. When they receive the pet, the pet is likely to experience stress reactions and may be injured or escape due to improper handling by the airline during transit. Some adverse examples (6) have exacerbated people's feelings of insecurity and lack of control over transporting pets as cargo. However, the other half of the users would still choose to transport their pets in cargo if there was no other choice, as they were unwilling to be separated from their animal companions for a long time (7).

Users who chose to bring their pets on airplanes felt that airline fees and the services provided for pets were unreasonably high. In some cases they paid double the price of other passengers to secure a seat for their pet. However, the space allocated for the pet was only 18 inches long and 11 inches high under the seat, where the pet had to remain confined without being able to come out during the entire flight. The only advantage over placing the pets in the cabin was that the owner could be present to provide comfort and reassurance. At the same time, the space taken up by the pet reduces the owner's usable space, and large-size owners may not even be able to extend their legs for relief during the flight fully.

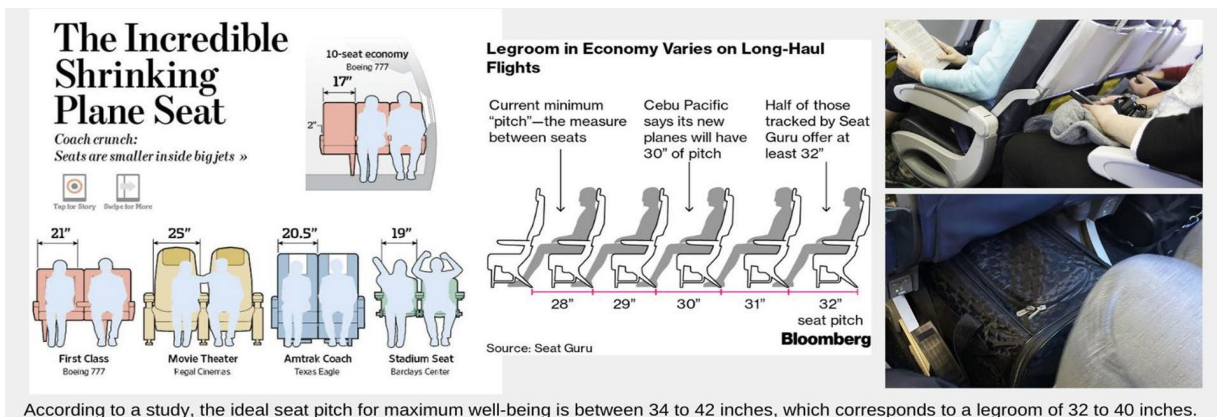


Figure 2. Research for plane seat size and ergonomics-related consideration .

The interview results showed a desire for more improvements in the amenities for checking in pets; the vast majority of people preferred a pet bag that was light and easy to carry around to be offered to those who brought their pets on board. This information tells me that if the basic pet airline bag could be made lighter and easier to use, the process would greatly improve the level of comfort for users with their pets. Based on this review, I narrowed the process into two journey maps for user experience for in-cabin and cargo with pets and identified the pain points that inform user-centered design decisions.

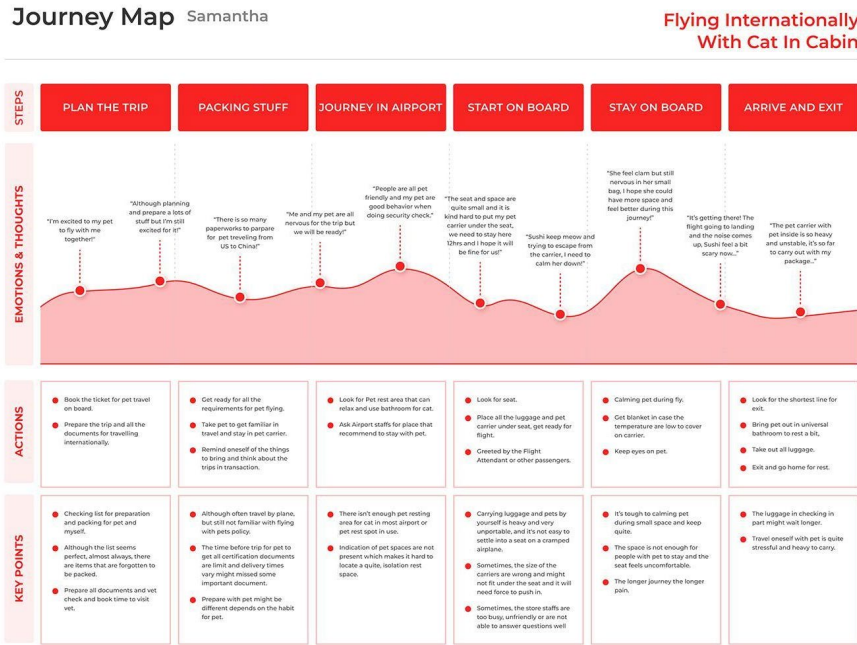


Figure 3. Journey map for flying internationally with a cat in the cabin.



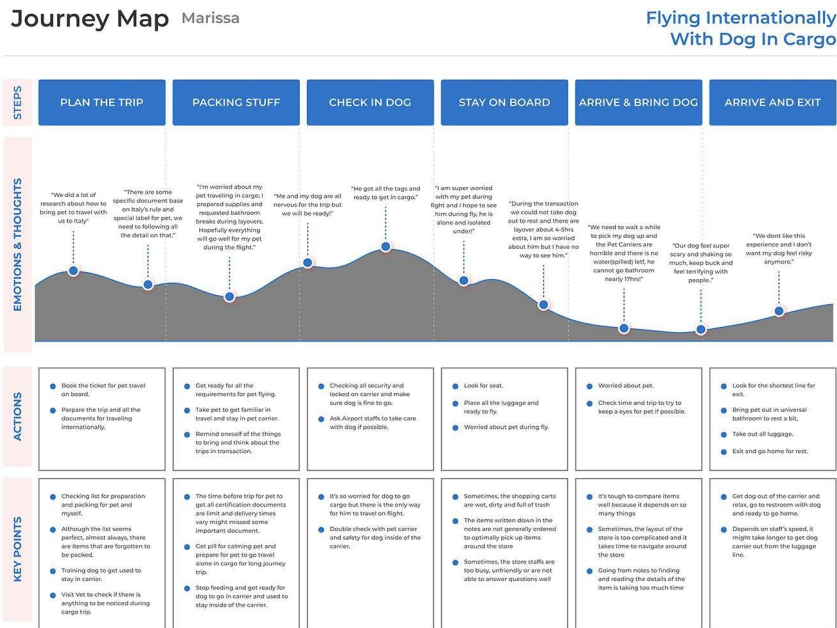


Figure 4. Journey map for flying internationally with a dog in the cargo.

From the interviews and Journey Map creation, I learned that although the cabin pet policy relieves the stress of cargo transportation for pets and their owners, it has disadvantages, such as cost, space restrictions for pets and owners, and the lack of mobility of pets during the flight. Users believe that current aviation policies and in-flight environments do not adequately meet the needs of pet owners traveling with their pets. There is greater support for improving on-board facilities and expansion space in future designs and hope for further improvements to pet check-in facilities. Still, to enhance cabin experience with pets on board in the next decade, the vast majority prefer to use the same amount of ticket money to purchase a seat next to them with a lightweight and easy-to-carry pet carrier that could go on the airline seat. This information tells me that if the basic pet carrier can be made lighter, easier to use, and owners can monitor pets' health on long-distance flights, this process will significantly improve the comfort and peace of mind of users flying with pets.

### Concept Refinement:

Due to varying restrictions on carrying pets across different airlines and aircraft models, I compiled data on aircraft types that allow pets to be onboard and cargo based on user feedback regarding their current pet carrier usage and in-flight experiences. From this analysis, the Boeing 777 was identified as the focal aircraft model for design improvements. Concurrently, I utilized existing seats and rough prototypes of cardboard boxes to measure and simulate the seating and aisle spaces within a Boeing 777 cabin.

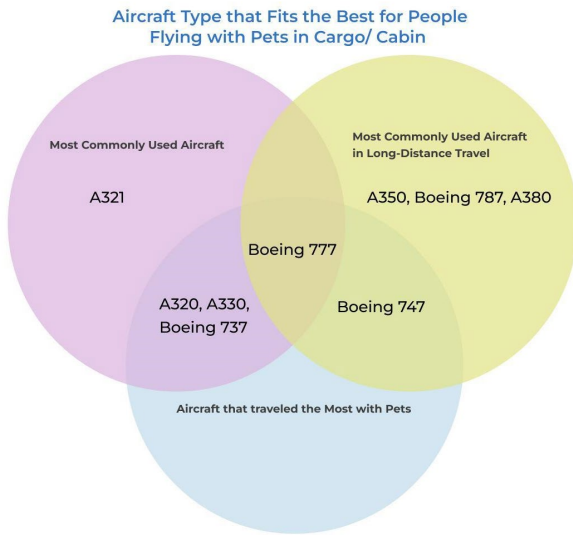


Figure 5. Determining aircraft type for flying with pets.

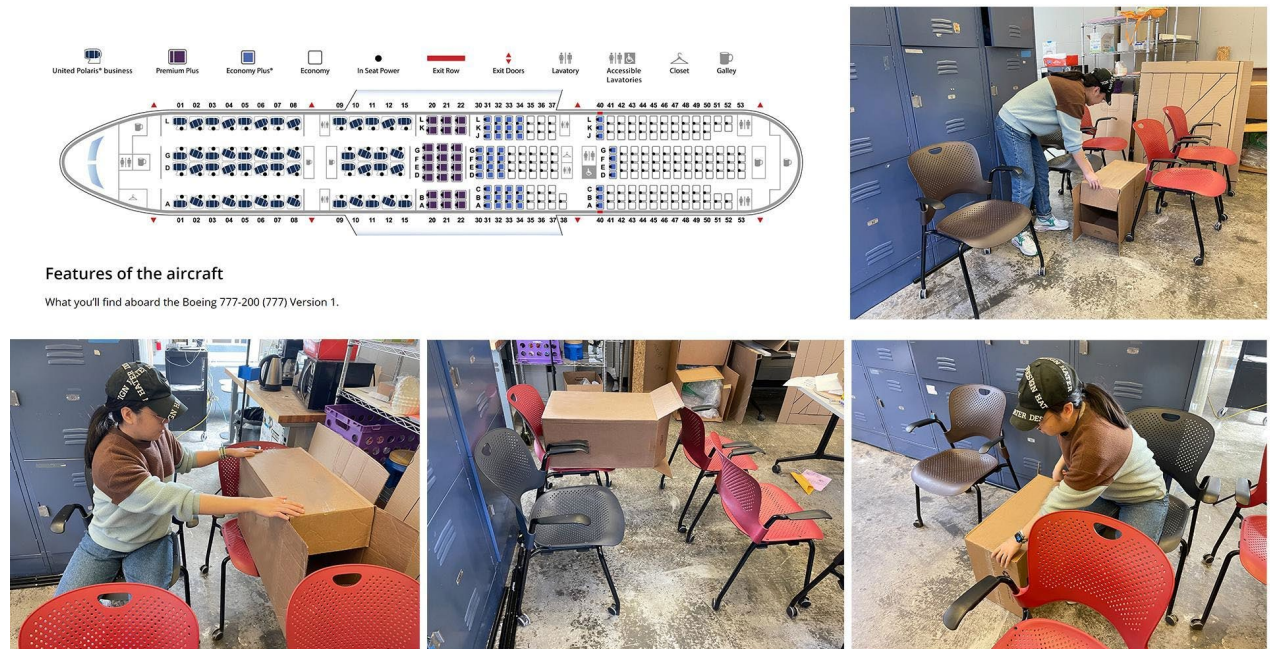


Figure 6. Simulate the seating and aisle spaces to carry a pet carrier within a Boeing 777 cabin.

This enabled me to determine the maximum width for a pet carrier and the maximum length when placed on a seat. Building upon these spatial constraints, I incorporated ergonomic principles to sketch new design concepts that would define the product form and usage scenarios for an optimized pet travel carrier.

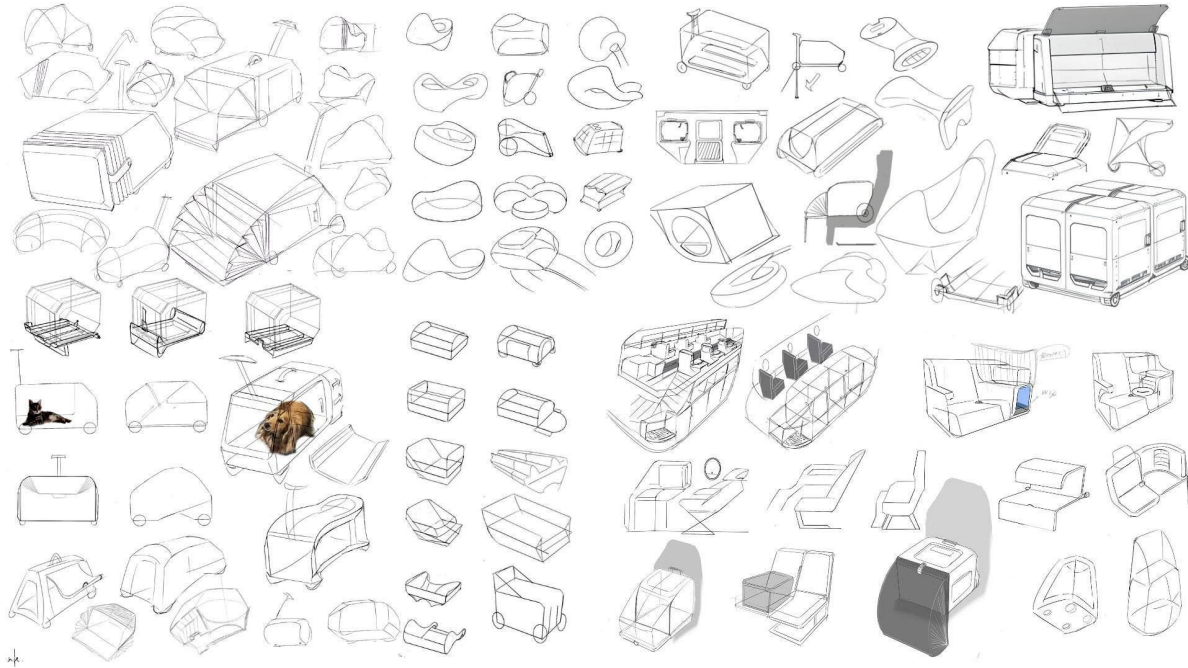


Figure 7. Sketches explore carrier design, detachable wheels, luggage integration, and cargo space redesigned.

I explored maximizing the utilization of the space between seats and the floor by conceptualizing an expandable pet carrier. Expansion modes encompass pullout designs, fan-style openings, or modular combinations. Concurrently, I explored numerous sketches investigating the carrier's form, detachable wheel designs, combinations with luggage for portability, and mechanisms for convenient space expansion/contraction adaptable to daily use scenarios. Based on these concepts, I fabricated a series of physical models and sought user evaluations to understand the usage experience and gather directions for improvement. Over half of the users found the wheeled carrying method akin to pulling luggage to be convenient and strain-reducing. However, considerations for simultaneously transporting other luggage were noted as a scenario to address. They appreciated the practicality of the expandable design, facilitating pet monitoring by owners with adjustable opening angles. This iterative design process aims to deliver a novel pet carrier solution that enhances convenience and adaptability and attends to the unique requirements of pet owners during travel.



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*Figure 7. Rough prototypes for multifunctional pet travel carrier.*

Based on the final revision and feedback from different users, I proposed a multifunctional pet travel carrier that can adapt its usage mode based on different scenarios.



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*Figure 8. Pawssenger Pet-Carrier use in scenario*

It serves as a portable wheeled carrier with retractable wheels for daily use or short trips. The front side features safety straps inside to secure it to airplane seats or car seats. When placed on an airplane seat, the back panel can extend outwards, providing more space for the pet to stretch out and rest. It is equipped with an air purifier, heart rate monitor, and oxygen level monitor to ensure a safe haven for the pet during travel. A sliding door/window on the side allows passengers to comfort their pet en route, while a light-blocking feature helps enhance the sense of security for cats or dogs inside. The bottom of the carrier uses easy-to-clean materials and includes disposable, recyclable cleaning wipes to address potential pet accidents. Regarding materials and structure, I avoided sharp edges or exposed metals while incorporating viewing windows to facilitate security screening and operation. This design comprehensively considers pets' needs across various scenarios and significantly enhances travel comfort and safety through its modular, multifunctional approach.

## **Conclusions and Future Considerations**

As people become increasingly attentive to their pets' well-being, the demand for traveling with pets by air is also rising steadily. While plans to improve the pet flight experience are still in development, I hope this project can provide a practical and feasible solution for airlines and users who travel with their pets. This solution not only allows users and their pets to travel more comfortably and with peace of mind but also ensures their safety and health during long-haul air travel.

The proposed multifunctional pet travel carrier can seamlessly transition between usage modes depending on the scenario—serving as a portable wheeled unit for daily use or expanding into a more spacious area for pets to stretch out and rest when placed on an airplane seat. Moving forward, efforts will continue to collaborate with airlines to assess implementation feasibility, ensure compliance with regulations across different regions, explore manufacturing and commercialization avenues, conduct ongoing user testing and iterate based on feedback, investigate expanding the scope to accommodate different pet types, integrate smart technologies for remote monitoring, and adopt eco-friendly materials to reduce environmental impact.

Through industry collaboration, practical validation, and continuous innovation, this pet travel carrier system may revolutionize the air travel experience for pets and their owners. It will set new standards for pet-friendly and owner-pleasing journeys and pave the way for truly inclusive pet travel.

## References:

1. "Plane Talk: Traveling with Animals." U.S. Department of Transportation, June 22, 2022. <https://www.transportation.gov/airconsumer/plane-talk-traveling-animals>.
2. IPATA (International Pet and Animal Transportation Association). "IPATA Statement: Addressing the Safety of Pet Travel." Last modified date not provided. Accessed Jan 27, 2024. <https://www.ipata.org/ipata-statement-addressing-the-safety-of-pet-travel>.
3. "U.S. Department of Transportation. 'Air Travel Consumer Report: December 2022, Full Year 2022 Numbers.' Last modified December 16, 2023. <https://www.transportation.gov/briefing-room/air-travel-consumer-report-december-2022-full-year-2022-numbers>.
4. T;, Jahn K; DePorter. "Feline Stress Management during Air Travel: A Multimodal Approach." Journal of feline medicine and surgery, January 2023. <https://pubmed.ncbi.nlm.nih.gov/36622769/>.
5. Jansen, Bart. "Official reports of animal deaths on airline flights focus only on cargo." USA Today, March 16, 2018. <https://www.usatoday.com/story/travel/flights/2018/03/16/official-reports-animal-deaths-airline-flights-focus-only-cargo/432343002/>
6. Venable, Erin B., Stacy D. Bland, Hannah D. Holscher, and Kelly S. Swanson. "Effects of Air Travel Stress on the Canine Microbiome: A Pilot Study." International Journal of Veterinary Health Science & Research 4, no. 6 (2016): 132-139. <https://doi.org/10.19070/2332-2748-1600028>.
7. Jahn, Katrin, Jacqui Ley, Theresa DePorter, and Kersti Seksel. "How Well Do Dogs Cope with Air Travel? An Owner-Reported Survey Study." Animals 13, no. 19 (2023): 3093. <https://doi.org/10.3390/ani13193093>.