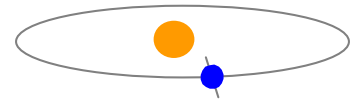


Fluid Optics™ Letter

La lettre des Syzygies



Spring 2003

EDITORIAL

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

In concept and products columns, you will find, the continuation of the article on the development of a new type of beaconing for flying clubs.

The powerful Fluid Optics' illuminator for plastic fibre optics, Hélios 18, was at the EuroLuce exhibition of Milan and has achieved a big success.

Also, we present you, polarizers, made by the German CODIXX company, which will surely interest the physicists and the designers.

Finally, you will find our thanks to Sir professor Jean Fresnel. He devoted a part of his precious time to read some of our theoretical works.

The inventors of the Fluid Optics

CONCEPT

AIR BEACONING OF THE AERODROME

We saw, in the last letter of silygies, this same air beaconing of aerodrome presented in a dioptric version.

This new version, constituted with reflectors, has the same photometric characteristics as the previous version. Furthermore, this new optical system is heat-resitant.

Indeed, in the Dioptric version, a monolithic optical block surmounts the reflector and the source, the whole forming a small stuffy space being able to limit the power from the used sources. To make the Dioptric version viable technically, it would only be necessary

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Aeroptik prototype, measured by the STNA

PRODUCTS



VFR portable beaconing of night

The VFR(1) of night attracts more and more pilots. It is an enriching alternative in local flights or in small proximity navigations which inevitably tired the little fortunate pilots who can not dash into distant

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navigations. Furthermore, it is necessary to be registered in a flying club installed on an aerodrome with a fixed beaconing organized by the CCI and justified by the daily or weekly passage of a regional company. The night VFR exercises so essentially on flat forms " in hard " equipped for users in IFR regime.

On the other hand, to make night flights on a runway dating from the second world war becomes more complicated when the only users are the planes of the local flying club. It is necessary to invest... trenches, beacons, generator... amount of money being able to reach the cost of a plane.

Impossible for the small flying clubs. Then the portable beacon is necessary. No help group, no trench, no more important bill note of electricity... the simplicity. Naturally it is necessary to set up beacons before every flight and to put them in load later; but what could be a bad adventure is good for our clubs which find so a "spirit club", where each member needs the other one to share its passion. It is what stays can still be at our sailor friend's. And often evening ends, together, around a good snack.

MEGALUX, a Parisian company, look into the problem and made the impossible, a solution based on the concept of the Fluid Optics. Prototype coming from their studies recently satisfied the attempts of official services.



AeroptiK prototype, measured by the STNA

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The AeroptiK beacon is in accordance with the appendix 14 of the OACI international standards. It is equipped with a lamp of 15 watts which gives, with a battery of 7Ah, gives it an autonomy of 4,5 hours of flight in complete safety (discharge in 80 %) and more than 8 hours with a battery of 12Ah. The weight of the beacon varies so 4 to 5 kg according to used battery and its dimensions are of 18cm / 23cm in the base and 27 cms in height. The load system is made from a unique charger which optimizes the current of load and keeps the battery full for permanent availability.

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Now, it remains to make the mass production of the first 50 beacons for the airstrip of St. André (LFFD). This work is in progress with the realistic objective to have our beaconing for autumn, 2003. " "BARON moules", a local company, studies the industrialization of the product which will be widely realized in synthetic material for a simplification of the maintenance in use and a considerable reduction of production costs and sales.

If you are interested by the product for your flying club, contact us.

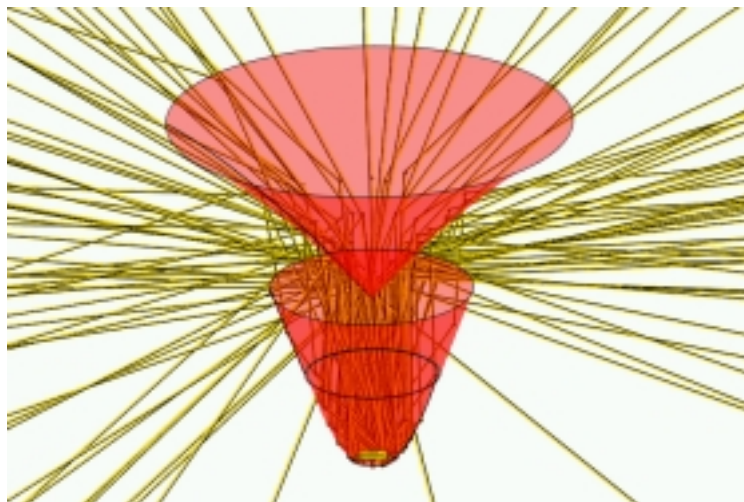
MEGALUX	01.48.04.36.03	megalux@aeroptik.com
BARON MOULES	02.32.37.92.76	baronmoules@aeroptik.com
Patrick FRANCOIS	06.20.02.23.41	patrick.francois@aeroptik.com

- (1) Visual Flying Rule : Flight according to the rules of flight at sight, which mean the use of visual external references (the natural horizon); in opposition IFR uses an instrumental reference of "artificial horizon". The IFR requires a specific qualification of the pilot and a plane equipped consequently. The VFR, it is a flight in condition of good visibility whereas IFR can be executed in condition of flight without visibility.

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to ventilate it normally.

To avoid this problem of heat, we developed a reflector intended to replace the Dioptric optic. The research software packages of the Fluid Optics, Horus 2D and Khnoum 3D, gave us a fluid curve generative of a surface of revolution.



Simulation of the new optical system
composed of two reflectors and one filament lamp

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At the moment, with this new optical system, we meet the optical and thermic specifications of the contract. The second reflector is put on the other with a gap between them allowing the heat of the source to be correctly evacuated.

HELIOS 18 PRESENT A EUROLUCE (ITALIE)

The SIBYLUX® company presented the Fluid Optics® illuminator, HELIOS 18, of a power equal to 1800 watts for plastic optical fibres, at the exhibition EUROLUCE of MILAN (ITALY) from April 8 till April 12, 2003.



Photo 1

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The generator worked perfectly during the exhibition and allowed presentations of lightings by simple and double optical fibres. Different configurations and associations of conduction and side-glow emitting fibres were used. The illuminator has achieved a big success by lighting Architects and Designers. During this exhibition, SIBYLUX® was visited by 30 % of French professionals.

The photo 1 show the illuminator and cooling system. The illuminator is used with a bundle (65-mm diameter) of fibres constituted with 5400 elementary fibres. The bundle of plastic fibres is divided in two bundles of fibres (40 mm diameter each).



Photo 2

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Photos 2 and 3 present the two extremities of the bundles of optical fibres, one emerging in the lighting, the other, posed on the ground. The bundle, posed on the ground, is constituted of first seven-meter of conduction fibre connected to seven meters of side glows emitting fibre. At the end of the bundle therefore at fourteen meters of the illuminator, it remains sufficient light for a supplementary use, in spite of the important decrease created with seven meters of side glow emitting fibers.



Photo 3

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At the exit of the illuminator, there is a plastic filter wheel with various coloured sectors. One sees on the photo, the passage of the yellow colour.

SIBYLUX® [info@sibylux.com] company will present HELIOS 18, the Fluid Optics®? illuminator, at INTEL exhibition of MILAN from May 20 till May 24, 2003, on the stand of FORT FIBRE OTTICHE. The SIBYLUX company will take advantage of it to present to the public a harness of 50 meters of fibres in functioning.

colorPol®- a new glass polarizer family by CODIXX

The CODIXX AG, a new Gennan company founded in 1998, has developed a unique technology for the production of dichroic glass polarizers in the last two years. Based on soda-lime display glass containing metallic silver nano particles a process has been developed to stretch the silver clusters and to give them all a uniform orientation causing the polarizing effects.

In 2002 a new production line was erected in Barleben near Magdeburg for the production of different types of polarizers.

ColorPol®-polarizers are flat and thin like foils, can be processed like silicon wafers, are resistant against UV radiation and solvents and temperature resistant in a wide temperature range from very low temperatures up to +400 °C. They have a high contrast ratio and a high transmittance. The wavelength ranges of maximum



Fig. 3 - various colorPol®-

polarization and contrast ratio can be adjusted according to customer's requests. The standard polarizer is available for the UV-range (340 nm - 410 nm) and for the VIS and NIR range (450 nm - 1700 nm). The contrast ratio classes are 1:10000, 1:1000 and 1:100. Higher contrast ratios are available for selected wavelength ranges. The original thickness of the colorPol®-polarizer is 200 - 400 µm. Other thickness can be obtained by grinding and polishing or by laminating the glass foils on substrates, sustaining all the excellent properties of the polarizer. Currently polarizer dimensions of maximum 50 mm x 120 mm can be reached, and the shape can be chosen by the customer. To improve transmittance and to reduce the reflectivity the colorPol®-polarizer can be ordered with an AR-layer coating.

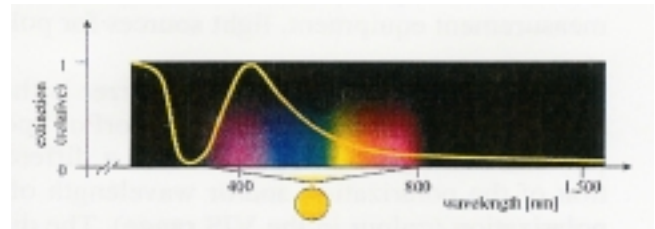


Fig. 1 - Absorption spectra of soda-lime-glass containing spherical silver-cluster

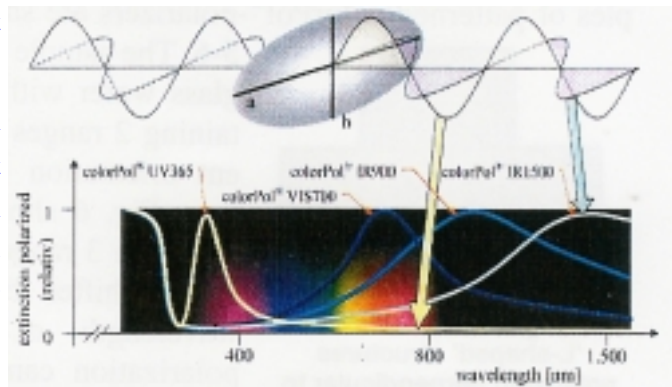
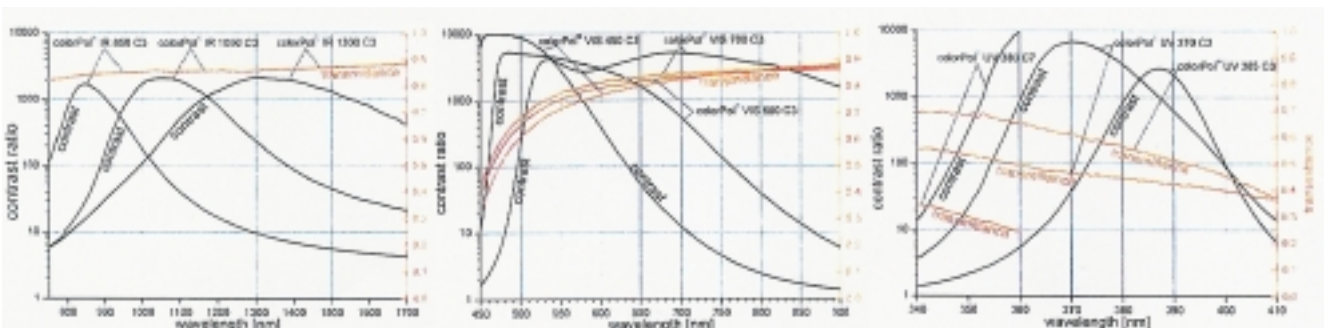


Fig. 2 - Extinction of uniformly oriented prolate silver particles

The wavelength ranges of maximum polarization and contrast ratio can be adjusted according to customer's requests. The standard polarizer is available for the UV-range (340 nm - 410 nm) and for the VIS and NIR range (450 nm - 1700 nm). The contrast ratio classes are 1:10000, 1:1000 and 1:100. Higher contrast ratios are available for selected wavelength ranges. The original thickness of the colorPol®-polarizer is 200 - 400 µm. Other thickness can be obtained by grinding and polishing or by laminating the glass foils on substrates, sustaining all the excellent properties of the polarizer. Currently polarizer dimensions of maximum 50 mm x 120 mm can be reached, and the shape can be chosen by the customer. To improve transmittance and to reduce the reflectivity the colorPol®-polarizer can be ordered with an AR-layer coating.



The colorPol®-polarizers are used in optical insulators, optical sensors, fibre applications, measurement equipment, light sources for polarized radiation, fibre gyroscopes etc.

A unique feature of colorPol®-polarizer is the chance to produce patterned polarizers. Based on the special

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properties of the colorPol[®]-polarizers CODIXX can produce polarizers with patterns of neighbouring areas with a different orientation of the polarization and/or wavelength of maximum polarization (colour in the VIS range). The dimension of the areas can be scaled down to the micron range. Samples of patterned colorPol[®]-polarizers are shown in Fig 5-6. The sample in Fig.5 is a glass wafer with chips containing 2

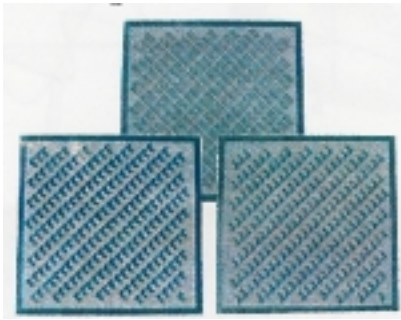


Fig. 6 - colorPol[®]S : 'L-shaped' structures polarizing perpendicular to each other for mounting on a silicon-chip after dicing

Fig 5-6. The sample in Fig.5 is a glass wafer with chips containing 2 ranges with different orientation of

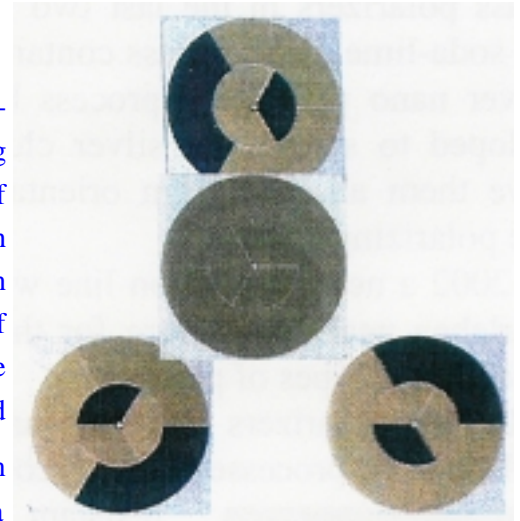


Fig. 5 - colorPol[®]S : pie-shaped patterns with 3 directions of polarization displaced 60° to each other

polarization, Fig. 6 shows a polarizer with 3 ranges of polarization shifted by 60°. The wavelength of maximum polarization can be chosen free for each range. For more information, visit the website <http://www.codixx.de>

THANKS TO SIR PROFESSOR JEANS FRESNEL
(Professor of geometry in the University of Bordeaux I)

We thank Sir Professor Jean FRESNEL to have devote a part of his precious time to read some theoretical works on the geometrical properties of the logarithmic spiral applied to the optics.

We used competence and comments of Sir FRESNEL to finalize the implementation of the first fundamental used properties in all our studies.

These properties were initially discovered thanks to the HORUS software and serve now as a base of calculus and set in geometry of all kinds of very successful reflexive optics.

You will find precious and fundamental information in the excellent book of Sir Jean FRESNEL. [Jean Fresnel - Méthodes Modernes en géométrie - Hermann 1997 (ISBN 2705614370)]

NEWS

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 documentations of the company as well as articles.

NEXT LETTER

The next Letter of Syzygies will appear for the summer solstice.