BIRD OBSERVATION SYSTEM SEMMERZAKE

BOSS91.

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BELGIAN AIR FORCE

INTRODUCTION

During the years 90-91, the Belgian Airforce developed a new system to observe and quantify bird migration through the use of radar and a standard PC. Before, the observation program was integrated in the operational ATC computer and had some limitations.

The actual system has the possibility to obtain radar information from 4 area radars and 3 airfield radars, all located in Belgium. Two of the area radars are 3-dimensional and give the capability of receiving the height information of the bird migration.

The calculation of a "bird intensity" is based on a specially adapted tracking program, and through the automation of the system it is possible to calculate the intensity without the need for interpretation by the user.

1. General description.

The system consists of a standard PC(AT) with color display, a
plotter, a printer and a specially built interface for the task. The
digital radar information is sent from the different radar sources to
the PC via an interface, all information is converted to the same
protocol and format. The radar data is sent to the PC for a fixed
number of radar scans and is held on the PC. In this way, a number of
radar data files are obtained to be used for the calculation of the
bird intensity.

Unwanted plot information such as clutter, permanent echoes and
aircraft are littered out by the tracking program.

The results are displayed on the screen in the form of birdtracks,
they can also be displayed as an intensity, calibrated according to a
logarithmic scale. This information can be either plotted or printed
out.

2. Functional description.

The software has been developed to be used in a simple way through a
number of program modules. The final results are displayed as a
birdintensity for each GEOREF.

2.1. Read-in phase.

Digital radar information from different radars is read into a
PC via an interface. These radar plot files are sequentially
read in during 25 scans per file. The operator can specify the
number and type of radars to be used and the start time of the
read-in phase before the program begins.

2.2. Analysis phase.

During this phase the unwanted returns from the radar files
are eliminated, this is achieved via the tracking program.
This program can be adjusted by varying certain parameters
such as minimum and maximum speed, scan to scan correlation,
detection, ... to ensure that.
From the number of bird tracks and other tracking information,
the computer calculates an intensity between 0 and 8 on the
basis of a logarithmic scale.
The analysis module provides the possibility to manually track
the plots to get, in case of doubt, more detailed information.

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2.5.   Print

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4. In Annexes:

a. Plotting

b. Bird inte

2.3.   Additional utility programs.

Plotfile management routine.
Possibility to manually enter meteo information and radar settings.

2.4.   Display facilities.

The following display possibilities are included:

a.   presentation of the raw or the "cleaned-up" plotfile

b.   zoom and off-centre functions

c.   moving picture of bird track produced by fast replay of plot or track files

d.   display of final results per GEOREF (i.e. number of plots and tracks per height layer, intensity per GEOREF, etc)

## 2.5.   Printing and Plotting facilities.

The final results (intensity per GEOREF) can be printed out. In addition, it is possible to plot all tracks of the analysed radar data files together with a map of Belgium and the associated GEOREF squares.

3. Actual situation and operational performance.

The system was calibrated during the spring 1991 bird migration and became operational in the autumn of 1991. The radar sensors are presently limited to 4 search radars from Belgium, Bertem and St.-Hubert (civilian 2D radars), Glons and Semmerzake (military 3D radars). In 1992, three supplementary airfield radars will be added to the system to improve the coverage.

4. In Annexes:

a. Plotting example of a processed radar file.

b. Bird intensity printout from the Semmerzake radar.

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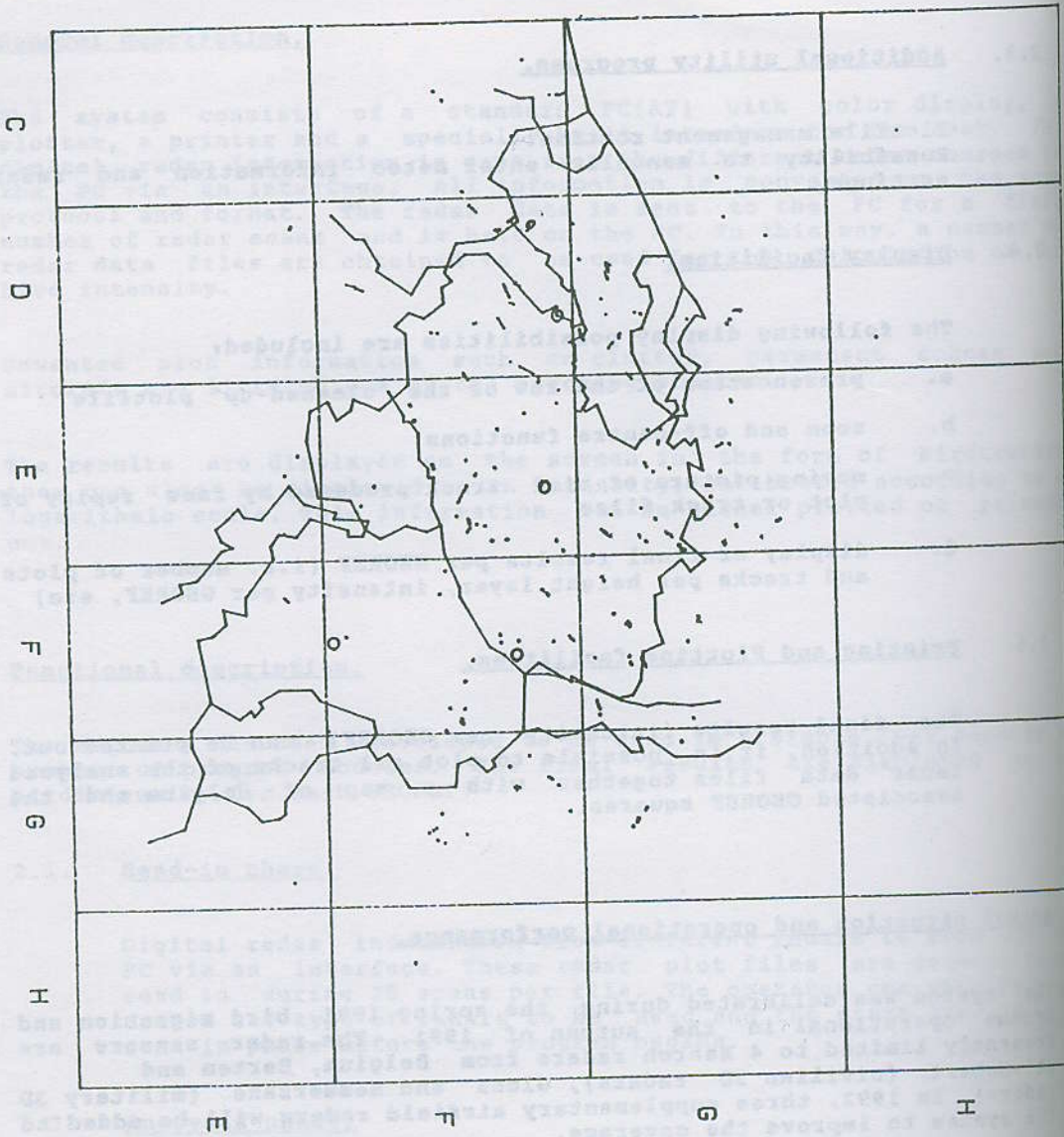
DATE -----------
WIND DIRECTION -
WIND SPEED -----
CLOUDS ---------
VISIBILITY -----
TEMPERATURE ----
PRESSURE -------
RADAR STATION --
RADAR SETTINGS -
FILENAME -------

GRF	>0 <2000 ft	>2000 <4500 ft	> <
CH			
DH			
EH			
FH			
GH			
HH			
CG	0	0	
DG	53	11	
EG	2	5	
FG			
GG			
HG			
CF	0	4	
DF	43	21	
EF	2	1	
FF			
GF			
HF			
CE			
DE			
EE			
FE			
GE			
HE			

INTENSITY

1		1		1	
	4	1	1		
1	1	1	3	3	1
	3	1	1	1	
		1	2	1	
1		1	1		
		1	1		

EBSZ1711.203
EBGL1711.263
EBSH1711.323
EBLV1711.373

06-02-1992

```
DATE ----------- : 06-02-1992
WIND DIRECTION - :
WIND SPEED ----- :
CLOUDS ---------- :
VISIBILITY ----- :
TEMPERATURE ---- :
PRESSURE ------- :
RADAR STATION -- : EBSZ
RADAR SETTINGS - :
FILENAME ------- : EBSZ1711.203
```

GRF	>0 <2000 ft	>2000 <4500 ft	>4500 <8000 ft	>8000 <10000 ft	>10000 ft	TOT	PLOTS TRK	%MISSES	LENGTH	HEAD.	%ACCU.	INT
CH												
DH												
EH												
FH												
GH												
HH												
CG	0	0	1	0	0	1	2	0	2	53	100	1
DG	53	11	4	0	4	72	181	0	3	18	66	4
EG	2	5	10	6	0	23	54	0	2	45	69	1
FG												
GG												
HG												
CF	0	4	5	0	0	9	22	0	2	101	66	1
DF	43	21	21	1	1	87	224	0	3	48	68	5
EF	2	1	2	0	0	5	10	0	2	181	67	1
FF												
GF												
HF												
CE												
DE												
EE												
FE												
GE												
HE												