CROW

Communicating RAVen to the Outside World

DURATION
15/03/2019 – 15/03/2021

BUDGET
20 000 €

Valorisation of the BRAIN-be project
RAVEN

PROJECT DESCRIPTION

The BRAIN-be pioneer project RAVen was a collaboration between the Royal Belgian Institute of Natural Sciences (RBINS) and the Royal Meteorological Institute of Belgium (RMIB) to study bird migration using different radar systems near the Belgian coast.

One of the achievements of RAVen was the installation and configuration of the bird detection algorithm of Dokter et al. (2011) at RMIB, which enables the extraction of biological signals from weather radar data, and the transfer of its output to RBINS for further study. These bird detections are currently calculated on the non-critical part of the RMIB computer infrastructure, and only a basic visualisation of the results is provided.

An example of the current visualisation of the bird detections is given in Fig.1. The figure shows bird profiles generated from the radar of Wideumont. The upper panel represents the bird density profile over time for one week. The lower panel shows the corresponding height integrated density over time. This type of images is currently generated for the radars of Jabbeke (RMIB), Wideumont (RMIB), Zaventem (Belgocontrol), Helchteren (VMM) and Herwijnen (KNMI). Recently (10/2018) also the radars of Abbeville (Météo-France) and Avesnois (Météo-France) were added.

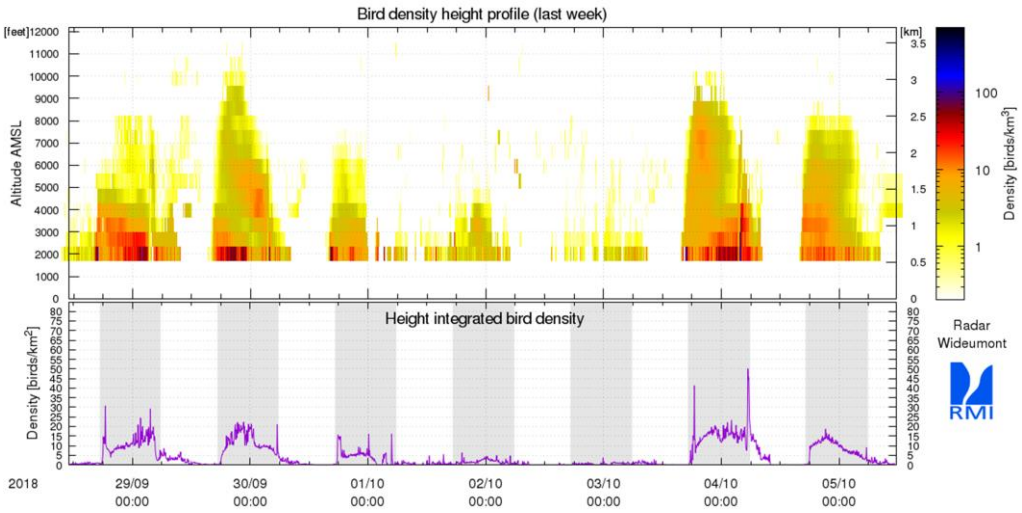

Figure 1: Example of the static figures of the bird detection algorithm, generated on the non-critical computer infrastructure of the RMIB. The figures are tailored towards specialist users (radar experts, ornithologists, aviation traffic controllers).

There are, however, several shortcomings of the current visualisation:

- Images are static (there is no possibility to zoom or pan)
- Images are shown for each radar separately so an easy comparison between the radars is not possible
- Not possible to explore historical data (only last week is shown)
- Difficult to interpret for non-specialists

Moreover, the visualisations are sent to only a limited number of stakeholders, being:

- the forecasters of the RMIB (as a tool for the correct interpretation of radar data)
- the Wildlife Hazard Management section of the Belgian Airforce for issuing BIRDTAMs (bird notice to airmen) and flight planning
- the OD Nature of RBINS

The latter two transfers were realised during the RAVen project, and are still in place. The images are, however, not freely accessible on the main webpage of the RMIB or through any other channel.

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Objectives

1. Transfer the bird detection algorithm **from research to operations**, including a flexible upgrading process, training and documentation. The suite will be installed and maintained in an operational setting at the RMIB, which covers a 24/7 monitoring.
2. Develop an **interactive visualisation** hosted at RMIB's public website that allows an exploration of the bird estimations. This front-end layer will overcome the shortcomings of the current static visualisation mentioned above. Data visualisation expertise and knowledge of modern web technologies are required for this task, and this know-how is available at team LifeWatch of INBO (see e.g. [3]). For this front-end, we envisage a two-level approach: basic and easily accessible information will be shown as the page opens, with the possibility to further explore the bird data in a more detailed way. The platform will be offered in three languages: Dutch, French and English. The data visualisation layers should contain the following elements:
   - an *overview* component: visitors of the page should get a quick idea of the bird migration over Belgium (e.g. a map)
   - a *detail* component: visitors should be able to get explore the bird migration over each radar for the last week
   - an *archive* component: visitors should be able to visualise also historical data

   The visualisation will be offered as an open source software suite, so that it can easily be reused by other meteorological services, research institutes or wildlife organisations.
3. Integrate the (machine-readable) **bird detection data into the open data portal** of the RMIB which is currently under construction.

An important note concerning Task 2 is that the proposed web portal has to be merely regarded as the medium through which the bird detection information is visualised; it is not a goal in itself. The intended data visualisation package (which is the main goal of Task 2) will be portable and hence it will be possible to host it at other premises than RMIB's (e.g. at INBO, RBINS or wildlife organisations like Natuurpunt or Natagora).

Work plan

WP1: From research to operations
The algorithms that were used in the RAVen project, will be transferred to an operational environment at RMIB. As such, the software suite will be monitored on a 24/7 basis.

- Task 1.1: setup, install and test the bird detection software suite in a software environment suitable for operational purposes ("Docker container")
- Task 1.2: deposit the bird detection data products as public open data
- Task 1.3: documentation and training

WP2: Setting up the data visualisation

- Task 2.1: definition of scope and requirements
- Task 2.2: development of a web-based interactive visualisation, including documentation and publishing the software suite as open source
- Task 2.3: implementation of the visualisation at RMIB's infrastructure, including drafting guidelines for a correct interpretation of the results

WP3: Project management and promotional activities

- Task 3.1: all administrative and practical tasks and appointments
- Task 3.2: press releases and promotion

CONTACT INFORMATION

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