9-1-2011

BIRD STRIKE PREVENTION Version 3.x

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Bird Strike Committee USA Meeting

7:00 AM – 9:00 AM Oakes South Room
John E. Ostrom

Session 3: Radar Part 1

9:00 AM – 10:30 AM
Moderator: Scott Snow

Bird Strike Prevention version 3.0

9:00 AM
Arie Dekker

Traditionally, bird strike prevention involves the removal of birds from airfields, using a variety of scaring techniques. In time this has been supplemented with habitat management as a more preventive method. These approaches can be considered as bird strike prevention version 1.0 and 2.0. Bird strike statistics indicate that a minimum ratio is reached. For a further decrease the traditional measures have to be complemented with attention towards birds overflying airports. This implicates that apart from legal and ethical issues much more knowledge on bird mobility needs to be acquired. Satellite tracking of birds show that home ranges not only vary between seasons but also between and within species. In a number of examples we show that home ranges vary enormously. Breeding Buzzards on Leeuwarden airbase occupy an areas varying from 25 to 70 Hectares while non breeding Buzzards in the same season wander distances of more than 200 kilometres. A breeding Lesser Black backed Gull travelled from the colony in the Waddensea to Amsterdam (100 Km) and back in a single day. Because of the complicated mobility and often extreme large source areas of flying birds, large scale lethal methods are likely to be both ineffective and inefficient in dealing with overflying birds. Instead, aircraft avoiding flocks of flying birds is a promising alternative strategy. Effort should be put on the development of concepts of operations that include the use of avian radars in a real time setting.

Update on the Avian Radar Performance Assessment Program

9:30 AM
Edwin E. Herricks

In 1999 the Federal Aviation Administration initiated a program with the University of Illinois Center of Excellence for Airport Technology to assess new safety technologies for commercial airports. The emphasis in that program shifted to the assessment of commercially available sensors and systems in 2006 resulting in the deployment of avian radar systems at the Naval Air Station Whidbey Island, Seattle Tacoma International Airport, Vancouver International Airport, O'Hare International Airport, John F. Kennedy International Airport, and Dallas Fort Worth International Airport. In the assessment, multiple sensors in S-band, and X-band, including magnetron and solid state marine radars, and multiple configurations of avian radar systems, including advanced L-band and Frequency Modulated Continuous Wave radars have been assessed. The program has operated avian radars continuously for up to 4 ½ years, amassed over 6 tera bytes of data, and has supported the publication of an Advisory Circular (AC 150-5220-25) in November 2010. Issues of deployment, operations and maintenance, data management, and integration into airport operations have been assessed. This paper will review the status of the avian radar performance assessment program and provide examples of applications in wildlife management at airports and the use of avian radar data in operations at civil airports.

3-D Radar Sampling Methods for Ornithology and Wildlife Management

10:00 AM
Robert C. Beason

Ornithologists and wildlife biologists have used visual and auditory sampling techniques to monitor the composition of avian communities for decades, even centuries. These sampling techniques have been standardized to compare among different communities and geographical locations. From these temporally and spatially restricted samples, biologists have extrapolated to local avian communities, although not all species, individuals, or behaviours were detected and recorded. Avian radar complements the limitations of visual and auditory sampling with greater temporal and geographic sample sizes. Radar operates continuously and has a greater detection range. Its sampling volume is dictated by the coverage pattern projected by its antenna as it scans. Dish antennas provide 3-D data and standard array antennas provide 2-D data in either a horizontal or vertical plane within the volume of interest. We present new radar sampling methods that provide 3-D data of birds within a full cylinder of coverage, with typical dimensions of 6-mile radius, 10,000-ft tall representing a volume of interest at most airfields. Like the standardized visual and auditory sampling methods, these methods allow users to make comparisons among samples from different locations, systems with different configurations, and with visual sampling techniques. These methods provide rich and complete datasets of avian behaviour that can be presented visually in a grid format for conceptual overview or numerically for statistical analyses. Examples include densities (birds/sq mile) in selected habitats or Traffic Rates of migration. These analyses enhance a biologist's ability to manage birds within the landscape of his/her responsibility.

Coffee Break

10:30 AM – 11:00 AM Oakes North Room & Foyer

Royal Netherlands Air Force

BIRD STRIKE PREVENTION

Version 3.x

Arie Dekker, Hans van Gasteren and Inge Both

Royal Netherlands Air Force Command
Mission Support Branche, Nature Bureau

Bird strike prevention is dictated by
3 main aspects of human behaviour:

- Give the Black Jack (+ the bill) to someone else!
- Do something!
- Genesis 1:28

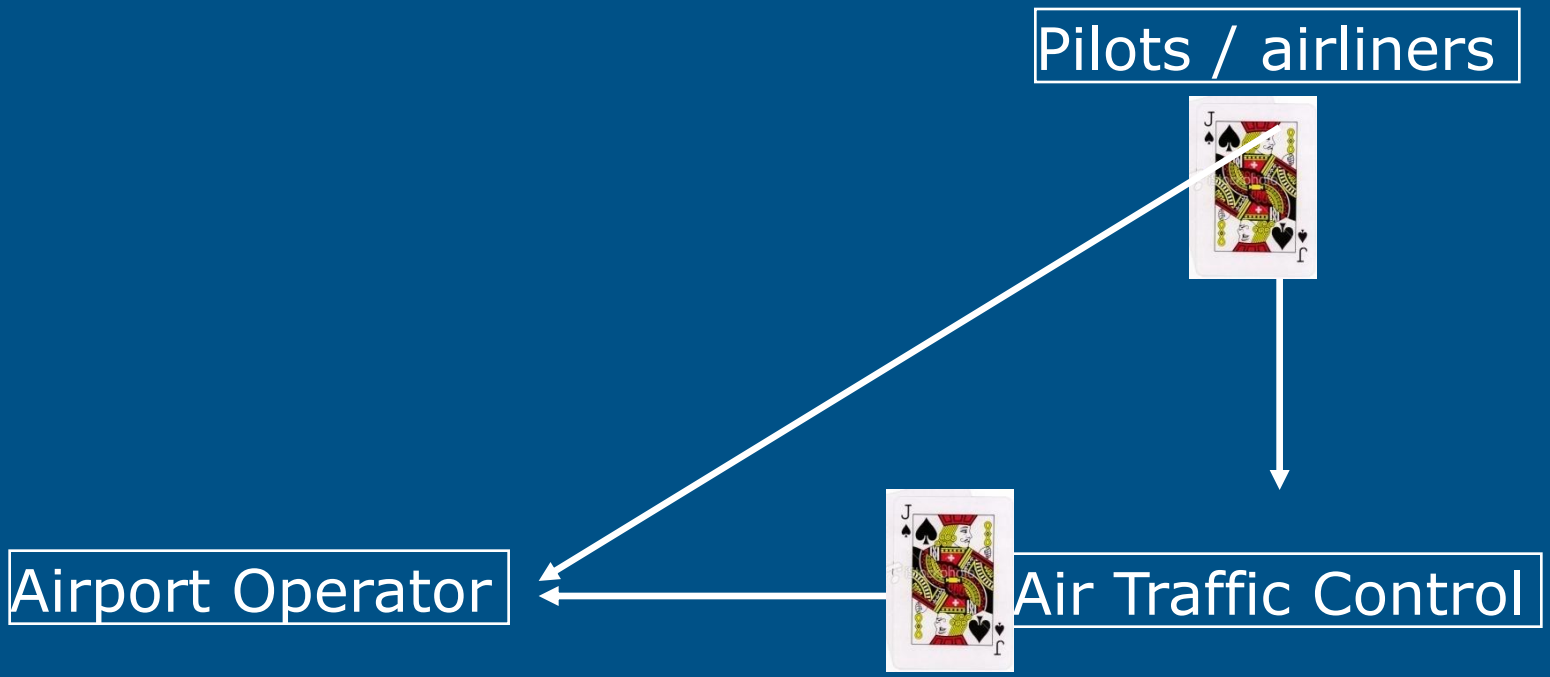
Genesis 1:28

God said to them: "….Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground…"

In Western society this statement has justified and contributed towards a human centred approach towards nature.

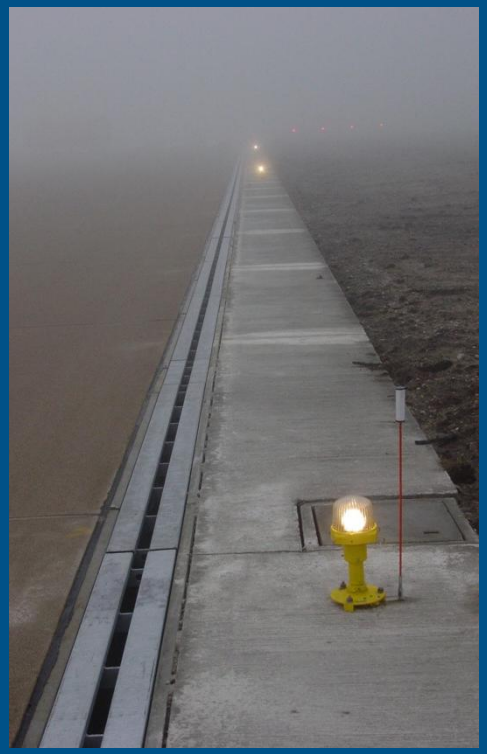
Bird strike prevention Version 1.x and 2.x are based on this assumption. "*Birds have to make way for undisturbed aviation operations*"

Players in the bird strike prevention

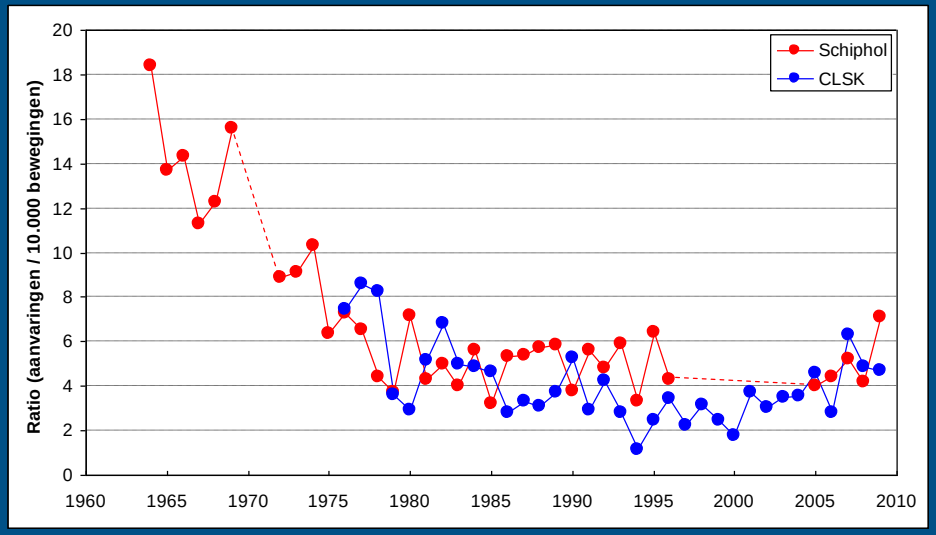


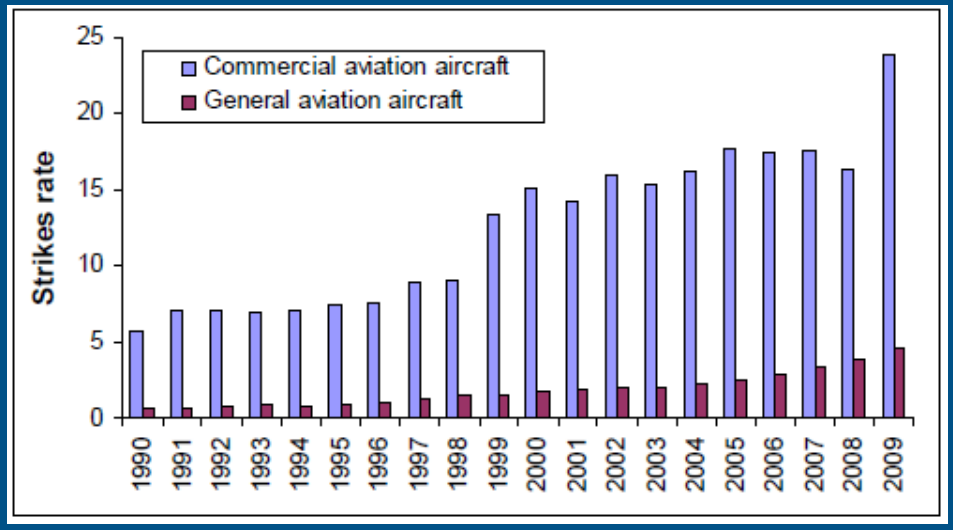
Bird Strike Prevention Version 1.x
"Do something" : active dispersal of birds

Bird Strike Prevention Version 2.x
"Do something" : habitat management



Bird Strike Prevention Version 1.x / Version 2.x has been successful. **But has reached its limits**





	Inside Germany				
	2000	2001	2002	2003	2004
Bird strike rate	6.68	6.93	5.78	5.92	6.07
Damage rate	1.60	1.61	1.53	1.29	1.53

Bird and Aviation, Vol. 25 (2005), No.2

REPORT OF THE ASSOCIATE ADMINISTRATOR FOR AIRPORTS
OFFICE OF AIRPORT SAFETY AND STANDARDS
AIRPORT SAFETY & CERTIFICATION
WASHINGTON, DC

MAY 2011

Royal Netherlands Air Force

Emphasis needs to be shifted!

Not just aimed at

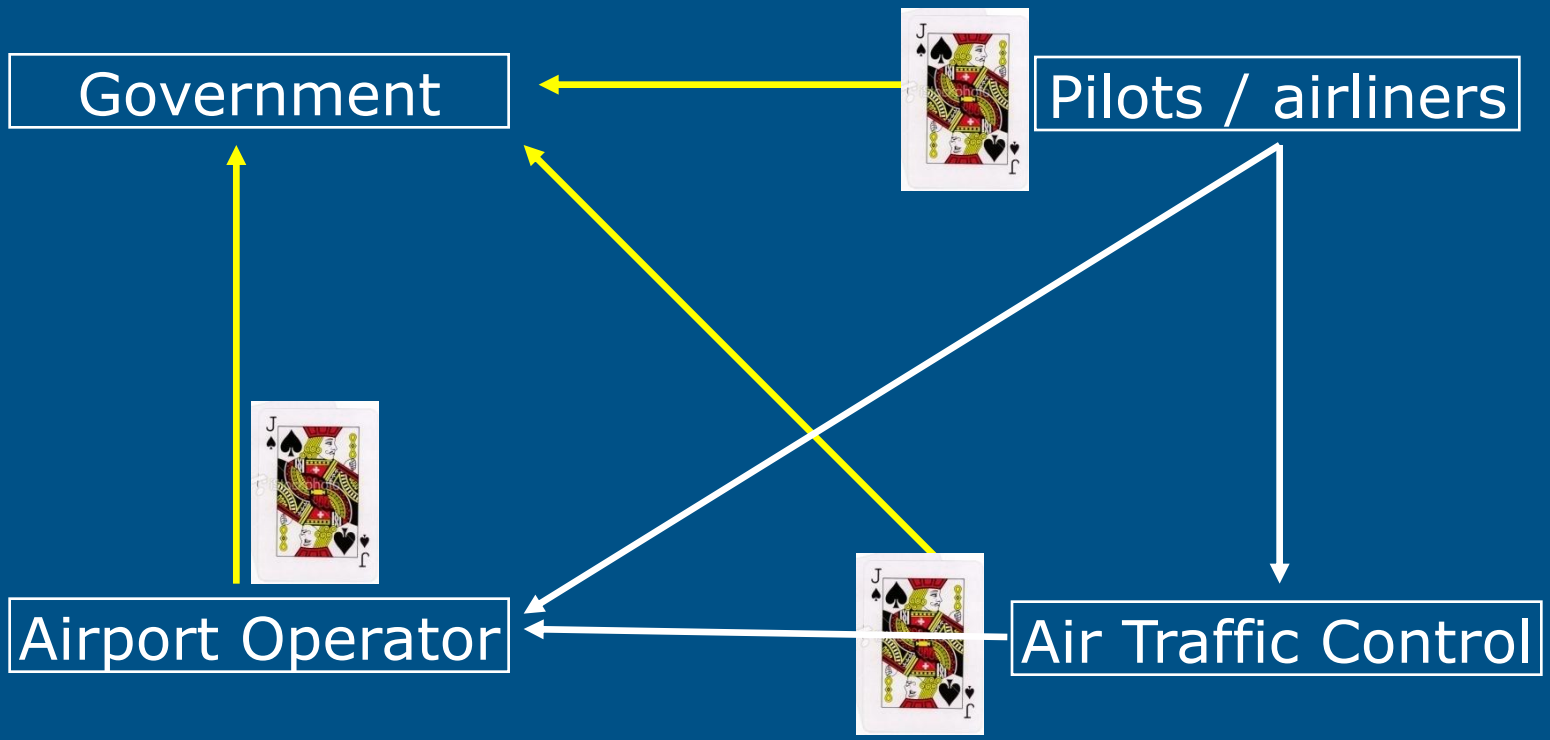
birds at or around airports

But also at

birds overflying the airport coming from A, flying to B

Royal Netherlands Air Force

Players in the bird strike prevention
including overflying birds changes everything



Government is asked to "do something"

"Do something" = "*keep birds out of our way*"
= pay the bill

Spatial planning = how large an area is needed?
= in what way is the landscape affected?

Population management = culling: to what extend?
= is it effective/ feasible?
= public acceptance?

In other words = how big is aviation's footprint?

BIRD MOBILITY = keyfactor

Spatial management, as well as population management is only effective / efficient if aimed at those individuals that cause problems.

Individual home ranges determine success of measures

Large home ranges:

- Require spatial planning in large areas
- Minimize the effect of local/regional population management

On home ranges / bird mobility

Home range according to Wikipedia:
= the area where an animal lives and travels in.

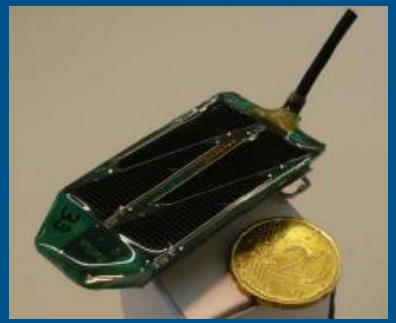
Varies between species, seasons and individuals

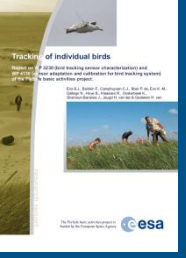
Latest GPS related studies show:

- Extreme variability in mobility between individuals of same species
- Birds often prove to be extremely mobile

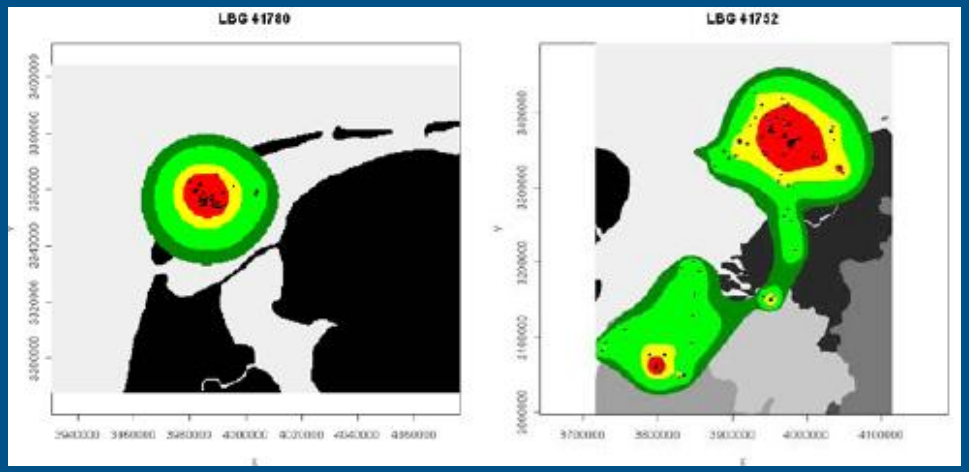
GPS Platform
Transmitting Terminal
Up to 30 grams
4 fixes/day

Univ. Amsterdam
GPS receiver
14-18 grams
Fixes at 10 min/
interval

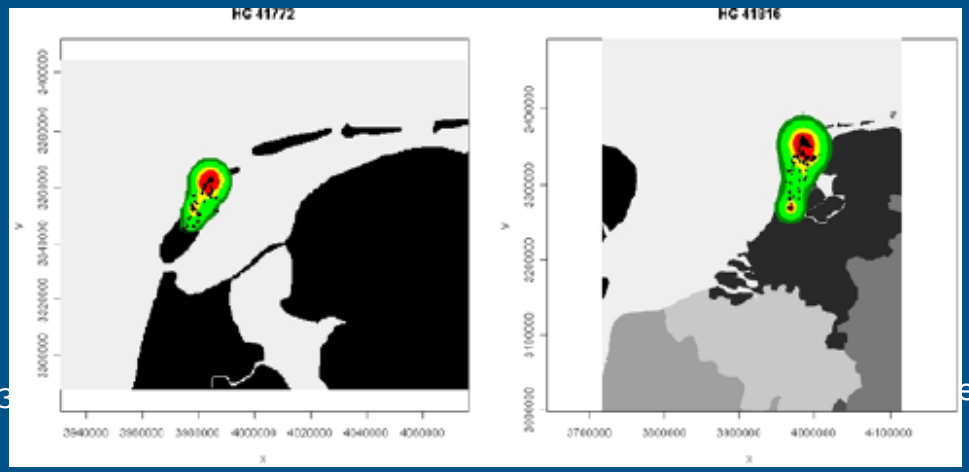




Smallest and largest home range of gulls breeding on Texel 2007 (dark green=95%; green=90%; red=50%)

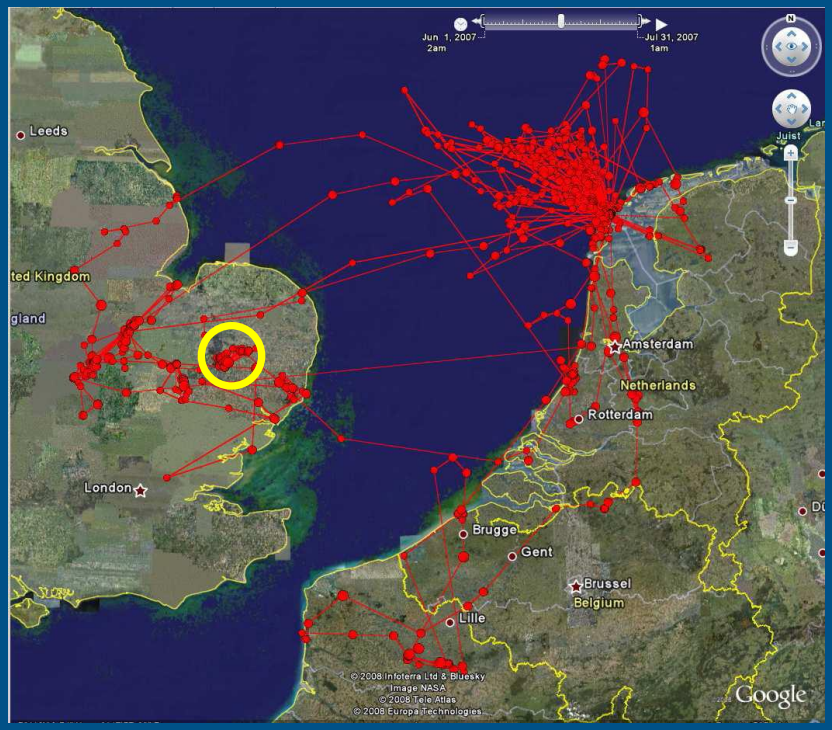


13 Lesser Blackbacked Gulls (Larus fuscus)



8 Herring Gulls (Larus fuscus)

Movements of 1 individual Lesser Blackbacked Gull (Larus Fuscus) in July 2007 registered by GPS PTT

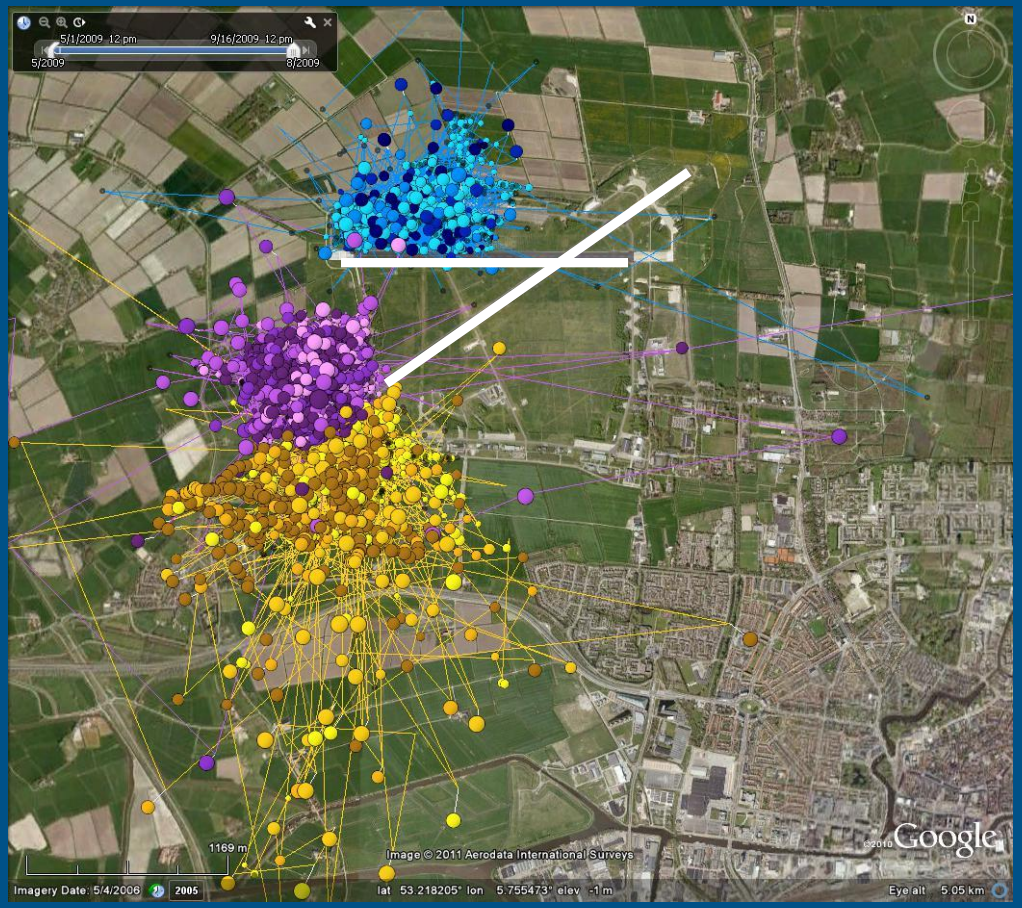


Lesser Blackbacked Gull breeding on Texel, between May 23th and June 25th 2011 (UvA GPS)

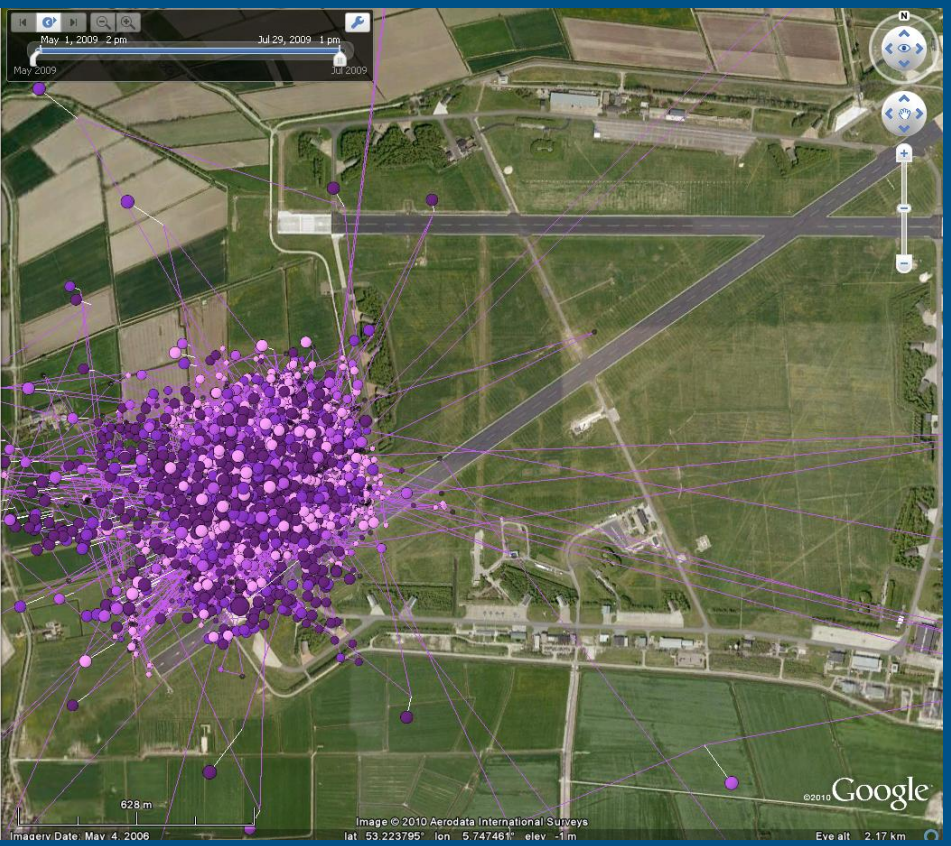
Movements of three Lesser Blackbacked Gulls after breeding on Texel, between June 26th and July 10th 2011

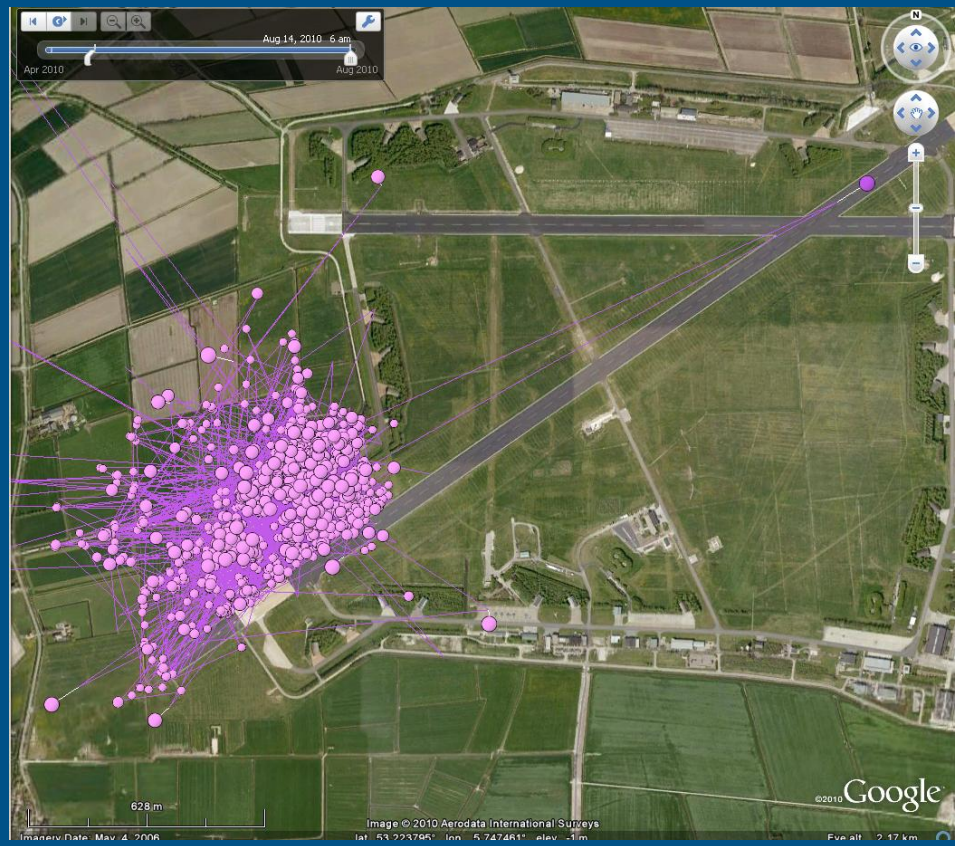
Buzzards on LWD and EHV Airbase (UvA GPS receivers), May 2009.

3 birds breeding on base, 3 birds gone

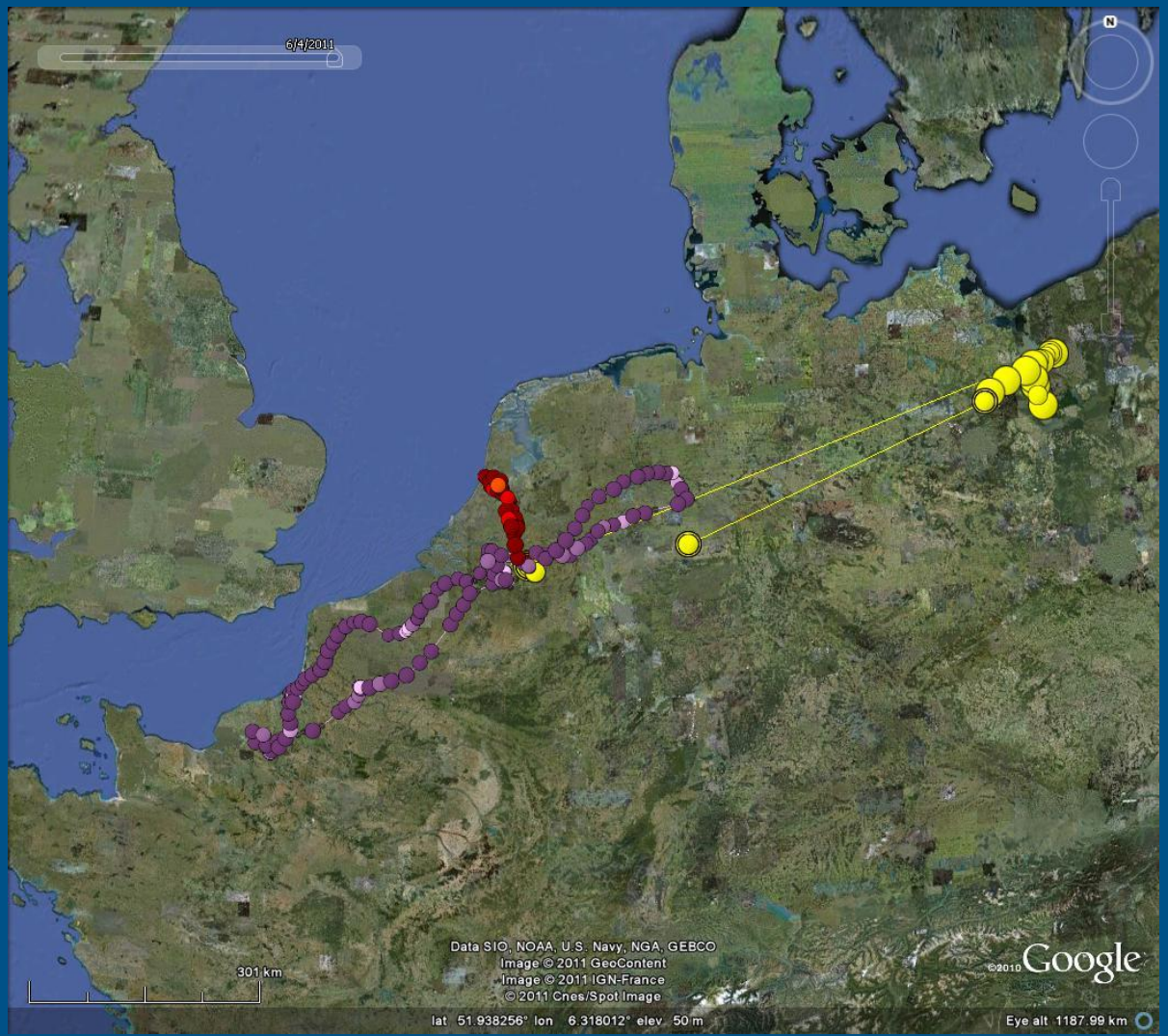


Buzzard nr 128 breeding on LWD Airbase in 2009 (left) and 2010 (right)





Non-breeding Buzzards from EHV Airbase 2010.



BIRD MOBILITY = keyfactor

Spatial management, as well as population management is only effective / efficient if aimed at those individuals that cause problems.

Individual home ranges determine success of measures

Large home ranges:

- Require spatial planning in large areas
- Minimize the effect of local/regional population management

At least part of the population of gulls and Buzzards is extremely mobile → making local and regional population management ineffective

Bird Strike Prevention Version 3.0

- Should be aimed at birds flying over the runway environment
- Cannot rely on population management
- Can only to a limited extend be supported by spatial planning
- Should be based on separating aircraft and significant flying birds or bird groups

Bird Strike Prevention Version 3.0 should be based on the assumption that:

- Birds are part of the environment, as is weather / geography / geology
- Birds can never completely be “kept out of the way of aviation”
- Aviation has to incorporate bird avoiding strategies
- Densities of flying birds vary in space and time
- Small operational impact can lead to major safety profit

Bird Strike Prevention Version 3.0 = separation based and needs:

- Sensors that timely detect birds flying on collision course
- Techniques that timely discriminate between hazardous and non-hazardous flying birds
- Techniques that distribute the information near real-time to the relevant persons (pilots, Air Traffic Control (ATC), Bird Control Units (BCU))
- Techniques that enable BCU's to make flying birds change their course
- CONOPS that enable pilots to avoid birds (postponing starts!), either via ATC or direct

Acknowledgements

- RNLAF for letting me be here
- European Space Agency for initiating GPS tracking of gulls
- RNLAF for funding GPS studies on airfield Buzzards
- University of Amsterdam for using the GPS info from Lesser Black Backed Gulls breeding on Texel
- Judy Shamoun Baranes and Luit Buurma for inspiring discussion on the subject

More GPS tracking of birds visible on www.UvA-bits.nl

- Griffon Vultures, France
- Honey Buzzards, Netherlands
- Lesser Black-backed Gulls, Netherlands
- Lesser Black-backed Gulls, United Kingdom
- Oystercatchers, Netherlands
- Great Skuas, United Kingdom
- Crab Plover, Oman

Understanding birds is not easy!

Are we re-inventing the wheel?

Bi