Policies Toward Advanced Display in the Clinton Administration

by

Jeffrey A. Hart
Professor
Department of Political Science
Indiana University
Bloomington, IN 47405
internet: hartj@ucs.indiana.edu

Paper prepared for delivery at the IS&T/SPIE Symposium on Electronic Imaging Science and Technology, San Jose, California, February 6-10, 1994. This is paper No. 2174-04 in a session on Government Infrastructure Support Programs chaired by Peter Friedman in the technical conference on Advanced Flat Panel Display Technologies.

ABSTRACT

The Clinton administration is using its policy toward advanced displays as a test case for making industry-specific policies. They have established a number of criteria for advanced displays that they hope to apply to other industries in the future. For example, they want to support the development of generic technologies through ARPA and NIST, while minimizing the government's role in key business decisions. They want the industry (by which they mean the tool makers, the component assemblers, and the systems firms) to agree internally before they go ahead with their promotional policies. Given the past history of the advanced display industry, especially its disunity in regard to the enforcement of the successful antidumping petition of the Advanced Display Manufacturers Association and to efforts to create the U.S. Display Consortium, these criteria will be hard to meet. Nevertheless, there now appears to be much greater consensus among the three groups than in the past on the need to build indigenous technological capabilities in advanced displays.

Introduction

The Clinton Administration will be announcing its policies for promoting a domestic advanced display industry in February 1994. This announcement is important because it will be sure to generate a broader debate about what can and should be done in the U.S. setting to promote specific industries and technologies. The inner circle of economic policy officials is participating directly in these discussions because they want to make sure that an industrial policy for advanced displays does what needs to be done while not becoming a political liability for the administration. There is, of course, a serious risk that such a policy will fail on both counts.

0-8194-1469-7/94/$6.00

The inner circle of policy makers in the Republican administration of George Bush (particularly John Sununu, Michael Boskin, and Richard Darman) was steadfastly opposed to industrial policies, even though specific industries and technologies -- including advanced displays -- continued to receive funds from agencies like the Advanced Research Projects Agency (ARPA) of the Department of Defense.[1] President Bush committed himself to opposing industrial policy in both the 1988 and 1992 election campaigns. This stance made the Bush Republicans vulnerable to charges of "do-nothingism" and indifference to the fate of key industries. This vulnerability was a key advantage for Clinton in the 1992 campaign. Clinton was careful to build allies in the high technology community, and many of them strongly opposed the Bush administration's stance on industrial policy. One critical phrase which was heard frequently in the 1992 election campaign, was: "They [the Bush administration] think a potato chip is just as important as a computer chip."[2]

When the Clinton administration took office in the beginning of 1993, several major policy pronouncements indicated that the new administration was going to be much more aggressive than the previous one in promoting high technology industries. The technology policies announced by the President's science adviser, John Gibbons, suggested that the administration would be looking for opportunities to support government/industry funded R&D consortia in a number of areas. Since that time, new R&D consortia for pollution-free automobiles, an all-optical computer network capable of transmitting 25 terabits per second, and for advanced displays have been announced (see the section of the U.S. Display Consortium below).

Vice President Gore, while still a Senator, had sponsored a major bill supporting the building of a National Research and Education Network (NREN).[3] The ideas behind the NREN were later repackaged

---

1. See Jeffrey Hart, The Politics of HDTV in Japan, Europe, and the United States, Discussion Paper #100, Indiana Center for Global Business, Bloomington, Indiana, revised version, October 1993.

2. Ross Perot uttered this pronouncement during the three-way debate between Bush, Clinton, and Perot. But Clinton stated similar views many times during the campaign. He chose Laura Tyson to be chair of the Council of Economic Advisers because she had argued persuasively for distinctive policies for strategic high-technology industries in her book, Who's Bashing Whom? (Washington, D.C.: Institute for International Economics, 1992).

3. See Jeffrey Hart, Robert Reed, and Francois Bar, "The Building of the Internet," Telecommunications Policy, (November 1992), pp. 666-689.

and renamed the National Information Infrastructure (NII). Vice President Gore has remained strongly interested in this issue, even though the Secretary of Commerce, Ron Brown, has been assigned the task of studying how the government can assist the creation of the NII. After some initial bumbling, the Clinton administration appears to be in favor of letting industry build the infrastructure itself. The government will attempt to deal with technological obstacles by funding high-risk R&D and expanding the existing high-speed testbeds. In addition, the government is trying to redefine "universal access" rules in such a way as to promote the building of the new networks without creating an "information underclass."

The administration has explicitly linked the NII to displays by arguing, with much verbal support from industry, that many of the terminals on the NII will require advanced displays. Thus, building an advanced display industry and generating new display technologies in the United States was more likely to be an important part of the administration's industrial policy initiatives thanks to the link with the NII.

Another point of departure from the Bush administration has been the Clinton administration's position of the promotion of "dual-use" technologies. Dual-use technologies are those which have applications for both military and civilian products. The inner circle of the Bush administration had argued that dual-use technologies could take care of themselves because the producers had sufficient market incentives without help from the government. The critics of this view argued that some dual-use technologies required special governmental attention for at least three reasons: (1) there were major opportunities to reduce weapons acquisition costs by emphasizing the production of dual-use technologies; (2) some products utilizing or embodying dual-use technologies were not being produced in the United States in sufficient numbers and their availability in case of military emergency was not, therefore, secure; and (3) some dual-use technologies could be produced competitively in the United States only if there was strong enough domestic demand to make high-volume production possible, which was not the case for certain important items like charged coupled devices (CCDs) for videocameras or small color displays for personal TVs. The tendency of Japanese electronics producers to source key components from Japanese suppliers was an important part of the third argument. The Bush administration basically ignored these objections and focused its attention, accordingly, on military sole-use technologies, despite the fact that members of previous Republican administrations, including Reagan's former Assistant Secretary of Defense for Acquistions, Robert Costello, were among the critics.

The Clinton administration has been much more sympathetic to the idea of promoting dual-use technologies, even though it is presiding over a major build-down of U.S. defense capabilities. The budget deficit and the end of the Cold War have made it necessary and desirable to impose major cutbacks on overall defense spending. The administration is committed, however, to keep DOD spending for R&D flat during this period. Approximately one billion dollars was set aside for the Technology Reinvestment Program (TRP), a competitive grants program for assisting states and local communities to convert defense-oriented facilities to civilian uses. There is also a new Independent Research and Development (IR&D) program to help major defense contractors diversify out of defense production. In addition, there is a major effort to get the defense-oriented federal laboratories, like Lincoln Labs, Brookhaven, Sandia, and Los Alamos, to do more civilian work in alliance with commercial firms.[4] Thus, the Clinton administration differs markedly from its predecessor in its views toward the promotion of high technology and particularly towards R&D consortia and the support of dual-use technologies. This change in atmosphere is quite evident in the administration's policies toward advanced displays. The concrete evidence for this can be found in the recent history of the ARPA High Definition Systems (HDS) program, the U.S. Display Consortium, and the Interagency Task Force on Advanced Displays.

The ARPA HDS Program

The High Definition Systems Program of ARPA began at the end of 1988 when Craig Fields was the acting director. HDS was designed to provide some support for the creation of new technologies that would provide U.S. firms with some capability to participate in emerging markets for high definition video products. ARPA intelligently avoided committing itself to HDTV per se, but instead focused on underlying technologies and particularly ones which were likely to impede the development of both military and commercial products. The HDS program was inherently focused on dual-use technologies from the start. That is why it ran into so much flak from the Bush administration inner circle and part of the reason why Fields was fired in May 1989. Curiously enough, after the departure of Craig Fields, ARPA persisted in its grant program in this area, covered cosmetically by a change in the name of the program, but actually with increased funding, thanks to the support of key members of Congress.

---

4. Statements by Deputy Secretary of Defense William Perry at the 1993 Technology Summit organized by the Berkeley Roundtable on the International Economy, San Francisco, California, November 4-5, 1993. I will refer to this meeting henceforth as the Technology Summit.

As of February 1993, ARPA had funded 85 projects of various sorts at a total cost of at least $70 million. These projects ranged from fairly direct research on military-related technologies, like combat displays for aircraft, to new processes for making color filters, to lithography equipment for manufacturing flat panel displays. Both university and private firm research was supported. Research on active matrix LCDs (AMLCDs) was combined with research on alternative technologies, like field emission displays (FED or "cold cathode"), color electroluminescent (EL), and color plasma. The ARPA method of putting out a "Broad Area Announcement" to announce the grants competition and then a combination of peer review with site visits to evaluate the projects seems to have produced some interesting, if not yet fully commercializable results.

In any event, the Clinton administration, impressed with the substantial if still somewhat limited success of ARPA's technology support programs signalled its intent to use similar techniques for purely commercial technologies by shifting an ARPA veteran, Arati Prabakhar, to the National Institute for Standards and Technology (NIST), the civilian R&D agency which is under the purview of the Department of Commerce. In addition, Congress mandated in 1992 a new Advanced Technology Program (ATP) with substantial increases in funds (from $10 million in the 1992-93 fiscal year to over $700 million in only a few years) to be administered by a reorganized NIST.[5]

The U.S. Display Consortium

The U.S. Display Consortium (henceforth USDC) was established in July 1993. Its founding members were: ARPA, AT&T, Xerox, Tektronix, and a number of smaller display manufacturers.[6] The headquarters of USDC is in Austin, Texas; its technical office is in Berkeley Heights, New Jersey; and its first production facility will be located in the San Francisco Bay Area. Malcolm J. Thompson, of Xerox, is chairman of the Governing Board; Peter Mills in the Chief Executive Officer. The mission of the USDC is to "develop the U.S. manufacturing infrastructure required to support a world-class U.S.-based production capability for high definition flat panel displays."[7]

---

5. Speech by John Young, formerly of Hewlett-Packard, at the Technology Summit.

6. Electro-Plasma, Kent Digital Signs, Norden Systems, OIS, Photonics Imaging, Planar Systems, Silicon Video, Standish Industries, and Three-Five Systems.

7. U.S. Display Consortium, Fact Sheet, September 1993.

In pursuit of this goal, the USDC has opened its membership not just to display manufacturers, but also to display manufacturing equipment makers and to companies that use displays in their products. It hopes to attract members by pooling the costs of R&D and thereby reduce the risks associated with developing new technologies. The government will initially provide 70 percent of R&D expenditures for USDC projects but will eventually reduce its participation to 50 percent as the consortium matures.

Discussions among the membership to determine where to place the initial priorities were difficult because of the diverging technological stragegies of the small U.S. display manufacturers. AMLCD manufacturers wanted to focus on AMLCD technologies, plasma manufacturers on plasma, etc. But eventually, a limited consensus emerged on developing technologies needed for a wide variety of types of displays. Some of the initial project focus areas are: large-area chemical vapor deposition (CVD) tools, polymer coating, spacers, rapid thermal processing and laser annealing, automated handling of glass substrates, color filter manufacturing, and large-area lithography. The list of USDC project focus areas is curiously similar to the list of already-funded ARPA projects, but since ARPA is a founding member and with NIST a major contributor to the USDC budget, this is not too surprising. Also, ARPA quite self consciously tried to fund generic technologies in the HDS so as to maximize the R&D bang for its bucks.

Indeed, one can see USDC as a logical follow-on to the technology grants administered by ARPA. The latter created opportunities for the commercialization of new technologies that probably will not be acted upon unless there is a new form of support for the companies that developed them. The reason for this is that the small display manufacturers have not generally been able to attract funds from private capital markets to establish the kind of production facilities that could compete with international (mainly Japanese) producers of advanced displays. This is either because the technologies themselves are not sufficiently mature or because the owners of capital are frightened to take on the keiretsu capitalists of Japan without some major commitment on the part of the U.S. government to reduce their market risks. The Japanese AMLCD plants cost in the neighborhood of $200 million. The sheer size of the investment required to establish a world-class AMLCD plant makes U.S. investors nervous. For this reason, one of the subgoals of the USDC is to search for technologies that can reduce the setup costs for a display manufacturer while still allowing it to compete with larger firms.

The USDC represents movement in the direction of reducing the market risks of firms just entering the advanced display market, but it not yet clear that it will have a large enough budget to fulfill its mission. This issue is necessarily one of the issues that is being discussed in the Clinton Administration Interagency Task Force.

The Interagency Task Force on Advanced Displays

In February 1993, the chair of the Council of Economic Advisers, Laura D'Andrea Tyson, sent a letter to the President requesting an interagency study about what the government should do to promote the domestic advanced display industry. That letter had the effect of creating an interagency task force on advanced displays. The task force is chaired by Kenneth Flamm, a deputy to John Deutsch and a member of the Dual-Use Technologies group at the Department of Defense.

Other members of the task force include:

Richard Van Atta, DOD
Charles Kimse, DOD
Dan McMahon, DOD
Heidi Hoffman, Commerce
Matthew Rohde, US Customs Bureau (Treasury)
David Slobodin, ARPA
Kerry Hanson, OSTP
[full list not yet available]

Flamm is coordinating the work of the task force and briefs the members of the National Economic Council (NEC), and particularly Tom Kalil, one of the NEC Directors, on a regular basis. Task force members have conducted interviews and meetings with business representatives both in Washington and in the field in order to gather relevant information. The initial drafts of the final report are being done by various task force members from different agencies. The final report will go to the President and will be made public sometime in February 1994.

From my telephone interviews with participants, I learned that the final report is likely to contain some innovative proposals for incentivizing the establishment of commercially viable production of advanced flat panel displays. There is likely to be some upgrading of the preexisting commitments to R&D funding (through ARPA and NIST) and to the creation of a supply infrastructure (mainly through USDC). The problem is to make the argument for further efforts to create incentives for production that will work but which do not violate international agreements like the subsidies code of the General Agreement on Tariffs and Trade (GATT). Participants have assured me that they have found a way, but it is still too early to pronounce their efforts a success. One can be heartened by the fact

that an intelligent and normally skeptical economist like Ken Flamm has been put in charge of this group, but one has to be cautious in predicting the ability of any interagency group to convince the White House inner circle that their industrial policy proposals will not cause more political hassle than they are worth.

Summary and Conclusions

I have tried to provide evidence in this short paper for a change in perspectives from the Bush administration to the Clinton administration on the need for industrial policies in general, and for policies to promote advance displays specifically. After a brief summary of the Bush administration's views and policies, I launched into a rehash of the Clinton administration's initiatives in three areas: the continuation of ARPA's HDS Program and the reorganization of NIST, the U.S. Display Consortium, and the Interagency Task Force on Advanced Displays. I do not wish to exaggerate the importance of any of these efforts, but they do seem to have had a broader significance beyond displays per se because they are contributing to the formation of the Clinton administration's overall position on industrial policy.

In a recent talk at a panel on advanced displays at the Technology Summit held in San Francisco in early November 1993, Tom Kalil, Director of the National Economic Council, said that there would be four key criteria for determining the appropriate governmental role in promoting specific industries in the Clinton administration:

(1) there must be an industry consensus on ends and means before the government can get involved;
(2) the government's share of investment in the industry must be kept as low as possible;
(3) the government needs an exit strategy for its participation so that it does not get locked into a "shut-down problem;" and
(4) even if there is an industry consensus, there is a need to arrive at a national consensus that promoting that specific industry is important (especially if one does not exist at the outset).[8]

I noticed that industrialists in the audience were paying especially close attention to Mr. Kalil's remarks.

The display industry has had problems developing a consensus internally. The industry is still smarting from the after effects of their success in getting the government to impose countervailing duties against Japanese display manufacturers. One of the near term

---

8. Speech by Tom Kalil at the Technology Summit.

results of this policy was to give U.S. laptop computer manufacturers new incentives to offshore their assembly operations to places where there were no countervailing duties (they already had some incentives to do this to be near to suppliers or to reduce labor costs). Eventually, the disagreement within the group of display manufacturers led to defections from the coalition and eventually the group decided to withdraw its antidumping petition.

Similarly, there was fighting among the group about where the USDC should place its limited assets.

On the other hand, it should be noted that the level of consensus among the display manufacturer and user community has increased in the past year partly thanks to the tangible achievements of the government-funded R&D programs but also due to a worldwide shortage of color AMLCD displays. The U.S. computer manufacturers are more aware now than they were before of the dangers of being overly dependent on Japanese suppliers and are more optimistic about the prospects of developing alternative suppliers in the U.S. and elsewhere. So one source of resistance to display industry promotion has receded in importance.

Another potential source of resistance to an industrial policy for displays might have been the producers of display manufacturing equipment. There were problems of conflict between semiconductor manufacturers and manufacturers of semiconductor production equipment in the early days of Sematech that stemmed from the rather late inclusion of the latter in the planning of Sematech's operations. That lesson appears to have been internalized in the government and in the electronics industry from the remarks made by Mr. Kalil and in the early efforts of the USDC to include the equipment manufacturers in the design of projects.

The big unknown here is whether the nation as a whole, as opposed to just some Clinton administration officials and representatives of the U.S. electronics industry, can be convinced that displays like semiconductors are strategically important high-technology components and that there is a danger in letting a major economic competitor like Japan dominate the industry. Given what I have seen so far, I would argue that there is a good chance that the country will agree with these business leaders and policy makers and the various proposals of the Interagency Task Force will be adopted (with the usual modifications). Nevertheless, it still may be of no avail in terms of building a viable domestic display industry. Given that the U.S. display industry currently controls less than 5 percent of the world market of advanced displays, it may be, as Andy Grove of Intel has said, like administering an "EKG after the patient has died."[9]

---

9. Kalil speech, op cit.