

Please send this report to the Secretary of the European Mechanics Council, Professor Bengt Lundberg, Dept of Mechanical Engineering, Luleå University of Technology, S-951 87 Luleå, Sweden, within one month after the Colloquium.

General

Euromech Colloquium No: 309

Title: Optical Flow Diagnostics

Co-Chairmen: Dr. K. Bütetfisch (DLR); Dr. J.P. Bonnet (Poitiers);
Dr. W. Beck (DLR)

Place and country: DLR, Bunsenstr. 10, 37073 Göttingen, Germany

Dates: 28. Sept. - 01. Oct. 1993

Finance

The conference fee ~~-----included~~ was not levied.

Funding: DM 6.000,-

Accommodation (type and cost): hotel rooms, DM 100,- per night

Meals: Canteen lunch DM 7,- per day both optional
Conference dinner DM 42,-

Participation

Total number of participants: 32

Distribution of participants by country:

<u>Code</u>	<u>Country</u>	<u>Number</u>	<u>Code</u>	<u>Country</u>	<u>Number</u>
A	Austria	<u> </u>	IRL	Ireland	<u> </u>
B	Belgium	<u> 1 </u>	LT	Latvia	<u> </u>
BG	Bulgaria	<u> </u>	LV	Lithuania	<u> </u>
CH	Switzerland	<u> </u>	N	Norway	<u> </u>
CS	Czechoslovakia	<u> </u>	NL	Netherlands	<u> </u>
D	Germany	<u> 23 </u>	P	Portugal	<u> 1 </u>
DK	Denmark	<u> </u>	PL	Poland	<u> </u>
E	Spain	<u> </u>	R	Rumania	<u> </u>
EE	Estonia	<u> </u>	S	Sweden	<u> </u>
F	France	<u> 3 </u>	SF	Finland	<u> </u>
GB	Great Britain	<u> 1 </u>	YU	Yugoslavia	<u> </u>
GR	Greece	<u> </u>	CIS	CIS	<u> </u>
H	Hungary	<u> </u>	-	Others	<u> 1 </u>
I	Italy	<u> 2 </u>			

see annex 1.

Is there need of another colloquium on the same subject? Which year? Yes. 1995

Scientific Report

The Euromech 309 Colloquium titled "Optical Flow Diagnostics" was devoted to non-intrusive measuring techniques being used in experimental fluid mechanics. The topics covered:

- spectroscopic methods such as CARS, LIF, emission and absorption techniques
- non-spectroscopic methods such as Schlieren, interferometry, LDA, Rayleigh scattering.

The 4 day colloquium was divided into 10 Sessions, as shown in annex 2.

Although there was considerable initial interest, the final number of participants was relatively small. Several scientists from Russia, Estonia, and Slovakia were finally not able to participate as funding could not be provided. Even colleagues asked to act as chairmen had to cancel their attendance for the same reason.

Compared with the Euromech 260 Colloquium (1990), which was devoted to a similar topic, some characteristic trends can be pointed out:

- The number of papers is identical (30) with only 8 common groups.
- The number of presentations in some topics is very stable (e.g. CARS, thermography, holography).
- The techniques discussed in the following categories have matured considerably and have shown improved precision or application range:
 - RELIEF
 - PIV
 - combination methods such as CARS/Rayleigh, LDV/Rayleigh, LIF/EF/Raman/Rayleigh
 - collective light scattering.
- In some some areas there were no new results presented, e.g. LIPA, ultrasonics.
- Some methods are brand new (compared to 1990), e.g. filtered Rayleigh, Doppler global.
- Some new domains were covered, e.g. bio-mechanics.

In summary, it can be stated that considerable progress in the development and application of spectroscopic methods to experimental flow phenomena could be noticed; the number of these contributions relative to the more "classical" methods such as LDA was considerably increased. The non-intrusive (optical) experimental techniques have undergone a rapid evolution mainly due to improvements in laser methodologies, data collecting and processing (image analysis). There is also a consistent trend towards more and more emphasis being placed on spatially resolved techniques, i.e. where in one measurement 2d information is obtained. The further developing interest in transient phenomena (e.g. turbulence) also places special demands on existing techniques and provides an impetus for the development of new methods. These trends could be clearly seen in the presentations at this Colloquium.

A further positive development is the maturing of several techniques. Whereas several techniques are still at the laboratory-bench stage, others are ready to be (or have already been) used in industrial environments. In this sense, the domains of application are rapidly growing, and quite complex flow systems can already be analysed.

On this basis, it is recommended that after a period of about two years a subsequent colloquium should be held. Prof. Carlomagno from the University of Naples has already expressed an interest in organizing a future colloquium devoted to this topic, a wish with which the organisers of Euromech 309 readily and whole-heartedly concur.

