

peared down a deep shaft. Hydrogen gas is delivered in through a central location in the project; tank trucks with liquid hydrogen, flames of burning hydrogen gas and both hydrogen and the hydrogen isotope tritium have been indicated by high altitude satellite.

*Aviation Week* openly speculates on the application of all this. Strangely enough they have not done so with two alternating critical nuclear gas reactors coupled with an MHD generator. This is an old, and, from a reactor safety standpoint, hair-raising idea for direct and virtually unlimited electricity production.

### *Three Main Lines*

One would be mistaken if one connects an hypothetical proton beam weapon with the enormous magnet, a high vacuum system and long tunnels typical for the accelerators, 'atom smashers,' with which high energy physics investigates the inner structure of the atom. A part of their technology, for example assembly of many single particles in a storage ring which is then gathered together in a single pulse, can however be immensely important. The central problem of accelerator technology has its most feasible solution within plasma physics, the theory of electrically charged gases.

With the prospect of peaceful development of fusion power as an energy source, right now an almost explosive growth in constructing proton beams in plasma has occurred. Here it can be mentioned that experimental work in the West currently follows three main lines of development, referred to as the "reflex triode," "magnetically confined diode" and "pinch beam."

A theoretical school in the closely related area of plasma-wave interactions has developed at Chalmers

Institute in Gothenburg under the direction of Prof. Hans Wilhelmsson. International symposia have been organized several times at Aspenasgaarden in Lerum. Those who then heard the U.S. and Soviet "theoretical heavy-weights" in intellectual infighting need have no doubts of the quality of the *public* portions of the Russian fusion research.

Recently in the U.S. unexpected revelations, unexpected that is for the Americans, have been made regarding the *non-public* portions (of Soviet fusion research-ed.). Irritated by a sarcastic commentary, researcher Leonid Rudakov from the Kurchatov Institute in Moscow gave an astonished American audience a ruthless crash lesson in the superior method for creating a peaceful "miniature h-bomb:" "Substitute for laser light the x-ray beam produced at the point of impact of electron beams!" The method is truly better, but presupposes an entirely superior knowledge in electron beam physics.

### *Exceptionally Important*

There is a significant difference between laser and nuclear particle beams, for example proton, in the beam weapon connection. The laser is by its nature a light beam and works on the surface of solid materials. Penetration can only be accomplished through certain materials. But it is these exceptions, for example, the optics in a reconnaissance satellite, which are important. A fast proton can penetrate all materials, the stopping depending on the energy incident on the solid, regardless of the type or construction. The damage occurs in the solid material, worst in those with complicated microstructure such as is encountered with semiconducting electronics or living organisms. Damage of a special type can be expected from nuclear reactions.

## 'Sputnik Of The Seventies' Revisited

# Why The Red Army Doesn't Need The Cyber 7600

Syndicated columnist Jack Anderson disclosed on June 13 that Jimmy Carter has personally intervened to stop the sale of the U.S.-built Cyber 7600 computer to the Soviet Union, on the grounds that this "electronic marvel" could be used to "track (U.S.) missiles, decode secrets, and improve nuclear production." Anderson, journalistic *pissoir* for many of the State Department's calculated "leaks," notes that it was National Security Advisor Zbigniew Brzezinski who rushed the decision through the Oval Office and into implementation, and heartily congratulates himself for originally revealing the planned computer sale and prodding the government into action.

As the cast of characters in this charade attests, the publicized Cyber 7600 flap has nothing to do with technology per se but everything to do with politics.

Former Air Force Intelligence head Major General Keegan and others created a furor last month with revelations in *Aviation Week* magazine that the Soviets were on the verge of developing — perhaps have already developed — a "beam superweapon" that would make mincemeat out of the United States' strategic missile

forces. As the "Sputnik of the Seventies" series in the U.S. Labor Party's newspaper, *New Solidarity* showed in detail, the Soviets were able to develop such a capability precisely because they, unlike the Rockefeller-faction incompetents who have dominated U.S. defense over the last several Administrations, have devoted tremendous resources to basic science researches centering on the plasma physics questions raised by controlled thermonuclear reactions — fusion power.

To redirect the uproar sparked by this exposé of the Carter Administration's treasonously stupid war policy, conservatives, military leaders, and the man in the street are being told, via the Cyber 7600 story, that even if the Soviets have such a "superbeam," their limited computer capability makes it impossible for them to track incoming missiles or, therefore, bring them down with a beam weapon — "and we'll make sure they never get the capability, too." So, the argument goes, the planned war buildup of B-1 bombers and the rest of the (actually already obsolete) military porkbarrel can proceed as planned, with the anti-Soviet banners flying.

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Jack Anderson can stop patting himself on the back, however. The available evidence is more than enough to show that, even without the Cyber 7600, the Soviet *already have* the ability to track U.S. missiles accurately enough to knock them off like ducks in a shooting gallery. In fact, there are abundant indications that the East bloc doesn't even want the Cyber 7600, since this "marvel" is technologically obsolete compared to computers being developed by the Soviets.

#### *Embargo on Technology*

Conservatives and military men, in particular, are being wooed with the line that the United States should not be handing over its advanced technology to the Soviet Union. Control Data Corporation had applied for an export license for its Cyber 7600 for use in a United Nations-sponsored international weather study, and had given assurances that the Soviets could be watchdogged to ensure that the computer was not used for military purposes. The Carter Administration insisted that the computer's capacity to execute 10-15 million instructions per second is far greater than that of currently available Soviet computers, and could easily be diverted to radar processing. Specifically, this capacity could be used to quickly retrieve the radar signal of, for example, an incoming missile against the background of a much larger radio noise spectrum.

Before getting down to the facts on Soviet radar capabilities, it should be noted that the "transfer of technology" issue is a particularly motheaten fraud. Readers of *New Solidarity* will not need to be reminded of what happened to the attempted "technology transfer" by Soviet physicist L.I. Rudakov, whose remarks to a group of top U.S. scientists during his visit to the States last summer were immediately declared "top secret" by the U.S. government and concealed from the U.S. scientific community. What Rudakov had revealed, in a clear offer of U.S.-Soviet collaboration, was the scope of the Soviet lead in critical phenomenological aspects of electron-beam fusion (with obvious implications for the "superbeam"). The "Rudakov affair," the most outrageous of a series of similar government moves, was widely publicized in the scientific community. It brought home to many U.S. scientists that while the Soviets were eager to share their scientific advances with the U.S. in the interests of peaceful development, particularly of fusion power, Rockefeller factioneers in the U.S. government were intent on preventing such collaboration because it threatened to show up the hash their policies had made of U.S. basic research and development, civilian *and* military.

The truth about the Cyber 7600 only pokes more holes in the "technology transfer" bogey.

The Cyber 7600's fast execution time might perhaps qualify it as an advanced "fourth generation" machine. But its construction is based on the much less advanced "second generation" technology of individual transistors, meaning that the Cyber 7600 must actually be classified as merely a second generation machine. Fourth generation computers, both in the United States and the Soviet Union, are based on large-scale integration technology, whereby something like 10,000 or more individual transistors are photographically interconnected (integrated) with each other for a designed functional execution.

Does the Soviet Union possess such a machine? According to an article by Bohdan Szuprowicz in the September 1976 issue of *Datamation*, the U.S. computer industry magazine, the Soviets will have a prototype advanced fourth generation computer, the BESM-X, in operation by 1977 — i.e., now — with an instruction speed as high as 15 million per second. It is true that the Soviet Union lags behind the U.S. in terms of current computer hardware implementation, because of its slow start in developing a mass base for solid-state components. But tall tales from the likes of Jack Anderson that a machine like the Cyber 7600 is "20 time faster than anything the Soviets produce" belong on the funnies page (where, in fact, the *Washington Post* tucked Anderson's June 13 column).

Indeed, the Soviets are apparently not at all anxious to obtain "technology transfers" from the U.S. computer industry. According to the Szuprowicz article, the Soviet bloc has been a very reluctant purchaser of U.S. computer technology. "Comecon 'anti-import committees,' often unidentified yet operating in every country, take even longer to approve Western imports than (the U.S. does) to approve export licenses," Szuprowicz wrote. "In fact, average annual exports from each Western country of such (computer) products are consistently so small that it is even difficult to substantiate the argument that stricter export controls in one Western country create a long-term advantage for another." The article noted that in addition to Comecon reluctance to spend on "industrial luxuries," Western computer imports are also crimped by the Soviet bloc's integration of their own standard computer models within the Comecon nations and some Third World countries as well. It indicated that the Comecon nations will eventually dominate a good portion of the world market.

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### *The Radar Angle*

Yet despite the evidence that the Soviet Union is not eagerly seeking the Cyber 7600, some may still doubt that, even without this machine, the Soviets now have the ability to solve the problems involved in tracking supersonic missiles.

Once again, the Soviets' advantage over the United States in basic plasma physics research has opened the way to solving an otherwise knotty problem, even without the processing speeds provided by fourth generation computers.

Radar, which evolved during World War II, is an easily understood technology. The tracking of a remote object is dependent on two basic physical concepts.

First, if a radio pulse in the form of a sinusoidal wave is directed toward a distant object, the time it takes the pulse to travel to the object and bounce back is equal to approximately twice the intervening distance (range) divided by the speed of light. Therefore, by knowing the elevation of the antennae transmitting the pulse and its horizontal displacement (azimuth) — the angular distance from the North Pole — one can readily determine the location of the target object in relation to the transmitting site by simple instrumentation.

Second, if the object being tracked by radar is moving with respect to the transmitting site, the sinusoidal wave form in the return pulse will be lengthened or compressed (a phenomenon called the Doppler shift) depending on whether the object is moving away from or toward the transmitting site. Again, this frequency or wave length shift is relatively easy to instrument, making it possible to distinguish one moving missile from another and from nearby stationary objects.

These principles have been well understood since the 1940s, and have been applied to so-called "line of sight" radar at relatively high frequencies, i.e., greater than 100 megahertz.

However, the return signal from a target object is subject to considerable weakening, dependent mainly on the range involved. In addition, received return signals must compete with intervening natural or man-made radiation, designated as noise with respect to the signal. Hence the goal of good radar design is to improve the receiver and other accessory parts of the radar system so as to maximize the "signal-to-noise" ration.

### *Over The Horizon*

A further problem is the detection of objects over the horizon, since a pulse will not be able to "hit" such an object directly. The ionosphere must therefore be used as a reflecting surface. But since the ionosphere is a plasma, and a plasma will only reflect frequencies below the plasma's own natural frequency, this limits the radar frequency to no higher than 30 megahertz.

In over-the-horizon (OTH) radar, the calculation of the distance separating the transmitter site from the object — range — demands a knowledge of the height of the reflecting ionosphere from ground level. Azimuth determination in OTH radar presents no special problems, but the elevation of the target object is quite difficult to obtain. Moreover, OTH radar is handicapped by the extreme variability of the ionosphere itself. The effective ionosphere height above ground at the point of

reflection is a function of its location, the time of day or night, the season, solar activity, and so on. In addition to meteors, auroras, and other natural sources of noise interfering with the radar signal, there are the other signals on the commonly used 3-to-30 megahertz band. Clearly, then, the signal-to-noise ratio is a serious problem.

And it is here that the question of computer technologies like the Cyber 7600's comes to the fore. Slower computers will amass incoming data over a period of time, and then process it. The advantage of the fast Cyber 7600 and similar machines is that they can process the data immediately as it comes in — a "real time" capability that is obviously essential for tracking an incoming nuclear missile. Thus a common method for improving a radar system's signal-to-noise ratio is to use such a "real time" computer to summate responses from many radar installations and thereby increase the coherent signals off the target object as compared to the random noise.

Clearly OTH radar is necessary for locating airplanes or missiles that travel below the ionosphere, and it has received considerable attention in both the United States and the Soviet Union. The point to the Cyber 7600 flap is that the Soviet Union is supposed to be unable to process the noise out of OTH radar because of its lack of high-speed computer technology — including noise deliberately introduced to jam the radar signal.

### *The Soviet Solution*

Careful analysis of evidence in the public domain strongly indicates that the Soviets have chosen an *alternative* to computer processing of OTH radar, by effectively controlling the ionosphere plasma with massive radar pulses.

In July of 1976 there were worldwide reports of powerful, pulsed high-frequency radio signals originating from a Soviet OTH radar site, which caused interference with most communications. The Nov. 8, 1976 issue of *Aviation Week* magazine identified these pulses as being in the 3-to-30 megahertz per second range, pulsed at approximately 10 per second, and with a relatively narrow pulse suitable for accurate target resolution. What surprised the *Aviation Week* editors and others observers was the incredible strength of the pulses, and the fact that the pulse repetition rate of 10 per second was much too slow to identify airplane or missile velocity using Doppler shift techniques.

What are the Soviets up to?

The Russian choice of powerful pulses for OTH radar

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indicates that they intend to use this method to get a "fix" on a non-moving OTH target object, such as a city, mountain, or other large body. (The choice of 10-per-second pulses is excellent for such "fixed" object identification using Doppler shift methods.) The strength of the pulses introduces perturbations in the ionosphere which become significant with respect to the disturbances occurring naturally. This considerably improves the signal-to-noise ratio for this "fixed" object, requiring minimum processing, and is subject to minimum jamming since the OTH radar controls all the parameters of the pulses.

Why use radar to locate stationary bodies? It is a logical inference that the Soviets will use the time in between the 10-per-second pulses to introduce lower amplitude but higher pulse repetition rates — 100 pulses per second or higher — to identify fast-moving objects such as planes or missiles! The overpowering 10-per-second pulses would not necessarily be noise to the transmitting station, for since their frequency is known, they can be processed out relatively easily. And the precisely located "fixed" object serves as a range reference for the moving object!

In other words, the Soviets don't need the Cyber 7600 or other "real time" computers to track U.S. missiles. They have instead relied on their ability to modify and control the plasma of the ionosphere — in this case with high-energy radio pulses — which demonstrates once more that the Soviets have an edge over the U.S. precisely because of their continuing commitment to applying their researches in basic physics to the problems of high energy technologies.

This puts the issue of "technology transfers" in the proper focus. The Soviet Union has demonstrated again and again its willingness to work together with the United States for cooperative development of fusion power and other high energy technologies, to the benefit of both nations and the entire world. American politicians and military men who foolishly continue to ignore these offers, and instead tag along after the Carter Administration's war mobilization, will be leaving the Soviets no choice but a one-way "technology transfer" that will leave this nation a heap of smoking rubble.

— M. Bacco

## General Keegan: An Appreciation And A Critique

Major General George Keegan's March 11 speech at an American Security Council press luncheon, reprinted in full in the April issue of the ASC's *Washington Report* under the title "Strategic Balance: Trends and Perceptions," demonstrates his patriotic contribution and merit, but at the same time reveals his failure, thus far, to develop a coherent *positive political strategic conception* necessary to redirect the United States during a period of grave international political crisis which finds the U.S. government isolated and threatening nuclear war as the rest of the world breaks with the dollar.

General Keegan, recently retired chief of U.S. Air Force Intelligence, is exemplary of a great American tradition originating with our Founding Fathers. The product of a technology-proud Maine farming family, a graduate of Harvard University, an accomplished scientist with a degree in physics, and a military intelligence officer of the highest calibre, Keegan took the extraordinary step, in the face of Rockefeller and Rothschild-controlled government, intelligence and university bureaucracies, of organizing from his position as chief of Air Force Intelligence a *cadre* force composed primarily of young scientists to re-evaluate the nation's strategic-military posture and that of its ostensible enemy, the Soviet Union.

In recent months, General Keegan has been sounding the alarm. Over and against the efforts of leading financiers and their puppet Carter Administration, Keegan has managed to get a vitally important message across to the American people. Despite "Tory" ravings, the "Whig" Keegan has scientifically established that the Soviet Union has prepared, if necessary, to fight and

win a nuclear war, surviving as a viable society. He has demonstrated that the considerable military superiority of the USSR over the United States is a direct result of breakthroughs in Soviet fusion technology whose military application to high energy beam weaponry threatens to shortly make the ballistic missile obsolete. He has exposed the bankruptcy of current U.S. strategic doctrine which is based on the imbecilic mutually assured destruction (MAD) "deterrence" formula, and he is trying to rally leading political, military and intellectual layers of the population to take urgent measures in behalf of the national interests of the country.

But General Keegan's March 11 address barely touches upon those positive programmatic considerations necessary to a political strategic conception that would extricate the nation from its present plunge toward depression and general thermonuclear war. This problem is rooted primarily in the General's failure to grasp the full implications of Clausewitz's famous dictum that "war is a continuation of policy by other means," specifically that *war-fighting is a branch of political economy*. General Keegan's lack of comprehension of the political economic determination of military conflict — "war is an act of human intercourse," as Clausewitz puts it — leads him into several errors and, in fact, keeps him within the bounds of the very strategic view he is otherwise in the process of rejecting!

*Seeds of a Political Economic-Cultural Perspective*

General Keegan, in his remarks, does plant the seeds of a positive political strategic conception which in fact