

Communications
The Viewing Revolution
DIPLOMATIC PLANET PRESENTATION
The U. S. Display Consortium

The Viewing Revolution
The U. S. Display Consortium

Excerpts - Interview Transcript

Michael Ciesinski, CEO and President, and
M. Robert "Bob" Pinnel, Ph.D., CTO
The U. S. Display Consortium

with David W. Alvey, Executive Director and Editor - Diplomatic Planet

***Introduction-** An industry that is already a global behemoth is undergoing a dramatic shift in technology as the basic liquid crystal display (lcd) and the "led"-display (light emitting diode) are being replaced in several stalwart fields of their current applications and being ignored in favor of new technology for much of the growing segments for display application.*

The competition for dominance is fierce - and the desire to avoid concentrating these new manufacturing and assembly industries in one region of the globe as occurred with the Asian dominance in semi-conductor manufacturing - has a nationalistic / regional focus. European and North American electronic firms see these new technologies as strategic to their survival - even while bringing in global partners to insure global market access for their products.

“The USDC is an industry-led public/private partnership providing a common forum for flat panel display manufacturers and developers, FPD users and the supplier base. Headquartered in San Jose, CA, the consortium's primary mission is to manage supply-chain projects and share the results with USDC member companies. The USDC also provides a communication channel among industry, government and the financial communities for display issues, sponsors workshops to broaden the impact of technological developments and educates consumers on the importance of displays in providing access to information technology.”

DPlanet: What are the key objectives and the activities of USDC?**Mr. Ciesinski:**

We are often confused with organizations that are more interested in building displays. We are not about the display industry, but we are focused on the tools, materials and components that will make up a display.

We receive funding from the Defense Advanced Research Projects Agency (DARPA) which is the R&D arm of the Defense Department. Our member companies contribute dues and income obligations as they help manage the technical programs. Also, the companies that we work with, our development contractors and development partners, contribute both cash as well as internal resources to develop new tools and materials to be used to develop displays.

USDC was founded to address the desire to have a display industry based in the US that was capable of meeting defense requirements for displays as the commercial world, the military world and the consumer world all move to a digital environment. This digital environment requires newer types of approaches, because at the end of the day, it really matters how you display that data so that a user can interact with the data.

Obviously, displays are important for DOD purposes - they are looking at ways to build displays that display more information, that are lighter, that consume less power, that are technically a better type of display than we have today.

DPlanet: Why the consortium effort as an organization structure?**Mr. Ciesinski:**

Consortiums, like USDC, began in the US in the mid 1980's when Congress passed enabling legislation allowing consortiums to form to do some pre competitive development, - and out of that legislation several did form - SEMATECH, MCC (micro electronics), and the National Center for Manufacturing Sciences are a few examples. If you want to encourage technology development that is really pre competitive, it makes sense to have companies become engaged and work together in those areas. Generally, a prime field for this type of cooperation is in basic manufacturing technology. Where companies do tend to compete is in differentiating their products, defining their products, marketing and placing their products. In the display industry, through USDC, small to medium size firms can work together on the early stages of basic tools and materials development. They will see results - components, materials and equipment - earlier than they would without the Consortium effort.

Dr. Pinnel:

The underlying thought there is the synergistic effect of allowing people to work for the common good and the practical aspect of conserving resources and dollars. The public

aspect of a legislatively created structure removes any issues about violating anti trust laws. This development becomes a very open activity.

DPlanet: Are there other company groupings or countries that have formed similar type of structures, collaborative research programs, that are also focused on display technology?

Mr. Ciesinski:

A couple of these come to mind. LIREC is the Liquid Crystal Research organization in Japan comprised of companies which are in the LCD business in Japan and they are pooling some basic research and manufacturing data on the Liquid Crystal Display industry.

The Electronic Display Industrial Research Association of Korea (EDIRAK) is a similar organization, with companies working together, with which USDC has worked. I am sure this has been done selectively in Taiwan, and we have heard of some organizations that may be taking shape in Europe that would include UK, German, French and Dutch firms that will also focus on the Display industry.

DPlanet: What are the market segments as related to the technology?

Dr. Pinnel:

There are six or seven major technology options that are being pursued to satisfy the vast display market. In addition to the Liquid Crystals Display (LCD) there are Electro Luminescence (EL) Displays. The Plasma Display Panel (PDP) and the Field Emission Display (FED) are two of the newer technologies. The OLED Display, (Organic Light Emitting Diode) is a technology that is drawing a lot of attention. There are also the Micro Displays that are focused on the projection display market, rather than direct viewing.

All of these technology options are competing for a growing number of applications.

These market sectors are major - not just for the computing market, but in telecom, in transportation, both automotive and aero, in medical applications, instrumentation, home entertainment, business / industrial entertainment and conference activity. These are all emerging market places where these various technologies are applying their strengths and minimizing their weaknesses for particular applications.

DPlanet: Are there currently pairings of technology with uses - based on size, motion, brightness or other attributes that differentiates the types of technologies and the uses, or that forecasts uses for particular technologies ?

Dr. Pinnel:

Absolutely. Every display technology has evaluated strengths and weaknesses or key performance parameters that excites the customer. These parameters are matched very directly against the performance requirements for any given application.

As an example, plasma displays are not very effective in manufacturing cost performance until you get to very large display sizes, more than thirty or forty inches. Plasma display proponents would view their prime market space as part of the HDTV technology of the future - large screen TV on the wall -- but never applied down to the level of a desk top computer application or in your automobile.

By contrast, an automobile is a harsh environment in the sense of having very bright sunlight and very wide temperature extremes in which it may operate. That is not an effective market for a Liquid Crystal Display.

For size reasons, that is also not an effective market for a Plasma Display but, if the technology works out, the characteristics of a Field Emission Display (FED) work very well in that environment. FE would then target the automotive market as one of their applications.

The bottom line is that the display technologies have a wide enough variation in their relative strengths and weaknesses that there is no one display technology as the 'be all and the end all' for the broad set of market applications.

Each technology has a niche, generally a pretty big niche, in which it fits best as a technology and in which it fits the cost targets to be applied in that application.

DPlanet: Is there an end game or an exit strategy for USDC as far as developing the infrastructure or will that be an ongoing and continuing process independent of the source of funding. ?

Dr. Pinnel:

It is an ongoing and continuous process as long as we receive support from the Federal Government. They determine whether USDC is or is not a worthwhile activity to support.

That said, I don't see that USDC in displays will be an immediate copy of what SEMATECH has become in electronics. SEMATECH was able to deal with a large enough, high revenue level manufacturers that could afford to be self funding in the development areas that the Consortium normally fosters, and provide the levels of

funding down the infrastructure chain that are required so that their suppliers will meet their needs.

In SEMATECH (circa 2001) you have companies like Intel, Motorola, Lucent Technologies, which are multi billion dollar companies. Even those companies recognized, when SEMATECH was first put together in 1986 - 1987, that federal support was necessary because electronics is a national security issue as well as an economic security issue. Fortunately, those companies were able to carry on the programs themselves.

DPlanet: Is there going to be a strict proprietary aspect to these processes ? Are there restrictions on technology transfer?

Mr. Ciesinski:

No. We have had the benefit of other consortiums going before us and we can draw several conclusions from their results.

First of all, the intellectual property most properly belongs to the company that is doing the work and developing the intellectual property. In the case of USDC, this property belongs to the supplier. They have the most to gain in terms of being successful in the market and we ought to give them every opportunity to be successful. What we require of our manufacturing partners is that they first provide a cost share element to the program. We won't fund entirely a program; we want 50% of the money to come from one of our development partners.

Second we try to adhere to a time table that is realistic - not rigid.

Third, we ask our partners - once the tool, material or component is developed - to give USDC the first samples and that the initial production quantities be made available to USDC members first. Once the company has met the needs of the USDC members, it is eligible to sell its products anywhere and everywhere in the open market - including overseas.

We are dealing with new technology which is untried, and the introduction of technology is a slow and laborious process requiring a number of years. If it really looks as though a particular technology will pan out, before anyone has achieved very high volumes, other players will enter the market.

If you just follow the historical example of the introduction of Liquid Crystal Displays, it started with a few major Japanese companies stepping in, and with Sharp taking a major market share. But, because the investment of capital to grow volume to satisfy market demand was so extensive, nobody could afford to keep making that investment and supply all of the need.

It wasn't hard for IBM, Toshiba, Hitachi, Fujitsu and others to make comparable investments, to jump in to the ball game and very quickly have a reasonable market share. Five years after all of that happened, the Koreans made the decision that they wanted to get into the game. Samsung and Hyundai made major investments and in a year and a half were able to pull away between 15% and 20% market share.

Now that the industry has achieved a little stability, the Taiwanese are about ready to come on and do the same thing as a third player. The fact that Sharp was the number one entry is forgotten as you now have, in just five or six years, fifteen companies competing and all doing very well in terms of getting market share.

I don't see that being first in this area - Pioneer using Eastman Kodak technology and being the first to commercialize it - as precluding in any way others from stepping in, once the technology is well proven, and being big players in the field.

DPlanet: Is there a competitive list today of the targets for these technologies. Are there already the top five "killer apps" that people are looking at to roll out early or target in order to gain market recognition, if not market dominance?

Mr. Ciesinski:

To paraphrase one of our Board members, 'there is one market that has been dominated by one technology in its early history and that has been in the portable PC market the Liquid Crystal Display technology'. LCD is still the dominant technology for that application, even so much that the LCD makers are trying to penetrate the desk top market - companies like Compaq and Dell are now offering flat panel displays as a feature that can be shipped with their desk top systems. However, this is what makes the display business so exciting.

That is a very good market -- in portable PCs (lap tops) alone it accounts for \$3 - 4 Billion in business for LCDs.

Where we see an equally interesting emerging market is in transportation where the dashboard could be revolutionized, or in home entertainment - Bob was talking earlier about the size of the display typically used for HDTV and that is a very important component for the home entertainment system or for the boardroom - we see important applications for that type of display with 40 inch diagonal screens for viewing.

We also think pretty highly of what are being called 'internet appliances' - or thin appliances where people want information where they are and they want to access it remotely. It is pretty hard to lug a computer screen, a CRT computer screen. Not many people do that. Today, you want a small portable device that you can use to access the information, a cell phone and the Palm Pilot are early examples.

All of those displays are going to be improved and enhanced over the next two - five years, and beyond. We will see a lot of these emerging applications for display technology.

Dr. Pinnel:

Just think of any place where there is portability of the input / output device. You need that data, that information, to be in a visual format.

DPlanet: Twenty years ago we might have defined this industry as a zero sum competitive landscape - but that doesn't seem to be the case now, does it?

Dr. Pinnel:

Not at all. It is technology that is enabling opportunities that hadn't even been thought of before. Many of these first approaches are looking at replacements for CRT. But the flat panel display, particularly the new technologies, are offering so many performance opportunities that it will enable completely new markets. Clearly, it is not a zero sum game but one that will continue to grow by several billion dollars or more per year.

One of the advantages that the US industry faces now is that it is really the cost of entry that has the big impact on which companies are willing to enter these markets and how much they are willing to spend. For the display manufacturing industry and semiconductors, the important factor in LCD production is building the factories with high capacities. Each factory involves about \$500 Million minimum investment (half a Billion dollars) and a newer fab can be \$1 Billion each. That is a major corporate commitment. The difference now is that some of these new display technologies, like Micro Displays or OLED, change that manufacturing paradigm drastically

In Micro Displays, they can use the existing silicon foundries in the US, and for investments in the neighborhood of \$25 million, initiate a meaningful business.

OLED is not a semiconductor type of process but one that is pretty much a chemistry based process. Companies that have been in the photographic film business, for example, face a minimal capital investment to become engaged in OLED production. That lower level of investment requirement is why the US interest has turned so strongly, particularly among the small start up companies, taking advantage of these technology opportunities.

USDC has taken very seriously the need to define a roadmap and to identify each of the technologies and applications gaps. We make that roadmap known globally. In Korea and Japan there are similar studies. We need to recognize where the common gaps are and make that knowledge available to potential industry participants. In fact, that is the basis for our selection of the technical programs we choose to pursue with government funding.

We want to target the funding to technical programs specifically directed at those process steps and the various technologies where these major gaps continue to exist. Essentially, USDC becomes a marriage broker between two or three companies. We present these opportunities to the industry, review their best ideas and then, based on the technical expertise that exists within our management community, make the call as to which of those ideas appears likely to succeed.

We then help support that development through both government funding and by maintaining interaction with the eventual manufacturer who will be their customer base. Our goals at that point are to assist their management team, keep their program focused and on a realistic schedule, and then to evaluate the product they produce.

DPlanet: Does this technology allow the manufacturing to be more distributed, or disseminated to smaller economically or less technically enabled countries?

Dr. Pinnel:

Not necessarily. I do not see any significance difference between these opportunities and the semiconductor manufacturing industry, or with most other parts of the electronics industry where you require a major capital investment. People can do that capital investment anywhere.

The limitation is often in the skilled and trained resources that manage and operate a high technology factory. That can be a limitation in moving these operations into under developed countries which can better provide the much more manual based end-assembly operations.

We do find, however, that as companies globalize and establish offshore manufacturing, they generally grow that capability from the back end forward starting with the labor intensive or menial tasks. That process does allow the country's human resource assets to gain skills and to evolve to a level where they can move into the more sophisticated production processes.

Naturally, each country will want to attract investments, to buy technology and operate new businesses. I don't think there is any question that electronics is the widest global industry that exists today. I don't see anything on the horizon to displace it.

DPlanet: What is your essential summary statement?

Mr. Ciesinski:

At the end of the day - The Display is The Product. What we typically say at the end of each of our presentations is that the display is the face of the new digital economy. Every place where you collect data, generally speaking you want to understand that data, move that data, manipulate that data, and transform that data. Each of those steps requires a

visual interface. We have just scratched the surface of the needs and uses, and we will continue to develop these visual interfaces through organizations like USDC and its member companies. We are very much a major component and one of the driving forces in the telecommunications revolution.

Dr. Pinnel:

Look at the Internet, without the display at the end, how can you see all of that information and make use of it?

At the end of the day, we are firm believers in the future of the Display Industry and that Displays will truly revolutionize our lives. I tell people that everyone wants data and they want it where they are. They do not want to have to go get it from somewhere else. If you want to accomplish that, you have to have a better display.

The keys are: it is digital, it is visual and it is portable. It is bit streams now. The eyeball is the only sense in the human body that is able to comprehend that scope of data at the rate that it is being transmitted. Your ears and the telephone do not do it anymore. Nor do your fingers and the keyboard do it anymore. Those natural visual aspects, plus the fact that we are highly mobile, requires one or more display instruments that are going to work whether we are home, in the automobile, in the air or in the office.

These evolving needs will dictate the types of display technology on which USDC and its members will focus.

DPlanet: Thank you.

David W. Alvey, Editor – DiplomaticPlanet.net (*originally published in 2001*)

Sources: U. S. Display Consortium (www.USDC.org)

Published at www.DiplomaticPlanet.net
<http://www.DiplomaticPlanet.net/8E19-USDC-PANL.html>

This Document is available at
<http://www.DiplomaticPlanet.net/8E19-USDC.pdf>

This is neither a solicitation of investment nor an offer to sell and/or buy any securities, Registered or UnRegistered, under the Securities Act of 1933, as amended, or in any state or country or in violation of any applicable Securities Laws. Do not rely on these statements to form or make any investment decision. Consult your own advisers with respect to any investment decision. The statements expressed herein are opinion and may be changed, revised or withdrawn at any time with no prior notice and no obligation to correct, amend or notify anyone at any time of any such actions.