Export-Control Paranoia

Controlling personal-computer exports may be an impossible dream at great national expense.

by Jan Czekajewski

If you have been worrying about the United States' negative trade balance in the area of high technology, or wondering why this country's pride and resources are being diverted from manufacturing industries to hamburger and insurance empires, read this story about the ease and simplicity of computer exporting. It may be especially enlightening to those who are excited about the recent drive by the U.S. government "to obtain national competitiveness. "

I have "hands-on" experience with export-control regulations, and also have to my credit a federal grand jury criminal investigation against me, instigated by the U.S. Customs Service of the Treasury Department, related to an attempt by my company to ship some medical equipment to the Soviet Union. But before I tell you my story , let me give you the background.

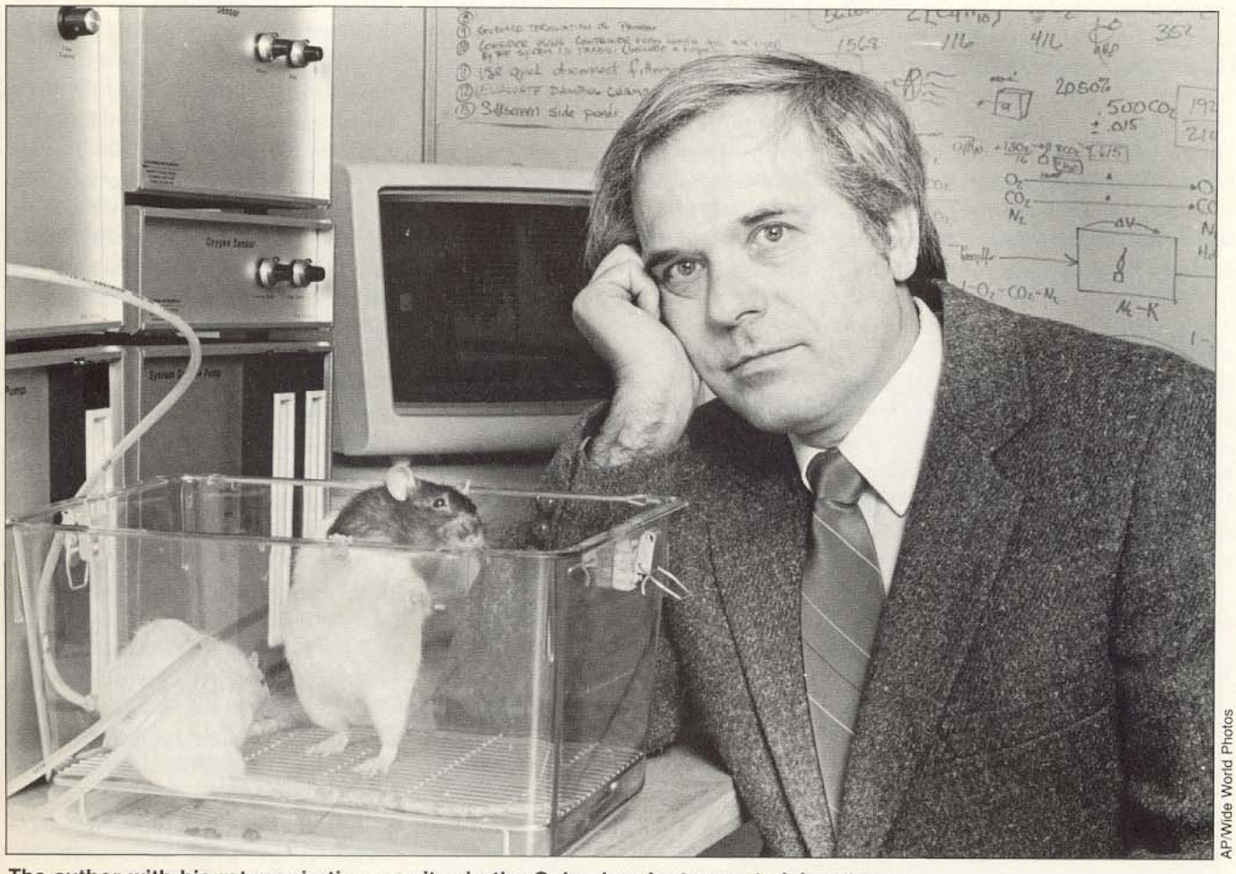
Transferring Technology to the Soviet Union

The transfer of technology to the Soviet Union is nothing new. Periodically over the past 70 years, the Soviets have been showered with our technology, with the blessing of various administrations. It happened in the twenties; it happened again during World War II, and it happened as recently as the Nixon/Kissinger era. Surprisingly, despite all these transfers of American high technology-both secret and overt - the Soviets still lag behind.

Jan Czekajewski was born in Poland in 1934. He received an M.S. in electrical engineering from Wroclaw Technical University in Poland and a Ph.D. from Uppsala University in Sweden. In 1968 he emigrated to the United States, and in 1970 founded Columbus Instruments, a manufacturer and exporter of medical research equipment, of which he is owner and president. The company employs thirty-five people and exports to fifty countries, including the Eastern bloc and the Soviet Union via a distributor in Sweden.

This is due to inherent defects in their cumbersome, centrally planned system, not because the Soviets lack ideas, talented people, or resources. So long as the Soviets adhere to this system, they will be dependent on Western products, which owe their existence to the easy exchange of information, and to the entrepreneurial spirit, willingness to take risks, and limited bureaucratic complications in managing production and trade. Yet communist methods of centralized control are emulated by some organizations even in the United States, as exemplified by the export-control regulations and the methods of enforcing them.

If we achieve a total embargo on our products, as the complexities of export licensing almost do, the Soviets will no doubt benefit in the long run. They will have to rely more on their own ideas and invest their money in their own research instead of supporting ours, as they do indirectly when trading with us. They will benefit



AP/Wide World Photos

The author with his rat respiration monitor in the Columbus Instruments laboratory.

from the embargo more than from trading with United States. The even more perturbing result of current export controls is their negative effect on trade with our allies. In terms of distrust and paranoia, the complexities of ex- port licensing are nearly the same when selling to friends or to enemies.

The Origins of "New and Improved Export Controls "

Some years ago--according to Richard Perle, former Assistant Secretary of Defense--the United States had a secret friend in the Kremlin. This friend passed on to U.S. intelligence a book filled with thousands of entries specifying technologies of special interest to the Soviet military .

Eventually, according to Mr. Perle, the agent was caught, but not before his book on the Soviet technology requirements had be- come the Scripture of the export-control fundamentalists, and a base for the creation of the mighty interagency program named *Exodus.* This organization is a joint venture of at least three govern- mental departments: Treasury, Justice, and Commerce. It has the formidable task of plugging leaks of our technology to Moscow - Apple IIe and IBM-PC computers included.

As always happens when grandiose ideas are met with the dreary realities of ordinary life, there was confusion. I sometimes wonder whether the name *Exodus* symbolizes the intent to expel American high-tech companies to offshore locations where they can escape the bureaucratic night- mares of export licensing, or whether it represents a desire to stem scientific and industrial espionage.

Customs and Conventions Written into Law

On 31 December 1984, after protracted negotiations with our Western allies through COCOM (the COordinating COMmittee of Multilateral Export Controls set up by the NATO countries-plus Japan and minus Iceland), the Department of Commerce issued a set of rules and criteria. In extremely complex legal jargon, which con- fuses even those with degrees in both law and computer science, these regulations tell exporters which computers do and which do not require an export license.

The basic indicator for computer licensing is the *processing data rate* or PDR factor, expressed in megabits per second (Mbs). Ex- port regulations provide a formula to calculate the PDR (see the panel, *PDR Calculation).* The method used firmly contradicts the belief that computers belong to the realm of natural and experimental science.

Computers are divided into three categories:

- Those that are embedded into a nonlicensable product and have no universal programmability (for instance, microprocessors in a car).
- Those that are attached to (or incorporated in) a nonlicensable product and function as controllers.
- Those that are considered self-standing and universal in nature.

A license is required for all *embedded* processors with PDR > 20, for *incorporated* microcomputers with PDR > 5, and for *self- standing* computers with PDR > 2. For example, the PDR for an Apple lie with a 6502 processor was established at 0.8 Mbs. But the IBM-PC and clones with 8088 processors were assessed as having PDR = 5.4 Mbs, and therefore required an export license whether they were self-standing computers or incorporated as controllers into medical or other nonlicensable commodities.

Somehow, none of the software ever runs as fast as the government claims it should, according to established PDRs. Depending on how the formula is interpreted and which assumptions are made, a wide variety of PDRs can be calculated; twenty versions of the PDR for the same processor were calculated at the Argonne National Laboratory. This would be a joke on government bureaucracy, except that these calculations can seriously be used as a tool for prosecution by Customs and the

PDR Calculation

For computers that have no instructions for floating-point addition or multiplication, the PDR is calculated using the following formula:

$$PDR = \frac{(0.85)n_{iax} + (0.15)n_{imx} + (0.55)n_{ox}}{(0.85)t_{ax} + (0.15)t_{mx}}$$

n_{iax} is the number of bits in the shortest fixed or floating-point addition instruction length that permits full direct addressing of the main storage;

n_{imx} is the number of bits in the shortest fixed-point multiplication instruction length that permits full direct addressing of the main storage;

n_{ox} is the number of bits in a fixed-point operand;

t_{ax} is the execution time for a fixed-point addition;

t_{mx} is the execution time for a fixed-point multiplication.

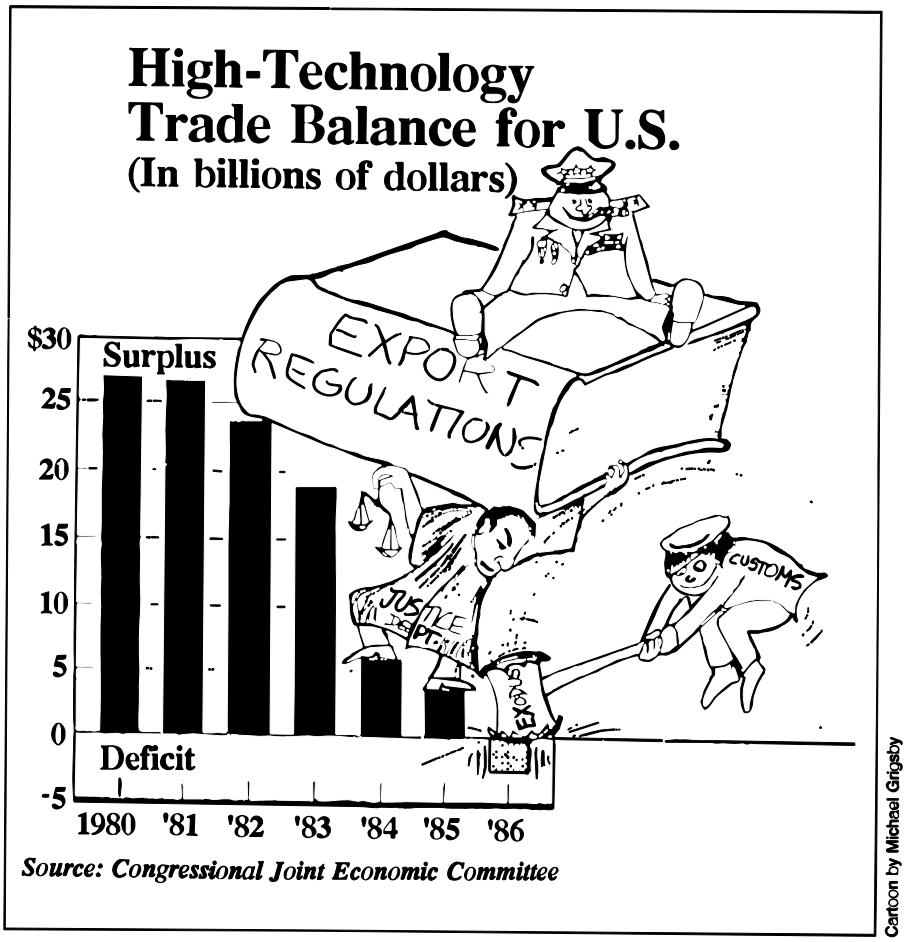
Department of Justice. As the present law prescribes, a sentence of up to ten years in prison is possible for an offense against the export regulations.

As the United States is a country where citizens have choices, the determination of the PDR in each instance is left up to the exporter. The exporter can do the PDR calculations or, if in doubt, can apply for an export-license determination for each personal computer, and then wait two to three months until the Department of Commerce comes up with an official ruling.

The exporter can also call the Department of Commerce in Washington for information-and risk becoming even more con- fused. Initially, when my ordeal with computer export controls began, we made over a hundred long-distance telephone calls to the Department of Commerce in a ten-day period, and could not get a clear and consistent answer as to whether the IBM-PC requires an export license when it is part of medical equipment.

The real risk results if the computer is shipped to a ,foreign nation without a license after the exporter's calculations show the PDR to be below licensing limits. If Customs disagrees with the calculations, there may be a criminal investigation by the Exodus unit, and perhaps a federal grand jury inquiry into whether "the laws established to protect national security" have been violated.

There is yet another trap in the export regulations. Suppose you have calculated the PDR of the Apple IIe to be 0.8, exactly as the government has, and you have decided to send it to a foreign country-say, South Korea. If you do not apply for a license, you still stand a chance of being investigated: Apple IIe models made since the regulations were promulgated are equipped not with 6502 processors, but with 65C02 CMOS processors, which cannot be shipped

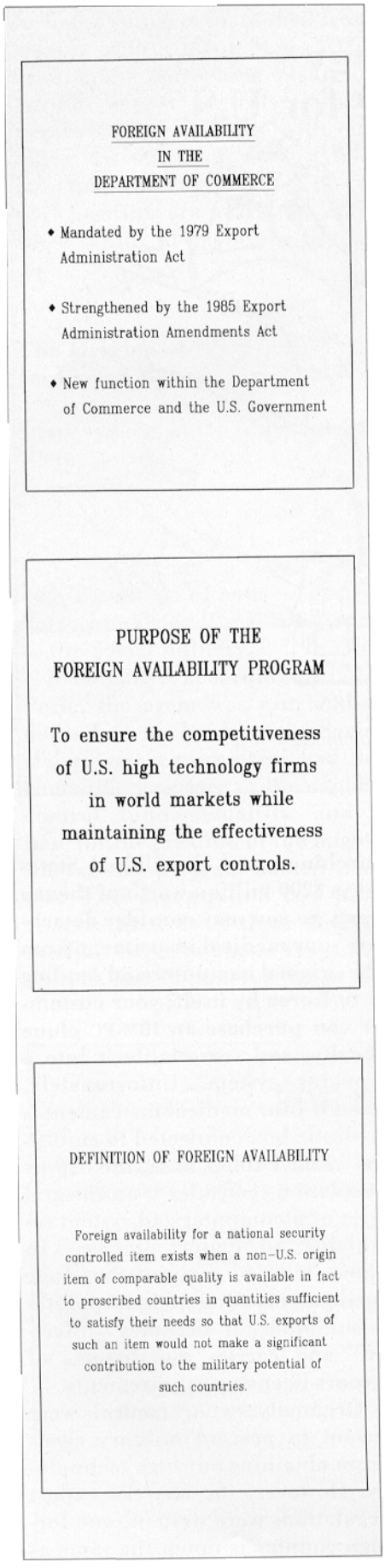


without a license, due to their low power consumption. Apparently the government is afraid that the Soviets will purchase Apple IIe computers, remove their processors, and use them in battery-operated space vehicles. How they are to get them from South Korea is not clear to me, but the law does not distinguish between the Soviet Union and our trusted Koreans.

If you have given up on shipping stand-alone computers, you may consider exporting computerized medical equipment. Using the Apple lie in your medical product is out of the question be- cause it utilizes the CMOS processor. The IBM-PC might be another alternative, but unfortunately it was rated with a PDR = 5.4 (0.4 higher than the limit), and there- fore could not be shipped without a lengthy licensing process.

Now the South Koreans are manufacturing IBM-PC-compatible machines, and the United States buys $200 million worth of them a year. So you may consider detaching your medical instrument from the original computer and sending it to Korea by itself; your customer can purchase an IBM-PC clone locally, and reassemble it into a working system. Unfortunately, even if your medical instrument is a plastic box connected to an IBM- PC with a rubber hose, the export regulations consider it an integral part of a computerized system requiring an export license. **In** short, if word gets out that your medical instrument incorporates a computer, it becomes "infected" and carries the diseases of export-licensing requirements.

Originally, export controls were meant to prevent military rivals from obtaining our high technology. However, the way the export regulations were written, one foreign country is much the same as



FOREIGN AVAILABILITY
IN THE
DEPARTMENT OF COMMERCE

- Mandated by the 1979 Export Administration Act
- Strengthened by the 1985 Export Administration Amendments Act
- New function within the Department of Commerce and the U.S. Government

PURPOSE OF THE
FOREIGN AVAILABILITY PROGRAM

To ensure the competitiveness of U.S. high technology firms in world markets while maintaining the effectiveness of U.S. export controls.

DEFINITION OF FOREIGN AVAILABILITY

Foreign availability for a national security controlled item exists when a non-U.S. origin item of comparable quality is available in fact to proscribed countries in quantities sufficient to satisfy their needs so that U.S. exports of such an item would not make a significant contribution to the military potential of such countries.

At left: three handouts from a "Foreign Availability Workshop" at the Commerce Department in 1985.

another. After much bureaucratic hassle, our close friends in NATO convinced COCOM to remove some of the licensing complexities. But prior to June 1986, sending an IBM-PC without an export license to England or West Germany was a "crime against the national interest of the country ."

And there is more. You cannot ship Korean computers back to Korea, Taiwanese to Taiwan, or Bulgarian to Bulgaria, without the same export licensing procedures that apply to American products. What this licensing requirement has to do with national security no one seems able to explain. At the same time, the sale of personal computers to the U.S.S.R. is not forbidden, and export licenses are routinely attainable. Why then so much hubbub about sales to our allies when we are selling computers to the Soviets right and left? Why the threat of putting U.S. exporters into federal slammers for omitting the paper formality of securing a routinely approved export license ?

The Puzzle of Foreign Availability

Back in 1979, under pressure from industry, Congress passed the Export Administration Act (amended in 1985), ordering the Department of Commerce, the Department of Defense, and the others to remove export-license requirements from products that are widely available from other foreign sources. The resolution was intended to improve our competitive position against foreign suppliers. It is known as the "foreign availability" mandate.

In 1984 the Foreign Availability Division was formed within the Department of Commerce, to determine foreign sources of equivalent American products-though for more than two years the group did not remove the licensing requirements from a single U.S. product.

Still, I was overwhelmed by the wisdom of the congressional mandate until I visited the Department of Commerce in Washington in October 1985, and took part in a meeting to discuss electronic instrumentation. I argued that in the Soviet bloc, our competitors (such as Italian Olivetti) are selling IBM PC/XT/AT clones at a moment's notice. IBM is selling its own original machines with ease; it can bypass export licensing complexities by assembling computers in other countries and obtaining licenses in Austria. The comment from the bureaucratic wizards was that "foreign avail- ability" actually means "the Soviet bloc's own production is of sufficient quality and quantity." Because the word *sufficient* does not carry any number attached to it, the congressional mandate means nothing.

Manufacturers must be encouraged to find that none of our products can be produced abroad in "sufficient" quantity and quality. Why, then, all this recent fuss about national competitiveness? After this enlightening meeting, I acquired a new understanding of such words such as *foreign, quantity,* and *quality.*

My Story

Imagine that you decide to be- come an exporter. To begin with, it is best if you are not of Slavic descent, much less a recent immi- grant from Eastern Europe. Your name should not sound Polish or Russian, as this may arouse the suspicions of Exodus.

Assume, then, that your name is

proper and you are a "true" American who would never even trade grain to the Soviets, let alone personal computers. It would be

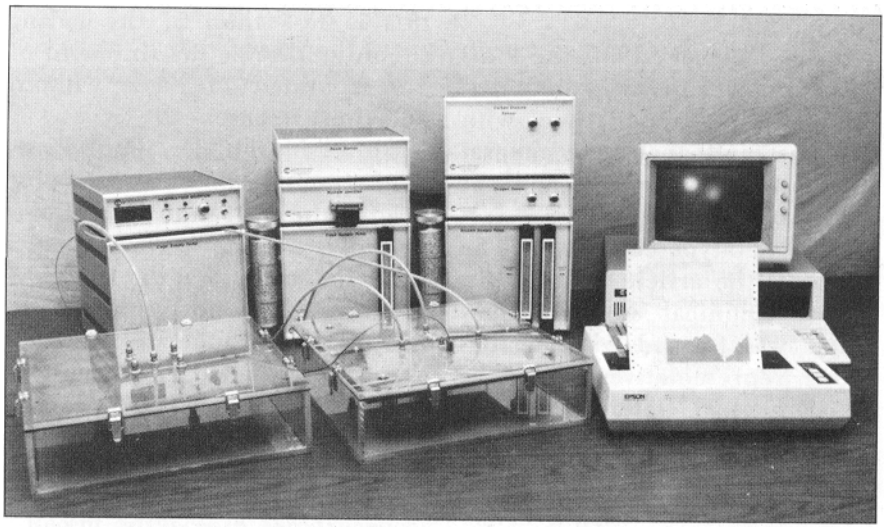
prudent to start by selling to trusted military allies such as South Korea or Taiwan. Trading with these two countries has additional merit, as they sell more personal computers to us than we sell to them - an obvious economic injustice that has to be addressed and corrected in the marketplace. Assume that you already manufacture superior, price-competitive computers and have plenty of Korean customers waiting for them, cash in hand.

All this is obvious and simple now, but was not so clear when my export odyssey began. I had attempted to ship a "rat respiration monitor" to a Moscow medical exhibit; following our usual procedure, I was sending it to my distributor in Finland, who was organizing the Moscow exhibit. This equipn1ent, which incorporated an IBM-PC clone made in Taiwan as its controller, was seized at Kennedy Airport in New York on 1 June 1985, and has remained there rusting ever since. The total value of the medical equipment in this shipment was $228,000. In addition to the rat respiration monitor, there were a few other medical research instruments, which utilized Apple IIe personal computers made in 1984 with 6502 processors.

The IBM-PC clone had been given the unfortunate name "Super Computer" to boost its image and compensate for its meager performance. Customs inspectors got excited when they found a "super computer" on its way to Moscow via Finland. They assumed that the shipment to Finland was an attempt to disguise the real destination and avoid the export-license requirement.

On 3 June, eight Exodus agents raided my company in Columbus, armed with a search warrant for

" Apple IIe computers, super



Here is some of the author's controversial equipment: part of a $228,000 shipment of medical hardware, including a PC clone (right) that bore the unfortunate label of "Super Computer."

computers (IBM-PC clones), Epson printers, and other high-technology. ..." They kept us in the office for six hours, while they examined and took files pertaining to our exports. Colleagues from Poland happened to be in the office that day, and the agents searched their belongings, too. My visitors were outraged, saying that in Poland such searches would not be permitted without individual warrants.

Ten days later the agents came back and confiscated still more files. Television crews from the local stations arrived before the agents did-presumably tipped off by Customs.

Customs continued to investigate the case. Our office manager was twice called to testify before a federal grand jury .The two problems were: had we falsified documents by showing Helsinki as the final destination, and ha4 we failed to obtain the export license we needed for a processor with a PDR of 5.4? I contended-sup- ported by an expert from the National Bureau of Standards-that the IBM-PC clone used in the rat respiration monitor had a PDR less than 5. The U.S. government insisted that the 5.4 figure was correct.

On 11 December 1985, I attended a meeting at the Department of Commerce specifically to discuss the question of foreign availability. I arrived with a Bulgarian- made IBM *PC/XT* clone with color monitor and hard disk. It performed exactly like the original IBM, and was even equipped with the original IBM BIOS. I speculated that Bulgaria, a staunch Soviet ally, would be considered sufficiently foreign, even by the zealots of export controls. All software for the IBM *PC/XT* was 100% compatible with my Bulgarian clone.

After I had completed a thorough demonstration, the Foreign Availability Division offered to purchase the Bulgarian computer from me as "hard evidence," a proposal to which I gladly agreed. My interests would be served as well. My criminal offense was in shipping a similar IBM clone to Moscow. Common sense had me believing that the government would deregulate this computer on the basis of foreign availability, and that I would soon be returning to a normal life instead of lobbying for changes in the export laws. After parting with my Bulgarian marvel in 1985, I waited a long time for the foreign-availability mandate to be applied to

IBM.PC clones.

On 10 February 1987, the *Wall Street Journal* published an article about 'my tribulations with Customs, and about the general confusion, within government agencies concerning the PDR level of IBM-PC-type computers. The day after the article appeared, a special technical advisory Committee was formed with participating representatives from the Department of Defense, the Department of Commerce, the electronics industry, the Central Intelligence Agency, the National Security Agency, and more, to make a ruling on the PDR of 8088 processors. They unanimously accepted the finding of a report by the National Bureau of Standards referring to the IBM-PC, which read "PDR = 4.628" (just what I had been trying to tell the government for the past two years). Since this is less than 5, the ruling should authorize the shipment of "incorporated" IBM-PCs without an export license.

On 19 March, Dr. Paul Freedenberg, Assistant Secretary for Trade Administration at the Commerce Department, wrote me a letter indicating that the PDR level of the IBM-PC and similar computers was now officially accepted as 4.6. 1 forwarded this document to the U.S. District Attorney in Columbus, and on 8 April the grand jury's 23-month investigation of my activities was dropped on the basis of "lack of evidence of a crime."

Meanwhile, I had come to the conclusion that such biblical decisions as whether or not to release a rat respiration monitor cannot be made by Exodus in haste. On 8 July, the Customs Service notified me that it would release the monitor on condition that I sign a "hold harmless agreement," whereby I would never file a claim against the U.S. government for holding the equipment - and I would also pay any expenses I incurred in recovering this property. I refused to sign.

Finally, late in August, Customs conceded that I could retrieve my equipment without paying further expenses if I would sign the hold-harmless letter. I again refused: their maneuver seemed a heavy- handed attempt to twist my arm. The detained equipment is still dilapidating at JFK Airport; though I would like to retrieve it, the value of the hardware does not even compare with the investment of time my coworkers and I have spent trying to resolve this issue. Through two years of haggling, I have become increasingly upset by my conviction that the country

Tech-Busters?

In a public-relations drive geared partly to put spies on notice, Customs printed a number of posters and bumper stickers resembling the *Ghostbusters* logo, but replacing the cute Casper-like figure (as in the Friendly Ghost, not Weinberger) with a trench-coat-clad spy. You can get these stickers from the Strategic Investigation Division of Customs or by calling 202/566-5104. On some of these posters the Exodus organization appropriately labeled itself "Tech-Busters," although the most recent issues of the posters have a new label, "Tech-Protectors." I am still confused about which label is correct, especially in conjunction with the picture of a sneaky foreign spy.

is succumbing to an export paranoia, which could paralyze commercial, scientific, and information exchange in the interest of totalitarian control.

I experienced some measure of satisfaction in August, when the Commerce Department proposed new guidelines for export licenses. Recognizing that the U.S.S.R. can easily obtain clones of common American personal computers, representatives from Commerce and Defense have dropped their objections to liberalizing the rules. Under the proposed guide- lines, computers with PDRs up to 6.5 could be exported without a license. Apple lIs would once again be freely shipped, and so would IBM-PCs and XTs-which of course are considered outdated now, since IBM introduced Personal System/2.

Envoi

I have been having persistent nightmares that I really made a mistake and equipped my Taiwanese PC clone with a 10-Mb hard disk, which would definitely have made it a license-requiring commodity. The threat of a prison term was not just in my imagination; people have been arrested and convicted for similar offenses. The Exodus organization is desperate to justify its existence and substantiate its continuous funding by providing a record of arrests and convictions. Anything that looks like a crossbreed between a TV and a typewriter must be a supercomputer on the way to Moscow.

The moral is that if a totalitarian system ever arrives in the United States, it will not be under the red banners of the workers' revolution; it will be announced in the Federal Register in complicated bureaucratic jargon. I am wondering why I ran so far from communist oppression to find myself so close to it. Does it prove the earth is round?