

## MEPROS

The measurement of wind turbulence and wind profiling systems are important both for air safety and for energy production.

We've never travelled so much for business or for pleasure before. Flying more airplanes inevitably increases the risk that they will encounter some turbulence, at the same time we have to ensure that it remains the safest means of transportations. Thanks to a consortium of small and medium enterprises and academic research partners a software programme has been developed that can identify and eliminate underlying noise peaks in the electronic signals of wind profiles.

ITW:

Mark SEUBERT

Captain 747 Lufthansa

'When the plane encounters turbulence, its position is shifted. According to the level of turbulence, the movement is amplified. Sometimes, the movement becomes very violent, in the horizontal axis and in the vertical axis. This clearly influences the passengers' comfort level, and can also constitute a certain risk.'

In order to measure the air movements in sensitive areas such as airports, we use RADAR WIND PROFILERS. German SME Scintec built this radar on the site of the Frankfurt airport for the Deutsche Flugsicherung.

ITW:

Dr. Jens KONOPKA

Deutsche Flugsicherung=Client

'This is the core of our installation. We are in a radar wind profiler that measures wind and air temperature. It is equipped with an acoustic sonic radio system. What you see here is the antenna, whose total area is of 25 square meters. The entire installation is 400 square meters'.

The radar is combined with a very powerful sound system that consists of thousands of transmitters.

Animation:

The sound produced is reflected against the air at various altitudes, which detects airwaves. The radar can then produce an image of these air movements along a column of around one and a half kilometres high.

Previously when airplanes or birds over flew the radar, the measurement was not recorded accurately.

ITW:

Dr. Jens KONOPKA

Deutsche Flugsicherung=Client

Jürgen Spiess

ITW:

Jürgen Spiess

SHE Information Technology

And here again, European SMEs gave us the solution to this problem of air safety.

Map:

European project MEPROS is a cooperation research project, which brings together 7 SMEs.

SHE Informations-technologie AG, Scintec AG, and Metek GmbH in Germany, Bristol Industrial & Research Associates LTD and University of Salford Enterprises (UK), Eurelectronica ICAS SRL in Italy, and the Espace Eolien Developpement in France.

These small and medium enterprises collaborated with the FACHHOCHSCHULE in WORMS and the BREMEN University in Germany, and with the AVEIRO University, in Portugal.

The MEPROS project started in November 2002, and ended in October 2004.

The European Union contributed to €511700 (five hundred and eleven thousand seven hundred euros) of the total MEPROS budget, which is of 1 049 000 €(one million forty nine thousand euros).

The ZETEM, the Bremen University's Zentrum für Techno Mathematik designed the mathematical instrument that made it possible, as it were, to make the planes radar signatures disappear so that we can only measure wind turbulence.

ITW :

Lutz Justen

ZETEM,Zentrum für Techno Mathematik

University of Bremen

'When an airplane over flies the antenna, it reflects radar waves. When you measure these waves, the result can give some erroneous interpretations on the speed of the wind. I will demonstrate this... what you have just heard is the radio signal, which I transformed into sound, and this (whistle)... is the echo of an airplane. We call this a TSJIRP in English. We will make this interference disappear. This is the same signal, but treated with the MEPROS tool... you can hear that the TSJIRP has completely disappeared.'

This formula was designed through a collaboration between the Bremen University in Germany and the Aveiro University in Portugal.

ITW :

Dr. Paula Cerejeiras

University of Aveiro Portugal

'The participation of the Aveiro University consisted in optimizing the algorithms for the project. We received data and the necessary information to work on these algorithms which we refined according to the parameters requested by the University of Bremen'.

The result is that it works under all circumstances, airplane or not.

ITW:

Dr. Gerd Teschke

ZETEM,Zentrum für Techno Mathematik

University of Bremen

'It was essential that we met with companies in Rome, Lille (in France), in Ludwigshafen (in Germany), and in Bristol (in England), to determine the details, since the parameters had to be optimized to improve the quality of the product.'

The final product needed to adapt for multifunctional exploitation of potential markets

ITW :

Jürgen Spiess

SHE Information Technology

‘Some companies will resell the software. Others will use it under a different form. This will allow them to increase the performance of the measuring equipment, especially for the quality of the data. In terms of application, we have the air transport market, where we will obtain more specific data that will allow us to economize on fuel. Another application is the implementation of wind generator parks, which tend to be hazardly planned, In the future this new software equipment will allow more effective implementation of these. This will allow a higher return on investment. You see, we finally managed to transform our project to a real success story for all the partners involved.’