

# EUROMECH

EUROPEAN MECHANICS SOCIETY

# Final Report

Please send this report to the Secretary-General of EUROMECH, within one month after the Colloquium.

EUROMECH Colloquium No: 364

Title: *Dynamics and statistics of concentrated vortices in turbulent flows*

Dates and location: *CARRY-LE-ROUET (FRANCE) 23-27 JUNE 1997*

Chairman: *LE DIZÈS Stéphane*

Co-Chairman: *MOFFATT Keith*

Is there need of another Colloquium on the same or a related subject? Which year?

Full registration fee: *1700 FF*

What other funding was obtained?

What were the participants offered?

Number of members of EUROMECH (reduced registration fee): *50*

Number of non-members of EUROMECH (full registration fee): *40*

Number of participants from each country:

Austria	_____	Germany	<u>6</u>	Romania	_____
Belgium	_____	Great Britain	<u>7</u>	Russia	<u>5</u>
Byelorussia	_____	Greece	_____	Slovakia	_____
Bosnia	_____	Hungary	_____	Slovenia	_____
Bulgaria	_____	Ireland	<u>1</u>	Spain	<u>3</u>
Croatia	_____	Italy	<u>8</u>	Sweden	_____
Czech Republic	_____	Latvia	_____	Switzerland	_____
Denmark	_____	Lithuania	_____	Ukraine	_____
Estonia	_____	Netherlands	<u>1</u>	Yugoslavia	_____
Finland	_____	Norway	_____	Others	<u>20</u>
France	<u>36</u>	Poland	<u>2</u>	Total	<u>90</u>
Georgia	<u>1</u>	Portugal	_____		

Please turn

# EUROMECH Colloquium364

## Dynamics and Statistics of Concentrated Vortices in Turbulent Flows

Carry-le-Rouet, 23-27 June 1997

### Final Report

The conference was devoted to the study of turbulence from a dynamical point of view. The goal was to gather experimentalists, numerical and theoretical physicists, working on Vortex Dynamics and Turbulence in order to stimulate the development of new methods and new ideas in Turbulence Modelling. This goal has been reached with the participation of 90 researchers from 17 countries. Several new results were presented and there were numerous animated and enriching discussions between the participants.

#### ***I- Conference organisation***

The conference announcement has been widely diffused using different means (scientific journals, internet, e-mail, diffusion during other meetings). The main industrial groups (CNES, EDF, GDF, CEA, Aérospatiale, SNECMA, Dassault, SEP) have also been contacted to participate in the organisation of the conference. Unfortunately, very few responses have been received from them, and only one engineer effectively attended to the conference. The meeting has been supported by public organisms. In particular, an important grant from the European Community has been used to support young researchers (50% of the participants), et researchers from less-favorised regions (10% of the participants). The selection of the participant has been done from abstracts by a scientific committee formed of imminent specialists from vortex dynamics and turbulence. The committee has also selected the most interesting papers (1/4 of the participants only) to be submitted for publication in the European Journal of Mechanics B/ Fluids in a special issue dedicated to the conference. The meeting was hold in a quiet and isolated hotel in Carry-le-Rouet (near Marseilles, France).

#### ***II- Scientific themes***

All the themes debated during the conference were connected to the general issue of finding the role of concentrated vortices in turbulent flows and in transitional flows. The following topics have however received a particular attention :

- Experimental and numerical evidence of localised structures in turbulence flows. The main question was : what is the geometrical nature of localised structures ? And in particular, are these structures described by known vortex models, such as Burgers vortex ?
- Statistical properties of turbulence : theoretical predictions, numerical and experimental results. The main issue was : what is the dependency of scaling laws on localised structures ?
- Vortex dynamics : asymptotic analysis, numerical simulation and experiments. These studies focused on simple configurations in order to understand the dynamics of a vortex during its interaction with another vortex, with a wall, with a free surface, etc ...
- Vortex stability analysis. The main question was : how and why are vortices destabilised by the external field?
- Complex flows (boundary layers, shear flows, wakes, stratified flows). The issue was in several talks to understand the transition to turbulence using vortex dynamics and vortex stability results.