Kolizje ptaków z bezzałogowymi statkami powietrznymi

SPOTKANIE KOMITETU DS. ZDERZEŃ STATKÓW POWIETRZNYCH ZE ZWIERZĘTAMI

LOTNISKO CHOPINA, 19-12-2017

Adam Zbyryt
Polskie Towarzystwo Ochrony Ptaków

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

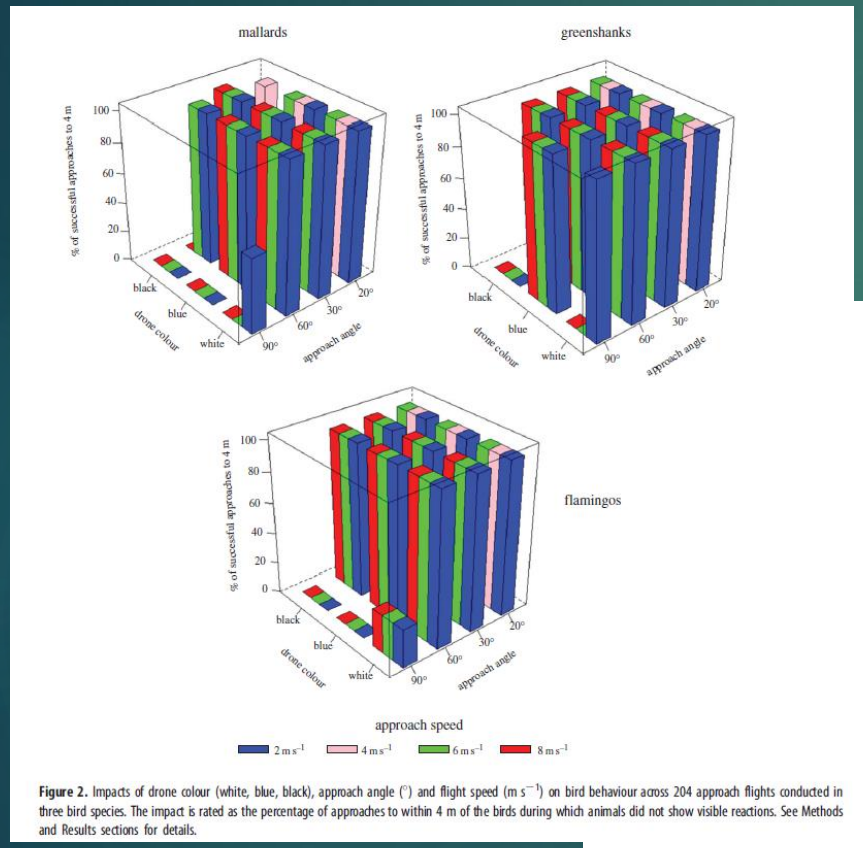


Figure 2. Impacts of drone colour (white, blue, black), approach angle (°) and flight speed (m s^{-1}) on bird behaviour across 204 approach flights conducted in three bird species. The impact is rated as the percentage of approaches to within 4 m of the birds during which animals did not show visible reactions. See Methods and Results sections for details.

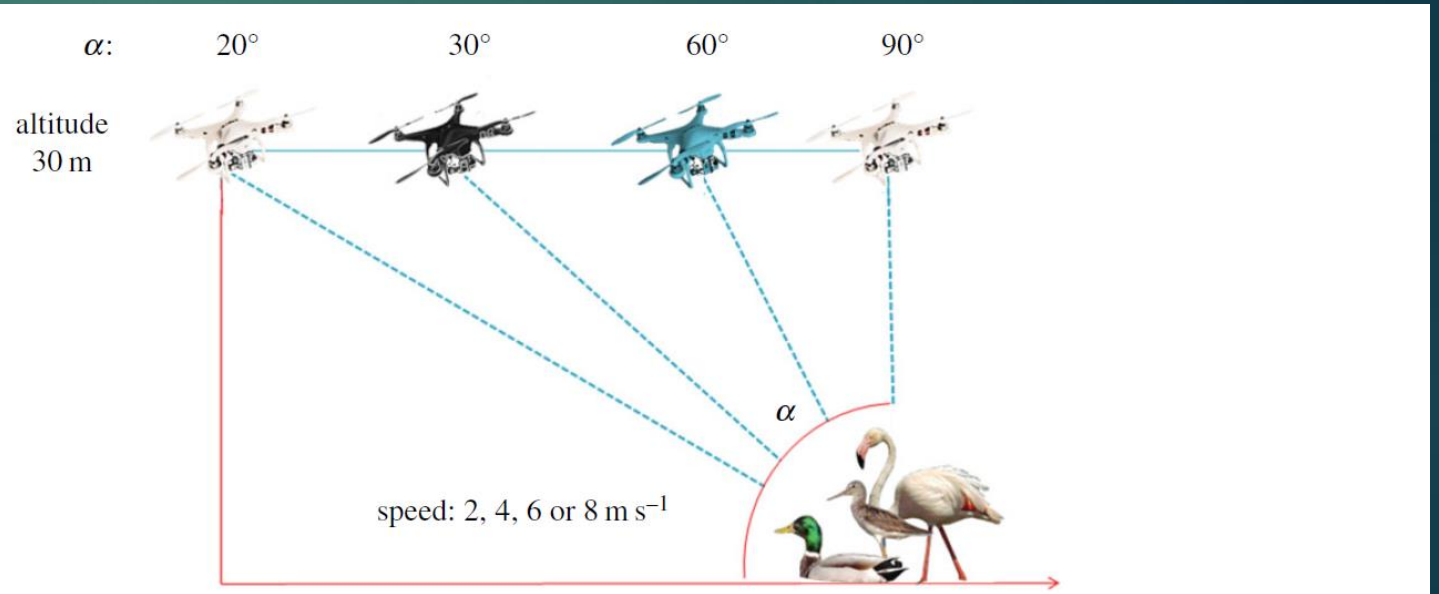


Figure 1. Flight plan for approaching birds with the Phantom drone. The drone was first ascended to 30 m, and then moved at speeds of 2–4–6 or 8 m s^{-1} towards the birds at angles α of 20°, 30°, 60° or 90°. Drones of three colours were used (white, black and blue).

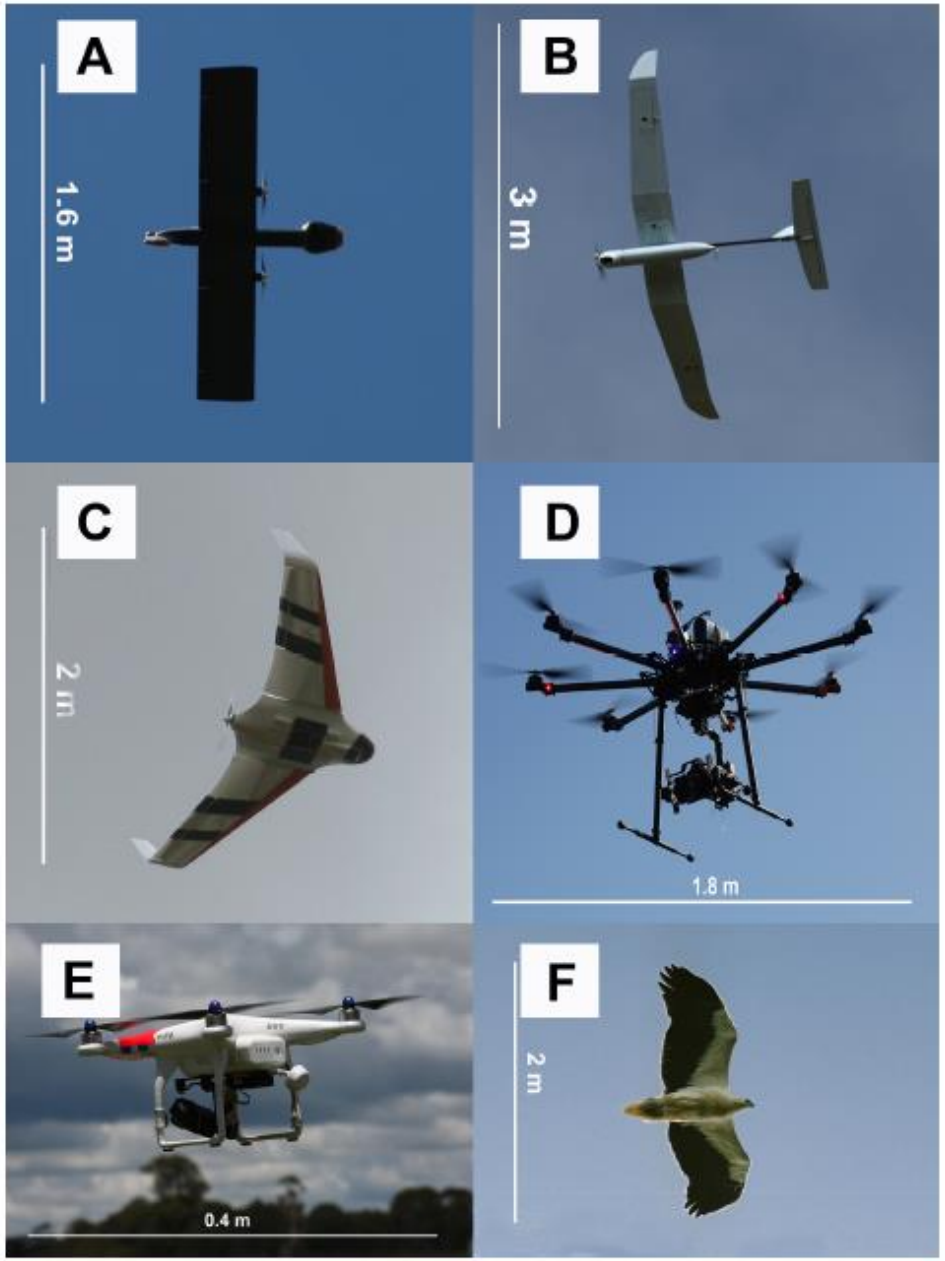
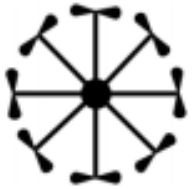


Figure 3 Examples of UAV models with different wing profiles. (A) Avian-P fixed wing UAV, (B) Sky-lark II fixed wing UAV, (C) Topodrone-100 fixed wing UAV, resembles bird of prey, (D) Kraken-130 multirotor type UAV, (E) Phantom multirotor type UAV, (F) White-bellied sea eagle, a common avian predator active at each study site

Table 2 Response of mixed flocks of waterfowl to UAVs of different shapes flying overhead at various altitudes. For fixed wing UAVs the lower altitudes (15 m) represent take-off where the UAV was launched directly towards the birds before gaining height. NR (green squares) = No discernible response, V (yellow squares) = Vigilance response detected, F (red squares) = Flight response. Cells are marked "N/A" where a given UAV did not fly over birds at that altitude.

UAV	Shape	Altitude Above Water						
		100 m	90 m	80 m	70 m	60 m	50 m	15 m (take-off)
UAVER Avian-P		NR	NR	NR	NR	V	N/A	F
Skylark II		NR	NR	NR	NR	V	NA	F
Drone Metrex Topodrone-100		NR	NR	F	F	F	N/A	F
DJI Phantom		N/A	N/A	N/A	N/A	N/A	V	V
FoxTech Kraken-130		NR	NR	NR	NR	NR	V	N/A

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

- Szybko wzrastająca liczba użytkowników dronów.

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

- BVLOS vs. VLOS.

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

- Brak danych literaturowych.

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

- Analiza zawartości internetu:

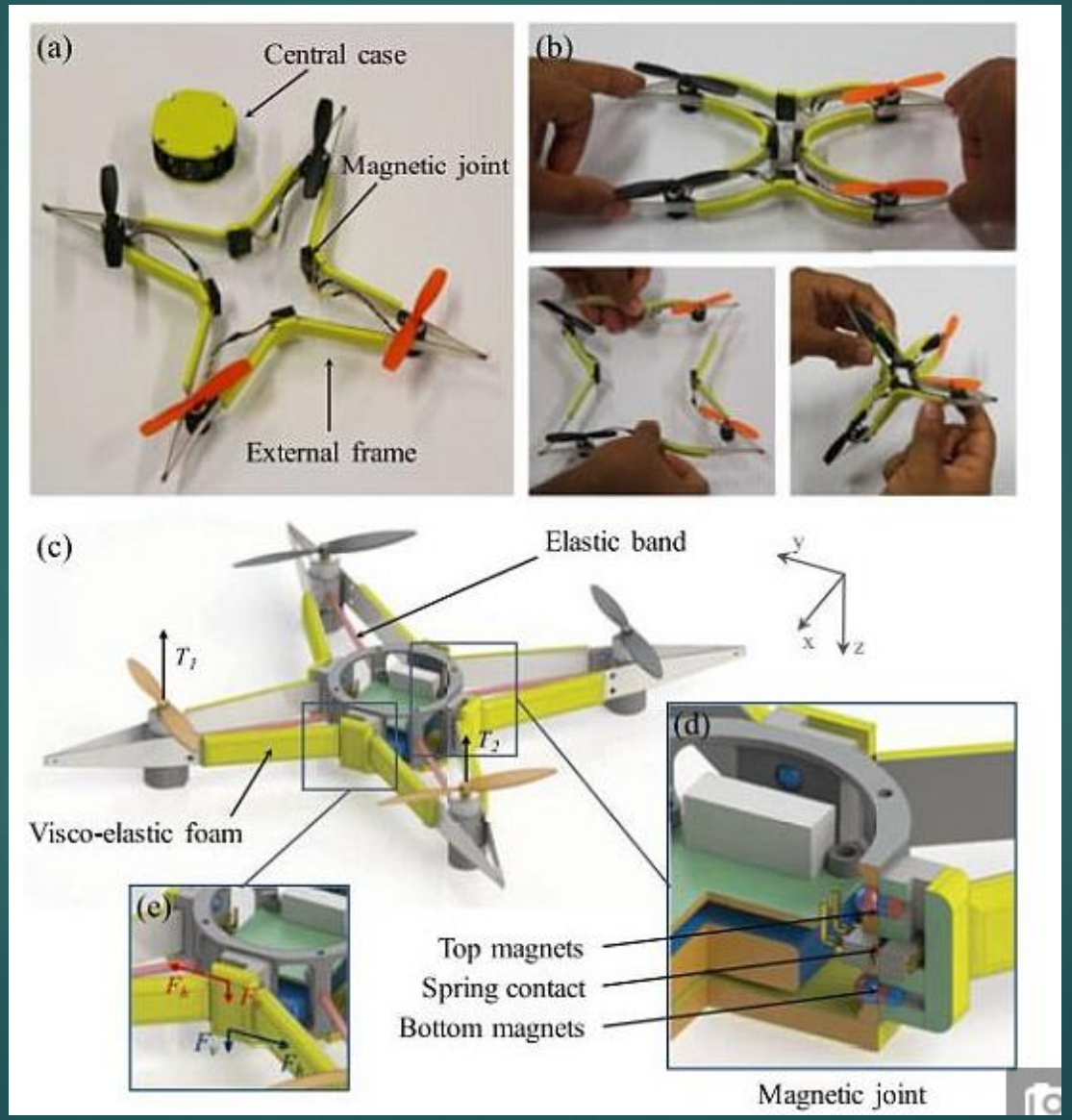
1. fora dla „droniarzy”,
2. fora przyrodnicze,
3. YouTube.

Drony – nowe statki powietrzne na niebie. Zagrożenie dla ptaków?

- Zagrożenie dla wybranych grup i gatunków ptaków:

1. ptaki o agresywnych behawiorze,
2. o silnym terytorializmie,
3. o średnich i dużych rozmiarach ciała.

Dron odporny „zniszczenie”



PLOS ONE

RESEARCH ARTICLE

Strategies for Pre-Emptive Mid-Air Collision Avoidance in Budgerigars

Ingo Schiffner[1]*, Tristan Perez[2,1], Mandyam V. Srinivasan[1,3]

1 Queensland Brain Institute, University of Queensland, St Lucia, QLD, Australia, **2** Elec. Eng. and Comp. Sc., Queensland University of Technology, Brisbane, QLD, Australia, **3** School of Information Technology and Electrical Engineering, University of Queensland, St Lucia, QLD, Australia

* i.schiffner@uq.edu.au

OPEN ACCESS

Citation: Schiffner I, Perez T, Srinivasan MV (2016) Strategies for Pre-Emptive Mid-Air Collision Avoidance in Budgerigars. PLoS ONE 11(9): e0162435. doi:10.1371/journal.pone.0162435

Editor: Daniel Osorio, University of Sussex, UNITED KINGDOM

Received: April 22, 2016

Abstract

We have investigated how birds avoid mid-air collisions during head-on encounters. Trajectories of birds flying towards each other in a tunnel were recorded using high speed video cameras. Analysis and modelling of the data suggest two simple strategies for collision avoidance: (a) each bird veers to its right and (b) each bird changes its altitude relative to the other bird according to a preset preference. Both strategies suggest simple rules by which collisions can be avoided in head-on encounters by two agents, be they animals or machines. The findings are potentially applicable to the design of guidance algorithms for automated collision avoidance on aircraft.

Dziękuję za uwagę

azbyryt@ptop.org.pl