

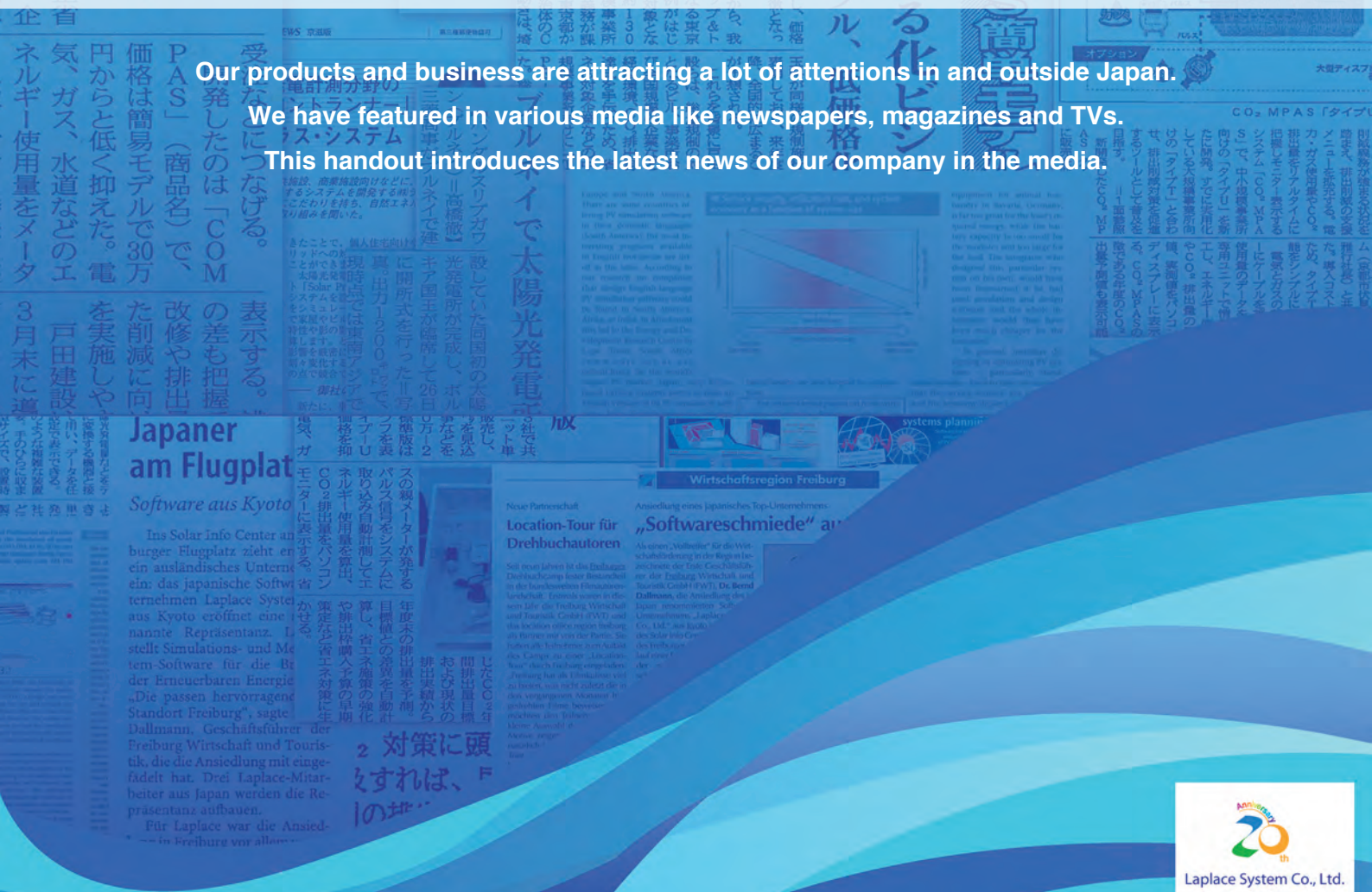


Laplace System



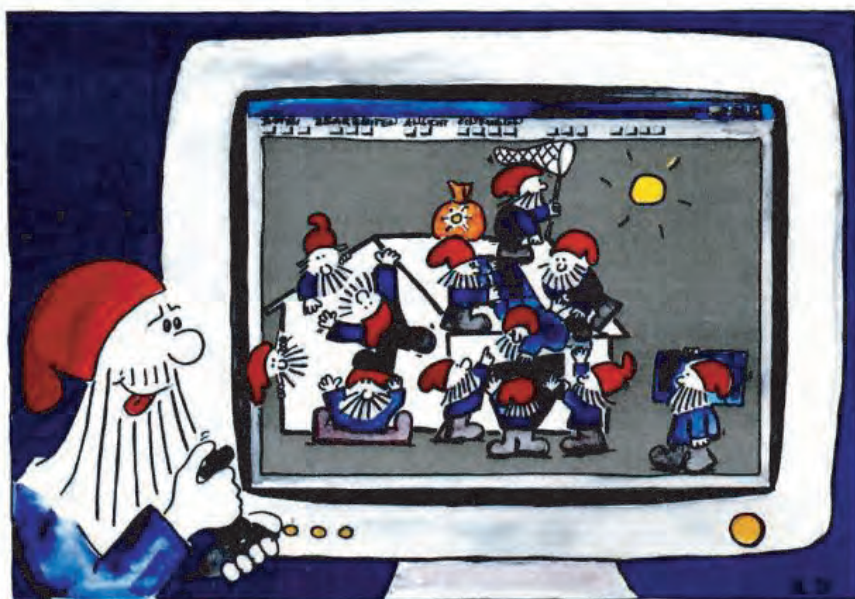
Laplace System Co., Ltd. On Various Media

Our products and business are attracting a lot of attentions in and outside Japan.
We have featured in various media like newspapers, magazines and TVs.
This handout introduces the latest news of our company in the media.





worldwide market survey simulation software



Solar Pro had a good reputation as "the best software" comparing to other simulation software by PHOTON International. (The January 2001 issue)

Virtual assistants

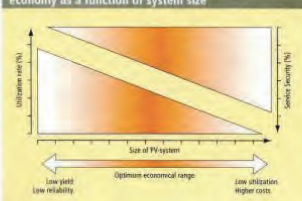
Market survey of PV design and simulation software

Europe and North America. There are some countries offering PV simulation software in their domestic languages (South America); the most interesting programs available in English worldwide are listed in the table. According to our research no companies that design English-language PV simulation software could be found in South America, Africa, or India. In Africa most hits led to the Energy and Development Research Centre in Cape Town, South Africa (www.edrc.uct.ac.za/default.htm). In the world's largest PV market, Japan, only Kyoto-based LaPlace Systems seems to offer an English version of its PV simulation software. Most English-language software, interestingly, is available in Europe, particularly in Germany, which reflects the dominant market situation there. However, a few features of the German programs are only of use for investors in Germany: so Luxe's SOLINVEST and others offer calculations of financing possibilities on national or regional funding schemes only for the German market.

Simulation of grid-connected PV systems

Most installed grid-connected PV systems are smaller than 10 kW, and with these, simulation software is mainly of use in the planning and acquisition period. Investors in a PV system may be interested, for example, in predictions of annual energy yields, and analysis of shadowing. Especially convenient software tools include finding an inverter with the optimum MPV area for a particular PV generator, and calculating the profitability of a system – which becomes even more important if the investor can obtain subsidies, special low-interest loans for PV, or feed-in tariffs. PV*SOL 2.1 by Valentin Energiesoftware of Berlin, Germany, and PVS 2000 by concept of Freiburg, Germany, include a complete database of the subsidies available in Germany; so that an integrator can calculate costs for different system sizes while taking into consideration the optimum financing. The use of such software is not only a helpful and convenient tool for individualized or complicated system designs. It also aids with standardized systems, while these may not need any design simulation for modules and BOS, cost calculations are almost as fast and economical as with thumb-rules. In addition, the often-attractive visual designs can be a convincing argument during sales talks with potential customers. Hard copies of simu-

Service security, utilization rate, and system economy as a function of system size



lation results are also helpful for acquisition.

For systems being placed on roofs with many chimneys, dormer windows, or large trees in a garden, the use of simulation software is advantageous. LaPlace, based in Kyoto, offers probably the best software for such applications, allowing three-dimensional modeling of shading. Designers of large systems (greater than 50 kW, for instance) could benefit from software that allows the analysis and projection of individual project features (like PV-SYST, from the Université de Genève, Switzerland). This program also offers optional 3D-shading analysis, mismatch analysis, and a tool-box that describes the solar parameters of different locations with tables and graphs.

Simulation of stand-alone PV systems

Stand-alone PV systems, which consist of a generator, a controller, and sometimes even an inverter, a battery, and different loads (and thus include more components than grid-connected PV applications), are much more difficult to design. And since the loads' energy requirement defines the size of the components, each system is somewhat unique. Consequently, software is usually even more helpful in designing stand-alone systems than grid-connected systems.

An example of a badly designed system is given in graphic 1. The module capacity of this stand-alone system, which was installed to power some agricultural

equipment for animal husbandry in Bavaria, Germany, is far too great for the load's required energy, while the battery capacity is too small for the load. The integrator, who designed this particular system on his own, would have been forewarned if he had used simulation and design software, and the whole investment would thus have been much cheaper for the customer.

In general, installers designing or optimizing PV systems – particularly stand-alone systems – have to take into account that the service security, the efficiency, and the economy depend on system size (graphic 2).

1. The larger the system, the greater the service security, since at a certain point generated energy exceeds energy needs. With less sunlight being directly used, system efficiency begins to decrease.

2. If the system is too small, energy needs can only be satisfied at a low level, which reduces the service security. Moreover, a too-small system can result in penalties for installers, which are often included in installation contracts.

3. If the system is too large, efficiency decreases, leading to an increase in the price of electricity generation.

Ultimately, it is up to the installer to design an economical system based on optimal fitting components.

How simulation software works

Simulation software forecasts how a real system is expected to operate. Statistical (table-based) procedures – like ISE 1.0 or NSOL 3.13 – are based on statistical data, making such calculations fast, but not very reliable. Time-step simulation programs and simulation systems, however, usually employ models of the different system components, exchange data during the simulation, and thus work like real PV systems.

Time-step simulation programs generally use databases with average monthly data for global radiation falling on a horizontal surface and with

Freiburg, Germany, seven years ago and is distributed by concept, a company based in the same city. The software is a menu-led time-step program for the simulation and design of common configurations for DC and AC stand-alone and grid-connected systems. For stand-alone systems, the software allows users to define how often batteries' state of charging is displayed, for example. The software was completely redesigned in December 1999; it now offers an easier user interface and provides more detailed solar module and inverter curves for the simulation. Also, the editor that simulates system shading was improved, and results for system loads can now be visualized. As of May 2000, the tool for calculating system profitability includes data for the German 100,000 Roofs Program and Renewable Energy Law. An interesting feature is the opportunity to update the software's integrated databases: just one click in the Windows interface, and a new file with module data is downloaded from concept's web site. The price for PVS 2000 is 404 Euro (\$360).

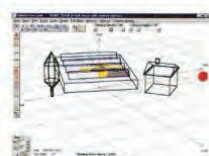


PV*SOL

One program that is increasing its German market share is PV*SOL, developed and distributed by Berlin-based Valentin Energiesoftware. It is intended for professionals planning and installing on-grid and off-grid (as well as PV-diesel hybrid) PV systems. The software's user interface is well-designed; the simulation works quickly with the most important parameters, and many helpful features are included. Like dividing the PV system into different parts with up to six different PV modules, which allows, for example, the calculation of module-mismatch effects. The program includes editable databases for modules, inverters, batteries, load profiles, and financing schemes. PV*SOL offers a tool to calculate energy losses due to shading, and also considers energy losses due to mismatching, temperature, albedo, cables, and diodes.

Software support via hotline is free with the new version. Version N of PV*SOL covers only grid-connected systems and costs 702 DM (\$315), while the more ex-

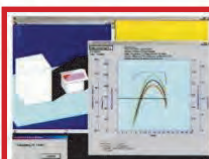
pensive PV*SOL Professional also includes databases for the simulation of stand-alone systems (955 DM; \$430). If the user wants to change languages during operation, a language update costs 234 DM (\$105).



PVSYST 3.1

In November 2000, the University of Geneva, Switzerland, released the updated version of PVSYST, a design and simulation program for on- and off-grid systems. The software offers more functions than any other listed in this market survey, and the new version has overhauled the chaotic and user-unfriendly operating structure, which often led to software crashes.

The update is structured according to a multi-level approach that offers three levels with different contents adapted to the users: system sizing for installers, project design for engineers, and measured data analysis for scientists. The redesigned software also has improved interfaces to import data – for example, meteorological data from the Meteosoft software – and exporting to Microsoft Excel is easier as well. Other interesting features are a 3-D tool for calculating shading of PV systems, and the importing of data for remote PV system control. The price is CHF 700 (\$415).



Solar Pro

The only Japanese product in our market survey was developed by Kyoto-based LaPlace Systems, which recently released an English-language version of its Solar Pro software. The program was intended for the calculation of shading effects on

Where to look for insolation data

One cannot simulate a PV system's operational behavior without insolation data, which is usually available on the horizontal level, and needs to be calculated to inclined levels of the module surface.

A good source for weather data is radiation atlases like the third edition of the "European Solar Radiation Atlas – Solar Radiation on Horizontal and Inclined Surfaces," by W. Peitz and J. Greif, published in 1996 by Springer-Verlag, which provides meteorological data for all of Europe and also includes them on two floppy disks. An updated and expanded version should be released within the next few months. Similar atlases exist for other regions of the world, like the "Solar Radiation Atlas of Africa," by E. Raschke, R. Stuhlmann, W. Peitz, and T.C. Steemers, published in 1991 by A.A. Balkema, Rotterdam.

The most interesting software offering worldwide weather data is Meteosoft, version 4.0 (see article). Data of latest reference years (TRY) can be bought for England, Italy, France, Belgium, the Netherlands, and Germany for some regions of these countries, average hourly values of different climate data are even included. For the US, similar data are available, here called typical meteorological years (TMY).

Sometimes, local meteorological institutes offer radiation data on their web sites, though these data are not usually free. An excellent list of sources for weather data services can be found at www.magna.ca/~internet. Some good, free options are the web sites of Switzerland's Meteosoft (www.meteosoft.ch/prog/wetterstation.html), NASA (<http://roswell.larc.nasa.gov/>), and the World Radiation Data Center in the US (<http://www.mredc.nrel.gov/>). The best new place for European weather data will be the web site of Sârltel-Light (www.satelight.com/), which offers radiation data for every spot in Europe as time rows, maps, statistical variances, or average values in different time resolutions (monthly to hourly). m2

grid-connected PV systems. At the beginning, the user specifies the PV system's components, geographical data, and how to connect the module strings. A user-friendly Windows interface with a 3-D graphics tool facilitates the design of different types and sizes of objects, such as houses with flat, sloped, or shed roofs, mountains, or trees – and they can be moved using the mouse.

SUN & WIND ENERGY

Special International Issue 1/2004
€ 9,50

The big players in the thermal market

Global Solar Art

Biomass in Europe

Thin film technology: state of the art

Prospects of turbine manufacturers

Thermophotovoltaic

PHOTOVOLTAICS

Simulate it in English

PV systems are in use all over the world. The various applications represent a major challenge for planners. Simulation programs can provide important help here. This market overview describes the English-language programs for practical application throughout the world.

Uncertain weather

There are two principal uncertainties for the programs presented here: firstly, that they have an English language user interface and secondly, that they are applicable all over the world. A decision must be made as to the extent to which the input data is to be used for simulation. Although many programs are available, some require additional data, even the most comprehensive simulation can cover only a small portion of the data. It is thus important that the programs have either a universal solution generator or are able to import meteorological data. In Europe, the use of charge (light) (1) and solar radiation (2) data is common, while in the USA the use of solar radiation (3) data is common. The use of solar radiation (3) data is the preferred option. The use of solar radiation (3) data is the preferred option. The use of solar radiation (3) data is the preferred option.

PHOTOVOLT

COME ON! GET GOING!

HEY! DON'T ENGAGE WITH THE TEST SETUP!

START

FINISH

PHOTOVOLT

PV*SOL

The PV*SOL time-step simulation program was created by Dr. Valentin Energie Software GmbH in Berlin, which has also developed the well-known T*SOL program for thermal solar plants. PV*SOL enables interpretation and simulation of grid-parallel and grid-independent PV systems. The current 2.4 edition is available in two versions. The «N» version allows only simulation of grid-linked plants, while the «Professional» version also contains the models and libraries for simulating stand-alone PV systems. This also allows integration of a backup generator in the system.

The major functional range of PV*SOL makes the program a practical and useful tool for professional PV work. The simulation processes deliver the most important results relatively quickly and many useful program features are also provided. The PV system for simulation can, for instance, be divided into sub-generators with different modules and inverters. This enables the analysis of differently arranged sub-generators, mismatch effects and sample stress.

The program has direct interfaces with the METEONORM program for weather data synthesis, to the horiZon program for calculation of the horizon line and to the ArcON-STUDIO program for building planning and visualization. The bilingual German and English version of PV*SOL allows the languages to be changed as desired while the program is running.

PVSYST

Thanks to its broad range of functions, the PVSYST program developed at the University of Geneva, Switzerland, is one of the most effective and powerful programs in this overview. However, detailed

Solar Pro

Laplace-System

Fast and professional energy systems planning

Software for the design and simulation of PV and Solar Thermal Heating Systems

Available in 5 languages!

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e-mail: info@valentin.de

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PHOTOVOLTAICS

THIS PHOTOVOLTAIC UNIT WAS PLANNED, DESIGNED AND INSTALLED AS A RESULT OF MOST EXPENSIVE AND ELABORATE COMPUTER SIMULATIONS

THE OPERATOR ACHIEVED THE AWARD HIGH EFFICIENCY

INSTITUTE OF PERFECT SIMULATION

The free-of-charge program can thus at least provide initial, simple yield estimates as a basis for subsequent, more detailed analyses.

SOLAR PRO

The SOLAR PRO program from the Japanese company Laplace System Co. Inc. is characterised by very powerful shadowing analyses for PV system operation on and around buildings. The surroundings of a PV system can be represented three-dimensionally and displayed in CAD mode with shadow projections for selected days or as an animation through the course of a day. This in itself gives a good impression of when shadowing can be expected. In the IU characteristic curve mode it is possible to calculate and graphically represent the characteristic curve for any desired module circuit arrangements and shadowing situations and to calculate the reduced power yield.

Through changes in the module circuit arrangements it is possible to maximise the system yield. On the basis of the optimised circuit arrangement or the previously defined surroundings of the PV system it is then possible to calculate the system yield for specific days, months or a year and to represent this in graphic or tabular form.

Unfortunately SOLAR PRO can analyse only grid-linked systems and lacks other calculation possibilities such as economic viability analysis and balance of emissions. The use of SOLAR PRO can thus be recommended when one needs to calculate and maximise the yield of partially shadowed, building-integrated PV systems, for instance in areas with a high settlement density. In this area of use the performance of SOLAR PRO considerably exceeds that of the other programs presented here – with the exception of PVSYST.

Miscellaneous

The NSOL (6) descriptive program from the company Orion Energy of Frederick, Maryland (USA), is a good example of programs with which one can calculate Remote Area Power Supply Systems (RAPSS). NSOL can be used for quick project planning of stand-alone PV systems or for acquisition. It provides statements on the balance of energy (BoE) of systems, on loss of load probability (LoLP) and a matrix with the battery state of charge (SOC) on the basis of varying daily and monthly profiles. If required a fossil-powered auxiliary generator can also be calculated for.

There are a number of programs which can be used to calculate more complex stand-alone hybrid systems. Some of these are rather cumbersome to use, such as HYBRID2 (7) or SOMES (8), or are very powerful but expensive to procure, such as SOLSIM (9). An interesting program alternative for calculating these systems is the Remote Area Power Supply Simulator (RAPSSIM), developed at the Murdoch University Energy Research Institute (MURI) in Australia (10). The RAPSSIM simulation package enables users to calculate PV systems, small wind power plants and diesel stand-alone systems, or any desired combination of these systems. RAPSSIM allows a detailed analysis of the system performance to be expected with various load profiles and the interplay of the different generators. One of the most interesting program properties is the estimate of the long-term energy generation costs, taking into account the life expectancy of components and the running costs.

Various interpretation programs are provided free of charge by manufacturers of inverters. Some of these programs are based on EXCEL or utilise the Internet. These include GENIUS from SMA (11), KONFIGURATOR from Fronius (12), SITOPSELECT 4.0 from Siemens (13) and PV SIZING TOOL from Xantrex (formerly Trace Engineering) (14).

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Contact: volker.quaschnig@htw-berlin.de

- References:**
- (1) www.solarlight.com
 - (2) www.solar-ly.com
 - (3) www.meridian-energy.com
 - (4) www.meridian-energy.com
 - (5) www.meridian-energy.com
 - (6) www.orion-energy.com
 - (7) www.meridian-energy.com
 - (8) www.meridian-energy.com
 - (9) www.meridian-energy.com
 - (10) www.meridian-energy.com
 - (11) www.meridian-energy.com
 - (12) www.meridian-energy.com
 - (13) www.meridian-energy.com
 - (14) www.meridian-energy.com

Der Sonntag on May 9, 2004

Badische Zeitung on May 10, 2004

Japaner am Flugplatz

Software aus Kyoto

Ins Solar Info Center am Freiburger Flugplatz zieht erstmals ein ausländisches Unternehmen ein: das japanische Softwareunternehmen Laplace System Co. aus Kyoto eröffnet eine so genannte Repräsentanz. Laplace stellt Simulations- und Messsystem-Software für die Branche der Erneuerbaren Energien her. „Die passen hervorragend zum Standort Freiburg“, sagte Bernd Dallmann, Geschäftsführer der Freiburg Wirtschaft und Touristik, die die Ansiedlung mit eingefädelt hat. Drei Laplace-Mitarbeiter aus Japan werden die Repräsentanz aufbauen.

Für Laplace war die Ansiedlung in Freiburg vor allem wegen der jährlich veranstalteten, internationalen Fachmesse Intersolar attraktiv. Geschäftsführer Masayuki Horii sieht hier einen Zugang zu potenziellen Kunden und Absatzmärkten. (ds)

Software-Haus aus Japan in Freiburg

FREIBURG (hös). Das japanische Software-Unternehmen Laplace System mit Sitz in Kyoto hat im Freiburger Solar-Info-Center ein Vertriebsbüro eröffnet. Nach Angaben von Laplace-Geschäftsführer Masayuki Horii geht die Vertretung in Freiburg mit drei Mitarbeitern aus Japan an den Start. Die Schaffung weiterer Stellen für Arbeitskräfte aus Deutschland sei geplant. Außerdem sei vorgesehen, das neue Büro, welches zugleich den ersten Schritt von Laplace nach Europa darstelle, langfristig zur Zentrale für den ganzen Kontinent auszubauen. Laplace System wurde 1990 gegründet und entwickelt Software für die Simulation und die Überwachung von Solar- und Windkraftanlagen.

Kommunalintern in June 2004

Wirtschaftsregion Freiburg

Neue Partnerschaft

Location-Tour für Drehbuchautoren

Seit neun Jahren ist das Freiburger Drehbuchcamp fester Bestandteil in der bundesweiten Filmautorenlandschaft. Erstmals waren in diesem Jahr die Freiburg Wirtschaft und Touristik GmbH (FWT) und das location office region freiburg als Partner mit von der Partie. Sie hatten alle Teilnehmer zum Auftakt des Camps zu einer „Location-Tour“ durch Freiburg eingeladen. „Freiburg hat als Filmkulisse viel zu bieten, was nicht zuletzt die in den vergangenen Monaten hier gedrehten Filme beweisen. Wir möchten den Teilnehmern eine kleine Auswahl der zahlreichen Motive zeigen und würden uns natürlich freuen, wenn die kleine Tour neue Anregungen für zukünftige Drehbücher liefert“, so **Dr. Bernd Dallmann**, Erster Geschäftsführer der FWT. Veranstalter des Drehbuchcamps sind die MFG-Filmförderung Baden-Württemberg, die Zentrale Fortbildung von ARD und ZDF (ZFP), das Goethe-Institut Freiburg und die Hessische Filmförderung mit Unterstützung der Degoto Film GmbH. Bis zu 60 Fachleute nehmen jedes Jahr an dem Seminar teil.

Ansiedlung eines japanisches Top-Unternehmens

„Softwareschmiede“ aus Kyoto in Freiburg

Als einen „Volltreffer“ für die Wirtschaftsförderung in der Region bezeichnete der Erste Geschäftsführer der Freiburg Wirtschaft und Touristik GmbH (FWT), **Dr. Bernd Dallmann**, die Ansiedlung des in Japan renommierten Software-Unternehmens „Laplace System Co., Ltd.“ aus Kyoto im Gebäude des Solar Info Centers in der Nähe des Freiburger Flugplatzes. Im Verlauf einer Eröffnungsfeier sprachen der geschäftsführende Gesellschafter der japanischen „Softwareschmiede“, **Masayuki Horii**, und der örtliche Repräsentant der Firma, **Masaki Fujisawa**, von einem „ersten Schritt“ auf dem Weg zum Aufbau eines europäischen Vertriebsnetzes, dessen Mittelpunkt Freiburg sein werde. Die Gäste aus Fernost hatten Freiburg beim Besuch der Fachmesse „Intersolar“ kennen gelernt und hatten dabei ein besonders günstiges Umfeld für ihre Firmenaktivitäten ausgemacht. In Japan ist Freiburg nach den Worten Horii als deutsche „Umwelthauptstadt“ bekannt und genießt vor allem als „führende Standort in der Solartechnologie“ einen ausgezeichneten Ruf. Die stark expandierende Firma „Laplace System“ ist ein interna-



Repräsentanten der japanischen Firmen, Masaki Fujisawa, der geschäftsführende Gesellschafter Masayuki Horii, und FWT-Geschäftsführer Dr. Bernd Dallmann (v. l. n. r.) bei der Firmeneröffnung.

tional tätiger, führender Hersteller von Simulations- und Messsystem-Software im Bereich der erneuerbaren Energien und entwickelt innovative Produkte für Solar-, Photovoltaik- und Windkraftanlagen. Das Interesse, das den Produkten aus Fernost auf der Freiburger „Intersolar“ von einem sachverständigen Publikum entgegengebracht worden ist, bestärkte die Unternehmensleitung in dem Entschluss, in Freiburg einen Stützpunkt für den europäischen Markt einzurichten. Den ersten Kontakt zu dem Unternehmen aus Kyoto knüpfte die Japan-Beauftragte der FWT, **Shige-ko Maeda**. Zum Standort Freiburg bemerkte Masayuki Horii: „Freiburg hat, was wir suchen: die un-

mittelbare Nähe zur „Intersolar“ und damit zu potenziellen Kunden und Absatzmärkten, zu anwendungsorientierten Forschungs- und Entwicklungseinrichtungen wie dem Fraunhofer-Institut für Solare Energiesysteme und ein Image, das gut zu unseren Produkten passt und sich international hervorragend vermarkten lässt.“ FWT-Chef Bernd Dallmann wertete die Ansiedlung als einen Beleg dafür, wie wichtig international beachtete Ausstellungen im Rang einer „Intersolar“ für den Wirtschaftsstandort Freiburg sind, da es sich bei der Ansiedlung der Japaner aus Kyoto wieder einmal gezeigt habe, dass Kontakte in den Messehallen zu weit reichenden Verbindungen führen.

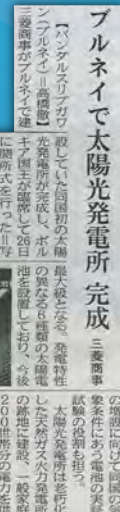
4:Japanese Media

Newspapers

THE NIKKAN KOGYO SHIMBUN on November 10, 2009



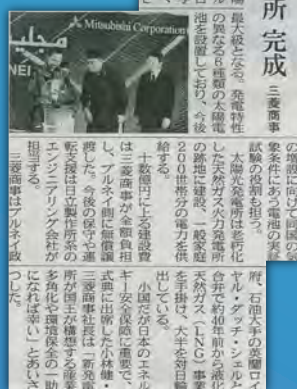
Our system was installed in Brunei.
The system monitors the operation status of 6 different types of solar panels.



THE MIYAKO MAINICHI SHIMBUN on June 5, 2011



THE NIKKAN KOGYO SHIMBUN on December 1, 2010



The Nikkan Kensetsu Kogyo Shimbun on December 1, 2010

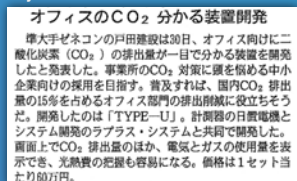


June 18, 2010

We were awarded "Top Runner for Environmental Efforts" from Kyoto Prefecture, an award for groups that made great effects on environment-friendly movement, for our products and its performance.



FujiSankei Business i. on December 1, 2010



TVs

■"Ohayo Nippon" (NHK) on April 7, 2010

Our product "CO2MPAS" was introduced in NHK as a carbon management system.



■"Jidai no New Wave" (ASAHI NEWSTAR) on April 30, 2011

Our performance of opening up the field of renewable energy and our future business plan was featured.

