

**European cooperation in Science and Technology  
Action IC0903: Knowledge Discovery from Moving Objects (MOVE)**



**Short-Term Scientific Mission Grant;  
COST-STSM-ECOST-STSM-IC0903-120912-019539  
12<sup>th</sup> - 30<sup>th</sup> September 2012  
Malaga, Spain**

**Host;  
Prof. Dr. Raimundo Real, University of Malaga**



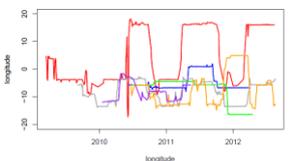
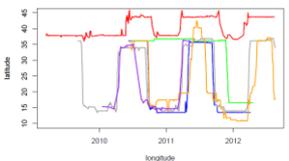
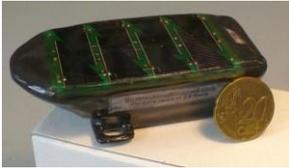
**Back-to-office report  
15<sup>th</sup> October 2012**

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**COST - Action IC0903: Knowledge Discovery from Moving Objects (MOVE)**  
**Short-Term Scientific Mission Grant, Back-to-office report**

<i>Reference Number</i>	COST-STSM-ECOST-STSM-IC0903-120912-019539
<i>Location</i>	Malaga and Cadiz, Andalucía, Spain
<i>Period</i>	12 <sup>th</sup> - 30 <sup>th</sup> September 2012
<i>Host</i>	Prof. Dr. Raimundo Real, Faculty of Science, University of Malaga, Spain (rrgimenez@uma.es)
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<i>Purpose</i>	This short-term scientific mission provided (1) a discussion opportunity to compare hypothetical deductive and data-driven approaches to explain species behavioural decisions (i.e. movements) in response to their dynamic environment, (2) an access to bird migration tracks, and hyper-temporal species movement data along with real-time field observations, (3) to discuss with local birders and ornithologists, and (4) to discuss and finalize the manuscript resulted in previous visit (COST-STSM-ECOST-STSM-IC0903-160511-005841)
<i>Description of activities</i>	<u>Task 1</u> Correlative approach relies on strong, often indirect, links between species distribution records and environmental predictor variables to make predictions. While hypothetical deductive approach attempts to simulate the mechanisms considered to underlie the observed correlations with environmental attributes. During STSM we discuss a conceptual model to compare movement prediction models based on above mentioned approaches for Griffon Vulture (diurnal local movements) and Short-toed Eagle (Migration tracks).



## Task 2

Griffon Vulture (*Gyps fulvus*) is a large-sized bird of prey also in the family Accipitridae and the order Falconiformes. Mainly resident in mountains specially ridges and peaks. They prefer open and dry valleys or plateaux to petrol for carrion. Soars and glides frequently, often appearing in loose flocks. They are very well-known species in southern Spain and the main concern is due to collision fatality in wind farms. There are 5 Griffon vultures harnessed with UvA ptt-transmitters in the study area. The UvA ptt-transmitter is a prototype bird tracking system which has been developed by the University of Amsterdam and consisted of 59-g solar-powered GPS tags, with a wireless ZigBee transceiver that communicates with a base station located in the centre of the wind farms. Data logged on the GPS tags were downloaded to the base station and new measurement settings were uploaded to the tag. Thus the system enables remote measurement flexibility while the tag is on the bird. The GPS tag measures and logs GPS x, y, z positions (geographical position and altitude above mean sea level), sensor temperature and air pressure, and GPS diagnostics (e.g. fix time, number of satellites in view). The locations of the birds were measured at intervals 30 minutes during the day.

Short-toed Eagle (*Circaetus gallicus*) is a medium-sized bird of prey in the family Accipitridae and the order Falconiformes. The European population migrate mainly to sub-Saharan Africa north of the equator, leaving in September/October and returning in April/May. In Europe they are most numerous in Spain and fairly common elsewhere. However, are not well-known species comparing to other raptors. In 2009 and 2010 five juvenile Short-toed Eagles were taken from three nests at the end of the breeding season (July) in the province of Andalucía (southern, Spain). Nestlings were handled when nearly fully grown but not yet prone to premature fledging. Birds were measured and ringed, and Microwave Telemetry and NorthStar solar/GPS ptt-transmitters were affixed to the back using a harness.

According to the available databank, four Argos ptt-transmitters on Short-toed Eagles, and one UvA ptt-transmitter on Griffon Vulture are operational. Raw data for all six Short-toed Eagles were downloaded from Argos databank and filtered using available algorithm (Feritas et al. 2008, and McConnell et al. 1992) to remove unrealistic locations. Filtered locations were then mapped and drawn over time to investigate the latitudinal and longitudinal variation over their movement.

Raw hyper-temporal moving tracks of Griffon vulture also obtained from



dedicated UvA databank. Unrealistic locations were relatively small compare to the above mentioned dataset. Although the transmitter was active during last 14 months, due to some technical difficulties with receiver antenna, a continues-dataset was not available on this specimen. However available dataset was used as a pilot experiment to frame the conceptual model.

### Task 3

During STSM I had two meetings and a day off in field with Dr. Antoio-Roman Munoz (roman@fundacionmigres.org) from Fundacion Migres (local ornithological NGO). We discussed future collaborations on expert knowledge elicitation forms and questionnaires.

### Task 4

In the previous STSM to University of Malaga we discussed a conceptual framework to investigate the incorporation of knowledge uncertainty into species distribution modelling. In the course of last year I developed the implemented the experiment and we discussed the outputs remotely. This year we finalized the discussion and wrapped up a manuscript to be submitted to a scientific journal.

#### *Future collaboration*

Although the mission to University of Malaga was short but it promoted a broad future collaborations, not only on dynamic moving species modelling but also on cross disciplinary topics such as spatio-temporal statistical inductive modelling and social deductive approaches. Furthermore, few other interesting topics were discussed which potentially can be a joint cooperation of University of Malaga and University of Twente.

#### *Foreseen outputs*

At this moment there are two manuscripts foreseen to result from the STSM by January and May 2013 respectively on improved species distribution models using environmental rather than geographical backgrounds, and on hypothetical deductive approach to model species behavioural decisions.

#### *Confirmation of the host*

This report along with electronic version of preliminary results has been sent to Professor Raimundo Real (host), University of Malaga for his confirmation of the successful execution of STSM on 17<sup>th</sup> October 2012 by email. His confirmation letter is attached.