Robotic challenges in conservation ecology

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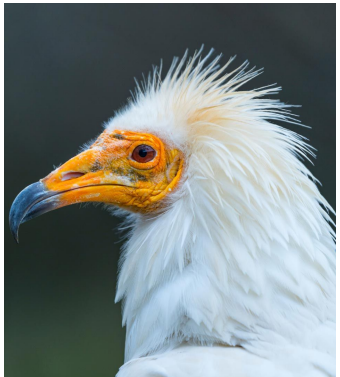

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CONSERVATION ECOLOGY

…the study of the conservation of **nature** and of **Earth's biodiversity** with the aim of protecting species, their habitats and ecosystems from excessive rates of extinction and the erosion of biotic interactions… [Wiki]

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MOTIVATIONS BEHIND THE WORKSHOP

- **Autonomous robots** for ecology & biodiversity conservation applications are generally **under-used**, being regarded as **expensive** hi-tech tools with **limited autonomy & intelligence**
- **Skill requirement** of workers to operate such robots is seen as a barrier that **impedes deployment**
- **Experiences, best practices and requirements** exchange between ecologists, researchers and industry is generally lacking, hindering effective deployment in conservation ecology

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NEEDS OF THE SECTOR

- To **boost** the use of **robotics** in monitoring nature & environment and biodiversity conservation
- To **overcome** actual **open technological issues**, e.g.:
  - to show how robots (aerial, land, and underwater) can learn to navigate and operate in environments that are highly complex, dense and rapidly changing
  - how robots are able to support decisions for biologists and ecologists
- To bring **automation**, but also **speed**, **consistency**, **versatility**, **robustness** and **safety** perception

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WHAT ROBOTICS CAN OFFER?

- realization / execution of specific jobs
- better spatial & temporal resolution
- objective acquisitions / data / results
- derivation of better data for better analyses
- realization of improved policies
- collaborative tasking
- etc.

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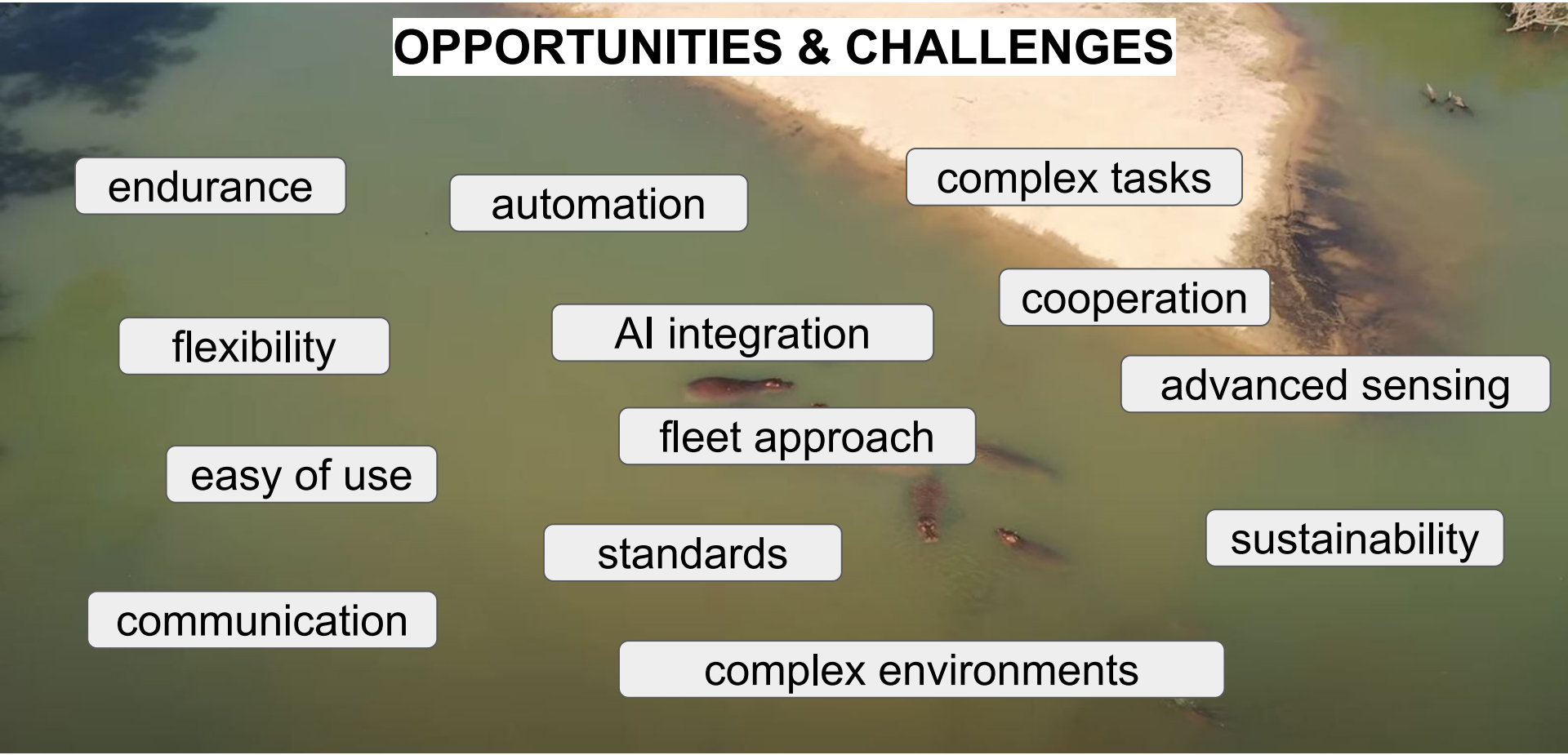

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PRESENTATIONS

- **Robotics & AI in Conservation Ecology** - Fabio Remondino, Fondazione Bruno Kessler (FBK), Italy
- **Introduction to the WildDrone project** - Tom Richardson, Bristol University & Ulrik Pagh Schultz Lundquist, SDU UAS Center, University of Southern Denmark
- **Overview of the MAMBO project** - Jesper Erenskjold Moeslund, ECOS, University of Aarhus, Denmark
- **Robotics for Environmental Monitoring: the Natural Intelligence Approach** - Francesco Iotti/Manolo Garabini, Research Center “E. Piaggio”, University of Pisa, Italy

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QUESTIONS

- How can robots be deployed in **daily ecology practices** that encompass **complex tasks** and need **real-time** reliable solutions to **scale-up** wildlife and habitat condition monitoring?
- How can computer-vision-driven technologies, such as **deep learning**, be applied to robot-collected data to generate innovative discoveries and **support** ecological studies and habitat monitoring?
- How can we **innovate** robot **design**, operations and control to support the **needs of ecology and nature conservation** while minimising their environmental impact?