

EDITORIAL

We have the pleasure to present you the letter of the Syzygies of the summer 2003.

In the theory column, you will find an article on the researches, led using Fluid Optics, intended to create Concols.

In the Products column, you will find interesting attempts on Hélios, the powerful Fluid Optics illuminator for plastic fibre optics. You will find also in this column the technical specifications of the AeroptiK®, a new beacon type for flying clubs.

Finally, do not miss the column News which treats necessary information to visit the stand of the Fluid Optics at the next exhibitions.

The inventors of the Fluid Optics

PRODUCTS

HELIOS ILLUMINATOR®

The SIBYLUX company, representative for the manufacture and the marketing of the most powerful Fluid Optics illuminator for plastic optical fibres, pursues the development of its products.

Its main product called, HELIOS ILLUMINATOR®, has presented excellent performances with a discharge lamp of 1800W (several hundred hours of functioning without any breakdown and producing regularly a luminous power between 80000 lumens and 90000 lumens under an ambient temperature around 60 °C). It has passed the tests of qualification for the functioning with a source of 2000 W. This illuminator offer a little more powerful lighting than the previous model, always deprived by heat and so useful with plastic optical fibres.

Several attempts made with plastic optical fibres, in longitudinal conduction and in side glow emitting of light, showed that it was possible to

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SUMMARY

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The Concols.

Products

HELIOS ILLUMINATOR.

Technical specifications of the AeroptiK®.

News

First publication in the «Techniques de l'Ingénieur»

THEORY

The Concols.

After the work of several years on different specific reflectors, the notion of reflector with fluid profile, calculated from the concept of the Fluid Optics, deduced from rules and specific methods of geometry, began to assert itself. Most wanted cases were resolved successfully. It is necessary to recognize that certain very particular cases

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create a sign, constituted with optical side glow emitting fibres (10 metres length), situated at the extremity of a bundle of longitudinal conduction optical fibre (90 metres length).

Attempts were realized with 180 metres of side glow emitting fibres. This fibre intensely illuminates and allows ornamental or signs and markings effects. (See photo below).

Furthermore, to prepare the future, attempts in power were led even farther. The modern conception of the HELIOS ILLUMINATOR[®] allows it to receive a discharge lamp of a power of 6 000 watts. This illuminator should be able to supply 270 000 lumens (at the exit) with an ambient temperature near of the temperatures already known.



The team of Research and Development of SIBYLUX and MEGALUX was able to record, during these attempts, the incredible capacity of the generator to transfer very big luminous powers.

We can think that the future developments of the HELIOS ILLUMINATOR[®] will allow new lighting projects impracticable previously.

Three HELIOS illuminators of small power (2000 watts) will be in functioning at the OPTO exhibition in PARIS from October 21 till October 23, 2003 (Stand R32) and at the Bâtimat exhibition in PARIS from November 3 till November 8, 2003 (Stand Hall 7.2-G54).

(creation of homogeneous flux very opened at very short distance, in the case where the dimensions of the source and the reflector are very close) have not yet received a completely satisfactory solution. However, there is henceforth some general method allowing to design many solutions.

In other respects, purely dioptric applications were achieved and presented to the public, even answered specifications with elegance.

MEGALUX, while pursuing its researches on reflectors, works more particularly on the concept of «CONCOL».

Etymology: word CONCOL was invented by the team of the Fluid Optics, and lack of anything better (we are open to suggestions) this word was kept.

Word CONCOL results from CON for CONCENTRATION and from COL for «COLINEARISATION».

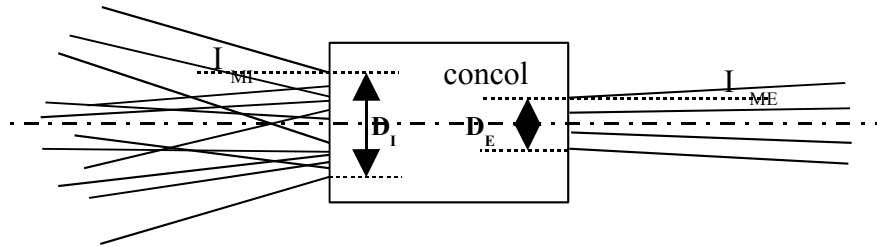
In the on-line placed lexicon, you can visit certain words corresponding to this CONCOL's notion,

Definition: The «CONCENTREUR-COLINÉARISEUR» or CONCOL has for function to collect all the types of

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beams resulting from one or several sources (leds and extremities of optical fibres), concentrate this light and make it more colinear.

The «concentreur-colinéariseur» has the double function to concentrate and to make a colinear beam of light. The emergent beam must be more closed than the incidental beam $I_{ME} < I_{MI}$ and when it is possible, to try simultaneously to reduce the diameter of the emitted flux with the CONCOL $D_E < D_I$.



Putting in geometry of this problem is very delicate, and we never managed to resolve, until this day, this problem using the families of diopter used in traditional optics. (It does not mean necessarily that this problem is impossible, but means only that we did not know how to resolve it).

[Brief Reminder of information already published in the letter of Sizygies]

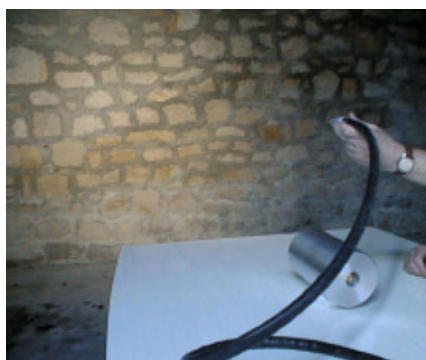
This assertion has already raised controversies but a CONCOL, intended for the architecture, was already realized and works very well. This one, already presented in the letter of the Sizygies of the autumn equinox 2000 (in September, 2000), transforms a beam of light resulting from a bundle of optical fibre opened to 60° in an opened organized beam which the half angle is lower than 3° (55% of beams have an angle lower than 1° and 33% of beams an angle between 1° and 2°).

The photo presents the illuminator and its optical fibre lighting the entry of the CONCOL. The illuminator is one of the states of the art for optical fibre equipped with a light bulb of electric power of 50W. This CONCOL is realized in PMMA.

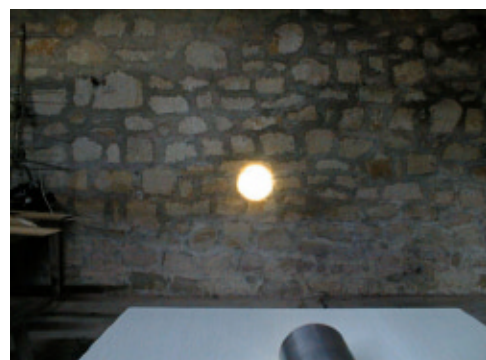


Two photos below put in evidence the effect of the CONCOL on the beam at the exit of optical fibre. The first left photo presents the flux on a wall situated at 3 metres. The second right photo presents the spot of light on the wall situated at the same distance. In both cases the illuminator creating the flux of light is the same.

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Without Concol



With Concol

The beam of light coming from the optics is in accordance with simulations.

The light, entering by the entry face is collected and organized and is sent to the exit in the same direction. It is important to note, that in the geometrical functioning of the CONCOL, no light is lost because it does not strike on any part of the aluminum cylinder. Inside the CONCOL, there is no internal mask, or optical trap intended to eliminate the badly steered beams.

In summary, this CONCOL create, at 50 metres, a spot of light with very net edges, from the flux of light, coming from an extremity of optical fibre.

After to have shown the undeniable superiority of the fluid profile, applied to calculations of reflectors, with regard to the traditional profile (circle, parabola ellipse), for vast or very vast sources, MEGALUX turns to studies of CONCOL in different configurations.

Hypotheses will be following ones:

a) In a first time, one will have an interest in the results of geometrical studies (2D). So, one will have an interest in purely geometrical results. One will use 3D geometry as support has CAD creations.

b) Respect for the canonical texts:

This study takes into account CARNOT's principles (SADI CARNOT and the development of the thermodynamics - publishing of the NATIONAL CENTRE FOR SCIENTIFIC RESEARCH - on 1976), respects the relation of invariance of CLAUSIUS, takes into account results presented in sir's thesis p. MALIFAUD, and many other fundamental results.

c) One will respect also the notions of states of order of flux. This notion was briefly presented, for the first time, in the letter of Sisygies of the Winter solstice 2000 (in December, 2000). In summary: More is a flux disorganized, more is difficult to control it. As a consequence, putting in geometry to create a new CONCOL should be subordinated to a maximum improvement of the state of order of the initial flux.

d) One arranges an initial flux of light of diameter I and of beam $2\alpha = I_{MI}$. One wishes to create an emergent flux of diameter D_E and of opening beam $2\beta = I_{ME}$.

e) The studied CONCOL should have to, in priority, create an emergent beam more closed than the incident beam $I_{ME} < I_{MI}$ and when it is possible, to try simultaneously to reduce the diameter of the beam emitted with the CONCOL $D_E < D_I$. (NOTED: we know cases where these two conditions are realized).

f) One keeps constantly at the spirit, that for every case, there is an unbridgeable limit of concentration or of «colinearisation», and even two at the same moment.

At present, CONCOLS, intended to concentrate and to «colinearise» the flux of light resulting from an extremity of optical fibre of an useful diameter equal to 65 mm and opened in $2\alpha = 120^\circ$, is at the end of study. Two copies should be realized and presented to OPTO's exhibition on 2003 (Stand R32). If theoretical problems are delicate, technological realizations are not simpler. We hope that these models will be ended in time.

PRODUCTS



Autonomous VFR night beacon

<http://aeroptik.com>

Aéroptik® Beacon

Light : omnidirectional type

Luminous Intensity : ≥ 25 Cd

Compliance : annex 14 OACI measured by the STNA

Lamp : 15 Watts

Lifetime : 200 hours

Power supply : 12 Volts with waterproof Lead battery

Autonomy

With 7 Ah battery :

- 4,5 hours with discharge at 80 %

- 5,5 hours with total discharge

With 12 Ah battery :

- 8 hours with 80 % discharged

- 10 hours with fully discharged

Weight :

4 Kg with 7 Ah battery

5 Kg with 12 Ah battery

Overall dimensions : L x l x h

18 x 23 x 27 (cm)

Grip of load : Japan type

Switch: 2 waterproof poles

Individual charger :

Output current = 0,6 A with preservation of the maximum load (floating)

Time of load after 80 % discharge : 10 at 12 o'clock.



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Beacon KIT 910

This kit allows the sign and marking of a track until 1020 m.

Composition

- 38 beacons of white colour (edge of runway)
- 12 beacons of green and red colour (threshold of runway)
- 50 typical batteries (drum kits) lead (shot) seals (quenches) 12 volts 7 Oh
- 50 chargers
- 50 halogen lamps of 15 watts 200 lumens
- 1 technical documentation

Price : 22800 € TTC

Study and design :



90 rue Saint Louis en l'île
75004 PARIS

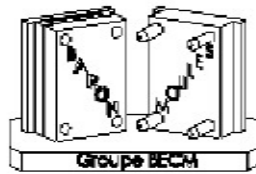
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NEWS

MEGALUX and SIBYLUX companies will present new products based on the concept of the Fluid Optics at the OPTO 2003 exhibition (stand R32) and at the BATIMAT 2003 exhibition (stand Hall 7.2-G54).

A complete part, dedicated to the Fluid Optics, was published in the column innovation of the «Techniques de l'Ingénieur».

The web site of the letter of Syzygies is at the address : <http://www.syzygies.optique-fluide.org>. In this site, you can consult all the previous letters of Syzygies. If there is a subject you wish to see treated in this letter, you can directly contact us by email at the address: redaction@syzygies.optique-fluide.org. On the internet site of MEGALUX (<http://www.megalux.com>), you can consult, directly in line, all the documentation of the company as well as articles. For more information about HELIOS ILLUMINATOR, go to the site of the SIBYLUX company at the address: <http://www.sibylux.com>.

NEXT LETTER

The next Letter of Szygies will appear during the Autumn.

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