AEROSPACE

FROM DENMARK TO KENYA:

Preparing Reliable Drone Noise Measurements for Wildlife Research



CUSTOMER
Saadia Afridi,
Industrial PhD Candidate – Avy / University of Southern Denmark

PRODUCT
GRAS 40HH for Reliable Field Measurements
GRAS 40HH >

Preparing Drone Noise Measurements for Wildlife Research

When Industrial PhD Candidate **Saadia Afridi (Avy / University of Southern Denmark)** set out to study how drones affect wildlife in Kenya, the success of the research depended on careful preparation long before arriving in the field. Accurate acoustic measurements in a remote wildlife environment require robust methodology, validated measurement approaches, and a strong understanding of environmental acoustics.

As Saadia explains:
"One of the key challenges was conducting calibrated acoustic measurements in an open field environment in Kenya, far from controlled laboratory conditions. Ensuring reliable, standards-compliant noise recordings under those conditions—with heat, wind, and remote logistics—required solid preparation and a thorough understanding of measurement fundamentals."



Per Rasmussen from GRAS Acoustics demonstrating the open-field acoustic measurement setup used to prepare reliable drone noise measurements prior to the wildlife research campaign in Kenya.

GRAS
An Axiometrix Solutions Brand





APPLICATION:
Drone noise measurement and wildlife impact research

LOCATION:
Ol Pejeta Conservancy, Kenya

Building the Measurement Foundation in Denmark

Before traveling to Kenya, Saadia was introduced to **Per Rasmussen from GRAS Acoustics** through her co-supervisor, Dylan Cawthorne.

"My co-supervisor connected me with Per Rasmussen to help me understand drone noise testing using measurement standards. Per guided me through the fundamentals of open-field acoustic measurements using GRAS equipment, and that training was invaluable. It gave me the methodological grounding I needed to design and execute reliable measurements in the field with confidence."



During training sessions in Denmark, Saadia gained hands-on experience with professional acoustic measurement microphones and instrumentation from GRAS. The sessions focused on the principles of drone noise testing, open-field acoustic measurement techniques, and the practical considerations involved in obtaining reliable environmental noise data.

Working with GRAS equipment allowed the research team to develop and validate their measurement methodology before conducting the final field campaign. This preparation ensured that the acoustic measurement approach used in Kenya was grounded in established standards and best practices within environmental acoustics.

In addition to the training, Oliver Niebuhr and his team supported the project by providing a multi-microphone recording setup and technical guidance for the field campaign.



PhD Candidate **Saadia Afridi (Avy / University of Southern Denmark)**

Measuring Drone Impact on Wildlife

The field research was conducted at the Ol Pejeta Conservancy in Kenya, where Saadia investigated how drone operations influence the behaviour of free-ranging plains zebras.



By combining acoustic recordings with behavioural observations, the research aimed to understand how drone noise exposure relates to wildlife responses under real environmental conditions.

The study revealed a clear relationship between drone operations, sound exposure, and animal behaviour. https://doi.org/10.1002/ece3.73643 >

As Saadia explains:
"*The study quantified how drone noise exposure and behavioural disturbance scale with both the number of drones in operation and their flight altitude in free-ranging plains zebras. We found that dual-drone flights increased sound pressure levels by 5 to 8 dB and caused significantly stronger disturbance responses compared to single drones, while single drones above roughly 50 to 60 meters above ground level generally resulted in only mild vigilance behaviour. The work provides preliminary guidance for drone operators working in wildlife areas.*"

These findings help improve the understanding of how drones can be operated responsibly in natural environments while minimizing disturbance to wildlife.





Reliable Field Data Starts Before the Fieldwork

For researchers working with environmental acoustics, collecting trustworthy data often begins long before the first measurement is made. Preparation, training, and a well-designed measurement methodology are essential when conducting acoustic research outside controlled laboratory environments.

Through hands-on training with **GRAS measurement equipment** and guidance on standards-based acoustic testing, Saadia was able to develop a robust measurement approach prior to the field campaign.

As she later reflected in a LinkedIn post:

"Good fieldwork starts long before you reach the field."

By combining acoustic measurement expertise, proper preparation, and carefully designed field methodology, the research team successfully conducted drone noise studies in one of the world's most challenging research environments. The resulting work contributes valuable insight into how drone technology can be used responsibly in wildlife research and conservation.

Using the GRAS 40HH for Reliable Field Measurements

A key part of the measurement setup was the **GRAS 40HH Low-Noise Microphone System**, selected for its ability to capture low-level environmental and drone noise with high accuracy. Prior to the field campaign, the measurement methodology was tested and validated using the GRAS 40HH to ensure reliable acoustic data collection under open-field conditions.



GRAS 40HH 1/2" Lownoise Microphone System

Freq range: 10 Hz to 16 kHz
Dyn range: 6.5 dB(A) to 113 dB
Sensitivity: 800 mV/Pa

GRAS 40HH >

The microphone's low inherent noise floor made it particularly well suited for measuring drone noise at varying flight altitudes and distances, where sound levels can approach ambient background noise. By using the GRAS 40HH during the preparation phase and in the field setup, the research team was able to obtain high-quality recordings that supported both acoustic analysis and the correlation of sound exposure with wildlife behaviour.

The use of professional-grade instrumentation such as the GRAS 40HH helped ensure that the measurements were consistent, repeatable, and aligned with established acoustic measurement practices, providing confidence in the resulting research findings.

For more information, please contact marketing@grasacoustics.com.

About GRAS Acoustics

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones to industries where acoustic measuring accuracy and repeatability is of the utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.
GRAS Acoustics is represented through subsidiaries and distributors in more than 40 countries and is part of Axiometrix Solutions, a leading test solutions provider comprised of globally recognized measurement brands.

GRAS Sound & Vibration
Skovlytoften 33, 2840 Holte, Denmark, +45 4566 4046, www.GRASacoustics.com

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