

La lettre des Syzygies

The Fluid Optics' letter

1998, December

EDITORIAL

The Syzygies' letter is edited on quarterly basis at solstice and equinox dates, as means its name. Here is then the winter solstice edition of 1998.

This Letter is the opportunity for Fluid Optics inventors to share their ideas and researches in order to promote this revolutionary concept. It is targeted to the people interested by innovating optic concept, from research and development laboratories, to end users, including manufacturers and the light mounters.

So, the Syzygies' Letter includes theoretical informations to better understand why and how the Fluid Optics has unquestionable advantages compared to the Traditional Optics. Industrialized solutions are also presented as proofs of these advantages.

Specific aspects of the majors tools used, Horus and Khnoum are presented. These home-made tools allow studies and simulations of any optical components developed by us.

Each letter is also the opportunity to highlight one of these components in the "Products" paragraph.

Innovating ideas on various optical systems are also presented.

At least, we communicate news regarding the Fluid Optics evolution and its Web site.

Obviously, such a letter cannot be alive without ideas share with readers. This letter is yours and if you want specific subject details, please get in touch by Email or through our web site.

The Fluid Optics inventors

THEORY

IN MOST CASES, THE "FLUID" CURVES ARE BETTER THAN ELLIPSES

Some theoretical studies and photometric measures, have been simultaneously made. The coherence of these results proves that the "Fluid Optics" curves have, in most cases, better yields than the ellipses have.

In this article, a comparison between an elliptic reflector and a "Fluid Optics" one is shown. In this study, a lightsource with a transversal filament is used.

We have compared these reflectors in 30 different configurations according to the filament length and the diameter of the target.

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Comparison between an elliptic relector and a Fluid Optic reflector

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PRODUCTS

FLUID OPTICS TAKES THE PARISIAN UNDERGROUND RAILWAY

There was no more new underground line in Paris since 60 years. The 14th line (METEOR), inaugurated in October, is different from all previous lines by the utilization of innovative technologies.

The Underground trains are auto-piloted, but the RATP also wanted a particular atmosphere. A remodelling of all the lightings of the corridors was necessary. So, the RATP wanted to light the lower part of the escalators. The budgets provided for the lightings necessitated to use plastic side-glow fibre optics. The heat fragility, the considérable length of some escalators and small overall dimensions required were great constraints and made the problem very difficult to solve. The NOVO CONCEPT company, a subcontractor of these lightings, decided to call upon the Fluid Optics' help.

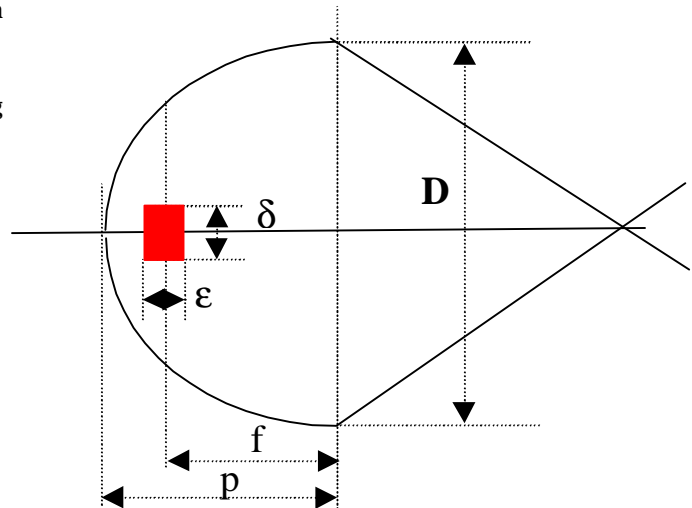
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THEORY

We have taken care of comparing similar reflectors in dimensions.

So, we have chosen two reflectors with the following parameters :

Paramètres	Elliptic reflector	Fluid Optics reflector
D (mm)	100 mm	100 mm
S(mm ²)	7854 mm ²	7854 mm ²
p (mm)	118 mm	109 mm
f (mm)	93 mm	93 mm



where S is the projected surface (opening surface).

So, we verify that these parameters are the same except the depth (p) which is smaller in the Fluid Optics reflector.

When the diameter of the target set at 120 mm from the filament (focal length of the ellipse) and δ , the filament length move, we get the following results :

YIELD GAINS OF THE FLUID OPTICS REFLECTOR COMPARED TO THE ELLIPTIC REFLECTOR

Filament length	Diameter of the target				
	8 mm	24 mm	40 mm	56 mm	72 mm
1 mm	- 39 %	14 %	68 %	109 %	108 %
6.5 mm	- 13 %	1 %	28 %	61 %	55 %
13 mm	8 %	28 %	36 %	49 %	49 %
26 mm	10%	3 %	17 %	29 %	33 %
38 mm	29 %	26 %	23 %	22 %	20 %
52 mm	51 %	28 %	15 %	13 %	8 %

Reading : At the intersection cell of the column “diameter of the target 40 mm” and the line “length of filament 13 mm”, the Fluid Optics reflector has a 36% better yield than the elliptic reflector.

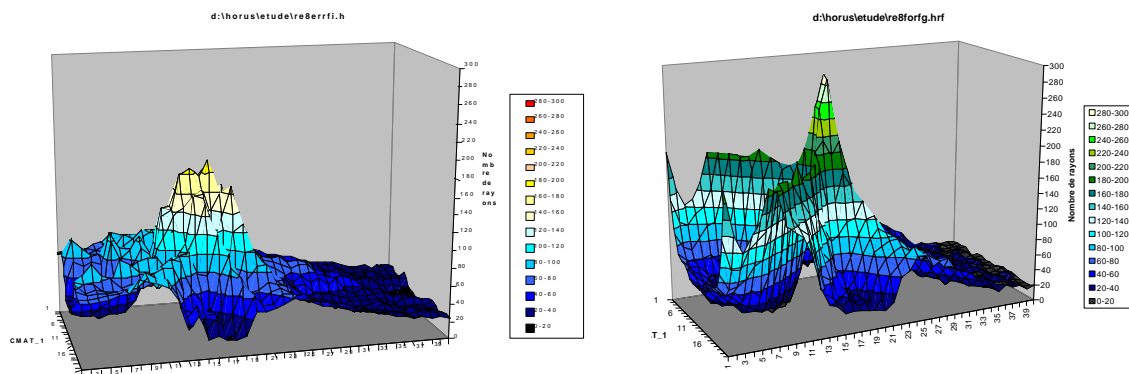
We verify in most cases that the Fluid Optics reflector has a better yield than the elliptic reflector.

It could be interesting to compare the quality of the quasi-focussing between these two reflectors. So, thanks to our simulation software Horus and the utilization of enumeration matrix sensors, we are able to see the focussing zones.

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THEORY

COMPARATIVE SIGHTS OF FOCUSING ZONES OBTAINED WITH THE ELLIPTIC REFLECTOR AND THE FLUID OPTICS REFLECTOR



Case with a 52mm filament length and a 72mm target diameter.

We notice that the focussing zone of the elliptic reflector is flatter. We can also notice that the maximum of light intensity is higher with the Fluid Optics reflector. Moreover, the focussing is better.

This comparative theoretical study between an elliptic reflector and a Fluid Optics reflector proves that, in most cases, the Fluid Optics concept allows to obtain better focussing yields than with an elliptic reflector.

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SOFTWARES

THE LATEST VERSIONS OF HORUS AND KHNOUM

2D SIMULATION : HORUS, THE 2D OPTICAL SIMULATION SOFTWARE OF THE FLUID OPTICS

The new 8.5 Horus version further develops the conception of optics through a visual and interactive way.

Thanks to new PCs workstations and its visual interactive module, this software allows to find quicker Fluid curves solving optical customer issues.

A module, converting Fluid curves in pieces of lines and arcs, brings now the ability to provide an optical profile with a determined tolerance without using NURBS curves.

It allows our subcontractors and customers to get a simple model of our Fluid curves, these ones not being understandable by optical simulation softwares, CAD, and so on... of the state of art.

3D SIMULATION : KHNOUM, THE 3D OPTICAL SIMULATION SOFTWARE OF THE FLUID OPTICS

A new tool is born with the Khnoum version 6. We can provide even more realistic simulations to our customers.

As a matter of fact, with its photometric/radiometric calculation module, Khnoum integrates data from measurements of source spacing spreading, dioptric or reflecting surfaces, With this data, it gives a radiating model issued from the optical system in the scales and units requested by customers.

With its original concept of differred analysis, all arrangements and interferences of the different optical parameters taken into account can be obtained with a single and unique simulation.

Recently, we simulated a project including more than 3,000 dioptric surfaces, successfully. Then, we have been able to analyze the influence of each surface in the project : projecting flux, each surface efficiency, and so on.

Within another project framework, we imagined an optic using data from space distribution measurements, we built up these optics by diamond tooling, we measured dimensionally these pieces, we generated the surfaces from dimensional measures in order to simulate them again, replacing the theoretical surfaces.

It underlines the coherence of the results : beam profiles between the final photometric measurements on the prototype and the theoretical simulation are very close to each other.

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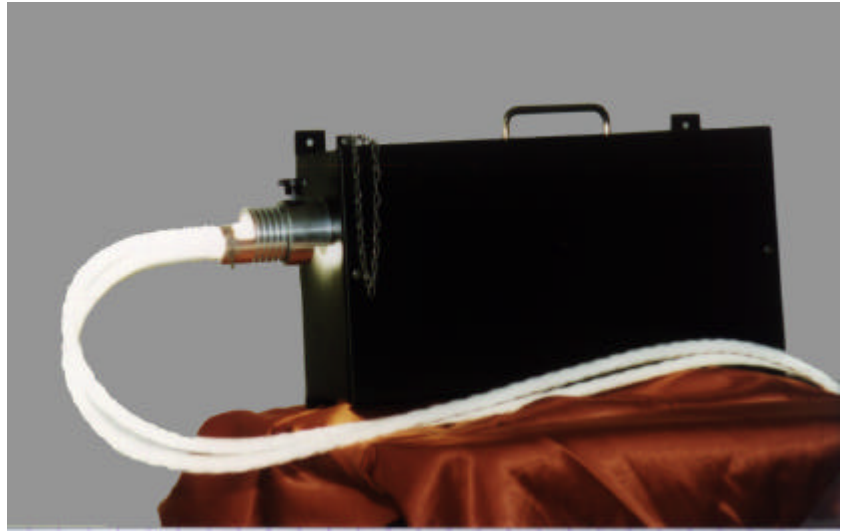
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PRODUCTS

FLUID OPTICS TAKES THE PARISIAN UNDERGROUND RAILWAY

We had to take these constraints into account and, at the same time, to have a very good yield.

We took up the wager. After some theoretical studies and some software simulations of our new reflector and its light source, we had made realized a prototype. This prototype was in a perfect coherence with the theoretical expectations. A 150 Watts illuminator having an excellent yield was born.



150 Watts illuminator used in the METEOR escalators

The Fluid Optics complied with the requests. So, all the METEOR escalators were set up with these illuminators.



Sight of a METEOR escalator.
We can see the side-glow plastic fiber near the steps

The Fluid Optics inventors are studying a 3 Kw (3 times 1kW) illuminator for plastic fiber optics.

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IDEAS

FLUID OPTICS HELPS LEDS

With the lowering of their prices and the arising of their luminous power, the light emitted diodes are more and more used in industrial applications. The Leds are still more expensive than the classical light sources but their life time is bigger seeing that some Leds have a 10,000 hours life time. This life time involves very important money saving in maintenance costs. This makes Leds very attractive. But Leds are not often used in lighting for two principal reasons : their small luminous power and the tightness of their beam.

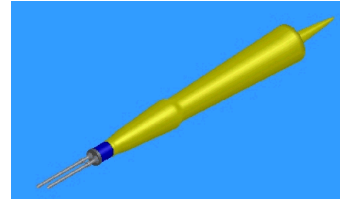
The simultaneous using of several Leds can compensate their small power. But, the beam widening means are missing and except in some cases, we can't provide a lenses in front of each Led.

Thanks to its ability to transform the light coming from several light sources into a single beam, the Fluid Optics solved this problem. So, we have conceived an optic which transform the tight beams of 21 Leds which are simultaneously used, into a π steradians (quarter of sphere) quasi-uniform beam.

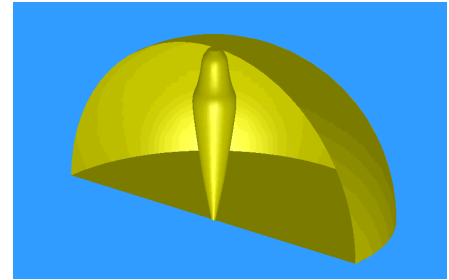
The theoretical results was good, so we have made realized a prototype. We can see it on the photo. The optical art is polished.

Some important progresses allow to utilize Leds more and more frequently. The Fluid Optics didn't want to be missing in the potentialities of this market. The Fluid Optics has proved that it efficiently participates in the scientific and technical progress.

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Photometric solid model of a Led



Photometric solide models of 21 Leds without (center) and with (quarter of sphere) fluid optic.



Sight of the prototype of the optic

NEWS

PROBLEMS OF GEOMETRY

We have received a first answer to the any diopter problem of our web site <http://home.worldnet.fr/of>

Unfortunately, this answer is not complete, but it is on the right way...

We could receive the right answer soon.

NEXT ITEMS

Soon, we shall develop the following subjects :

- ⇒ Comparison between a parabolic reflector and a Fluid Optics reflector,
- ⇒ The Fluid Optics and the car industry,
- ⇒ Uniform light diffusers,
- ⇒ The new versions of our softwares, and any item you would like us to treat in these pages.

You can contact us by Email at :

of@worldnet.fr

You can also contact MEGALUX, the firm in charge of the exploitation of the Fluid Optics at : info@megalux.com

NEXT LETTER

You will receive the next Letter of the Syzygies for the spring equinox in March.

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